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ORIGINAL

# Innovative approaches to learning foreign languages: the impact of virtual reality on overcoming the language barrier

## Enfoques innovadores en el aprendizaje de lenguas extranjeras: el impacto de la realidad virtual en la superación de la barrera lingüística

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**ABSTRACT**

The study is aimed at highlighting the peculiarities of using virtual reality in the educational practice of learning foreign languages. The study uses an economic and statistical method to assess the dynamics of the virtual reality market in education and forecast its development until 2029, as well as graphical display methods to visualize changes in interest in VR and market trends. The content analysis was used to systematize the advantages and disadvantages of VR in language learning, the comparative analysis method to correlate different VR platforms, the logical generalization method to summarize information about the functionality of the platforms, and the systematization method to formulate the advantages and disadvantages of using virtual reality in the process of learning foreign languages. The study found that the use of virtual reality in education has been growing rapidly over the past ten years, and the COVID-19 pandemic has spurred this active development.

**Keywords:** Distance Learning; Immersion; Interactive Environment; Personalization Of Learning; Platforms And Applications.

**RESUMEN**

El estudio pretende poner de relieve las peculiaridades del uso de la realidad virtual en la práctica educativa del aprendizaje de lenguas extranjeras. El estudio utiliza un método económico y estadístico para evaluar la dinámica del mercado de la realidad virtual en la enseñanza y prever su evolución hasta 2029, así como métodos de representación gráfica para visualizar los cambios de interés por la RV y las tendencias del mercado. Se utilizó el análisis de contenido para sistematizar las ventajas y desventajas de la RV en el aprendizaje de idiomas, el método de análisis comparativo para correlacionar diferentes plataformas de RV, el método de generalización lógica para resumir la información sobre la funcionalidad de las plataformas, y el método de sistematización para formular las ventajas y desventajas del uso de la realidad virtual en el proceso de aprendizaje de lenguas extranjeras. El estudio concluyó que el uso de la realidad virtual en la educación ha crecido rápidamente en los últimos diez años, y que la pandemia del COVID-19 ha impulsado este activo desarrollo.

**Palabras clave:** Aprendizaje a Distancia; Inmersión; Entorno Interactivo; Personalización del Aprendizaje; Plataformas y Aplicaciones.

## INTRODUCTION

Foreign language learning is becoming an urgent need in the context of lifelong learning due to constant globalization, internationalization, cooperation between countries, and the need to understand other cultures. Language proficiency implies the ability to formulate sentences and express your thoughts and feelings. The main reason for the language barrier is often fear and uncertainty. The most common factor is the fear of making a mistake or getting a negative grade. The student thinks that any mistake will provoke judgment or laughter from others.

This blocks confidence and prevents free expression. In this context, attention should be paid to innovative foreign language learning technologies. Effective and innovative teaching methods contribute to rapid and relatively easy language acquisition. It is important for teachers to be aware of the latest scientific achievements and to take into account, for example, the peculiarities of brain functioning to improve the learning outcomes of students.[1]

The crisis caused by the Covid-19 pandemic has become a stimulus for technological development that has further enhanced access to education. Technologies that enhance the learning process require an interdisciplinary approach due to the complexity of the situation and the variety of disciplines involved. It is important to understand how modern innovative technologies can be used and how learners and teachers adapt their learning practices through their use.[2] Modern approaches make learning more interesting for students and the process more enjoyable compared to, for example, traditional methods of reading and translation.[3]

Virtual reality (VR) provides mental and physical immersion in this context, creating a sense of full integration into the virtual environment.[4] VR systems can be useful because they bring language learning closer to the cultural context and create realistic simulations that cannot be reproduced in the physical world.[5]

Many researchers have paid attention to the peculiarities of implementing virtual reality as an innovative technology in the field of foreign language learning. Alkhayat[6] studied the use of VR platforms for the professional development of teachers of English as a second language. He drew attention to the advantages of VR over standard web conferencing, emphasizing its ability to create immersive environments. Other authors such as Bosa et al.[7] and Żammit[8] developed this topic by exploring the practical implementation of VR in foreign language teaching. The authors clearly demonstrated how VR increased students' cognitive engagement through interactive simulations and culturally relevant learning materials.

The authors of Kondratiuk et al.[9] focused on the use of VR for distance language learning. Their study showed that VR helped improve language skills by creating realistic communication environments. Their study also emphasized the importance of training teachers to work with VR to achieve better language learning outcomes. Nurtdinova[10] investigated the methodological organization of teaching materials for professional foreign language teaching using VR. The author proposed practical approaches to curriculum development that took into account the specifics of the virtual environment and emphasized the importance of integrating VR into professional language programs.

Palamar et al.[5] and Wu[11] focused on the use of immersive technologies in language teaching in Ukraine. The authors pointed to VR's ability to increase students' cognitive interest and achievement in language learning. Their results also emphasized the importance of VR in the development of the educational process.

Sarnovska et al.[12] conducted an important study focusing on innovative applications of VR and AI in distance language teaching at universities. They emphasized the importance of using AI to adapt educational programs to the needs of students and improve the quality of the learning process. The authors Urkevica[13] studied the development of foreign language teaching within the framework of technologically advanced learning. The authors examined the role of the latest technologies in transforming traditional approaches to language teaching, emphasizing their effectiveness in strengthening the interaction between teachers and students Kryvtsun[14] analyzed the problem of overcoming the language barrier in higher education.

Thus, despite the large number of studies conducted to determine the role of innovative technologies such as VR, the study of the impact of this technology on overcoming the language barrier still requires additional research and constant modernization, as the level of digitalization is constantly growing, which requires new approaches. The purpose of the study is to highlight the aspects of using virtual reality as an innovative educational technology to overcome the language barrier. The objectives of the study are summarized as follows:

1. To identify the trend of popularity of virtual reality in education.
2. To describe the advantages and disadvantages of using virtual reality in foreign language teaching.
3. To highlight the peculiarities of using modern VR platforms for learning foreign languages.

## METHOD

The first stage of the study involved collecting and analyzing data on interest in virtual reality in education for the period from 2004 to 2024 using the Google Trends tool. This made it possible to determine the level

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of popularity of virtual reality in the educational context at the global level. Data from the source "Virtual Reality (VR) in Education Market" was used to assess the dynamics of the virtual reality market in education and forecast its development until 2029.

The methodology included economic and statistical analysis, which allowed us to identify market trends and forecast future changes in the development of this technology in the education sector. Graphical display methods were used to create visualizations that clearly demonstrate changes in interest in virtual reality in education and the dynamics of the virtual reality market in the education sector.

The next stage of the study involved an analysis of the scientific works of authors who have studied the use of virtual reality in foreign language learning in order to systematize the advantages and disadvantages of this technology. Content analysis methods were used to summarize the research results and highlight the main aspects that affect the effectiveness of VR in teaching. Graphical display methods were used to visualize the results obtained, which made it possible to clearly classify the advantages and disadvantages, as well as visualize their interrelationships.

The final stage of the study involved the use of literature review methods to collect research papers and articles on modern virtual platforms used in foreign language teaching. Further, the data analysis method was used to process the data obtained, which allowed us to systematize information about popular platforms, their functionality and effectiveness. To compare different technologies, the study used the method of comparative analysis, which helped to identify the most appropriate platforms for improving the learning process. The data visualization methods also allowed us to graphically display the results of the platform comparison, and the synthesis method helped to summarize information from various sources, which made it possible to formulate a comprehensive overview of modern technologies in foreign language learning.

## RESULTS

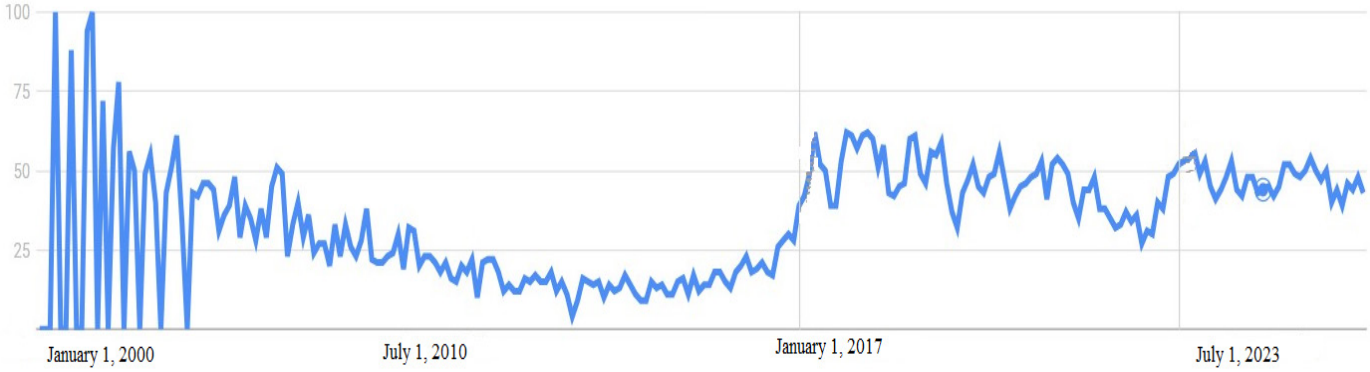
*Identifying the trend of virtual reality popularity in education*

The "virtual reality" system was created by the American computer scientist Sutherland in 1966 by replacing an infrared sensor with computer images.[7] In 1989, the term "virtual reality" was coined by computer scientist Jaron Lanier[15]. Today, virtual reality has become widely used not only in areas such as robot control, entertainment, healthcare, computer games, commerce, museums, the automotive industry, military, etc. but also in education.

VR technologies for language learning have been actively used relatively recently, around 2020. In the 2000s, virtual reality was mostly used for professional purposes such as training and simulations. In the 2010s, VR became more accessible to a wider audience due to the emergence of consumer VR headsets. By the end of this period, with the development of artificial intelligence, virtual simulations were widely used in education, medicine, and the entertainment industry.

The latest research[4,5,12] shows that the most effective way to learn foreign languages is to be fully immersed in the language environment. Constant interaction with such an environment turns out to be the most effective method of learning a foreign language. Modern teachers are constantly looking for teaching methods that are as close as possible to real-life conditions. Virtual reality technologies, combined with gamification elements, help maintain motivation and interest in learning, allowing you to immerse yourself in a foreign language environment and learn a language on a qualitatively new level.

This innovative technology is gradually gaining momentum. Figure 1 shows a graph that reflects the dynamics of interest in virtual reality in the education sector from 2004 to 2024.

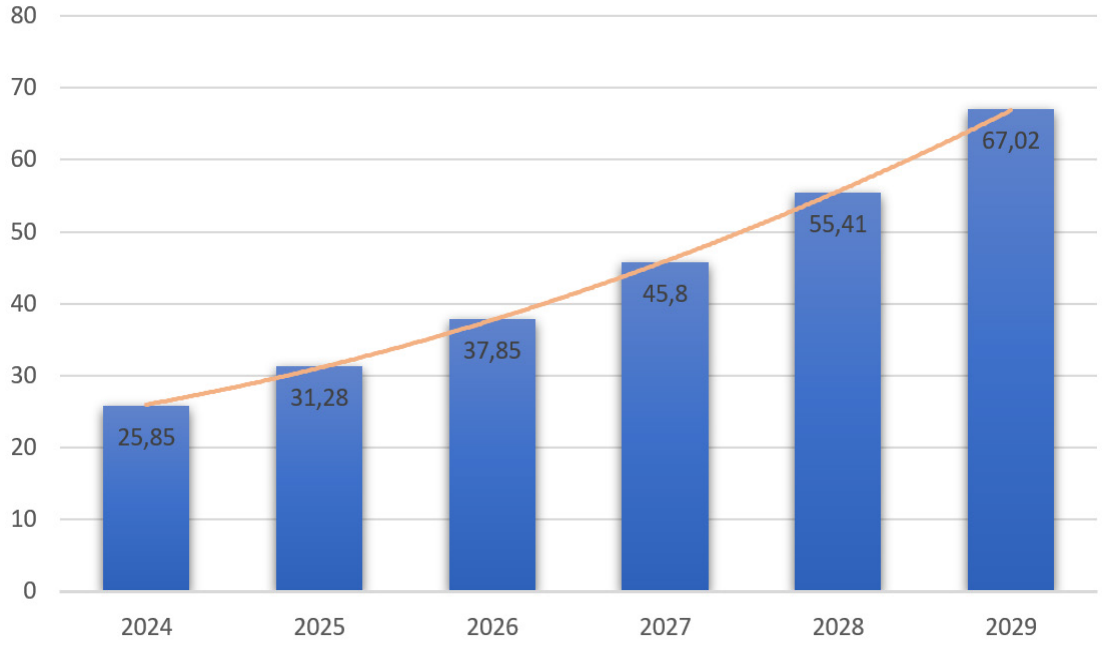



**Source:** Google Trends[16]

**Figure 1.** The interest in virtual reality in the field of education around the world between 2004 and 2014.

This graph allows to assess how interest in this technology has changed in the context of educational innovations and the development of digital technologies.

Thus, it can be seen that initially, in the mid-2000s, interest in VR was extremely high, due to the curiosity of the unknown. A particular acceleration was observed after 2010, when technologies improved significantly and educational institutions began to introduce VR into the educational process. In recent years (especially after 2020), the upward trend in interest has intensified even more due to the COVID-19 pandemic, which has contributed to the development of distance learning and innovative technologies in education. The dynamics of virtual learning market growth shown in figure 2 confirms the growth dynamics of the virtual reality market in education with a forecast until 2029.




**Source:** Mordor Intelligence[17]

**Figure 2.** Dynamics of the virtual reality market in education with a forecast until 2029, USD billion

Figure 2 shows that the virtual reality market in education has significant potential for growth in the coming years. This growth is driven by the fact that more and more companies are integrating VR technologies and game elements into the educational process, making it more interactive and engaging for students. The above analytical information makes it possible to form certain trends, which are summarized as follows:

1. Increased integration of VR into the educational process.
2. Technological progress in VR developments.
3. Growing demand for VR educational products.

*Advantages and disadvantages of using virtual reality in foreign language learning*

Virtual reality in foreign language learning is an innovative and effective way to learn a foreign language. The advantages and disadvantages of using virtual reality in foreign language learning are important aspects to consider in choosing the appropriate learning format. The advantages and disadvantages of using virtual reality are illustrated in figure 3.

The use of virtual reality in foreign language learning thus creates many new perspectives in the field of training and education, which are usually laborious, time-consuming, or financially expensive when using traditional methods. Virtual reality technologies have great potential for development in the field of education, including foreign language learning.

Virtual reality can be used to create interactive language courses where students can practice language skills in realistic situations, such as traveling, communicating with native speakers, or interacting in different cultural contexts. This allows you to immerse in the language environment, which greatly improves the learning process, making it more effective and engaging. These capabilities have already been implemented in programs such as VE 3D ieCenter, which offers interactive courses for students and teachers in virtual systems, on PCs, 3D Intranet and 3D Internet.

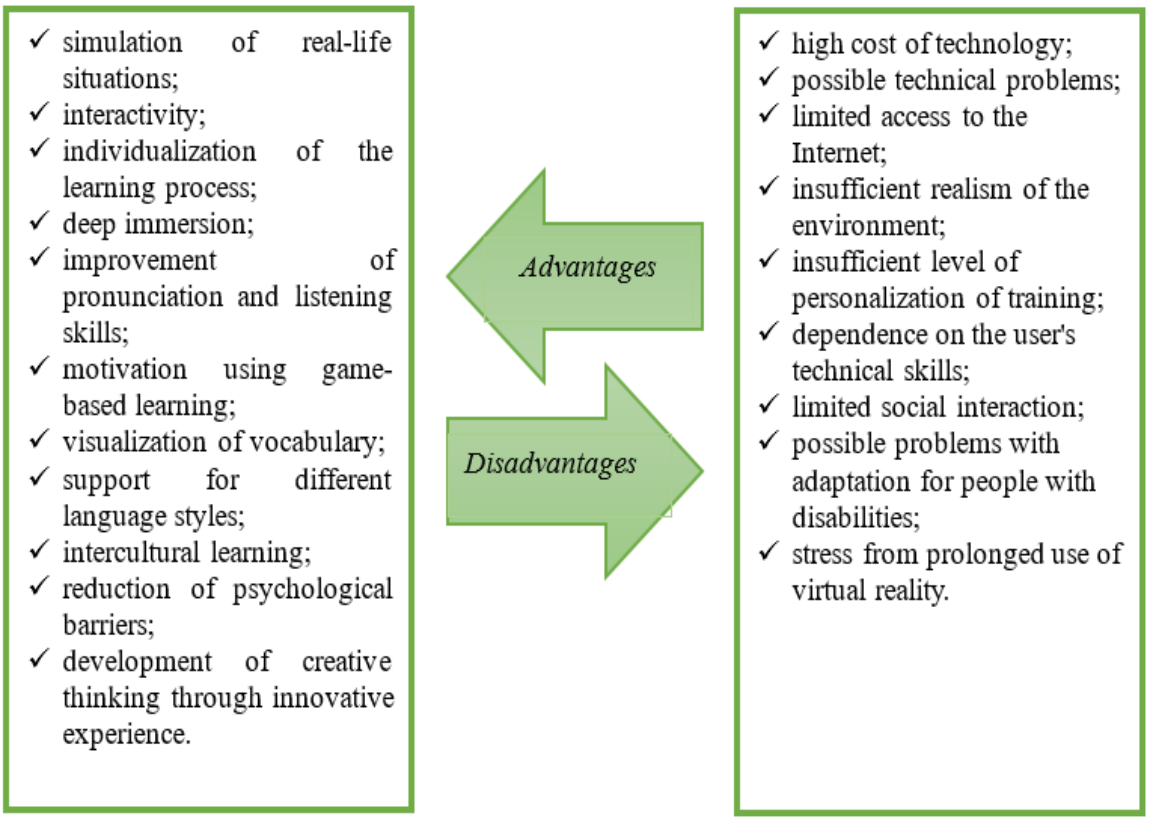



**Figure 3.** Advantages and disadvantages of using virtual reality in the process of learning foreign languages

Virtual reality immerses the learner in a language environment where they can communicate with native speakers in realistic simulated situations. This makes learning interactive and engaging, which greatly increases student motivation and participation. Technology is combined with a communicative methodology, allowing students to practice speaking without fear, which helps to overcome the language barrier.

Despite the significant advantages of VR technologies, their use in language learning is fraught with obstacles. The most important one is the cost of equipment. The headsets, controllers, and computers remain expensive, making them difficult to access for many educational institutions and students. Moreover, VR applications require a high-speed internet connection, which may not be available in remote regions. The cost of VR equipment can vary significantly. For example, basic controllers can be purchased for as low as USD 100, while more functional, high-end devices are available for as USD 1 000. while more functional ones, such as HTC Vive Controllers, cost from USD 200. The Meta Quest 3 virtual reality headset will cost about USD 500. In addition to the equipment, you should consider the cost of subscriptions to VR platforms for language learning, which start at USD 10-15 per month. At the same time, there are also free resources that allow using VR for learning.

The technical complexity of the technology is another problem. Since VR has only recently been used in education, users may face difficulties in setting up, technical difficulties, and limited functionality. Equally important are the methodological obstacles: there is a limited amount of high-quality educational content available today, and teachers need special training to effectively use VR in their work.[18]

These barriers need to be overcome by developing government programs for financing and implementing VR technologies in education. Schools, universities, and VR content developers should cooperate to create high-quality educational materials. Additional research will help identify the most effective ways to integrate VR into the learning process and adapt these technologies to the needs of modern education.

*Features of using modern VR platforms for learning foreign languages*

VR systems are available for both educational institutions and private users. Educational institutions have special funding programs available to enable them to purchase headsets for whole groups or classes. There are numerous language learning apps available for private users to use at home, and the steady decline in hardware prices is making these technologies increasingly affordable. The following is a list of the most popular platforms used for this purpose (table 1).

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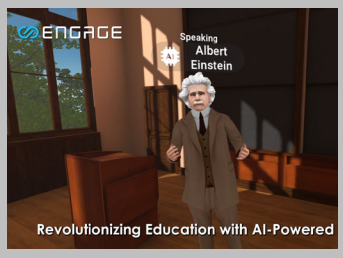
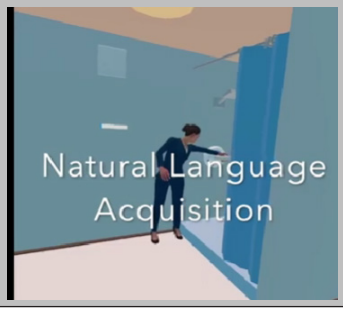
**Table 1.** The most popular VR platforms for learning foreign languages

| No. | Name of the platform | Description of the platforms | |
|---|---|---|---|
| 1 | Labster | The world leader in creating virtual learning simulations that are already used for the successful training of 5 million students in 3000 educational institutions from 70 countries. The platform offers virtual simulations in various fields, including foreign languages. The platform offers about 300 simulations with interactive exercises in the 3D environment of virtual laboratories, lasting from 10 to 50 minutes. |  |
| 2 | Mondly: Learn Languages in VR | The platform allows users to learn English, Spanish, French, German, Italian, and other languages. |  |
| 3 | ImmerseMe | The researchers at Oakwood University conducted a study to assess how two virtual reality language learning platforms, IMMERSE and ImmerseMe, align with theories of second language learning. They developed a special rubric based on five key principles of second language learning pedagogy including: focus on content, clear input, attention to form, interaction, and motivation. The researchers took two Spanish lessons on each platform and used their rubric to assess the presence and degree of compliance with these principles in each lesson. This approach allowed them to determine how effectively each platform supports the basic principles of second language acquisition. |  |
| 4 | Lecture VR | This is an educational program that uses VR technology to conduct interactive lectures, seminars, and classes. |  |
| 5 | Engage VR. | A meta-universe that provides an opportunity to communicate with other people, attend events, take training, and much more in any language. |  |
| 6 | Language Lab | A virtual reality game that emphasizes language learning rather than language skill practice. Languages currently available include English, Spanish, Arabic, Chinese, French, German, Hebrew, Italian, Japanese, Korean, Portuguese, Russian, Ukrainian, and Dutch. |  |

Virtual reality technologies are becoming more accessible, but their use requires the right equipment. Technical specifications are important for a high-quality virtual experience: the higher the resolution of the monitor or headset, the clearer the image, and the wider the field of view will provide a deeper immersion in the virtual world. Interaction with VR environments require additional devices, such as controllers and motion tracking sensors.

The set of devices used in such systems can vary from 3D rooms and three-dimensional screens to virtual

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reality helmets and other configurations. The VR system can also be equipped with various peripherals, such as virtual reality gloves, joysticks, or motion capture suits. All these technologies allow you to interact with the virtual environment at a high level of interactivity.

There are two perspectives to consider for successful implementation of virtual reality in language learning: the teacher's and the student's. Teachers should develop VR lessons and exercises that correspond to specific lesson objectives. For example, to develop listening skills, it is possible to create an exercise that simulates a real-life situation, such as "Going to a museum in virtual reality," where students listen and analyze the content.

The use of VR makes it possible to create immersive language learning that includes modeling real-life situations that allow students to practice speaking. These activities increase motivation and learning efficiency. Integrating VR into traditional teaching methods can be done by setting aside up to 10 minutes at the end of a class for a short VR session to help reinforce the material.

Students should use VR regularly, but without overloading. It's important to take breaks during virtual sessions to avoid fatigue or discomfort. Students should stop using VR if they feel dizzy or nauseous. VR language learning is especially effective when combined with other methods. Students can continue traditional lessons by adding short VR sessions to them, the duration of which can be gradually increased. It is also important to choose VR programs that correspond to the student's language proficiency level to keep them motivated and achieve better results.

## DISCUSSION

The current study's findings are in line with those of Korobova[19] and Lysak[20], who also highlight similar benefits of using virtual reality in foreign language learning. We can agree with the conclusions of the Żammit study, in particular in terms of recognizing the potential of virtual reality in foreign language learning, especially as a tool that creates an interactive and engaging learning environment. The article emphasizes the importance of this technology as a powerful tool for overcoming the language barrier, as in this study. The author emphasizes the problems of high cost of technology and technical difficulties that become obstacles to the widespread introduction of VR in the educational process.

The studies by Palamar et al.[5], Bosa et al.[7], Trach[15] also focus on popular VR platforms. These include Second Life, Google Expeditions, Labster, etc., which overlaps with the analysis of modern VR platforms for learning foreign languages in the current study. At the same time, both studies recognize the importance of actively engaging students in the learning process and developing professional communication skills through the integration of immersive technologies.

In contrast, the study by Palamar et al.[5] focuses more on the role of teachers in creating such learning environments and on measuring behavioral outcomes in intercultural learning, which is an important area for further research. Wu[11] came to an interesting conclusion by conducting a survey of students at Northwest Normal University who use virtual laboratories to learn foreign languages. The survey results showed that students consider these tools to be more effective and useful for learning, in particular through platforms such as Duolingo, Rosetta Stone, Babbel, Memrise, Busuu, Lingodeer, BBC Languages, and Italki.

Despite the positive attitude of the majority of students towards these technologies, some of them preferred traditional teaching methods, which indicates the importance of further adaptation of virtual resources to ensure their maximum effectiveness. The current study also draws attention to this, emphasizing that although virtual tools have great potential to improve the educational process, their optimal implementation in educational practice requires constant adaptation to the specific needs of students and pedagogical conditions. Thus, in agreement with the conclusions of other researchers, we recognize the importance of integrating VR for developing communication skills and overcoming the language barrier, but also emphasize the need to support traditional teaching methods in education.

## CONCLUSION

The use of virtual reality in education has been growing rapidly over the past ten years. Specifically, the COVID-19 pandemic has become one of the catalysts for the introduction of VR technologies in educational processes, providing free access to interactive content and innovative learning technologies.

This trend continues due to the continuous improvement of technology and the growing demand for innovative educational solutions. The use of virtual reality in foreign language learning has its advantages and disadvantages, such as interactivity, personalization of learning, immersive experience, and ease of access. There are also disadvantages, such as the high cost of equipment, technical difficulties, and dependence on a stable Internet connection.

VR remains a promising tool in the field of language education. Modern VR platforms for learning foreign languages provide extensive opportunities for immersing students in the language environment. Successful implementation of VR in language teaching requires teachers to develop interactive lessons that meet the

course objectives and integrate VR activities into traditional teaching methods. Students are encouraged to use VR regularly, combining it with other teaching methods. Future research could be focused on a more detailed study of virtual reality on learning effectiveness, and on conducting empirical studies to determine the effect of using these innovative technologies.

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