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IMPLEMENTATION OF IMMERSIVE TECHNOLOGIES IN FOREIGN LANGUAGE LEARNING: ANALYSIS OF FOREIGN AND DOMESTIC (UKRAINIAN) EXPERIENCE

ABSTRACT

The use of modern immersive technologies in the educational process is due to changes in the development of information and communication technologies and the challenges of the pandemic, which forced learning and working remotely. The article summarizes the Ukrainian and foreign experience of using immersive technologies in education in general and in the process of learning foreign languages in particular. A general description of the concepts “virtual reality”, “immersion” and “immersive technologies” in the context of their use in the educational process has been presented. The advantages of using immersive technologies over traditional ones have been defined and proved. They are visibility, concentration, involvement and effectiveness. It has been determined the expediency of using immersive technologies in the process of learning foreign languages as a method and technology of long-term immersion of students in a foreign language space based on a foreign language or bilingual education, which involves the use of video, audio, and text information by students to form relevant professional competencies.

The research of scientists and their main results related to the selection and application of immersive technologies in teaching foreign languages have been analyzed. Virtual applications that can be used for learning a foreign language have been analyzed. The conclusion has been formulated that immersive technologies provide the formation and development of a new information method of presenting and learning educational material, which positively affects the formation of basic and professional competencies of students studying a foreign language. The opinion about the possibility of combining immersive learning methods with other interactive methods has been substantiated.

Keywords: *virtual reality, immersion, immersive technologies, foreign language training, educational technology.*

ВПРОВАДЖЕННЯ ІМЕРСИВНИХ ТЕХНОЛОГІЙ У ПРОЦЕС НАВЧАННЯ ІНОЗЕМНИХ МОВ: АНАЛІЗ ЗАРУБІЖНОГО ТА ВІТЧИЗНЯНОГО ДОСВІДУ

АНОТАЦІЯ

Використання сучасних імерсивних технологій в освітньому процесі зумовлено змінами у розвитку інформаційно-комунікаційних технологіях та викликами пандемії, що змусила навчатися і працювати дистанційно. У статті узагальнено український і зарубіжний досвід використання імерсивних технологій у навчанні загалом та у процесі вивчення іноземних мов зокрема. Представлено загальну характеристику



понять «віртуальна реальності», «імерсія» та «імерсивні технології» в контексті їх використання в навчальному процесі. У результаті аналізу вітчизняного та зарубіжного досвіду використання імерсивних технологій у навчальному процесі, визначено та обгрунтовано переваги їхнього використання над традиційними, а саме: наочність, зосередженість, залученість, результативність. З'ясовано, що такі технології покращують навчальний процес, роблячи його більш наочним і мобільним, підвищують інтерес і навчальну мотивацію студентів до іноземної мови, удосконалюють навчальний процес за рахунок використання інноваційних форм роботи, покращують успішність студентів, допомагають зосередити їхню увагу на конкретних завданнях, розвивають лінгвокультурологічний аспект навчання. Визначено доцільність використання імерсивних технологій в процесі вивчення іноземних мов як способу й технології тривалого занурення студентів в іншомовний простір на засадах іншомовного чи білінгвального навчання, що передбачають використання студентами відео, аудіо, текстової інформації з метою формування відповідних професійних компетенцій.

Проаналізовано дослідження науковців та їхні основні результати, що стосуються підбору та застосування імерсивних технологій при навчанні студентів іноземних мовам. Проаналізовано віртуальні додатки, що можуть використовуватися для вивчення іноземної мови. Сформувано висновок, що імерсивні технології забезпечують формування та розвиток нового інформаційного способу подання та засвоєння навчального матеріалу, що позитивно впливає на формування базових і професійних компетенцій студентів, які вивчають іноземну мову. Розглянуто можливість поєднання імерсивних методів навчання з іншими інтерактивними методами.

Ключові слова: віртуальна реальності, імерсія, імерсивні технології, навчання іноземній мові, освітні технології.

INTRODUCTION

In modern digitalized society the search for new forms of education caused a rapid implementation of virtual reality technologies in this sphere. These are powerful technologies that allow us to replace real life with the perception of virtual life, artificially stimulating our senses and deceiving our bodies into accepting a different version of reality (Augmented and virtual reality survey report, 2020). L. Freina and M. Ott define this term as “a perception of being physically present in a non-physical world by surrounding the user of the virtual reality system created with images, sound, or other stimuli” so that a participant feels they are actually “there” (Freina & Ott, 2015).

According to the researchers, virtual reality devices will be used in everyday life at the level of mobile phones. With the help of such devices, users will be able to have fun, make purchases, and learn. And this means that virtual reality will significantly expand the possibilities of almost all spheres of our life (Augmented and virtual reality survey report, 2020).

Since the field of education has been the most affected by the COVID-19 pandemic, according to some analysts of the web technology market, this can become a kind of stimulus for the use of virtual reality in education, because it can help students experience lessons with their own eyes without the need for face-to-face learning in class. With virtual reality technologies in the classroom, learning becomes more fun and exciting (Biocca & Delaney, 1995).

Besides, virtual reality has been described as the learning aid of the 21st century (Rogers, 2019). A study that students remember more information after attending virtual



reality lessons (Makransky et al., 2019). Taking it into account, it is understandable why researchers, tutors, and educators nowadays use this technology so often in the education process.

THE AIM OF THE STUDY

The paper aims to analyze the state of the application of immersive technologies in the educational process in domestic and foreign researchers' works and to find out the existing methods of using the technologies mentioned above for foreign language learning.

THEORETICAL FRAMEWORK AND RESEARCH METHODS

Analysis of research on this problem shows that many scientists have paid attention to the problem of applying immersive technologies in the educational process. Thus, studies of the use of virtual reality technologies in the education process are reflected in the works of such domestic researchers as: V. Klymnyuk (2018), V. Volynets (2021), and others. Researchers L. Dashko and O. Dubytska (2019) put forward the idea of using virtual reality technologies within the educational process and its superiority over traditional teaching methods.

A large number of foreign studies have been devoted to the possibilities and problems of using virtual reality tools in the educational process. For example, Z. Merchant et al. (2014) focus on the effectiveness of virtual reality-based instruction on students' learning outcomes while L. Jensen and F. Konradsen (2018) emphasize the application of virtual reality technologies. The work of F. Biocca and B. Delaney (1995) is devoted to the analysis of immersive virtual reality technology. The aspects of student learning using virtual reality and how it applies to education and training have been disclosed in the works of L. Freina, M. Ott (2015), K. Lee (2012) and G. Makransky (Makransky et al, 2019). Besides, L. Jensen and F. Konradsen (2018) suggest an additional perspective concerning the positive effects of immersion and presence on learning outcomes.

However, despite the significant contribution of these studies, they do not fully reveal all the problems of using immersive technologies in language learning, but only reflect certain issues of the application of elements of virtual technology in education at different educational levels. The use of immersive virtual reality in foreign language education is still reported to be one of the least published research topics. There are only a small number of studies that have previously investigated this theme. T. Lin and Y. Lan (2015) studied the research trends in language learning in a virtual reality environment. R. Hein, C. Wienrich and M. Latoschik (2021) focused attention on the implementation of immersive virtual reality in foreign language teaching and learning.

The research was carried out with the use of general scientific methods (study, analysis, and synthesis of reference, overview of scientific educational print and online sources), as well as systematization and generalization.

RESULTS

There are various definitions of the term "virtual reality" (VR) in scientific research. VR can be defined as "the sum of the hardware and software systems that seek to perfect an all-inclusive, sensory illusion of being present in another environment" (Biocca & Delaney, 1995). Also, VR is defined as a "system that aims to bring simulated real-life experiences, providing topography, movement, and physics that offer the illusion of being there" (Lin & Lan, 2015).

Currently, there are several choices of virtual reality systems:

–ordinary (classical) virtual reality – a highly developed form of computer simulation that allows the user to immerse himself in the artificial world and directly act in



it with the help of special sensor devices that connect him with audiovisual effects and allow interaction with the virtual world;

–augmented, or computer-mediated reality, which superimposes computer-generated sensory information in the form of text, audio, or computer graphics onto physical objects, thus creating a real-time, simulated by technical means of depicting the real environment;

–mixed (hybrid) reality – reproduces the fusion of real and virtual worlds to create new environments and visualizations, and demonstrates the parallel coexistence and interaction of physical and digital objects in real time.

Basically, researchers (Klymnyuk, 2018; Volynets, 2021) note four components of virtual reality: user that is a person (user), virtual digital world, behavioral interfaces, and immersion in the virtual environment in real time. The main characteristics of virtual reality are interactivity, immersion, and a sense of presence. The term interactivity can be described as “the degree to which a user can modify the VR environment in real-time” (Lan, 2020). The term immersion means the “extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding, and vivid illusion of reality” (Slater & Wilbur, 1997). More precisely, this includes the degree to which the physical reality is excluded, the range of sensory modalities, the width of the surrounding environment as well as the resolution and accuracy of the display (Slater & Wilbur, 1997). A sense of presence is a consequence of immersion and interaction.

This study focuses on immersive VR, which is often associated with the use of head-mounted displays and contrasted with non-immersive (desktop) VR (Makransky, Terkildsen, & Mayer, 2019). Scientists have proven that the use of immersive technologies in the educational process of higher education contributes to the in-depth study of subjects and the qualitative assimilation of knowledge, the development of spatial thinking, and the strengthening of the motivation of students, effective involvement in the educational process, etc. (Volynets, 2021; Lee, 2012). It has been established that immersive technologies increase the level of digital competence through the interaction of learners with various objects in three-dimensional space (Biocca & Delaney, 1995). The results of the reviewed studies show that learners who used immersive technologies in the educational process were more engaged, spent more time on the learning tasks, and acquired better cognitive, psychomotor, and affective skills.

Today, the organization of events in various formats is possible with the help of digital immersive tools. Conducting training, lectures and practical classes, quests, conferences, joint viewings of thematic films, product presentations (educational, real) with networking, gamification of educational modules, organization of business/role-playing games, etc.

The above allows us to state that VR technologies can potentially become an important tool in education and be actively used for educational purposes. Moreover, VR is a promising arena for language learning because it can provide an immersive and authentic environment to socially interact with native speakers (Lin & Lan, 2015), as it provides learners with a special channel of interpersonal communication. Learners can explore the contexts and interact with the objects, avatars, and other learners. What is more important is that highly immersive virtual technologies help learners achieve a strong sense of presence, which increases learners’ positive feelings during performing the task (Makransky et al., 2019). Besides, students can learn a foreign language with an intercultural experience



beyond geographical limitations without leaving the classroom or their countries. Therefore, the specific features of VR have great potential for language learning.

Furthermore, the positive effects of immersive technologies on students' foreign language learning include improving the effectiveness of their language skills in professional activities, increasing motivation and engaging students to work with each other, and with native speakers of the foreign language being studied by students (Lan, 2020).

According to Paul Driver, some of the key benefits of using immersive technologies in the language learning process include: learning within the demanded context and making learning activities situated; physical activities of the body are as much important as current mental processes; Paul Driver names this coherence as "Embodied interaction"; VR ensures users' active control over their moves and directions; VR and digital games provide "Spatial Affordance" hence they are the most spatial form of media available to use in language training (Hytner, 2017).

In the research of Rebecca R. Hine, C. Wenrich, and M. Latoszczyk the attention is focused on the implementation of immersive virtual reality in foreign language teaching and learning. Scientists have analyzed how full immersion can influence the development of students' intercultural communicative competence (Hein et al., 2021). Scientists analyzed a lot of sources for the period from 2001 to 2020, which were related to the role of immersive technologies in teaching students a foreign language. They determined that most of these studies were about the comparative analysis of traditional teaching methods with blended learning that includes the use of VR. The main characteristics of these technologies that support foreign language learning are the promotion of vocabulary learning, the development of speaking skills, intercultural competence, motivation of students to learn a foreign language, and overcoming anxiety and discomfort when speaking a foreign language. Scientists have identified the main advantage of VR over traditional teaching methods in the fact that the student is given the opportunity to feel, rather than imagine, an object, situation, or scenario that cannot be demonstrated or described using traditional teaching methods (Hein et al., 2021).

The practice of implementation of immersive technologies in foreign language learning will enable students to feel themselves an integral part of the professionally oriented situation which is designed specifically to prepare the course participants for communication within. Having their legends and terms of existence within VR task students get used to psychological challenges as well as apply existing speaking skills in a foreign language to perform their roles stipulated by the tasks (Dashko & Dubytska, 2019).

Educational activities in VR encourage students' spontaneity and therefore entail the maximum possible immersion of every single or multi-user within virtual environments. It increases students' interest in following tasks and their motivation to achieve better results in a training course. VR applications solve the problem of immersion in the language environment, psychologically prepares students to use existing professional skills and knowledge and motivates their further study. VR based tasks also clearly demonstrate situational models of possible daily life circumstances for foreign language communication. Moreover, improving students' communication skills is one of the most wanted benefits of immersion into interaction with presumable partners because of the resemblance of emotions and feelings got by native speakers when communicating with each other within their natural language environment (Makransky et al., 2019).

There are various applications of VR including entertainment and educational purposes. The most important is the possibility to create "authentic" contexts in which learners can immerse themselves by using different technics (Lan, 2020).



Using applications based on Google Expeditions and Discovery VR students can be involved in activities that go beyond the classroom and develop language skills mediated by technology. Google Earth VR is used to develop the writing skills of learners in English (Chen et al, 2019). D. Parsons (Parsons et al, 2019) suggested using Cardboard VR and Google Expeditions in combination with Google Tour Builder to create learning activities through which students can navigate using QR codes or GPS locations. Google Expeditions has developed over 100 VR trips for cultural visits, available to the public.

Another category of VR applications that could be used for foreign language learning offers the opportunity for real-life-like interaction. Students can participate in role-playing and interpersonal social interactions in the contexts they have created (Lan, 2020). VRSpeech and VR Learn English are examples of applications of this group. A user is engaged in real-life situations: buying things in the shops, making orders in restaurants, presentations, job interviews, etc. The specific features of these applications are high-quality speech recognition and context-specific interaction.

The application that combines VR reality with chatbot technology and speech recognition for studying foreign languages is Mondly. Students can practice real-life conversations in 30 languages, get instant feedback on their pronunciation in virtual reality and build the confidence to speak new languages in real life. Mondly includes reading, listening, writing, and speaking activities. The distinguishing feature of the application is the possibility of taking part in the conversation with virtual characters on the given topic of real-life situations (making friends, ordering dinner, taking a taxi ride, etc.).

Applications VirtualSpeech and AltspaceVR allow users to apply their learning with practice in online exercises or VR scenarios. Applications allow users to attend, participate in and organize numerous events like live shows, conferences, classes on different disciplines, presentations, comedy shows, festivals, tech talks, and team meetings. The main peculiarities of these applications are their realistic venues, such as virtual rooms with the audience, the presence of noise, and distractions to fully immerse a user into the event. The function of speech analysis allows participants of the event to get feedback on their speeches, record all the speeches, and get the progress results. In addition to these, AltspaceVR is a social platform where individuals can gather, talk, collaborate, and co-present in small to large groups. The applications can be used in English courses for undergraduate and postgraduate students.

Thus, immersive technologies provide a new paradigm of teaching materials, which has a positive impact on the formation of basic and professional competencies of students who learn a foreign language.

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

In conclusion, it should be stated that VR is an inevitable tool in the education of the nearest decades as it has many advantages of using it for foreign language training. It enhances learning process by making it more visual and mobile, increases the interest and learning motivation of students to the foreign language, improves educational process through the use of innovative forms of work with students, improves student performance, helps to focus the user's attention on specific tasks, contributes to the support of the linguistic and cultural aspect in the education of students.

Thus, VR provides the formation and development of a new information method of presentation and assimilation of material, which is high-tech didactic tools. Immersive technologies can be effective when used in blended learning that combines distance, online, traditional, and self-directed learning of languages.



Future research should also explore the potential educational value of VR applications for both language learning and learning in different disciplines through large scale, longitudinal studies.

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