

Immersive Technologies in Adult Learning as an Innovative Marketing Tool in the Educational Market

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Abstract: *The article reviews the economic organization and effectiveness of adult education using virtual reality technologies. The main driver of the development of the immersive learning market is the demand from corporations. It is still expensive for most schools and universities, but companies, on the contrary, see it as a way to reduce costs. Immersive learning is a method that uses an artificial or simulated environment that allows students to become fully immersed in the learning process. In addition to creating a distraction-free environment, it can break the monotony of learning and development through stimulating visuals. Immersive learning can make learning more productive and valuable by increasing student engagement. The article also considers the factors that make immersive technologies an innovative tool for use in the marketing strategies of educational institutions and for the promotion of educational content. Immersive learning is a dynamic strategy that can improve e-learning and revolutionize the world of education. This method has great potential to lead the future of learning and help achieve its important goals. VR training is especially in demand in industries with a high line staff turnover: it reduces the cost of continuous training of new employees. Their business applications are almost limitless, from order picking and surgical operations to digital twins to modelling and tracking manufacturing plants, supply chains and other complex systems. AR and VR significantly increase the value and convenience that these opportunities create. These technologies improve how users visualize and access all new monitoring data, how they receive and follow instructions and product manuals, and how they interact. It was concluded that with immersive technologies in educational marketing, the educational market would develop, increase and change under the influence of innovations. It is also believed that the money spent on such technologies is not considered an expense but an investment in the development of the company and the person.*

Keywords: educational marketing, immersive technologies in education, online education for adults.

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Introduction

Technology has changed almost every aspect of life today, and education is no exception. Thanks to the advanced tools of EdTech (educational technologies), education has become more accessible and interesting for millions of people. Not surprisingly, the EdTech market is growing rapidly and is expected to reach a whopping \$605.40 billion by 2027. One of the most effective technologies widely used in education is immersion technology. Learning with artificial intelligence, virtual reality, and chatbot technologies such as ChatGPT has become an innovation, a dynamic future of education that is becoming more dynamic and interactive. Immersive technologies refer to technologies that use digital or simulated worlds to simulate the physical world. Immersive technologies, also called “augmented reality” (XR), have changed how organizations and individuals work, interact and communicate. Immersive technologies include augmented reality (AR), virtual reality (VR), mixed reality (MR), simulation, and 3D gaming (Klico, & Muhić, 2022).

Literature Review

Interest in researching the direction of educational marketing using immersive technologies is only growing. The use of immersive technologies is discussed by domestic and foreign scientists such as Fostolovych V. (Fostolovych and Botsian, 2021), Loureiro S. (Loureiro, 2020). The combination of marketing and education is noted in their works by such scientists as Klico A. (Klico et al., 2022), Alfaro L. (Alfaro et al., 2019). Klico A. notes that the use of immersive technologies in marketing has great potential and has attracted much attention in the last few years. Incorporating immersive technologies is increasingly becoming the subject of research in business and marketing. (Klico et al., 2022). We analyzed the number of scientific studies on the keywords "education" and "marketing" in the database Scopus. It found 20990 articles. As we can see, with the beginning of the Internet era, the rapid growth of scientific research in education marketing also began (Figure 1).

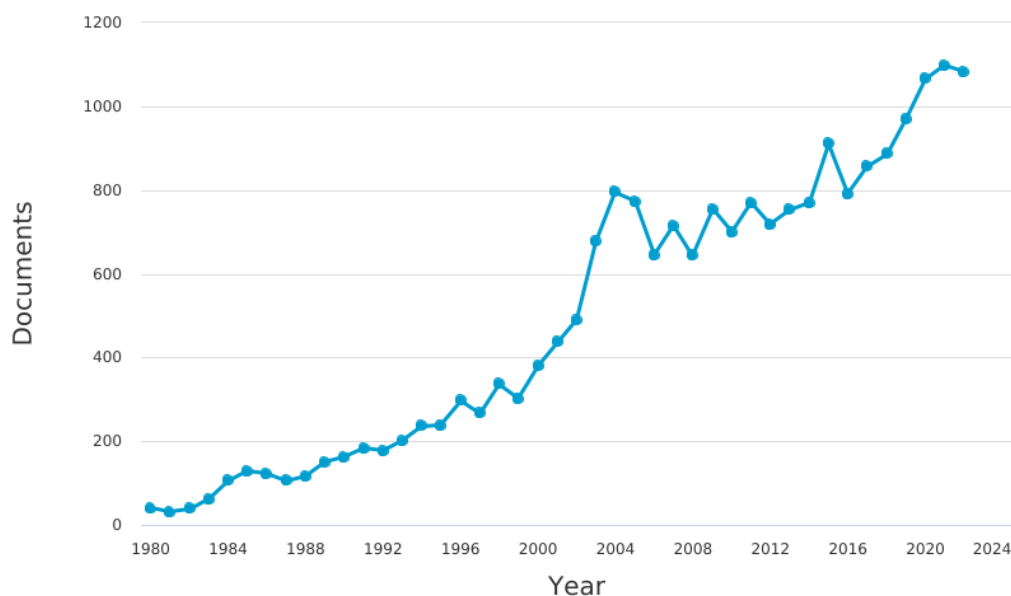


Figure 1. Dynamics of Several Scientific Studies in the Education and Marketing Field

Source: Scopus database

Analysis by country showed that most scientific works were written in America and Great Britain. Australia was in third place, and Italy closed the top ten countries. Of course, it is necessary to consider the number of the population and scientists as a whole by country. Still, even such analytics show the interest of certain countries in a given topic. It is also worth talking about the economic development of the countries represented. We see that more developed countries are faster to perceive innovations, and as a result, they introduce immersive technologies and explore them (Figure 2).

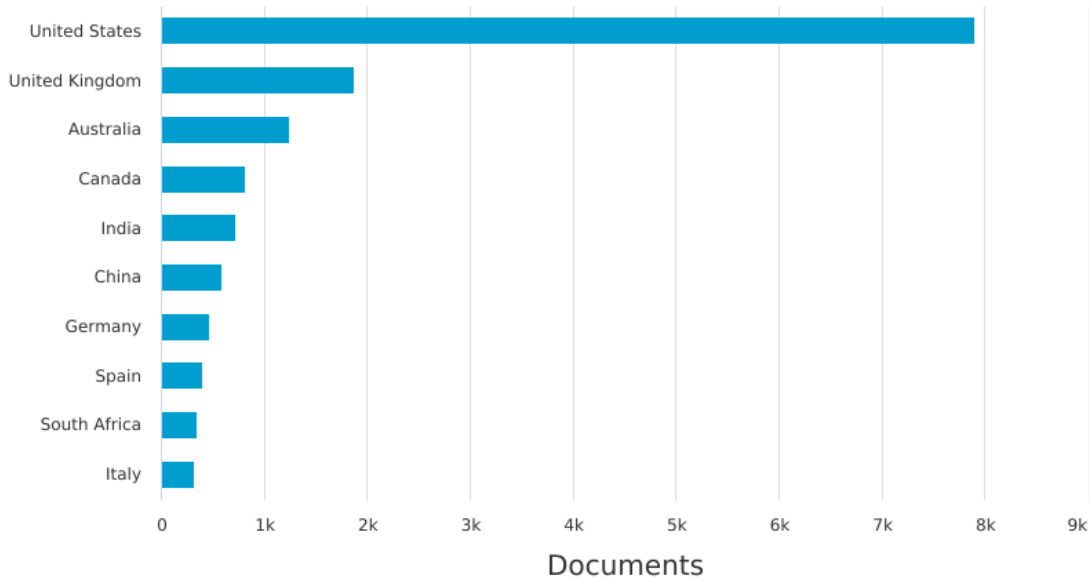


Figure 2. Number of Documents by Country

Source: Scopus database

It is considered that a scientific article is finished scientific research, thus, it is the most popular among scientists. Books or these are inappropriate on this topic, as innovations come out every 3-6 months, so long scientific works will not be as relevant as scientific articles. According to the document type, scientific papers form the largest share of scientific works. Books in this sector analysis occupy almost the last place and have an indicator of 1.1%, while scientific articles have 61.7%. (Figure 3).

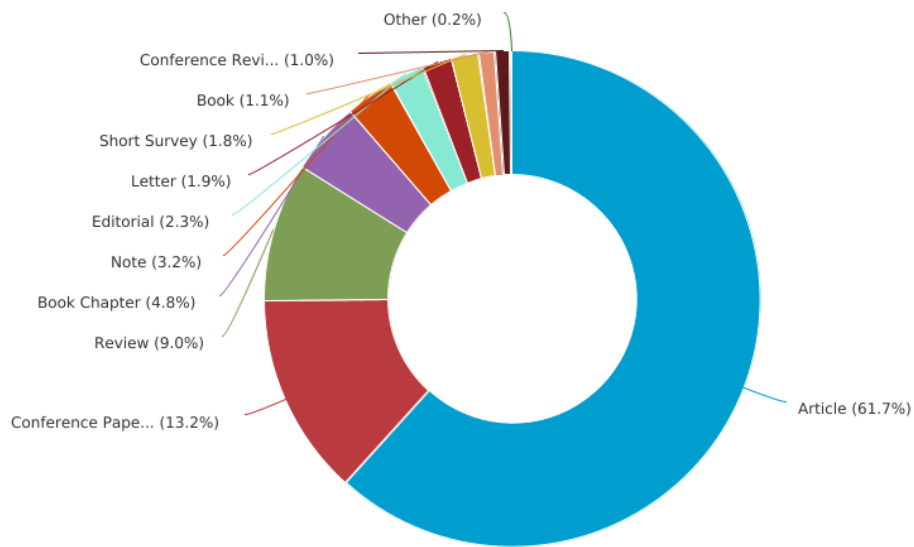


Figure 3. Documents by Type

Source: Scopus database

Medicine and social sciences predominate in publications. Business and management are in third place. Immersive technologies are used very actively in medicine to train doctors to simulate diseases, microorganisms, and stages of development of symptoms. However, it is worth noting that social sciences took second place. Immersive technologies are expected to be most represented in engineering and computer technology. However, an analysis of the Scopus database showed that publications in engineering, which would investigate immersive technologies, are almost three times less than publications in social sciences (7.8% and 17.3% respectively) (Figure 4).

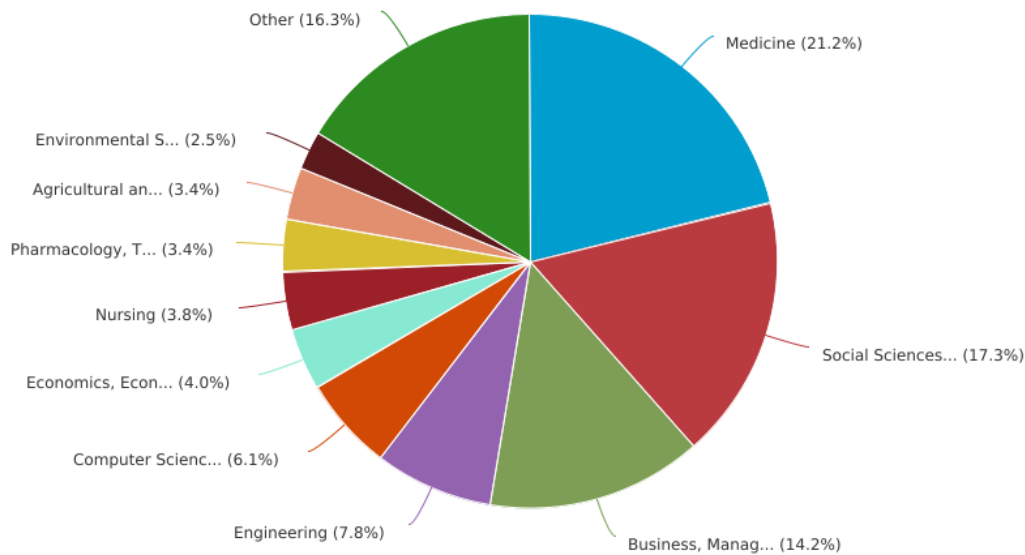


Figure 4. Documents by Subject Area

Source: Scopus database

The next step was to research in found articles the relationship between the concepts of immersive technologies, marketing and education. As a result of the bibliometric analysis of the articles in the Scopus database and the Vosviewer software, a close connection between the concepts was revealed: the keyword boxes are close to each other, and such concepts as e-learning, digital education, and virtual reality are also attached to them. As we can see, the concept of online educational technologies began to be mentioned more and more actively in combination with marketing since 2010, when the COVID-19 pandemic covered the entire world and education suddenly switched to distance and then to a hybrid mode, which still works today (Figure 5).

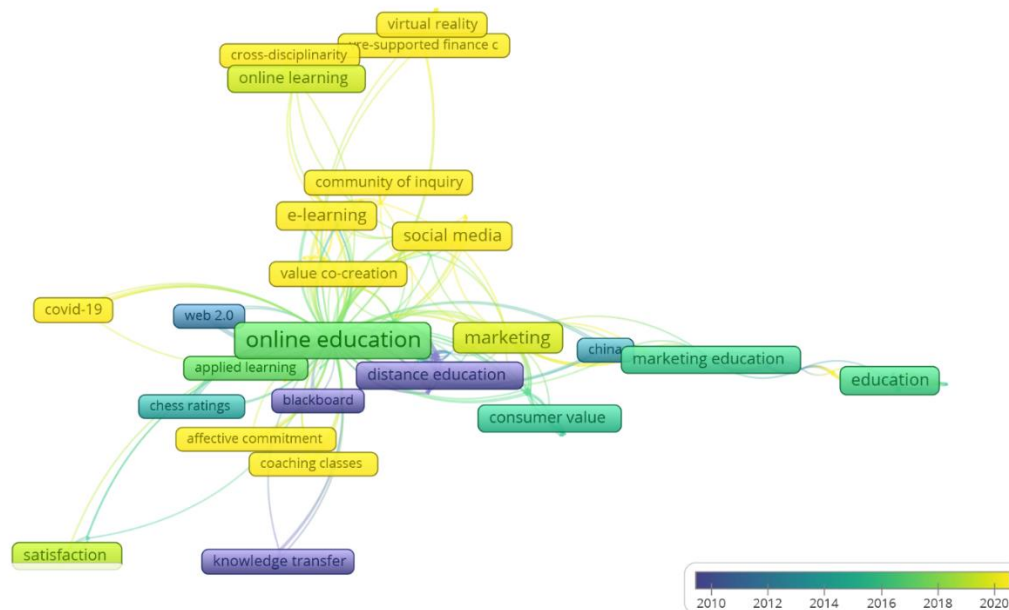


Figure 5. Frequency of Using Keywords in Scientific Articles on Marketing and Educational Technologies

Source: Developed by the authors based on Scopus database using Vosviewer software

The next study deals with the geographic component and the connection between countries in the research topic. Thus, we can see that 4 clusters of countries. The first: America, Poland, Canada. Second: Spain and Portugal. Third: New Zealand, Australia, China, South Korea. Fourth: Germany, Great Britain, France, India, etc. (Figure 6).

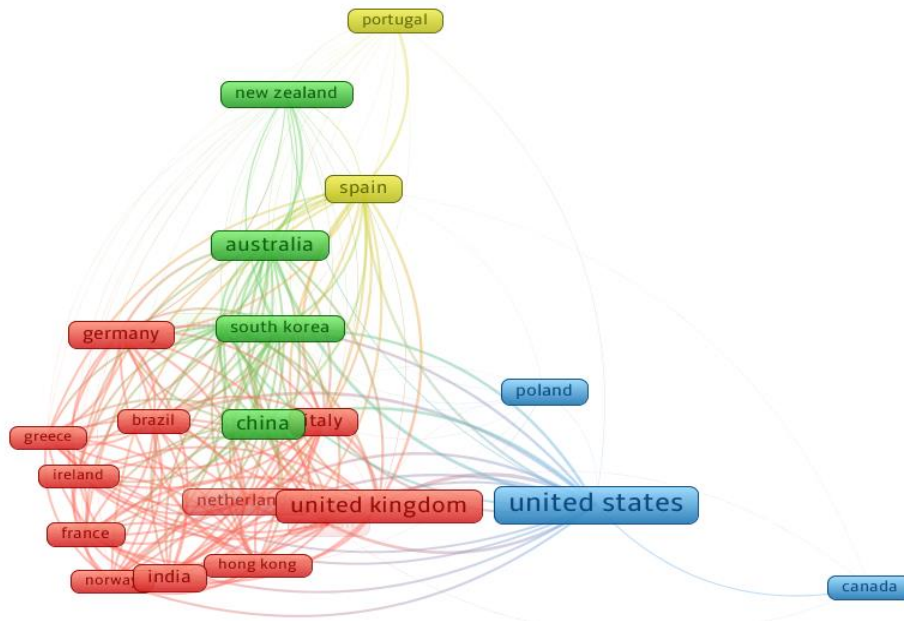


Figure 6. Visualization Map of the Space Dimension of Research on Immersive Technologies in Education According to the Scopus Database

Source: Developed by the authors based on Scopus database using Vosviewer software

In continuing the time perspective of the bibliometric analysis of research on immersive technologies in education, it is advisable also to analyze its spatial component. Therefore, based on the results of the bibliometric space-time dimension analysis found that the intensification of research on the topic of immersive technologies in education has been taking place in the countries of the world since 2016 within the framework of five consecutive time ranges, each of which has its geographical centers (Figure 7).

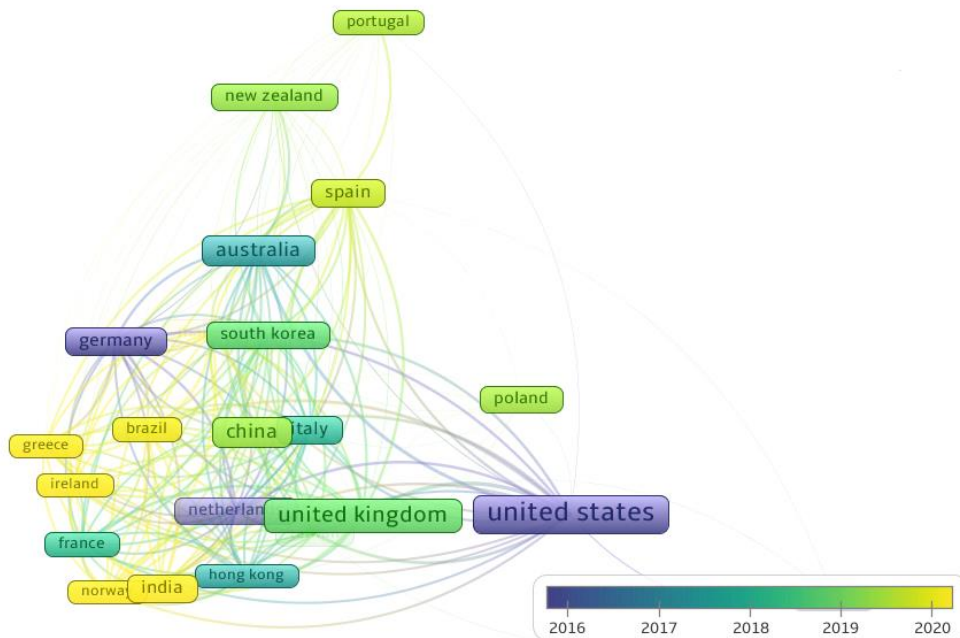


Figure 7. Visualization Map of the Space-Time Dimension of Research on Immersive Technologies in Education According to the Scopus Database

Source: Developed by the authors based on Scopus database using Vosviewer software

In general, a pattern can be noted: earlier studies on the topic of immersive technologies in education took place in industrially developed countries with a high level of GDP per capita and a high level of development of the education market (America, Germany, the Netherlands), while in the second half of the studied period, their geography also extends to less economically developed countries (India, Spain, Greece) (Figure 7).

Methodology and Research Methods

This article is built using bibliometric analysis methods, including analytics from the Scopus database and analysis using VOSviewer software. Such an analysis provides a complete understanding of the number of scientific works on the subject under investigation and their connections with each other. In this case, the article examines the relationships between keywords in scientific research and their frequency. Graphic and grouping methods were also used for the research, allowing you to see the situation more clearly. Considering the speed with which new technologies appear in all markets, the study hypothesised that immersive technologies positively affect the development of the market of educational products.

Results

Educational immersive technologies focus a person on learning. With the traditional learning environment full of distractions, one of the biggest challenges educators face is getting and keeping their students' attention. Implementing immersive technologies in education effectively attracts students' attention and focuses them on learning. It engages the senses, allowing you to observe, listen and interact with information while learning online. Empirical evidence shows that it works. For example, a study involving 160 students from Stanford University and the Technical University of Denmark found that immersive virtual reality learning resulted in a 76% increase in learning effectiveness compared to traditional learning methods (Loureiro S. et al., 2020). Like other services, education needs promotion and marketing activities to popularize and distribute, and immersive technologies can significantly help stimulate demand in the market for educational services. Educational marketing is a type of marketing that promotes valuable educational content and allows institutions and individuals to benefit from it. Educational content includes courses, video tutorials, research papers, books, and desktop and mobile software.

In this context, a new and promising branch of science that studies consumer behaviour - immersive marketing (Oh et al., 2018) is worth discussing. Virtual technologies are a powerful psychological tool for influencing potential buyers, which determines the high responsibility of the VR marketer to observe ethical standards when reproducing effects and avoiding emotional manipulation. The emotional impact on a person with the help of VR content is since the so-called “empathy effect” is triggered in the process of perception. Edward Bernays, a specialist in the field of psychology, Described the fundamental process of “consent engineering” that is at the heart of propaganda. Such a process is achieved by creating a convincing environment, which forms a certain perception of the world in the audience and gives it space for voluntary actions in accordance with the wishes of the creator or “engineer” of the environment. Thus, the VR environment is quite suitable for building manipulative narratives, which is rather not an advantage, but a disadvantage of this technology, if the VR specialist needs to follow some ethical norms when creating content (Verhulst et al., 2021).

3D, AR and VR technologies help to provide experiential learning. Immersive technologies create an environment that accurately replicates real-life scenarios so students can acquire new skills and knowledge, actively participating in the learning process. Thanks to such practical experience, students can improve new skills more effectively, contributing to long-term knowledge retention. In addition, experiential learning helps students quickly develop confidence and skill sets. For example, a PwC study showed that virtual reality students learn four times faster than in the classroom. The UK Immersive Economy 2019 report surveyed 200 organisations, including manufacturers, research and development companies, distributors, service providers, technology developers, government sponsors, industry networks and trade organisations. In a survey, 87% of participants found that immersive technologies helped improve their organization (Hurrell and Baker, 2021).

Technology-based immersive learning tools have the advantage of providing instant analysis of learning and progress. Immersive learning technologies can collect usage statistics (e.g., frequency, duration and completion of learning), performance data (tasks completed and questions answered correctly) and engagement levels (measured by eye tracking, head movements, clicks and other learner interactions). This unprecedented real-time data provides insight into individual progress and overall performance, supporting personal development and continuous improvement of immersive learning programs. 3D, AR and VR technologies excite the learning process and arouse curiosity. Exciting technology opens up a world of possibilities to make classes more playful, providing vivid interactivity. You can imagine a geography lesson where exploring Niagara Falls with your own eyes will be possible. Or a history lecture where you can travel to Ancient Greece. This type of learning is far more enriching than simply listening to a lecture.

By offering an immersive experience, immersive learning fosters curiosity and sparks interest and motivation. In 2018 the global virtual reality market was valued at \$3.8 billion. Many expect it to grow to 50-60 billion by 2025 alone. The fact that we are already seeing virtual reality and augmented reality technologies appear in brand marketing is evidence that immersive technologies will soon penetrate the marketing of educational organizations (Calvet et al., 2019). The demand for such technologies is due to the interest of the modern consumer in discovering new virtual opportunities. Although games are the main vector of the development of immersive devices, this market strives for multifunctionality and the possibility of application in all spheres of human activity, including education. The ratio of the market shares of immersive technologies is presented in Figure 8.

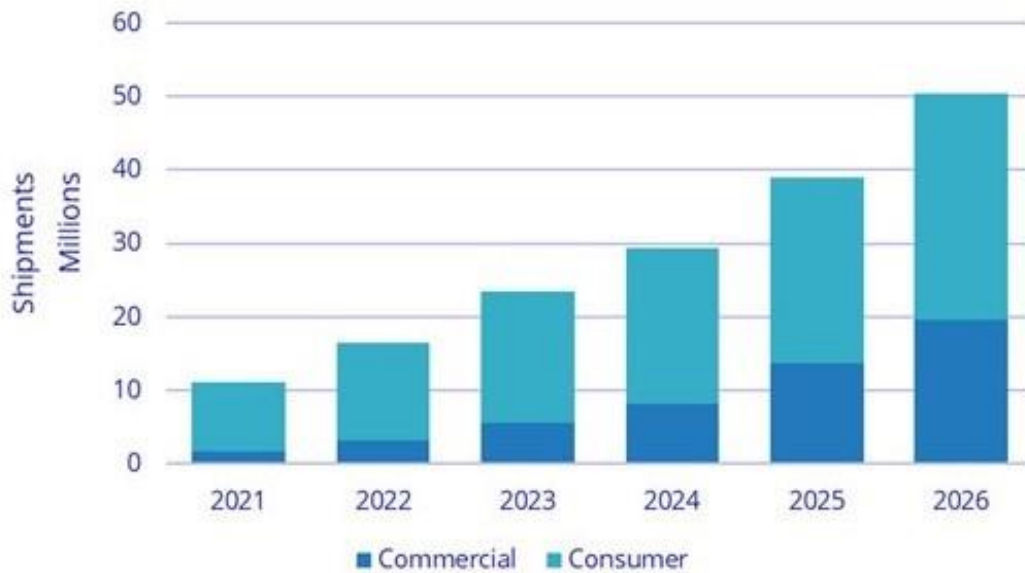


Figure 8. Growth Prospects for the Immersive Technology (VR/AR) Technology Market

Source: IDC

Thus, the task of developing a strategy for the introduction of VR technology into the activities of an educational organization becomes urgent. As a rule, such content requires many financial, material, and technical costs. The prerequisites for the purchase of immersive technological solutions are the definition of the goal, the designation of criteria according to which the calculation of work efficiency will be carried out; the study of VR implementation cases among market competitors, as well as the study of foreign experience and creation of VR integration with the marketing strategy of an educational organization (Figure 9).

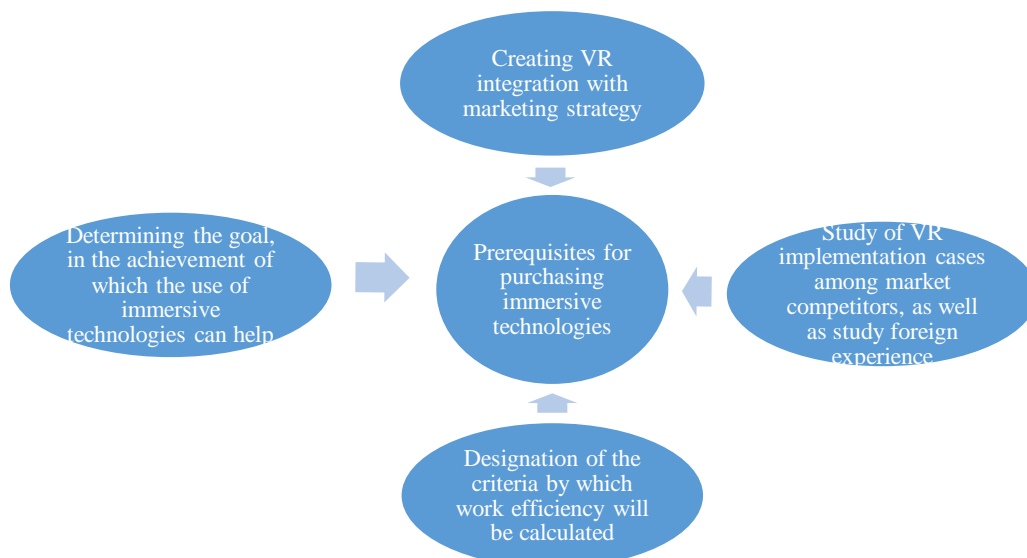


Figure 9. Prerequisites for Purchasing Immersive Technologies

Source: Compiled by the authors

There are already many examples of successful implementation of immersive technologies in adult education at enterprises. For example, decades ago, Motorola introduced the concept of robot navigation by blindfolding factory workers and having them navigate an obstacle course in the classroom following location data and movement instructions called by classmates. As students encountered physical obstacles in the classroom, they received feedback and had the opportunity to try again, considering what they had learned from previous experiences (Fostolovych & Botsian, 2021).

The results of these immersive experiences reflect a key tenet of adult learning theory – that adults learn and retain knowledge best under conditions close to real-world outcomes.

- BP and Maersk have developed a virtual environment for immersive training of oil drillers.
- The Texas Training Center has a cyber drilling simulator provides a real-life hazard-free experience. Airbus uses various immersive learning methods for flight crew training and maintenance, including cloud-based 3D cockpit simulations.
- Walmart uses VR training to prepare employees for Black Friday. It is also being used to assess employee reactions to customer-facing situations and middle management positions.
- Hilton Immersion is a virtual program the restaurant chain uses to train room service, housekeeping and front desk staff, focusing on developing empathy in customer interactions.
- DHL uses immersive learning to teach its employees how to load goods correctly and has implemented interactive VR training for various purposes.

This wave of new technologies is also transforming traditional marketing methods in education and is likely to continue (Klicó, Muhić, 2022).

Reasons for the introduction of immersive technologies in education marketing:

1. Immersive technology enhances the living experience in learning. The days of unmotivated folding tables and branded pens are becoming a distant memory. Now education can use immersive technology to deliver a complete live learning experience. These digital live experiences are highly effective in creating emotional responses in the audience. Instead of replacing the physical experience, technology enhances it, providing a very immersive engagement with information. 5.13 billion people have some mobile device. Innovative technologies have made it possible to elevate activities to levels that were not possible before AR technology allows anyone with a smartphone to learn without a book or notebook. Virtual reality technology, while not yet accessible, has the greatest growth potential. Technology market research firm IDC predicts that VR and AR headset makers will sell 9.8 million headsets in 2024, most of which will be VR. This figure was only 6.9 million in 2020 (Onopriienko et al., 2021).

2. Immersive technologies digitize educational content. Whereas people used to need books and notebooks, now a tablet and virtual reality glasses will suffice. Since April 2018, Snapchat has been offering increasingly sophisticated AR shopping lenses. These AR lenses allow Snapchat users to interact with products and educational content, while YouTube uses immersive technologies such as the 'AR Beauty Try On' feature. It allows users to view makeup tutorials on one side of the screen while virtually trying on affiliate makeup on the other. Before this technology, it was never expected that someone would interact with an ad presented as a mini-lesson for so long. This exciting technology is so successful in marketing because it significantly increases consumers' willingness to interact with branded materials, including advertising (Alfaro et al., 2019).

3. Maximization of social networks. In recent years, social media has played an important role in education marketing, which is maximized by immersive technologies. Since AR is usually viewed through a smartphone, social media platforms are ideally positioned to disseminate information. It allows people to talk to virtual interlocutors who are native English speakers, learn a foreign language or play chess with a virtual partner. These significant advances in social media could be one of the main drivers behind the growing number of brands promoting educational services through immersive technology.

4. Immersive technologies do not harm the environment. Traditional brand marketing relied heavily on conferences, events and giveaways. These were often small items made of plastic, polyethylene or rubber. Single-use plastics have devastating consequences for the planet: By 2016, 8.3 billion tons of plastic had been produced, two-thirds of which were released into the environment and remain to this day. (Violante et al., 2019). Creating partial (AR) or complete (VR) digital experiences for consumers to interact with a brand can significantly reduce the cost of marketing a product. Different educational tools are often designed to fulfil specific functions that students need or facilitate learning. While cell phones may seem like a

distraction to many students, many apps and programs can be used with such phones to make learning more productive and engaging. Students can also use E-readers and similar devices, such as tablets, to reduce textbook costs and make learning easier and more interactive. There are also more specialized gadgets, such as smart pens, which can be used with special paper to make handwritten works more like digital media. The quality and availability of immersive technologies is improving rapidly and there is increasing pressure on organizations and businesses to produce as little waste as possible. This shift towards technology-enabled marketing is expected to intensify.

5. Economic efficiency. While the cost of purchasing the technology needed to implement immersive virtual learning can be expensive, using it to train large numbers of people over multiple learning cycles can be very promising and profitable in the long run, a 2019 study found (Kamińska et al., 2019). The researchers compared the costs of training ICU staff in hospital evacuation procedures using mannequins with the costs of delivering the same training virtually. Initial costs were higher for virtual training, but it became a cost-effective option within three years. The real-time simulation requires repeated cycles of planning, setup and execution, and costs increase as the number of participants increases. In contrast, the cost per participant for virtual training remained the same.

Conclusions

Modern innovations and the application of immersive technologies in various sectors of the economy emphasize the huge potential of AR, MR and VR, including for the transformation of the educational services market. By 2030, 23 million workplaces worldwide will use virtual or augmented reality for meetings, training or customer service. According to forecasts, the growth rate of immersive technologies in education will reach 21.6 per cent between 2022 and 2027 (Kamińska et al., 2019).

Therefore, immersive technologies act as a marketing tool for stimulating demand and diversifying supply in the market of educational services. Educational institutions and companies need to determine the return on investment, considering the impact of technology on the optimization of the educational process and the development of new skills for an adult.

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