

Abdraimova E.T., Shoibekova A. Zh., Aimakhanova A. Sh., Abzaliyeva A.R.,
Mussina I.M., Abzaliyev Zh.R., Assykbaeva L.P.
Asfendiyarov Kazakh National medical university

THE IMPORTANCE OF IMMERSIVE APPROACHES IN THE UNIVERSITY ENVIRONMENT

Virtualization in training, mobile learning (m-learning), as well as hybrid educational technologies that allow implementing e-learning at the transition stage from their use to implementation have become the most viable and popular in terms of flexibility in the organization of the educational process and access to educational resources. The growing popularity of virtual reality technologies determines the key positions soon, and the prospects for using immersive approaches allow us to take a new look at the system of human-computer interaction (HCI). Virtual reality technologies have become a powerful and promising tool in education due to their unique technological characteristics that distinguish them from other applications. Special attention is paid to the concept of immersion, which allows us to look at modern immersion technologies in a qualitatively different way. The article combines all the research in the terminological aspect in the form of a definition of the concept of an immersive approach in education. The study of immersive technologies, in General, touched upon the question of the consequences that can be caused by their use. Here you should pay special attention to the psychological aspects of the impact of immersive environments on the student, be aware of the sense of proportion and goal setting of their use with an understanding of the risk of negating all the useful effects. It is also determined that immersive technologies, which imply the transformation of the role of the teacher, make us talk about the problem of the majority of teachers' unwillingness to implement them in educational practice.

Keywords: *immersive approach, education, immersive environment, virtual reality, immersive technology.*

«Technology is not a reflection of the world, but a way to manage reality»

Octavio Paz, Mexican writer

Introduction

The transformation of education and the development of the necessary strategy for its development today require the identification of certain grounds and trends. To do this, it is necessary to attempt to determine the prospects that will form the basis of the future paradigm of education [1].

According to many scientists, the current stage can be positioned as a transition, and the active introduction of e-learning, digitalization of the educational process dictate different requirements for approaches and technologies, which is confirmed by key documents [2]. The decree of the President of the Republic of KAZAKHSTAN "On approval of Strategic development plan of Kazakhstan up to 2025" one of the tasks assigned for the solution to the Government of Kazakhstan, the development of the national project in the sphere of education defined by the introduction of new methods of training and education, and educational technology [3]. Some modern educational technologies such as "inverted classroom", mixed learning, adaptive learning, and micro-learning are based on human-computer interaction (HCI). However, most often the control and output devices are limited to a standard set (keyboard, mouse, monitor, etc.).

To learn about the world around us, a person can use a number of different functions of the body: movement in space, interaction with objects using hands and feet, head rotation, etc. However, today, in the era of digital society, these mechanisms have acquired a completely different format, depending on the controls of the computer and other technical devices. Interaction with the user interface has made it a habit to start learning by pressing keys and waiting for the result in the form of visual images on the monitor. This reduces all human-machine interaction to "finger" manipulation, which is not human nature.

Objective

Based on this problem, the purpose of this study is to form key positions that allow us to identify the basis for further study and development of an immersive approach to education. Immersive as a complex of pragmatic structures and mechanisms in practice requires detailed analysis, including retrospective analysis and covering different branches and fields of science.

Materials and methods

Some scientists believe that «currently there are technologies for a fundamentally different way of learning and underestimating this circumstance may deprive domestic education of a strategic advantage». In addition, we are talking about virtual reality technologies. «Virtual reality is a new artificial world constructed by technological devices, transmitted to a person through his senses. It is based on the concept of using a human-machine interface to create the effect of a three-dimensional environment in which the user interactively interacts with virtual objects, rather than with images of these objects».

Virtual reality technologies are increasingly gaining pulse and the reduction in the cost of such equipment and, as a result, its mass availability determine key positions soon, especially in the field of education. Here, human-machine interaction becomes familiar to human nature: the movement of hands and feet to interact with the virtual environment, the rotation of the head, the movement of the entire body in space, receiving completely different feedback. This approach fundamentally changes the way multi-modal interaction with the user interface and virtual environments in general.

Virtual reality is closely related to the concept of artificial learning environments and by immersive. For example, L.M. Andryukhina paid attention to the parameter of immersive as a feature of the telepresence effect, which is not inherent in any of the types of communication analyzed in one of the works (video conferencing, Internet telephony, etc.) [4].

The method of multimodal interaction implemented in games based on the multimodal approach was described by Halawani, A., Feng, S., & Réhman, S. U. [5]. At the same time, the overall goal of immersive is to create a direct connection between content and its perception for deep immersion in the event environment. It should be noted that the prospects for immersive technologies and their mass distribution lie in interdisciplinary research, in the search for opportunities and limitations of immersive interaction in human-machine systems.

Russian scientists have defined (Podkosova Ya. G., Varlamova O. O.) virtual reality as «a new concept of using computers and a human-machine interface to create the effect of a three-dimensional environment in which the user interactively interacts with virtual objects, and a strong sense of three-dimensional presence is created» [6].

Virtual reality as a term is usually described as a set of technical equipment, which makes the focus on the technological component. However, this technological approach does not provide a conceptual framework for the educational use of virtual reality [7].

Immersive, understood literally as "immersion", "presence effect", allows us to look at the application of modern immersion technologies, in particular virtual reality technologies, in a qualitatively different way, expanding and deepening it. Thus, we can observe the development of immersive from the effect of telepresence [8] to full immersion with interactivity [9, 10].

Serious research in the development of an immersive approach in education should be noted in the works of S.F. Sergeev, who revealed the concept of an immersive learning environment as a basic concept in post-classical representations of pedagogy [11, 12, 13]. «Immersive learning environments the author is understood as a system of the self-organizing construct, which is manifested as a dynamic process in the subject of training, involving in its structure the various elements of internal and external environment to ensure autopoiesis of the body, stability of personality, the continuity of its history».

The immersive approach implies some key points on which the principle of visibility in education is implemented. Therefore, the principle of the immersive approach does not negate, but rather expands and complements it, taking into account current trends and technical capabilities. Immersive technologies in education increase the value of visual AIDS in the learning process through deep immersion in a virtual environment. They play a significant role in enriching students with complex sensory and cognitive experiences necessary for complex mastery of abstract concepts.

In foreign literature, the concept of «Immersive teaching» (immersive learning, immersive education) appears, describing the study and consolidation of the potential of the so-called «virtual worlds» in the educational environment [14]. Over the past few years, «virtuality» in education has been recognized as a powerful and effective tool for supporting learning. In particular, virtual worlds allow you to perform specific tasks in various «settings» created as scenarios for specific learning goals.

Consolidating all research in the terminological aspect, the author of this article interprets the immersive approach in education as a strategy of cognition. It also emphasizes a set of techniques and methods of interactive productive interaction of subjects of the educational process to develop and self-develop the student's personality in an artificially created virtual environment that can comprehensively affect his sensory modalities.

The immersive approach is partly interfaced with other approaches in education (activity-based, contextual, informational), deepening their meaning. From the point of view of the activity approach, which implies a set of ways to form and develop a student's subjectivity, aimed at self-improvement of the individual, it is possible to distinguish productive interaction between the teacher and students, the development of achievement motivation to promise professional activities in the future. From the perspective of the contextual approach as an integral complex model of the organization and functioning of the educational system, common points of convergence are seen in the student's desire for self-knowledge, self-development, and self-realization, as well as ensuring his self-actualization in the living space (context) in which he is included and part of. The information approach is most deeply integrated with the immersive approach since when studying any object, processing, or phenomenon in nature and society, the most characteristic information aspects that determine their functioning and development are first identified and analyzed. Thus, the information approach (according to D. Marr) reveals the study of the representation and processing of visual sensory information, which is based on the use of artificial intelligence and computer technologies in General.

The immersive approach implies some key points on which the principle of visibility in education is implemented. Therefore, the principle of immersive does not negate, but rather expands and complements it, taking into account modern trends and technical capabilities. Immersive technologies in education enhance the value of visual AIDS in the process of learning through deep immersion in the virtual environment. Their role in enriching students with the complex sensory cognitive experience necessary for the complex mastery of abstract concepts is very important.

Sensory modalities of a person as the first stage of cognition must be enhanced by deeper immersion, complex effects on the senses, which contributes to the acquisition of knowledge in the form of concepts, rules, laws laid down at the next stage. Providing knowledge with objectively existing reality should continuously accompany the learning process based on feelings.

Results

To increase the effectiveness of learning, the principle of immersive requires, first, to use immersion tools, to rely on visual modality. The principle of complexity in the immersive approach involves the impact on all human senses to the perception of educational material.

However, even today there is reason to believe that the immersive approach claims to be one of the key ones soon for the transformation of modern education.

Immersive technologies involve transforming the role of the teacher, focusing on designing a multimodal virtual environment, and creating immersion scenarios. According to the scientist L.M. Andryukhin, " its main function is to model various routes and educational scenarios for the student and, together with the student, support the processes of goal formation and meaning formation in the learning process, which is impossible without direct communication» [15].

Designing the most complete virtual environment is a new feature for teachers. Now the teacher becomes «an observer and an active participant in communication, using his experience and authority to guide the student in the field of educational meanings, changes in the observed parameters of the learning environment» [16]. At the same time, «the function of the lecturer gives way to the role of a guide, which enhances (facilitates) the psychological effect of the group's communication with the virtual world» [17].

Conclusion

Forward-looking analysis suggests that we should focus on the consequences that can be caused by implementing an immersive approach on students. First, you should take into account the psychological aspects of the impact. Hence, it is concluded that the inclusion of such technologies can exacerbate aspects of learning, formalizing the learning process, reducing the degree of communication between students, impoverishing the forms of educational activities and not only. «The psychological aspects of the transition to virtual reality are based on the natural desire of a person to get rid of all kinds of problems, including those related to

everyday life, and in fact with the difficulties of studying at a University» [18]. In this regard, it is necessary to understand the need for students to develop a sense of proportion, awareness of goal-setting using immersive environments.

It should also be noted that «psychophysiological capabilities are not fully used» and real communication is replaced by virtual communication. Prolonged exposure to immersive immersion can cause psychophysical problems. Due to the mismatch of information received from different types of analyzers at the inputs of the nervous system, students may experience undesirable symptoms in the form of dizziness and nausea, and according to experts, the entire beneficial effect of immersive immersion can thus be negated.

Virtual reality and immersive technologies have become a powerful and promising tool in education due to their unique technological characteristics that distinguish them from other it applications. Some views indicate a radical change in the usual world, the upcoming revolution, which will also affect education. In this case, a major task is to change pedagogical technologies and create promising integrated training systems, where the key role will be assigned to the immersive approach-a set of progressive techniques implemented in fundamentally new conditions.

It should be noted that the majority of teachers are not ready to implement new methods and technologies in practice, including innovative approaches, which can and should include the immersive approach. This indicates the urgent need to build new strategies for training personnel for education, whose work in the future will certainly be implemented in completely different conditions. Global trends in the transition of the educational process to "digital" dictate different rules, providing an arsenal of modern tools of virtual systems that are poorly studied in our country.

Of course, the full supremacy of the immersive approach in education should not be expected, but the prospect of close interaction with the new "artificial" world is quite likely in the coming years, stimulating the development of flexible information immersive environments.

REFERENCES

- 1 Veshneva I. V., Singatulin R. A. Transformation of education: trends, prospects // Higher education in Russia. 2016. No. 2 (198). Pp. 142-147.
- 2 Vasneva I. V., Singatulin R. A. Virtual technology – new perspectives in the education system. // In the collection: Information technologies in education. Saratov state University. 2015. Pp. 382-387.
- 3 Decree of the President of the Republic of Kazakhstan dated February 15, 2018 No. 636 «on approval of the Strategic development plan of the Republic of Kazakhstan until 2025 and invalidation of certain decrees of the President of the Republic of Kazakhstan (as amended on 10.09.2019)
- 4 Mikropoulos, T. A., & Natsis, A. (2011). Educational virtual environments: A ten-year review of empirical research (1999-2009). Computers and Education, 56(3), 769-780. doi:10.1016/j.compedu.2010.10.020
- 5 Halawani, A., Feng, S., Li, H., & Réhman, S. U. (2014). Multimodal hand and foot gesture interaction for handheld devices. ACM Transactions on Multimedia Computing, Communications and Applications, 11 doi:10.1145/2645860
- 6 Podkosova Ya. G. Analysis of prospects for using virtual reality technologies in distance learning / Podkosova Ya. G., Varlamov O. O., Ostroukh A.V., Krasnyansky M. N. // Questions of modern science and practice. V. I. Vernadsky University. 2011. No. 2 (33). Pp. 104-111
- 7 Steuer, J. (1992) Defining virtual reality: dimensions determining telepresence. Journal of Communication, 42 (4), pp. 73-93. doi.org/10.1111/j.1460-2466.1992.tb00812.x
- 8 Andryukhina L. M. Telepresence Technologies – a new creative platform for the development of education // Fundamental research. 2013. № 10-12. Pp. 2754-2759.
- 9 Kornilov Yu. V., Popov A. A. VR-technologies in education: experience, review of tools and application prospects // Innovations in education. 2018. №. 8. Pp. 117-129.
- 10 Kornilov Yu. V., Popov A. A. Augmented reality: application of AR technologies in training // Scientific electronic journal Meridian. 2018. №. 4 (15). Pp. 264-266.
- 11 Sergeev S. F. Training and professional immersive environments. - Moscow: National education, 2008. - 434 p.
- 12 Sergeev S. F. Problems and prospects of e-learning development // School technologies. 2015. no. 3. Pp. 28-38.
- 13 Sergeev S. F. Virtual simulators: problems of theory and methodology of design // Human-machine systems. 2010. No. 2 (8). Pp. 15-20.
- 14 Cummings, J. J., & Bailenson, J. N. (2016). How immersive is enough? A meta-analysis of the effect of immersive technology on user presence. Media Psychology, 19(2), 272-309. doi:10.1080/15213269.2015.1015740
- 15 Dede, C. (2009). Immersive interfaces for engagement and learning. Science, 323(5910), 66-69. doi:10.1126/science.1167311
- 16 Blascovich, J., Loomis, J., Beall, A. C., Swinith, K. R., Hoyt, C. L., & Bailenson, J. N. (2002). Immersive virtual environment technology as a methodological tool for social psychology. Psychological Inquiry, 13(2), 103-124. doi:10.1207/S15327965PLI1302_01
- 17 Sanchez-Vives, M. V., & Slater, M. (2005). From presence to consciousness through virtual reality. Nature Reviews Neuroscience, 6(4), 332-339. doi:1038/nrn1651
- 18 Ismailova N. P., Kurbanova Z. S. Psychological aspects of Informatization of the educational system // Azimuth of scientific research: pedagogy and psychology. 2018. Vol. 7. No. 1 (22). Pp. 87-90.

Абдраимова Э.Т., Шойбекова А.Ж., Аймаханова А.Ш., Абзалиева А.Р., Мусина И.М., Абзалиев Ж.Р., Асыкбаева Л.П.
С.Ж. Асфендияров атындағы Қазақ Ұлттық медицина университеті

УНИВЕРСИТЕТ Ортасындағы Иммерсивті Тәсілдердің Маңыздылығы

Түйін: Виртуалды шындық технологиялары оларды басқа ІТ қосымшаларынан ерекшелейтін ерекше технологиялық сипаттамалары арқасында білім беруде қуатты және перспективалы құралға айналды. Жақында виртуалды шындық технологияларының өсіп келе жатқан танымалдығы негізгі ұстанымдарды анықтайды, ал иммерсивті тәсілдерді қолдану

перспективалары адам-компьютерлік өзара әрекеттесу жүйесіне (HCI) жаңа көзқараспен қарауға мүмкіндік береді. Мақалада иммерсивтілік тұжырымдамасына ерекше назар аударылады, бұл заманауи батыру технологияларына басқаша қарауға мүмкіндік береді. Мақалада терминологиялық аспектідегі барлық зерттеулер білім берудегі иммерсивті тәсіл ұғымын анықтау түрінде біріктірілген. Сондай-ақ, мұғалімнің рөлін өзгертуді білдіретін иммерсивті технологиялар бізді көптеген мұғалімдердің білім беру тәжірибесінде оларды жүзеге асыруға дайын еместігі туралы айтуға мәжбүр ететіні анықталды.

Түйінді сөздер: иммерсивті тәсіл, білім, иммерсивті орта, виртуалды шындық, иммерсивті технологиялар

Абдраимова Э.Т., Шойбекова А.Ж., Аймаханова А.Ш., Абзалиева А.Р., Мүсина И.М., Абзалиев Ж.Р., Асыкбаева Л.П.

Казахский Национальный Медицинский Университет им. С.Д. Асфендиярова

ЗНАЧИМОСТЬ ИММЕРСИВНЫХ ПОДХОДОВ В УНИВЕРСИТЕТСКОЙ СРЕДЕ

Резюме: Технологии виртуальной реальности стали мощным и перспективным инструментом в образовании благодаря своим уникальным технологическим характеристикам, отличающим их от других ИТ-приложений. Набирающие популярность технологии виртуальной реальности определяют ключевые позиции в ближайшем будущем, а перспективы использования иммерсивных подходов позволяют по-новому взглянуть на систему взаимодействия человека с компьютером (human-computer interaction, HCI).

Особое внимание в статье уделено понятию иммерсивности, позволяющей качественно иначе взглянуть на современные технологии погружения. В статье объединены все изыскания в терминологическом аспекте в виде определения понятия иммерсивного подхода в образовании. Также определено, что иммерсивные технологии, подразумевающие трансформацию роли педагога, заставляют говорить и о проблеме неготовности большинства педагогов к их реализации в образовательной практике.

Ключевые слова: иммерсивный подход, образование, иммерсивная среда, виртуальная реальность, иммерсивные технологии