

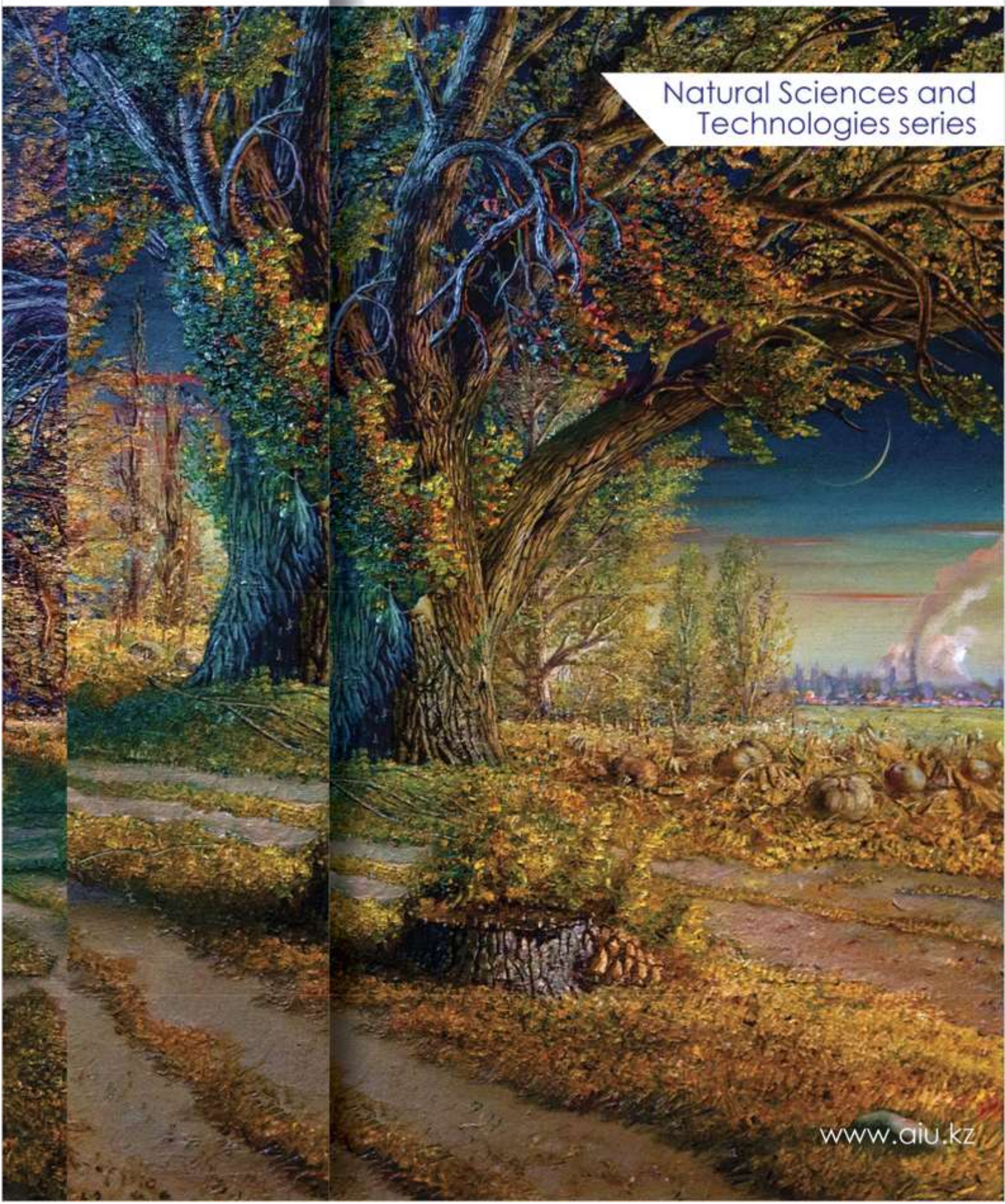


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ABOUT VIRTUAL AND AUGMENTED REALITY (VR/AR) AND GAMIFICATION OF TRAINING IN THE POWER INDUSTRY

Zhukabayeva T.K., Abdildayeva A.A., Mardenov E.M.

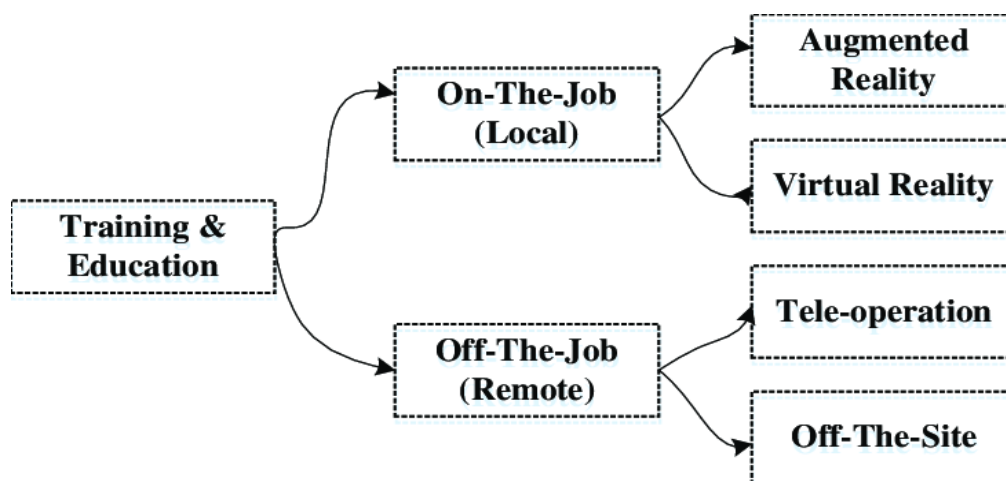
Abstract. The application of innovative IT technologies remains one of the current and important challenges facing education in the digitalization of modern society. The capabilities of mobile devices have led to the emergence of technologies that have opened up new opportunities in the process of teaching and learning, namely augmented reality (AR) and gamification (Gamification).

The scientific significance is due to the application of deep, modern mathematical results and the creation of new own methods of research and analysis, as well as the development of an educational platform based on the example of one section of discipline and the use of the latest VR/AR technologies and gamification in the educational process.

Key words: augmented reality, gamification, modern mathematical results, VR/AR technologies, the educational process

INTRODUCTION

The proposed study is in line with the strategic goals and objectives of the development of the digitalization of the industry and electricity industry of the State Program "Digital Kazakhstan" and the Strategic Development Plan of the Republic of Kazakhstan until 2025, in accordance with the roadmap for the digitalization of the industry and electricity industry of the Republic of Kazakhstan. On the basis of the above-mentioned state programs, the task of developing the domestic electricity system will be to modernize its methodological approaches based on the transfer of advanced world standards and concepts system. At present, the world, as well as Kazakhstan, are exploring and forming new concepts for the development of the electricity system on a global and national scale, which are in line with the new goals and trends of the world and national economies and the new nature of threats of economic, environmental and social nature. but interconnected technical elements that, in real time, carry out the processes of production, transmission and distribution of electric energy and realize a common strategic goal - to provide reliable electricity supply to energy consumers. As virtual environment technologies and artificial intelligence evolve, this system will find its use for staff training and management of complex processes. that allows you to remove the many restrictions imposed on the amount of visualized information, as well as quickly and efficiently develop the orientation-motor skills of the trained personnel by fully immersing the operator or trained personnel in a virtual environment.



Taxonomium of the use of VR/AR systems in training and education in the electricity industry

The move to Industry 4.0, where VR (virtual reality) technology is at the center of the new production system. At the same time, Kazakhstan, as well as all over the world, has launched the process of digitalization of the economy and industry. For Kazakhstan, the process of digitalization of electric power complexes is a technological response to external challenges against the backdrop of global trends.

The development of visual information processing techniques creates new technologies to explore the world around us and to construct an informational picture of the world. Visual modeling develops two directions: replacing reality by creating its virtual model in an artificial information field, and complementing reality by creating a multi-layered informative model that is not inherent in human perception.

Evidence suggests that augmented reality is a useful tool in education (Sumadio and Rambli, 2010). In education, the use of VR/AR software plays an active role in the learning process. Accordingly, students are absorbed and motivated to learn new problem-solving skills (Norman and Spohrer, 1996). Studies have shown that augmented reality can be a motivational factor in increasing interest and curiosity, leading to improved academic performance (Campos, Pessanha and Jorge, 2011; Yusoff, zaman, and Ahmad, 2011; Shea, Mitchell, Johnston and Dede, 2009). Augmented reality has the potential to become a pedagogical tool that motivates students because it improves learning experience and allows you to experiment. Motivation is an important component in learning. A motivated student will participate in the learning process and receive more from the educational experience (Ames, 2003; Sull, 2007).

Also about the days of the current trends in the development of educational technologies is gamification. Video games are the dominant form of entertainment of our time, which is why they are a powerful tool for motivating a new generation of students.

The gamification research shows that it is effective in attracting and motivating people to manage behavior and achieve desired outcomes (Brigham, 2015; Caton & Greenhill, 2014; Cheong, Filippou and Cheong, 2014; Leaning, 2015). There is a growing

interest in the use of gamification in education; Many educators have tried to apply their concept to Isotani, 2014). Durelli Reis Borges direction, in order for learning activities.

Student involvement means the degree of his active participation, the degree of attention, interest that the student shows when participating in the learning process (Reeve, 2012; Trowler, 2010). Student participation is one of the most important factors associated with improved learning, and much of the research to date points to the importance of student motivation leading to a positive effect on learning outcomes (e.g. Carini, Kuh & Klein, 2006; Klem & Connell, 2004; McMahon & Portelli, 2004). The more students engage in learning, the more they will learn and progress in their learning. As an evolving technology (Martin-Gonzalez, Chi-Put and Uk-Cetina, 2015; Johnson et al., 2014; Van Arnhem & Spiller, 2014), augmented reality (AR) not only complements the dynamic notion of teaching methods (Thornton, E Clarke, 2012) but also includes sensory modalities such as touch, sight, and hearing (Pérez-López & Contero, 2013). Except for the addition of a wide range of sensory modalities, there is a huge body of research to identify the potential benefits of AR in education, such as improving student achievement (Estapa, & Nadolny, 2015; Lu, & Liu, 2015; Civelek, Ucar, Ustunel, & Aydın 2014), motivation (Ferrer-Torregrosa et al. 2015), memorization (Pérez-López & Contero, 2013) and engagement (Bressler & Bodzin Bodzin, 2013; Zarraonandia, Aedo, Díaz & Montero, 2013). To achieve these critical learning outcomes, Thornton, Ernst, and Clarke (2012) envisage a continuous use of “modern and advanced” technology applications in teaching and learning, one of which is AR. The growing interest in the use of AR in education has led to the creation of AR learning, a learning experience that is supported by AR (M.E.C. Santos et al., 2014). D. Micela, D. Raskin, I. Sutherland, S. Siltanen, S. Feiner, G. Fitzmaurice, D. Schmalstiga, D. Engelbart et al.), Have made significant contributions to the development of information systems theory, the development of human-computer interaction issues, user interfaces and VR / AR.

AR research has created learning experience for almost every level of education from the very beginning, from childhood education to higher education, where a lot of research has been done. The results of this large and growing volume of LITERATURE on AR in education reveal the many advantages, opportunities, limitations and challenges of this technology in education.

Modern requirements for becoming a future specialist necessitate improving the educational system of secondary vocational education, applying innovative teaching methods and ways of perceiving new information. The Society of Information Technology needs people thinking independently, able to self-fulfillment.

EXAMPLES OF SERVICES THAT USE IFICATION FOR EDUCATION

Codecademy - teaching programming in JavaScript, HTML, Python, Ruby., Code School - another service for teaching programming with gamification elements, Motion Math Games - mobile games in mathematics make learning fun and exciting, Mathletics - a program for schools aimed at engaging children to mathematics through games and challenges, Khanacademy - free video courses in various subjects, Spongelab - a

platform for personalized science education, Foldit - solving scientific problems like puzzles. Gradual transition of users to online platforms carries a lot of advantages: the ability to learn from anywhere in the world at a convenient time, choose courses based on personal interests, not a pre-formed curriculum, etc., but there is a problem: freedom involves a lack of control and discourages the student. Gamification works on the principle of competition and helps to maintain a long-term interest in learning.

Augmented reality can add expressive animation to the static pages of a book, turn reading into a fun game, and make it easier to play audio and video content attached to a paper book. At present, the application of innovative technologies is of important social importance. Analyzing the global trends in the modernization of the economies of developed countries, the introduction into the national institutions of innovative approaches in management and technological processes, it is impossible not to touch on the issues of innovative energy development as a socio-economic system. The innovativeness of the project is to use the latest virtual reality technologies in the electricity system. Learning using virtual reality, allows visual training, show students all aspects of a real object or process, which in general gives a colossal effect, improves the quality and speed of educational processes and reduces their cost.

CONCLUSIONS

The application of innovative IT technologies remains one of the current and important challenges facing education in the digitalization of modern society. The capabilities of mobile devices have led to the emergence of technologies that have opened up new opportunities in the process of teaching and learning, namely augmented reality (AR) and gamification (Gamification).

The scientific significance is due to the application of deep, modern mathematical results and the creation of new own methods of research and analysis, as well as the development of an educational platform based on the example of one section of discipline and the use of the latest VR/AR technologies and gamification in the educational process..

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**О ВИРТУАЛЬНОЙ И ДОПОЛНЕННОЙ РЕАЛЬНОСТИ (VR / AR) И
ГАМИФИКАЦИИ ОБУЧЕНИЯ В ЭНЕРГЕТИЧЕСКОЙ ПРОМЫШЛЕННОСТИ**
Жукабаева Т.К., Абдилдаева А.А., Марденов Е.М.

Применение инновационных ИТ-технологий остается одной из актуальных и важных задач, стоящих перед образованием в области цифровизации современного общества. Возможности мобильных устройств привели к появлению технологий, которые открыли новые возможности в процессе преподавания и обучения, а именно дополненной реальности (AR) и геймификации (Gamification). Научная значимость обусловлена применением глубоких, современных математических результатов и созданием новых собственных методов исследования и анализа, а

также разработкой образовательной платформы на примере одного раздела дисциплины и использованием новейших VR / AR технологии и геймификация в образовательном процессе.

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