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# Application of educational simulations in the process of adult education

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## Abstract

The article analyzes modern research on the application of simulation games in the process of adult education, in particular in such areas as medicine, aviation, jurisprudence and pedagogy. The advantages of such training methods are noted, in particular, the development of practical skills in a safe environment. The article describes in detail the different types of simulations, such as virtual reality (VR), augmented reality (AR), role-playing and computer simulations, and provides examples of their successful use. In particular, the use of the Body Interact platform for the training of medical professionals, flight simulators for pilot training, and role-playing games in the simulation of court processes and the training of teaching staff are analyzed. It is noted that one of the key advantages of educational simulations is the opportunity to practice practical skills in a safe environment, which is especially relevant for professions that require a high level of responsibility. Also, simulations promote the development of critical thinking, decision-making and teamwork. The article emphasizes the importance of integrating simulation technologies into the educational process. The authors offer recommendations on the development of effective simulation scenarios, the selection of appropriate equipment, and the organization of the educational process. The authors reveal the potential of educational simulations to increase the effectiveness of adult learning and provide recommendations for the optimal integration of these technologies into the educational process.

**Keywords:** educational simulations, adult education

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# Застосування освітніх симуляцій в процесі освіти дорослих

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## Анотація

У статті аналізуються сучасні дослідження щодо застосування симуляційних ігор у процесі освіти дорослих, зокрема в таких сферах, як медицина, авіація, юриспруденція та педагогіка. Відзначаються переваги таких методів навчання, зокрема розвиток практичних навичок у безпечному середовищі. У статті детально описані різновиди симуляцій, такі як віртуальна реальність (VR), доповнена реальність (AR), рольові та комп'ютерні симуляції та наведено приклади їх успішного використання. Зокрема, аналізується використання платформи Body Interact для навчання медичних працівників, симуляторів польотів для підготовки пілотів та рольових ігор у моделюванні судових процесів та підготовки педагогічних працівників. Зазначається, що однією з ключових переваг освітніх симуляцій є можливість відпрацювання практичних навичок у безпечному середовищі, що є особливо актуальним для професій, які вимагають високого рівня відповідальності. Також, симуляції сприяють розвитку критичного мислення, прийняття рішень та командної роботи. У статті наголошується на важливості інтеграції симуляційних технологій в освітній процес. Автори пропонують рекомендації щодо розробки ефективних симуляційних сценаріїв, вибору відповідного обладнання та організації освітнього процесу. Автори розкривається потенціал освітніх симуляцій для підвищення ефективності навчання дорослих та надаються рекомендації щодо оптимальної інтеграції цих технологій у освітній процес.

**Ключові слова:** освітні симуляції, освіта дорослих

**Statement of the problem.** The modern world is developing rapidly, putting new demands on people for adaptation and constant learning. Traditional teaching methods, such as lectures and practical classes, although still relevant, often do not provide a sufficient level of development of practical skills and readiness to solve real problems. That is why there is a need to find innovative approaches to adult education. One of these promising methods is the use of simulation games.

Despite the growing interest, there is a lack of systematic research on the effectiveness of simulation games for the development of professional competencies in adults.

Insufficient research into the effectiveness of simulation games in andragogy, as well as the lack of clear recommendations for their use in various educational contexts, made it necessary to find out which types of simulation games are most effective for the development of various competencies in adults, how to optimally integrate them into the educational

process, and which factors affect the effectiveness of such training.

The need for constant updating of knowledge and skills, the development of technologies and interest in innovative teaching methods caused the urgency of researching the problem of using educational simulations in the process of adult education.

**The Analysis of Sources and Recent Research.** Khrulenko (2021) studied simulation games in the context of educational technology. Slyusarenko (2007) studied the educational game and its use in the process of training future teachers. Lazko (2023) studied the use of simulation technologies in the educational space of the medical high school.

However, the issue of the effective use of educational simulations in the process of adult education has not yet been worked out in detail.

**The Purpose of the article** is to analyze and systematize scientific research on the use of educational simulations in the process of teaching adults, as well as a description of practical

recommendations for the use of educational simulations in andragogy.

**The Results of the Research.** Gamification and simulation are two popular approaches used in the educational process to improve learner engagement and performance.

Educational simulations are a powerful tool that is increasingly being used in adult education. They create a safe space for experimentation, decision making and practical skills acquisition. Why are they so important? Let's take a closer look at the types of educational simulations in Table 1.

**Table 1.**

Types of educational simulations

Type of simulation	Description	Application examples
Computer simulations	Interactive programs that allow you to simulate various processes and phenomena.	Flight simulators, business simulations, chemical experiments, medical procedures
Virtual Reality (VR)	Immersion of the user in the digital environment.	Simulators for surgeons, driving lessons, virtual tours
Augmented Reality (AR)	Superimposition of virtual objects on the real world using special devices.	Interactive textbooks, equipment maintenance, medical diagnostics
Role playing games	Imitation of real social situations where participants perform certain roles.	Simulations of negotiations, court proceedings, client service
Scenario-based simulations	Practicing certain scenarios that may arise in real life.	Simulations of emergency situations, crisis management, decision-making
Physical simulators	Objects imitating real devices or systems.	Mannequins for practicing medical manipulations, simulators for pilots
Hybrid simulations	A combination of different types of simulations to achieve maximum efficiency.	Simulation of a surgical operation using VR glasses and a physical mannequin

Adult education needs transformation now more than ever due to rapid changes in technology, labor markets and societal needs. Traditional educational models often cannot keep up with the rapid development of modern skills, leaving many adults unprepared for new challenges. As industries embrace automation and digitization, adults need to continually update their competencies to remain relevant and competitive in the workforce. In addition, with the increasing complexity of global issues such as climate change, health care, and technology ethics, adults need to be equipped not only with specialized knowledge, but also with critical thinking and problem-solving skills (Dmitrenko, et al. 2023).

One of the most effective ways to achieve this transformation is through the use of learning simulations. Simulations create immersive, hands-on learning experiences that closely mimic real-world

scenarios, allowing students to engage in active problem-solving and decision-making. Unlike traditional classroom learning, simulations promote hands-on interaction, encouraging adults to apply theoretical knowledge in a realistic context. This leads to deeper understanding, better retention of information and the ability to adapt acquired skills to different situations. For example, in healthcare education, simulations can recreate emergency scenarios, allowing students to practice life-saving procedures without the risks associated with real-life situations (Lazko, 2023).

By integrating simulations into adult education, we can improve learning outcomes, make education

more tailored to individual needs, and prepare adults for the complexities of today's world. This approach promotes continuous learning, ensuring that people are not only prepared for current requirements, but also adaptable to future changes.

The choice of the type of educational simulation depends on the purpose and direction of learning. For example, in medicine, including during training courses for medical workers, augmented reality services for diagnosing virtual patients have become widely used.

Educational simulations are particularly effective in key areas of adult education where hands-on experience and critical thinking are key to successful learning. Let's consider some of them in more detail.

Medicine - Educational simulations allow medical professionals, doctors and nurses to practice emergency procedures and responses without risk to patients. This is especially useful in preparing for

operations, providing first aid or treating critical conditions.

**Business.** In the field of business, it is effective to simulate various management scenarios, financial risks, crisis situations or market changes.

**Information technology (IT).** Educational simulations in the IT field are used for training in cyber security, IT systems management or programming. This provides an opportunity to practice problem solving in a safe environment, simulating real threats and challenges.

**Aviation.** The training of pilots and operators of autonomous systems (drones, cars) traditionally includes simulations to develop the skills of driving and responding to a complex situation. Such simulations minimize risks and provide an opportunity to practice actions in conditions as close as possible to real ones.

**Law enforcement activities and emergency situations.** Educational simulations will be useful for training police officers, firefighters and rescuers. Simulation of crisis situations allows you to practice quick and effective actions in conditions of stress or danger.

**Education.** For teachers, modeling is a tool for professional development, modeling of various educational situations, student behavior or teaching methods. This contributes to better preparation for the challenges of the modern educational system.

The implementation of simulations in this field of adult education allows to make learning more interactive, effective and safe, which is especially important for complex and relevant professions (Kobyliansky, et al. 2024).

The training of medical workers involves the use of virtual training tools, such as. For example, the virtual simulation platform Body Interact. This innovative tool of virtual simulation is widely used in institutions of higher education specialized in the medical field, as well as during training of doctors or training aimed at changing the vector of their professional activity. Body Interact allows you to analyze clinical situations and solve diagnostic tasks with the help of "virtual patient" technology. This interactive tool allows you to study the symptoms of diseases in detail, develop and substantiate a treatment plan, as well as monitor the consequences of prescribed therapeutic measures. An important advantage is the possibility of conducting simulation sessions in a remote format. It is worth noting that this method of learning has a number of advantages.

First, virtual simulation eliminates possible risks for both the patient and the doctor.

Secondly, the possibility of effective training in a distance format, which, moreover, is capable of forming high-quality professional competences through training based on practical cases.

Thirdly, the simulation of real clinical situations allows safe and effective testing of new treatment methods that would not be possible to test in real life.

Pilot training can also include mountain flight simulations. This method of training, or professional development, allows you to carry out virtual training in different weather conditions, on different terrain. The main advantages of such simulations are the absence of risks for pilots and passengers, as well as the formation of professional competencies based on practical cases. Today, the most popular flight simulators are Microsoft Flight Simulator, X-Plane and X (FSX).

The simulation game «Model UN» is currently actively used to train lawyers or improve their qualifications throughout life.

Model UN is an educational role-playing game, during which the meeting of various bodies of the UN system is simulated. Its members act as diplomats, reproducing the work of the Organization in compliance with the real rules of procedure. They represent different countries and participate in the discussion of current issues that are on the agenda of the UN.





Special attention should be paid to improving the qualifications of teachers. After all, lifelong education is an indispensable companion of competent education workers. Modeling the process of interaction of various links of the education system of Ukraine, highlighting the strengths and difficulties of communication; identification of values, beliefs of the participants regarding the process of educational reform, priorities in the functioning and development of the school as a social institution; outlining the necessary changes in the education system and forming a vision of how to implement them are the main advantages of using the stimulating game called «Territory of Education».

Let's consider the simulation games in adult education in detail in Table 2.

**Table 2.**

Simulation games in the process of adult education

**Conclusions.** Educational simulations have great potential to transform the learning process. They not only increase the effectiveness of learning, but also

<p><b>Body Interact</b> The first and most advanced virtual patient simulator</p>	
<p><b>X-Plane</b> A flight simulator with unique features</p>	
<p><b>Model UN</b> An educational role-playing game, during which a meeting of various bodies of the UN system is simulated</p>	
<p><b>Territory of education</b> Simulator of the process of interaction of various links of the education system of Ukraine</p>	

The use of educational simulators makes learning more interesting, effective and practically oriented. Educational simulations are especially relevant in the process of adult education, because they help to qualitatively and effectively raise the educational level and form such necessary professional competencies.

make it more interesting and exciting. Thanks to the continuous development of technology and scientific research, we can expect that simulations will become an integral part of the educational process in the near future.

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