

Review of the effectiveness of new information technologies in the era of global digital technologies

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Abstract. The dynamic development of the economy in society is of great help in solving problems with the internal and international conditions of the development of a global country. Currently, the continuous and rapid development of information technologies in the economy is due to the quality of this knowledge system. As you know, the development of digital information technologies is due to the systematic and continuous quality education of secondary schools and higher educational institutions. That is, in the case of the development of information technologies, humanity can change, simplify life in society, introducing into history any innovative developments, in whatever industry they may be. Undoubtedly, the digital economy, which has become the core of today's topic of industrialization in accordance with the requirements of the digital era of new information technologies, is one of the leading mechanisms in the development of socio-social, industrial relations, various services and innovations at a characteristic level, in the management of infrastructure facilities with a new civilizational trend, i.e. in improving the social quality of life of the population.

This article examines the effectiveness of the use of digital information technologies in educational fields.

Keywords: education, information technology, global development, quality of education, additional reality AR, geoinformation system, virtual reality VR, digital economy.

1. Introduction

The rapid development of the economy in society is directly connected with the introduction of these transitional digital technologies and, accordingly, with the formation of the digital economy. Today, the development of information technologies plays an important role in society, including in the economy.

In the economy, digital technologies are developing more intensively than any innovations in our history. That is, the development of digital technologies depends on a conscious and modernized comprehensive system education of students of educational schools and universities. We must not forget that the development of any sphere directly depends on this knowledge. For example, we know that advanced technologies in the field of healthcare help to save lives, diagnose, treat any diseases, there are various programmable devices. This means that the continuous and dynamic development of information technologies in the economy can testify to the quality of the education system.

2. Materials and methods

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Today, the development of information and telecommunication technologies plays an important role in society, including in the economy. A person always strives to satisfy constantly growing needs in one or another area of his activity (Stefanova & Sedova, 2017).

Continuous development of new information and communication technologies in education is one of the requirements of modernity. The XXI century is the century of digital information technologies, which provides great help in solving global problems. Information and digital technologies are of great importance in the development of the education system in modern society. At the stage of development of digital information technologies, the main task of the teacher is to train modern educated and qualified working specialists. The rapid development of informatization processes in society requires the formation of a versatile person who owns new technologies.

The practical implementation of the model of science-oriented or practice-oriented education requires taking into account the processes that determine the development trends of both the education system in particular and society as a whole. The world has entered the era of accelerating technological changes, which are accompanied by a radical transformation of the content of many professions, the death of some of them, the emergence of completely new ones (Pakhomov, 2017).

Many scientists agree that today the computer is becoming the first universal mass tool for working with all kinds of data and providing information (Kozlova, 2018).

Recently, many authors (INTED, 2019) have been using various types of multi-medial tools in the learning process.

Modern computer programs allow you to work in a new way with images, sound, video materials and texts, with calculations, with information models of various objects, etc. (Kozlova, 2015).

An important role in the creation of educational materials, in addition to their content, is played by the overall design of the prepared materials (Jurik, 2017), therefore, the use of new technologies will allow the student to master the material better.

We live in a world where computer technology plays a key role in all production processes of society. Today, starting from everyday life and ending with the educational process, modern technologies have been introduced that help in all actions. It is especially important for modern society to maximize the use of computer technology in the educational process, since education is an important tool in the modern world, which is constantly transforming and expanding the boundaries of society's capabilities. Technologies that are being introduced into the educational process, which make it interactive thanks to multimedia technologies, the Internet, virtual and augmented reality, are changing rapidly (Ivanko, Ivanko & Burtseva, 2018).

As well as implementation – "in the learning process, the use of game elements also plays an important role" (Schmidt, 2018).

New information technologies include the use of augmented reality (AR) for geoinformation systems. Currently, these programs are used by anyone, regardless of age.

With the development of 3D geographic information systems (GIS) and the hype around tools such as Mapbox, ArcGIS Pro and CesiumJS ten years ago, advances in technology such as augmented reality (AR) appeared. AR began to be actively used in everyday life. Google Pixel users suddenly had the opportunity to photograph stormtroopers and dinosaurs in their living rooms, and Google glasses appeared that allowed digital images to be superimposed on reality (Proxima, 2021).

Modern multimedia technologies of virtual and augmented reality help in teaching to keep the student's attention to a certain object to the maximum, which helps to memorize new material at a new high level, while familiarizing and consolidating knowledge. Modern multimedia technologies can be used both for primary school classes and for professional retraining of qualified specialists. And when creating virtual reality, it is necessary to work out the mechanism of implementation, and to work out for which audience the conditions of reality are created, the future of education depends on this action (Ivanko, Ivanko & Burtseva, 2018).

The combination of intelligent infrastructure, big data and three-dimensional cartography allows you to create amazingly detailed models that are useful for engineers, builders and active residents who want to be aware of what is happening. The crown of the use of AR and VR in data visualization

is a single multi—level scalable three-dimensional model of the city, which can be used for thousands of different purposes.

The AR system has many applications, we want to develop these applications related to the use of geographical information, which should be different from them in the gaming or entertainment sphere, which can emphasize the smoothness of the image and rendering or vivid visual effects (Fong, Ong & Nee, 2009).

Apart from the gaming and simulation context, the role of AR/VR is becoming more and more central, indeed, international a review of improvements in teaching practice showed that this is due to the intensive use of video in teacher education (Christ, Arya & Chiu, 2017). That is, one of the easiest ways to learn can be called AR / VR.

VR GIS technology is a combination of virtual reality (VR) and GIS technologies, combining three-dimensional GIS (3D GIS) and Internet-oriented GIS (web GIS). VRGIS technology uses various human-computer interaction devices (Haklay, 2001).

It creates a three-dimensional (3D) model in a virtual environment and works through personal computers, mobile devices and smart glasses. New generations of inexpensive hardware technologies and ubiquitous devices significantly reduce the threshold for adoption of VRGIS by various research communities and user groups (Castelvecchi, 2016).

Using the GIS program in augmented reality allows us to see the appearance and structure in advance, or we can get accurate data about another object or building. The augmented reality feature makes every image on the map realistic. It also creates a comfortable environment for the user.

3. Results and their discussion

Table 1 shows that the selected types of technologies that allow to realize some properties of virtual reality technology and GIS are ideally suited for use not only in the economy, but also in various industries.

Table 1. Examples of the scope of AR,VR, and GIS

Technologies	Areas of application
AR,VR, and GIS	Education
	Healthcare
	Marketing and advertising
	Tourism
	Construction and urban planning
	Transport and communications
	Military industry
	Development
	Sales

Great influence in the study of various courses in the field of e.g. storytellers of architecture, power engineering at universities or secondary schools may have new methods based on AR. They allow us to get a better idea of this problem (CMDTUR, 2018).

And also one of the games that won the hearts of millions of celebrities – "Pokémon GO has become very popular: in the first month of its existence alone, tens of millions of users connected users from the real world to the virtual using their smartphones. Behind the scenes, Pokémon GO is powered by location services, GIS and GPS. Pokémon GO is built on the Niantic Real World Gaming Platform for augmented reality, which allows users to find and catch more than a hundred types of Pokemon while exploring their surroundings" (josephkerski, 2016).

Roman Meshcheryakov - Professor of the Russian Academy of Sciences, Doctor of Technical Sciences, Vice-Rector for Research and Innovation of Tomsk State University The University of Control Systems and Radio Electronics believes that there are two approaches to the term "digital

economy". The first approach is "classic": the digital economy is an economy based on digital technologies and at the same time it is more correct to characterize exclusively the field of electronic goods and services. Classic examples are telemedicine, distance learning, the sale of medical content (movies, TV, books, etc.). The second approach is an extended one: "digital economy" is economic production using digital technologies (Urmantseva, 2017).

Currently, each state has software systems "Digital Education", "Digital Program", "Digital Environment", "Digital Economy". That is, the purpose of these programs is high-quality education, the implementation of high-quality economic programs, and most importantly, effective appeal to the population.

4. Conclusion

The use of augmented reality in the geoinformation system is becoming global trends, whatever the branch of the economy. Games are currently being created using AR, VR and GIS programs, which also contributes to the development of tourism. It should be noted that the education system has been used since primary education. The introduction and integration of the use of AR and GIS programs in the educational sphere brings great results for both teachers and students. In the future, the use of AR and GIS programs in the education system that develop effective projects will increase.

Currently, using AR, VR and GIS technologies, smart homes, cars and many things related to household needs have been transferred to the public for use. And this means that any industry will flourish.

Therefore, in order to modernize the economy, it is necessary to introduce innovations with the continuous use of information technologies.

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