

RISKS ANALYSIS OF DIGITALIZATION OF EDUCATION

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Abstract: In modern conditions, one of the problems of digitalization of education is the risk. The purpose of this study is to identify, analyze and classify the risks of digitalization of education. Our study is based on the analysis of regulatory documents of the UN, UNESCO, OECD, and European Commission. We also carried out a review of the opportunities and threats of digitalization of education in the work of researchers. Based on the analysis, the authors proposed a classification of digitalization risks by highlighting external and internal risks. The proposed classification describes the ability to manage different types of risks. Research can affect the quality of education management and the success of IT introduction into the educational process. Digitalization of education is a decisive element in the development of competence of students in the era of knowledge economy, which allows the educational institutions quickly adapting in a rapidly changing environment and increasing the competitiveness of graduates.

Keywords: risk, education, digitalization, technology, threats, opportunities

1 Introduction

The high rate of changes in modern society is due to the acceleration of socio-economic development and scientific and technological progress. The transition to a knowledge economy is accompanied by a number of global trends affecting education. This is the transfer of the center of economic and technological development from the Western countries to the Asian region, to such countries as China, Singapore, India, Korea and Malaysia. Another important factor of these changes is the globalization of world markets, associated with an increase in the intensity of air transportation, export of goods and services. The growth of labor mobility and migration flows lead to a change in the demographic and cultural component of society. At the same time, the appearance of artificial intelligence changes the prospects of the individual and its functions in the emerging knowledge economy (OECD, 2019).

The tool for the development of global processes is the active digitalization of all aspects of life, including education. If the first elements of digitalization in education appeared in the 60s of XX century, when programmed learning was popular, then there was an active sequential transition from e-learning through b-learning and m-learning to learning in the conditions of AR and VR to the use of artificial intelligence and neural networks for several years (Escueta et al., 2017).

Digitalization expands access to education in the most remote corners of the world, improves the quality of training and management efficiency through the use of individual trajectories, creates opportunities for transparency and fairness in the assessment of learning outcomes by external or internal evaluators. This increases the effectiveness of the educational system and creates the conditions for achieving the sustainable development goals adopted by the UN in 2015 (UN, 2015).

The digitalization of society poses new challenges for the formation of the skills necessary for life in the future. These skills require not only a good mastery of computer programs, but also knowledge of the basics of machine learning, availability of programming skills and creation of Internet resources. However, the requirements of the digital economy may conflict with traditional approaches to educational processes and, accordingly, impede the development of the educational system, creating problems and becoming a source of risks and threats to education (Bullen et al., 2011; Huda et al., 2017).

The introduction of digital technology in education is part of the international policy. "Education 2030 Agenda" proclaims wide access to training for all categories of students, including the use of IT technology for distance learning (UNESCO, 2018).

In the Rome Declaration 2017, the EU Member States emphasized their commitment to providing young people with "better education and training". In October 2017, the European Council called for training and education systems to be "fit for the digital age". The main document in this discussion was the "Digital Education Action Plan," which was adopted in January 2018. The action plan describes how the EU can help individuals, educational institutions and educational systems better adapt to life and work in an era of rapid digital change. This is achieved by making better use of digital technology for teaching and learning; developing relevant digital competencies and skills for digital transformation; improving education through better data analysis and foresight (Digital Education Action Plan, 2018).

The "Council Recommendation on Key Competences for Lifelong Learning" proposes a revised "European reference system of key competencies for lifelong learning", which establishes the knowledge and skills of people to meet life needs, including digital competency. According to these recommendations, educational systems can more effectively use innovations and digital technologies, support the development of appropriate digital competencies necessary for life and work in the era of rapid digital (Council Recommendation on Key Competences for Lifelong Learning, 2018).

The development of the Bologna process considers digitalization as a key area for learning renewal. The "Paris Communiqué" dated May 25, 2018 calls on universities to prepare their students and help their teachers work creatively in a digital environment. Higher education systems should more effectively use the possibilities of digital and mixed education, with an appropriate guarantee of quality, in order to increase life expectancy and flexible learning, develop digital skills and competencies, improve data analysis, research and forecasts, as well as to remove regulatory obstacles to open and digital education (EHEA, 2018).

2 Methods

Digitalization of education involves a number of necessary actions:

- introduction of digital analytics associated with all processes in the activities of an educational institution, automation of the evaluation process for management effectiveness (Aetdinova et al., 2018).
- creation of a unified decision support system based on digital models, systematic digitization of all types of educational institution activities;
- development of e-learning, including for vulnerable students;
- ensuring openness, accessibility and wide coverage of all segments of the population by education, including residents of remote territories;
- integration into electronic national and international research and educational environment;
- digitization of educational activities: digital document management, digital analytics, revision, development and implementation of online courses for additional professional programs, including interdisciplinary programs and MEPs (Popova & Maslova, 2018).

To study the digitalization of education, it is important to identify first the possibilities and challenges of digitalization of education, which would be formalized to analyze and classify the risks of digitalization of education, which is the goal of this study.

The solution of these problems will contribute to improving the security of education, increasing the quality of education management and the use of risk management elements in management.

The study used sample analysis methods to apply it to the strategies to enhance cyber security and education management, classification method, logical and historical analysis based on past studies and literature review, modeling, formalization. As a result of applying these methods, we obtained a classification of the risks of digitalization of education, which were characterized by the abstract and logical method, carried out a comparative analysis, as well as modeling, using formalization methods for each type of risk.

3 Results and Discussion

The world and our lives will be dominated by digital software, digital gadgets, digital media, digital economy, digital algorithms and digital social networks.

It is important to understand that the digitalization of education is a natural interaction process between education and society.

The risks of digitalization of education carry both threats and opportunities. Therefore, it is necessary to consider each risk, seeing the likelihood of damage and the likelihood of new opportunities and advantages.

Years of experience in the application of IT technology in training allow identifying a number of threats that may result from the digitalization of education.

The threat to health, mental and physical health is one of the main reasons for the discussions around the use of gadgets in primary and secondary schools. In 2016, the World Health Organization changed the standards for the use of computers in childhood, indicating the main consequences of the uncontrolled use of gadgets by children: obesity, lack of sleep, delays in learning and developing social skills, problems with behavior.

A serious concern is the decrease in the age of first use of gadgets and the Internet (Figure 2). In such developed countries as Denmark and the Netherlands, over 30% of children under 6 years old used the Internet according to PISA in 2012. This sad fact is due to easy access to the Internet and presence of home computer (OECD, 2015).

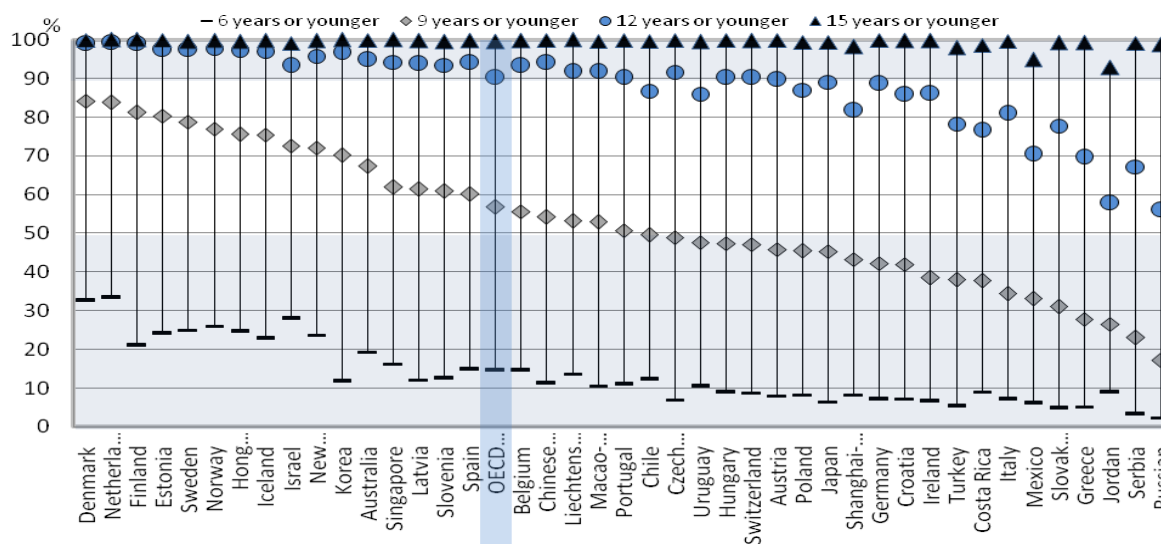


figure 1. AGE AT FIRST USE OF THE INTERNET

Source: OECD, PISA 2012 database, Table 1.4.

https://www.oecd-ilibrary.org/education/students-computers-and-learning_9789264239555-en

Other serious threats to the educational system are cyber risks. The development of IT technologies and the expansion of information volumes make cyber security a topical issue. In the era of the knowledge-based economy, the protection of personal data and official information is one of the main tasks in the strategic management of education. Cases of numerous cyber-attacks that have occurred in the educational institutions in recent years have led to enormous damage not only to education, but also to parents and the public.

The cyber risks that have the greatest risk to education include:

1. The risks of cyber-attacks. They are related to gaining access to the personal data of students, teachers, parents and other persons associated with an educational institution. The consequences of such attacks can be expressed in blackmail with threats of publishing personal data in the public domain, disclosing official secrets, using personal data when applying for online loans, and when issuing electronic signatures. Cyber-attacks can also be carried out in online testing processes and lead to a change in the students' grades. Many educational institutions use electronic

document management, and the consequences of cyber-attacks can be irreversible.

2. Phishing is a type of Internet fraud, the purpose of which is to gain access to user logins and passwords. For this purpose, a message is sent with the links to copy sites of large companies. The use of personal data (bank card numbers, etc.) on such sites leads to their theft and increase the likelihood of their use by criminals for their own purposes (Goran, 2017).

The main opportunities for digitalization of education include:

1. The possibility of creating new educational environments. Virtual, augmented and mixed space give great opportunities to include all categories of students and create conditions for the experiments and tests that were previously impossible. The development of skills in biology, medicine, and driving is the beginning of the list of competencies formed today through digital AR and VR tools (Newman, 2017).
2. Expanding access to education for various categories of students. It can be people from different regions, with different financial capabilities, of different ages. Digital

- education tools are the solution for lifelong education. This is especially important for vulnerable categories of students who, for various reasons, cannot receive a formal education on a par with everyone in the class. Distance courses create opportunities for advanced training and retraining of working categories of students (Aetdinova, 2018).
3. Individualization of education. Artificial intelligence has created tremendous opportunities for the transition to individual curricula and the creation of individual educational trajectories. At the same time, the principles of open education make it possible to make a choice in favor of those courses that develop the competencies the student needs and correct problems in his/her knowledge or skills. This approach is economically feasible, because it allows saving money without spending them on courses that are unnecessary for a person in the future.
 4. Speeding up communication. Digital technologies expand both the possibilities of individual communication (24/7 communication with a teacher or mentor, receiving quick feedback through online tests and polls), and increase the effectiveness of group work (social networks, the use of group chats or video conferences, the use of cloud storage technologies for sharing work on general documents).
 5. Social networks are becoming an excellent tool for learning the language (communication and correspondence with native speakers), self-presentation and the basics of marketing. Due to social networks, many students have mastered the specific nature of media letters, the ability to write texts for the media. The term "cyber socialization" has come into practice, implying the development of social skills through the use of social networks.
 6. Gamification of education. The game has always been part of learning. The use of digital technologies allows using them as: 1) an element of game-based learning; 2) an element of game design in a non-gaming context; 3) as a simulator, 4) as a learning tool (voice recorder, calculator, compass). In a broad sense, gamification includes almost all technologies based on digitalization: e-learning through b-learning and m-learning, gaming platforms, MEP (Mahfuzah & Salleh, 2018).
 7. Opportunities for wide scaling of best pedagogical practices. Creating platforms and teacher communication forums can be global. This allows sharing knowledge, teaching methods, analyzing the possibilities of applying new methods and approaches (Aetdinova, 2018).

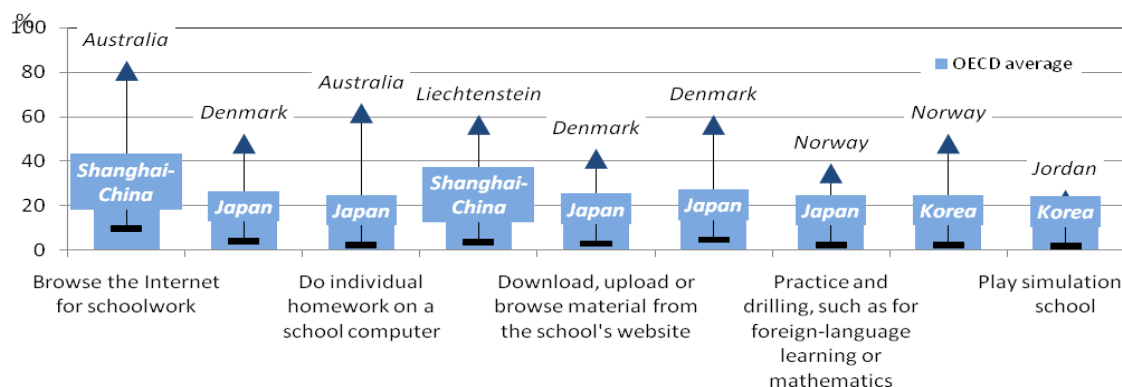


Figure 2. Use of ict at school

Source: OECD, PISA 2012 database, Table 2.1.

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4 Summary

Risk is the likelihood of a hazard occurrence. The manifestation of risk is associated, on the one hand, with threats and damage, on the other, with opportunities. In relation to any object, risks can be external (usually uncontrollable) and internal (the source of risk is the object itself) (Aetdinova & Nikolaeva, 2017).

The digitalization of education is fraught with many risks.

External risks are indirect in nature and affect processes gradually. They are difficult to avoid, they are more resistant to impact, their effect has a long-term effect.

External risks include the following types of risks:

1. Regulatory and political risks (changes in legislation in the field of digitalization of education; introduction of mandatory sanitary and hygienic standards for the use of IT technologies in education; a ban on the use of mobile devices in education).
2. Socio-economic risks (facilitated access to the Internet, low cost and accessibility of mobile devices).
3. Industry risks (a complete transition to online learning, application of testing as a way of the final control of students' knowledge in disciplines that are difficult to standardize).

4. Criminal risks (cyber-attacks, phishing, easy access to web resources with criminal activity (extremist organizations, distribution of psychotropic substances, sale of weapons, sects, pornography).

Internal risks often depend on subjects of educational activity. They can be their sources, but they can also control them and reduce them to an acceptable level). These risks in education are as follows:

1. Risks associated with the management of educational institutions (lack of cyber security system, poor risk management, lack of understanding of the problems of digitalization of education by the leadership).
2. Financial and economic risks (poor material base of educational institutions and application of old computers, lack of updates to IT programs and security programs, use of pirated software, lack of access to the Internet).
3. Personnel risks (low information culture of students and teachers, poor training of teachers in the IT field, lag of the content of disciplines in computer science and programming from the real situation in the IT industry, inept use of IT technologies in the teacher's work, complete disregard for the capabilities of IT technologies in teaching).
4. Information risks (poor protection of information resources, use of false information, falsification of information, distortion of information, lack of access to information).

5 Conclusions

Need of risk management causes the creation of a risk-oriented system of management of education. It is important to create the tools allowing educational institutions to develop independently management systems risks, to execute the quantitative and quality standard of risks of pedagogical education. The assessment of possible threats and risks will allow to predict timely unwanted results, to create system of situation-dependent response to unforeseen circumstances and, finally, to work out the strategy of development of education corresponding to urgent needs of the personality, society and state.

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Primary Paper Section: A

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