Development of digital competencies among students of higher educational institutions

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Abstract. The article is devoted to the development of digital competencies among students of higher educational institutions. The study analyzed the digital competencies of students and the level of Internet use for receiving services and their self-education. The analysis showed that students have the simplest digital competencies, while about half of the students perform specific digital operations and use the Internet for self-education; moreover, there is a digital inequality between students living in urban and rural areas. At the end of the study, activities were proposed aimed at developing digital competencies among university students and reducing the digital divide among students living in urban and rural areas.

1. Introduction

The development of digital competencies among the population is the most important task for the state during the transition to digital and intelligent technologies. The availability of the necessary digital competencies will increase the efficiency of all areas of activity, reduce and optimize the costs associated with maintaining functional personnel, give an additional impetus to the development of the economy, create completely new technologies to solve certain problems at the state and corporate levels. Of course, in modern times, the older generation lacks the necessary digital competencies to solve their problems and fulfill the tasks assigned to them; however, the younger generation is more developed in this direction and can no longer imagine their life without using various electronic devices, using the Internet, exercising the simplest tasks of life [1-2].

At the same time, it should be noted that in connection with the emergence of more and more new services and options of a different nature, the younger generation needs knowledge, skills and abilities to work in this area. The younger generation can develop the necessary digital competencies on their own, for example, with self-study, self-development and self-improvement programs, or they can acquire the necessary digital knowledge, skills and abilities in higher educational institutions during the educational process. At the same time, it is interesting to analyze the digital competencies of students, which reflect the level of skills in working with applied programs, equipment, communications in a digital environment and digital information, to identify the ability of students to use the Internet to
receive specific services and to determine whether the Internet is used for self-education and self-development by students of higher education. Educational institutions. It should be noted that the study will be limited to 2017 and will not affect the period of the pandemic, when educational organizations switched to distance and electronic forms of education, which, in our opinion, is relevant, since the authors of the study will be able to determine the level of training of students for the effective development of educational programs in remote and electronic modes [3-5].

2. Materials and methods
The purpose of this study is to develop digital competencies in university students. In the work, the following tasks were formed:

- Assess digital competencies among students of higher educational institutions;
- Suggest activities for the development of digital competencies among students of higher education institutions.

In the work, general scientific methods and approaches were used, which made it possible to reveal the goal and solve the assigned research tasks. As an information base, we used open data, placement on the websites of analytical agencies and statistical services.

3. Results
The acquisition of digital skills by students of higher educational institutions is necessary for the successful mastering of the educational program and the acquisition of professional competencies, it is worth noting that students acquire digital skills long before entering a higher educational institution, therefore, it is believed that the student already has the necessary digital skills to master higher education programs [6]. In order to assess the digital skills of higher education students, we will analyze the students' skills in working with applied programs, equipment and digital information, as well as their communication capabilities in a digital environment (figure 1) [7].

![Figure 1. Digital skills of tertiary students in 2017, percent.](image-url)

It can be seen from the presented figure that students have fairly well-developed skills in working with applied programs and communications in a digital environment, at the same time, only two-thirds of students are able to work with digital equipment and about half of the students have skills in working with digital information.
Further, it seems necessary to consider the use of the Internet in everyday practice by students at their place of residence (figure 2) [7].

![Figure 2](image_url1)

**Figure 2.** Use of the Internet in everyday practice by students of higher education institutions and place of residence in 2017, as a percentage.

The figure shows that only half of university students use the Internet to receive state and municipal services, while in urban areas the number of students is 7% higher than in rural areas who use this service. Approximately a quarter of students perform financial transactions and sell or buy goods and services via the Internet, however, in this area, there is also a digital divide between students living in urban and rural areas.

Let us consider the indicators of Internet use for learning and self-education by students of higher educational institutions at their place of residence (figure 3) [7].

![Figure 3](image_url2)

**Figure 3.** The use of the Internet for learning and self-education by students of higher education institutions by place of residence in 2017, in percent.
We see that about two-thirds of students use the Internet to obtain knowledge and information through the use of well-known sites, while in urban areas this number is three quarters, and in rural areas only half. Only 38% of students read or download online newspapers, magazines, e-books, 41% in urban areas and 26% in rural areas. Only a third of students search for information about education, courses of study, trainings, while there is a digital inequality between students living in urban and rural areas. Distance learning is only 14% of students in urban areas and 9% in rural areas, and only 3% of students in higher education participate in professional social networks.

Thus, the analysis showed that students of higher educational institutions have minimal digital communications that do not ensure the effective development of educational programs of higher education. Only half of the students use the Internet to receive state and municipal services, and only a quarter of university students conduct financial transactions and buy goods or services on the Internet. The same picture is observed in terms of indicators related to self-education, self-improvement and self-development, while, according to all indicators, there is a digital inequality among students living in urban and rural areas [8-11].

4. Discussion
There is undoubtedly a digital divide among university students living in rural and urban areas. Let's define the causes of the digital divide [12-17]:

- Inequality in access to digital infrastructure, the Internet and restrictions in communications in the digital environment, which ultimately leads to limited opportunities for a part of the population and to economic and social inequality in society;
- Digital inequality among students of higher education institutions, as a rule, is expressed in the area of residence of students, but at the same time, economic, social and technological problems cannot be ignored;
- One of the most important tasks of modern educational activities is to increase students' digital competencies not only for the purpose of successfully mastering the educational program, but also for self-realization of students, solving a number of professional and national economic problems during the period of digitalization of the economy;
- The lack of digital competencies among students is of a federal nature and to a small extent depends on the place of residence, in this regard, we can talk about the need for a state program to improve digital competencies among students and working youth in Russia.

Thus, it is advisable to develop the development of digital competencies among students of higher educational institutions at the state and corporate levels, which may be associated with the creation of appropriate electronic educational platforms, as well as an increase in digital literacy at universities and at work.

5. Conclusion
Within the framework of the presented study, digital competencies in students of higher educational institutions were analyzed. The analysis showed that students have minimal digital competencies, while they are not enough even to successfully complete their studies. In addition, it was revealed that students do not use the Internet to receive state and municipal services, financial transactions and the purchase of goods and services, as well as for self-education and training, in addition, it was concluded that digital inequality among students living in urban and rural terrain.

References
[1] Morkovkin D E, Lopatkin D S, Shushunova T N, Sharipov B K and Gibadullin A A 2020 Formation of the conditions for the development of innovation Journal of Physics: Conference Series 1515 032002
[2] Dudin M N, Zasko V N, Dontsova O I and Osokina I V 2020 The energy politics of the european
union and the possibility to implement it in post-soviet states *International Journal of Energy Economics and Policy* **10**(2) 409-16

[3] Buevich A, Karamova O and Sumarokov E 2019 Improvement of the institutional structure of the real sector under the conditions of the digital economy *Studies in Computational Intelligence* **826** 675-86

[4] Bogoviz A V, Zhuravleva T A, Popkova E G, Zarudneva A I and Alpidovskaya M L 2019 Effective Tax Policy Of The State: Conceptual Foundations And Methodology Of Evaluation *Studies in Systems Decision and Control* **182** 91-8

[5] Sharipov F F, Krotenko T Y and Dyakonova M A 2021 Transdisciplinary strategy of continuing engineering education *Lecture Notes in Networks and Systems* **139** 480-8

[6] Alpidovskaya M L, Gryaznova A G and Sokolov D P 2018 Regress Economy Vs Progress Economy: “Alternatives Of Senses” *Advances in Intelligent Systems and Computing* **622** 638-46

[7] 2018 *Russian statistical yearbook* (Moscow: Rosstat) p 694

[8] Sergeenkoa Yu S, Galkina O V, Zametina T V, Kombarova E V and Petrov D E 2020 Digitalization of Safety in the Field of Labor Protection *IOP Conference Series: Earth and Environmental Science* **543** 012001

[9] Tolkachev S A 2018 Network Industrial Policy in the Age of the New Industrial Revolution *Journal of the new economic association* **3** 155-62

[10] Abanina E N, Sergeenko Yu S, Devyatov O V, Ganyukhina O Yu and Nikitenko Yu M 2019 The Structure of Training Program and Advanced Training of Enterprise Managers in Order to Ensure Environmental Safety *IOP Conference Series: Materials Science and Engineering* **582** 012032

[11] Morkovkin D E, Mamychev A Y, Yakovenko N V, Komov I V, Derevyagina M V and Didenko O V 2016 Factors and material conditions for space-intensive economic development of region *International Review of Management and Marketing* **6**(1) 67-72

[12] Shumaev V A, Morkovkin D E, Nikonorova A V, Nezamaikin V N and Yurzinova I L 2018 Innovative aspects of agritourism project management *Financial and Economic Tools Used in the World Hospitality Industry - Proceedings of the 5th International Conference on Management and Technology in Knowledge Service Tourism and Hospitality SERVE* 241-8

[13] Yakunina G E 2019 Research of digital communications models within organizations and at the state level in the countries-leaders in the use of digital communication technologies *E-management* **2** 4 41-50

[14] Sharipov F F, Krotenko T Y and Dyakonova M A 2021 Digital Potential of Economic Education: Information Technologies in a Management University *Lecture Notes in Networks and Systems* **133** 561-72

[15] Romanova I N, Morkovkin D E, Nezamaikin V N, Gibadullin A A and Ivanova M A 2020 Formation of a policy to ensure environmental safety in modern economic conditions *IOP Conference Series: Materials Science and Engineering* **734** 012166

[16] Morkovkin D, Lopatkin D, Sadriddinov M, Shushunova T, Gibadullin A and Golikova O 2020 Assessment of innovation activity in the countries of the world *E3S Web of Conferences* **157** 04015

[17] Serykh A B, Grudtsina L Y, Votinov A A, Abramova N G, Gaidamashko I V and Morkovkin D E 2018 Algorithm of teacher projecting and training activity in the process of student social culture formation *Astra Salvensis* **6** 330-47