Assessment and Motivation of Increasing the Digital Literacy Level of Organization's Personnel in the Context of Digital Transformation of the Russian Federation Economy

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Abstract

Economic growth, achieved primarily through the development of the national innovation system and investment in human capital, is one of the priorities for the sustainable development of the state. In this regard, one of the national development goals of the Russian Federation for the period up to 2024 is to ensure the accelerated introduction of digital technologies in the economy and social sphere, which actualizes the need to increase the digital literacy of the country's population. This study provides a definition of digital literacy. The authors describe and analyze the approach of the G20 Summit group of experts to the assessment of digital literacy of the population on the basis of indicators of information, computer, communication literacy, media literacy and attitude to technology.And also the Digcomp 2.0 approach of the European Commission in the implementation of the digital skills training program, which uses the concept of analyzing digital competencies in terms of information, communication literacy, digital content creation, digital security and problem solving in the digital environment. An important component of the work is the assessment of the level of digital literacy and the development of digital competencies of teachers of higher education as a key figure for the successful implementation of new technologies in universities. In conclusion, the authors propose institutional conditions that contribute to increasing the level of digital literacy of scientific and pedagogical workers as the most important factor of human capital growth in the context of the digital transformation of the Russian economy.

Introduction

The transition to a new technological order, the active development of modern information and communication technologies actualize the need to improve the digital literacy of the population [1].

The purpose of this study is to analyze the level of digital literacy of the country's population and develop proposals for improving its digital competencies in the context of the digital transformation of the Russian economy. Based on this goal, the following tasks are formed:

- clarify the concept of digital literacy;
- to analyze the approach of the G20 Summit expert group to assessing the digital literacy of the population on the basis of information indicators, computer,communication literacy, media literacy and attitude to technology;
- ? analyze the European Commission's Digcomp 2.0 approach in implementing a digital skills training program that applies the concept of analyzing digital competencies in terms of information, communication literacy, digital content creation, digital security and problem solving in the digital environment;
- to assess the level of digital literacy and the development of digital competencies of teachers of higher education as a key figure for the successful implementation of new technologies in universities;
- to propose recommendations for improving the level of digital literacy of the organization's personnel as the most important factor in the growth of human capital in the context of the digital transformation of the economy of the Russian Federation.

Materials and Methods

Digital literacy is a rather capacious concept that implies a system of knowledge, skills and abilities necessary to obtain a positive effect from activities in a digital society, which improve the quality of life of citizens as the goal of the digitalization process [2].

The UN defines this concept as the ability to competently understand, evaluate and integrate, as well as safely manage information, receiving it through gadgets for active participation in modern society [3].

UNESCO experts associate this concept with the availability of the organization's personnel skills for working with digital media, for searching and processing data [4].

The Russian scientific research society describes digital literacy as the ability to understand the ideas of informatics, the role of ICT in the life of society, as well as skills in working with various information flows [5].

The G20 Expert Group's approach is to assess digital literacy based on five indicators. They include information (A), computer (B), communication literacy (C), media literacy (D), as well as attitude to technological innovation (E). Each indicator is analyzed in three aspects: cognitive, technical, ethical. At the same time, the cognitive aspect speaks of the ability to create and evaluate information, communicate with other digital users. The technical aspect involves assessing the skills of searching for information, using digital devices and information technologies for this. The ethical aspect obscures the understanding of the need to check the completeness, reliability and asymmetry of information, compliance with ethical standards of communication with the Internet [6].

Table 1 shows the aspects of the above indicators.

An information-literate person is capable of searching, evaluating, interpreting, and using information to achieve personal, educational, and professional goals.

Communication literacy with the use of information and communication technologies allows to maintain social ties of a person, as well as compensate for the lack of live communication.

Media literacy allows to navigate the information space, search for complete, reliable information, identify its asymmetry, participating in the media content market as consumers and producers.

Table 1:Summit Experts Indicators G20.

	Evaluatedaspect		
	Cognitive	**Technical**	**Ethical**
A	Awareness of the degree of influence of information flows on the life of an individual	Search for information using various resources	Benefits and harms of using information
B	Knowledge of the principles of interaction of technical components of computers	Using of applications and gadgets at work	Evaluating the role and purpose of using computers
C	Understanding the differences between virtual communication and live communication	Application of modern ICT	Ethical standards in the digital environment
D	Knowledge of various sources of information dissemination	Search for high -quality information in various sources and resources	Data Criticality
E	Awareness of technological trends in the digital environment	Application of digital space technologies	Understanding the benefits of technological innovation

The Digcomp 2.0 approach of the European Commission in the implementation of the digital skills training program, applies the concept of analyzing digital competencies in five dimensions: information (1), communication literacy (2), digital security (3), digital content creation (4) and problem solving in the digital environment (5) [7].

The “Information literacy” sub-index reflects the ability of citizens of a country to search for information on the Internet, work with various types of data and assess their reliability.

Communication literacy skills determine the ability of citizens to use various types of online services and devices, as well as to comply with ethical standards of communication on the Internet.

The sub-index "Digital Content Creation" demonstrates the development of competencies in the formation and editing of digital content, as well as work with copyright on the Internet.

Digital security illustrates the ability to highly assess the risks of fraudulent transactions in the digital space, as well as the application of measures to ensure an adequate level of security, as well as the degree of impact that devices have on the environment, physical and mental health of people.

The sub-index "Problem-solving skills in the digital environment" reflects the skills of using mobile applications and programs to solve problems, the ability to expand knowledge in the field of digital technologies.

A comprehensive study of the current level of formation of digital competencies of Russian citizens and the use of skills in life in the context of digitalization showed that only 27% of the country's population has a high level of digital literacy [8].

According to the study, the share of the country's citizens who have a sufficient level of digital literacy and key digital competencies has remained virtually unchanged over the past few years and lags behind the target values set by the FP "Personnel for the Digital Economy" (Table 2) [9].

Table 2.Target values of the share of citizens of the country with a sufficient level of literacy in the digital sphere, within the framework of the FP "Human Resources for the Digital Economy", %.

	2018	2019	2020	2021	2022	2023	2024
Percentage of the country's citizens with key digital competencies	26	27	30	32	36	38	40

Thus, in 2020, the indicator lags behind the project's target value by three percentage points. By 2024, it is planned that the indicator will reach the level of 40% of the total population of the Russian Federation [10]. The performance of this indicator will be influenced by a sufficiently large number of determinants.

Typically, 65% of respondents believe that employers can reduce staff due to the automation of production and the introduction of modern technological innovations. Every fourth employee is afraid of losing their job if they do not

acquire digital skills. Moreover, additional professional education in the digital sphere is provided to those who already have sufficiently highly developed digital skills.

According to the Digicomp methodology, the digital literacy index of Russian citizens in 2020 was 59 points (scale from 0 to 100 points) (Table 3) [11]. According to the table, we can say that the highest value in comparison with other components of the assessment of the formation of digital literacy of the population is in the sub – index "Communication literacy", as well as citizens have a good understanding of the rules of security on the Internet-the value of the indicator reaches 59 percentage points, the lowest value is in the component responsible for the ability to create digital content.

Table 3.Components of the Digital Literacy Index, %.

	All survey participants
Digital Literacy index, including by component:	59
1st component	60
2nd component	61
3rd component	59
4th component	52
5th component	58

As for the socio-demographic differences in the level of digital literacy of citizens, according to the results of the study, it can be stated that digital literacy is largely determined by the region of residence. So, the residents of the Southern Federal District and the North Caucasus Federal District have lower indicators than in the whole country (Table 4). In the Southern Federal District, the component “Creating digital content” has the lowest value (Figure 1).

Table 4.Digital literacy index of citizens by region of residence, %.

	Southern Federal District	North Caucasus Federal District	Central FederalDistrict	Northwestern Federal District	Volga Federal District	Ural Federal District	Siberian Federal District	Far East Federal District
Digital Literacy index, including by component:	56	55	59	64	56	56	61	57
1st component	58	59	58	64	56	58	61	54
2nd component	59	58	63	66	60	58	65	66
3rd component	58	58	60	65	58	58	60	58
4th component	49	49	54	58	50	51	56	51
5th component	55	54	57	66	56	56	61	57

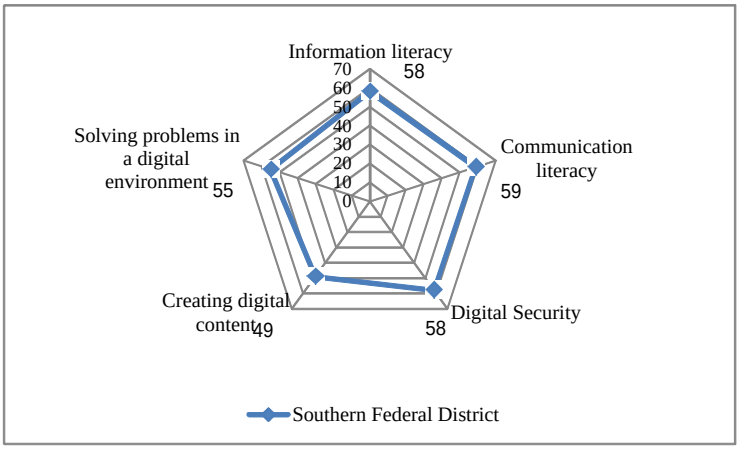


Fig. 1.Literacy index of citizens in the Southern Federal District, %

The analysis also showed that there are no significant differences in the values of the level of digital literacy between men and women. Women are characterized by a lower level of information literacy, they are weaker in solving problems in the digital environment (Table 5).

Table 5.Digital Literacy Index by gender, %.

	Female	Male
Digital literacy index, including by component:	57	59
1st component	57	60
2nd component	62	62
3rd component	59	60
4th component	52	53
5th component	56	59

Age has a significant impact on the level of digital literacy. The most significant indicators are typical for persons under 44 years old, the lowest values are for citizens over 55 years old (Table 6).

Table 6.Digital Literacy Index by age, %.

	18-24	25-34	35-44	45-54	55+
Digital literacy index, including by component:	61	59	60	58	53
1st component	62	62	60	57	52
2nd component	64	63	64	62	57
3rd component	62	58	61	62	57
4th component	56	54	54	52	46
5th component	60	59	61	57	52

There is a close correlation between the level of digital literacy and a person's professional activity. In comparison with other categories of citizens, the highest level of indicators is typical for working students, and the lowest level of digital literacy is for non-working pensioners (Table 7).

Table 7.Digital Literacy Index by Type of Employment, %.

	Temporarily unemployed	Busy with housework, on maternity leave	Retired (not working)	Retired (working)	I work (except for part-time students and pensioners)	Student (not working)	Student (working)
Digital literacy index, including by components:	57	56	51	56	59	61	64
1st component	58	55	49	55	60	61	67
2nd component	63	59	55	62	63	64	65
3rd component	58	59	55	58	60	61	68
4th component	50	51	45	51	53	59	57
5th component	54	57	50	55	59	61	62

Due to the fact that the teachers of higher education act as guides to the world of digital technologies, it is necessary to dwell in more detail on the assessment of the level of digital literacy and the development of digital competencies of teachers of higher education.

Teachers are distinguished by high values of indicators in the digital environment compared to other groups of respondents. This trend can be easily explained by the close correlation between the current state of the digital space and the requirements for training students in higher educational institutions. Thus, the digital literacy index for higher education teachers is 88 percentage points [12].

The lowest of all the components of the index is the sub-index, which is responsible for the attitude of respondents to technological innovations. Its value is 78 percentage points (Figure 2). The highest sub-index of information literacy is 94 percentage points [13].

It can be argued that the value of the level of formation of digital competencies of higher school teachers exceeds the value of the average Russian level, which also includes values for other professions.

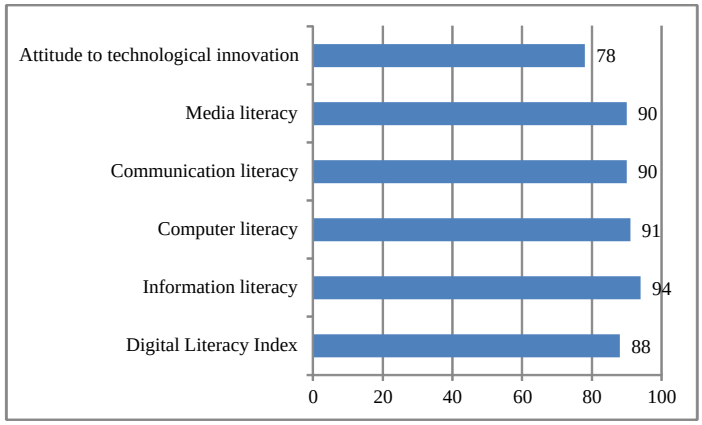
The level of digital literacy of teachers also exceeds the level of digital literacy of students, although the respondents in this group show a fairly high level of formation of digital competencies due to their high adaptive ability (Figure 3).

Teachers showed higher rates in almost all indicators, but could not get ahead of the students in relation to innovations - 81 pp versus 78 pp.

The assessment of each of the five components of the cumulative digital literacy index of teachers showed the following.

The majority of higher school teachers (97%) use information from several sources to solve everyday tasks. Almost all higher school teachers (98%) can easily find the required information on the Internet. Three-quarters of respondents confirm that the information received from the Internet can have both useful and harmful properties, so they try to limit the distribution of harmful information.

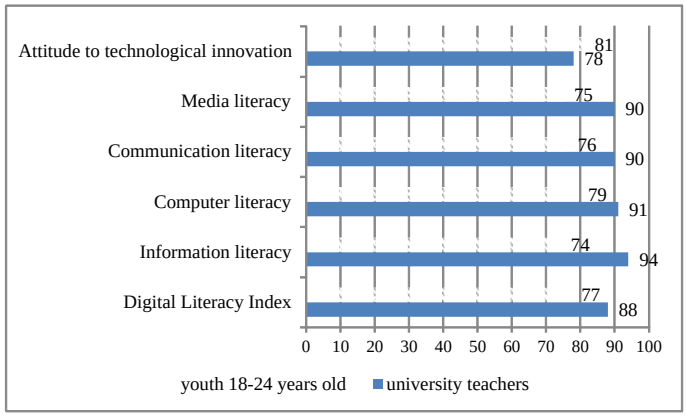
Fig. 2.Digital Literacy Index of Higher School teachers, %



More than 80% of higher school teachers can assess how modern technical tools and software are used. For the vast majority of teachers, working on a personal computer is a routine process. The computer helps to solve everyday tasks of professional activity.

More than 85% of high school teachers know the most common social networks. Most teachers support the idea of observing the generally accepted ethical norms of communication via the Internet [14].

Fig. 3.Comparison of components of the digital literacy index for teachers and students, %



Most of the teachers of higher education are confident that anyone can post information on the Internet that can be seen by the masses of people; 96% of teachers know where to read or view the latest news; 92% of teachers in higher education have a critical point of view about the possibility of the appearance of unreliable information on the network [15].

Two-thirds of high school respondents try to keep abreast of innovations in the digital sphere. The use of modern gadgets and applications is not particularly difficult for 84% of teachers.

Results

The results of the study of the level of formation of competencies in the digital sphere of university teachers demonstrate rather high values of indicators of knowledge, skills and abilities. However, it is necessary to improve:

- knowledge in the field of technical innovations and software;
- skills in using gadgets and applications for daily activities;
- skills in the field of verifying the accuracy of information from the Internet.

The development of these areas is a significant prerequisite for improving the digital competencies used by higher school teachers in their professional activities, which in turn contributes to the growth of human capital.

To increase the level of formation of digital competencies among teachers of higher education in the Russian Federation, it is necessary, first of all, to organize complex work in the following areas:

- continuous self-education of teachers;
- implementation of support measures from the top management of educational institutions;
- Formation of state policy at the macro level.

Conclusions

Let's consider in detail the directions of improving the level of digital literacy of higher education teachers.

First of all, teachers need to develop knowledge, skills and application skills of modern technical means, such as personal computers, gadgets, applications, various updated software. It is necessary to correct the perception of the possible beneficial effect of using modern computer devices, as well as in the field of checking the completeness and reliability of the information obtained from virtual sources.

An inevitable condition for the successful professional activity of higher school teachers will be an independent striving for development, the exchange of accumulated experience among teachers, the dissemination of digital competencies and achievements in educational activities. The rise in the level of digital literacy of the teaching staff will be facilitated by awareness of innovations in the IT market, the application of the experience of using digital technologies by young employees and students in the process of continuous communication. Modern methods of assessing the personal level of digital awareness and literacy will allow tracking the current level of formation of digital competencies and developing individual educational trajectories in the digital sphere.

Secondly, the activation of the interest of the teaching staff in innovations in the field of digital technologies will be facilitated by the actions of the top management to create a comfortable digital environment in higher educational institutions, the daily demonstration of the possibilities of digitalization that simplify the educational process and scientific activity.

Conducting consultation sessions with the expert community on the use of information and communication technologies in the educational process, sharing approaches to using digital technologies with more experienced colleagues will help to acquire new and improve existing skills, as well as actively apply them when communicating with students. It is also important to create a favorable psychological climate in the team in the process of teaching employees who are lagging behind in the level of formation of digital competencies.

It is possible to propose to adopt programs to improve digital literacy of higher education teachers. However, this will require the formation of a system of motivating teachers to use digital technologies in educational activities. Such a system will provoke the growth of digital competencies of teachers, which means the prestige of the educational institution, both for employees and for students.

On the part of state bodies, for the development of the digital space, it is required to build an information security policy that allows you to competently work with the

personal data of participants in the educational process. In the near future, digital technologies and software will be increasingly used in research, business, education in the collection, analysis and processing of data.

There is no doubt that digitalization will bring the country's economy to a higher level of development, increasing the indicators of gross domestic product, investment demand and the quality of life of the country's citizens. However, it can be accompanied by such threats as the growth of fraudulent transactions, job losses, the need to increase attention to the global requirements of the new digital economy and meet the high performance in the digital environment.

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