

## Assessments of Teachers' Digital Skills as the Main Factors of Willingness for University Digitalization

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There are four trends associated with the introduction of digital technologies and tools into the educational process: the formation of a blended learning model; transition to online learning; creation of a virtual (digital) educational and social environment; changing the approach to managing educational organizations. Digitalization introduces significant changes in the roles of the teacher and student in the learning process, which requires appropriate adaptation. The aim of the current study is to assess teachers' digital skills in pandemic and post-pandemic period and analyze the impact of Covid19. For this study we conducted an online survey among teachers of Peter the Great Polytechnic university (Institute of Humanity). The surveys were conducted two times: in March of 2020 (the beginning of the pandemic) and in June of 2021 (post-pandemic period). 44 teachers of different specialties (Law, Linguistics, Pedagogy and Psychology) completed the first survey and 42 teachers completed the second survey. To assess the level of digital skills we used the Digital Competence Scale that consist of 10 subscales that reflect the 22 digital competences of DigCompEdu2.0. The results of the study showed that teachers had quite high level of digital skills before the pandemic that facilitated the transition of the learning processes to online format. A positive impact of this transition on the development of the teachers' digital competences also can be noted. The highest impact was on such indicators as Communication and Collaboration, Teaching and Learning and Assessment.

**Keywords:** digitalization, higher education, digital competence, impact of Covid-19.

**Funding.** The reported study was funded by Russian Federation President's grant, project number MK-1201.2022.2

**For citation:** Kobicheva A.M. Baranova T.A. Assessments of Teachers' Digital Skills as the Main Factors of Willingness for University Digitalization //

Digital Humanities and Technology in Education (DHTE 2023): Collection of Articles of the IV International Scientific and Practical Conference. November 16–17, 2023 / V.V. Rubtsov, M.G. Sorokova, N.P. Radchikova (Eds). Moscow: Publishing house MSUPE, 2023. 264–271 p.

## Introduction

After analyzing publications on the topic of digitalization of higher education, we can identify four trends associated with the introduction of digital technologies and tools into the educational process: the formation of a blended learning model; transition to online learning; creation of a virtual (digital) educational and social environment; changing the approach to managing educational organizations [1]. These trends are interconnected, however, each of them reveals a specific impact on the institution of higher education. On the one hand, digitalization contributes to an increase in the openness and flexibility of education, an increase in the involvement of students in the learning process, and the development of a network model of interaction between universities. On the other hand, it leads to the creation of a new educational situation, the inclusion of new actors in the education system, which changes the configuration of relations between its main participants. Digitalization introduces significant changes in the roles of the teacher and student in the learning process, which requires appropriate adaptation [2]. The transition to online education, the creation of a virtual educational and social environment at university is possible if all involved parties are ready for these changes, or then digitalization can lead to negative consequences. Among many factors that influence the willingness of a person for digital transformation growth are digital skills and competencies. The aim of the current study is to assess teachers' digital skills in pandemic and post-pandemic period and analyze the impact of Covid-19.

*Literature review.* The spread of digital technologies in social, economic and personal life has made digital information skills an important success factor not only in the labor market, but also in public life [6, 8, 16]. The search, evaluation and processing of information are an integral part of everyday life in the modern information society. The more advanced digital applications in the future, the more digital skills will be required [17]. According to Castells [3], a process called informatization is observed in all professions, since information itself is the source of productivity in many professions. This also applies to teachers, whose main day-to-day duties are largely based on the search, processing and exchange of information, making these skills the main requirements for the competence of the teaching profession.

Digital skills similar to internet skills, information literacy or digital competence are used to define what people should be able to achieve with digital technologies [11]. Regardless of the different terms, digital skills are a key part of digital inclusion [5].

The requirements of the information society for adequate mastery of new digital skills have become one of the key drivers of curriculum reform in many countries. In Finland, digital skills (included in ICT competence and multi-literacy) are part of the so-called transversal skills of the current core curriculum. The aim is to provide these skills within the teaching of all subjects within basic education [9]. Investigative and problem-based learning, which is emphasized in the Finnish national core curriculum, requires students to develop skills in finding, interpreting, evaluating and managing digital information. These types of skills are not only important in the context of education or work life, but also play a key role in society as a whole, as social interactions and everyday activities are increasingly digitalized.

As can be seen from the above, information skills are the key skills that teachers must pass through education to new generations.

However, the qualifications of teachers as mediators of these skills vary, and modern educational practices are not always compatible with the goals of the information society [12]. In fact, Claro et al. [4] found that only a minority of teachers were able to help students with tasks related to digital information and communication skills, showing that most teachers do not play the desired role of this kind of facilitator in the digital environment. Different teacher attitudes towards the use of information and communication technologies in teaching, as well as differences in the adequacy of equipment in educational institutions, predict the development of students' digital skills [14], which leads to differences in student capabilities. As a result, it is believed that there is a gap between the skills children acquire through formal education and the skills they will actually need to live and work in the 21st century world [13]. However, formal education is critical to supporting learners in developing adequate competencies. This is why well-trained, qualified and motivated teachers are needed to help develop student skills [10].

The Digital Education Action Plan 2021–2027 recently published by the European Commission [7] highlights that the skills that teachers have and the sense of competence they have is a necessary condition for the transfer of core competencies of the 21st century. Strengthening the capacity of teachers requires a deeper understanding of the diversity of teachers' digital skills, with particular attention to the interdependence and multidimensionality of underlying factors.

## Methodology

For our study we conducted an online survey among teachers of Peter the Great Polytechnic university (Institute of Humanity). The surveys were conducted two times: in March of 2020 (the beginning of the pandemic) and in June of 2021 (post-pandemic period). 44 teachers (79 % – females, 21 % – males) of different specialties (Law, Linguistics, Pedagogy and Psychology) completed the first survey and 42 teachers completed the second survey. To assess the level of digital skills we used the Digital Competence Scale that consist of 10 subscales that reflect the 22 digital competences of DigCompEdu2.0 [15]. The subscales are the following: Communication and Collaboration (6 items, e.g. “I use digital technologies to communicate with learners and colleagues (e.g. e-mail, school website, platforms such as Moodle, ...)”), Professional Development (3 items, e.g. “I am proactive in developing my skills in the use of digital technologies for teaching.”), Digital Resources Selection (3 items, e.g. “I use the Web (search engines, digital archives, websites, specialized blogs, ...) to find and select different digital resources.”), Digital Resources Creation (4 items, e.g. “I adapt and modify selected digital resources based on relevant criteria (on the basis of learning objectives, specific needs of PIF and my teaching style.”), Data Protection (6 items, e.g. “I know the privacy and data protection rules and I put them into practice in my work.”), Teaching and Learning (9 items, e.g. “I think carefully about how, when and why to use digital technologies in the classroom, making sure that they are used for the benefit of the learning process.”), Assessment (5 items, e.g. “I use digital assessment tools to monitor learners’ progress.”), Learners’ Empowerment (6 items, e.g. “I use digital technologies to offer learners personalized and differentiated learning opportunities.”), Media Education (4 items, e.g. “I teach learners criteria and strategies for assessing the reliability of information gathered online and for identifying fabricated, misleading, or distorted information.”) and Learners Digital Competence (6 items, e.g. “I prepare deliverables that require learners to use digital tools to communicate and collaborate with each other.”). The response scale was: Not at all competent (1) to Highly competent (5).

The research questions were the following:

RQ1. What is the level of the teachers’ digital competence in the post-pandemic period?

RQ1. Does Covid-19 influence the teachers’ digital competence proficiency?

For the analysis we used descriptive statistics and pair sample t-test.

## Results and Discussion

The results on the level of teachers' digital competence are presented in Table 1.

Table 1

### The level of teachers' digital competence

Subscale	Period of survey	Mean	SD	t-value
Communication and Collaboration	2020	3,12	0,70	3,7***
	2021	3,84	0,67	
Professional Development	2020	2,94	0,77	2,3*
	2021	3,26	0,79	
Digital Resources Selection	2020	3,21	0,72	3,3***
	2021	3,73	0,70	
Digital Resources Creation	2020	2,67	0,64	3,4***
	2021	3,24	0,71	
Data Protection	2020	2,57	0,73	3,3***
	2021	3,11	0,72	
Teaching and Learning	2020	3,01	0,76	4,1***
	2021	3,83	0,77	
Assessment	2020	2,79	0,81	4,5***
	2021	3,68	0,69	
Learners' Empowerment	2020	2,98	0,71	2,1*
	2021	3,27	0,77	
Media Education	2020	3,08	0,66	2,6**
	2021	3,44	0,70	
Learners Digital Competence	2020	2,77	0,68	3,4***
	2021	3,31	0,72	

According to the results obtained teachers assessed their digital competence level as quite high. Moreover, they improved their digital competencies during the pandemic period. The indicators with the most significant difference are their technology use in communicating and collaborating with colleagues, professional trainers and external partners ( $t=3,7$ ;  $p < 0.001$ ), skills to integrate technology in teaching to support the learning process and to foster the connectivity between theory and practice ( $t=4,1$ ,  $p < 0.001$ ) and skills to use of technology to monitor and assess students' learning and provide them with effective feedback ( $t=4,5$ ,  $p < 0.001$ ). Indicators referring to the proactivity in developing digital competence and the ability of offering personalized learning opportunities and of ensuring the inclusion and participation of students

in the learning activities showed fewer progressive improvements ( $t=2,3$ ;  $t=2,1$ ,  $p < 0.05$ ).

This development in the level of digital competence occurred during the pandemic and was the result of a rapid transition to online learning, which was caused by Covid-19. Thus, it can be assumed that Covid-19 has had an impact on the improvement of the digital competence of teachers.

## **Conclusion**

The digitalization of society and education has a global potential that can lead to an increase in the importance of the teaching profession. Moreover, the teaching profession can be seen as a kind of social position, which van Dersen and van Dijk [16] consider to be pioneering professions in the digital society. However, to take advantage of this opportunity, teachers around the world need to be able to take advantage of digitalization and widely available information. Thus, the authorities should strive to promote a common understanding of the importance of digital skills and actively guide skills development activities among teachers in order to improve the overall level of teachers' skills.

The results of the study showed that teachers had quite high level of digital skills before the pandemic that facilitated the transition of the learning processes to online format. A positive impact of this transition on the development of the teachers' digital competences also can be noted. The highest impact was on such indicators as Communication and Collaboration, Teaching and Learning and Assessment. The development of the level of digital competence received a boost due to the transition to online learning. Since the transition to mass online education occurred due to the emergence of the Covid-19 coronavirus infection, we can say that Covid-19 had a significant impact on the development of the digital competence of university teachers.

This study has its limitations. The study was conducted only among teachers of social and humanitarian specialties. For teachers of technical areas, a separate study should be carried out, taking into account the specifics of their activities. In addition, interviews with teachers will be conducted in future studies to obtain more detailed qualitative information.

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