Digital Teacher for the 21st-century School 4.0

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Abstract. The article deals with some pedagogical aspects of the digitalization of education. As it is shown in the article, the problem of digital education has been systematically analyzed and discussed for the last two decades by various analysts, researchers, and experts. Most of them consider the transition of education into its digital stage as the greatest turning point in the history of civilization and its culture. At present, teachers are facing quite new educational and pedagogical functions. The idea of a digital teacher as the leader of digital educational activity is in the focus of the analysis presented in the article. Educational platforms, online courses, digital textbooks, etc. influence on the transformation of the educational environment. Education is becoming more personalized. The content of teaching and learning is being changed radically according to its new values, meanings, orientations, as well as educational and pedagogical discourses. It is stressed in the article that teacher's digital skills and competencies should be identified as the key professional pedagogical skills and competencies for his or her life-long learning, professional development and professional growth due to the challenges of the 21st-century knowledge, information and innovations society and education. To fulfill a system of professional-pedagogical and educational functions more effectively and to guarantee the optimal implementation of information and communication technologies (ICTs), it is quite necessary for teachers to have adequate skills and competencies that characterize his or her digital professional culture of teaching.
Keywords: educational paradigm, professional activity, digital teacher, digital school, digital educational environment, digital culture

1   Introduction

At present, the high quality of education becomes one of the basic factors and the fundamental mechanism for supporting positive dynamics of growth and development of the innovative knowledge-based economy and the changing society [1-9].

This actualizes the problem of "a digital teacher" including the aspects of the quality of his or her academic and professional background, professional-pedagogical values,

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meanings and thinking, his or her knowledge, skills and competencies implemented into "digital" teaching practices.

1.1 Problem statement

The theoretical and practical analysis of the present-day situation in education shows quite clearly that traditional pedagogical and educational paradigms are transforming actively into innovative ones based on the new values, meanings, and orientations of the digital society [10-12].

   This demands of creation and development of a new educational and pedagogic "digital" environment for effective teaching and learning. From the perspectives of digital transformation of teaching and learning it determines the necessity of introducing the digital teacher into new cultural, educational and pedagogical contexts and gives priority to the problems of the teacher's education (formal, informal, and non-formal), as well as professional development and professional growth of teachers [1-6, 8, 10, 13-25].

1.2 Literature review

The digital agenda of education is in the focus of the governments and national educational policies of most of the countries all over the world [4, 7, 8, 26].

   The problem of digital education has been systematically analyzed and discussed for the last two decades by various analysts, researchers and experts [1-6, 8, 13-25, 26]. Most of them consider the transition of education into its digital stage as the greatest turning point in the history of civilization and its culture.

   It is quite evident that there is deep integration between culture, education, technologies and innovations in the 21st century [6, 12]. The authors distinguish and characterize four global learning outcomes and five general learning outcomes of the 21st-century global education [23].

   The interdisciplinary problem of key skills and competencies for the 21st century is of essential scientific and practical interest and importance for researchers all over the world [18, 26-37].

   The professional skills and competencies of teachers in the changing educational environment are also of great research and practical interest [3, 15, 21, 28, 30-33, 38-42].

1.3 Research questions and purpose of the study

In this study, the authors' main question was formulated in the following way, "What is the phenomenon of a digital teacher?"

2 Methods

The study included a theoretical analysis of the problem of teacher's professional activity in the aspect of teacher's professional culture (including teacher's knowledge, values, meanings of teaching, skills, competencies, etc.); data collection, data analysis and interpretation; analytic framework and modelling.

3 Results and discussion

1. Due to the new paradigm of the civilization development, education is actively integrating with culture [11, 12, 43].

Under these conditions, education has to fulfill quite new functions, such as:

(a) facilitation and stimulation of "inner forces" of an individual (interests, values, meanings, orientations' demands and motives of cognitive activity and social practices) in a situation of an educational alternative and an educational choice;

(b) development and support of an individualized educational environment to assist an individual to construct and to implement his or her own unique educational route;

(c) joint creation of new ways of social and pedagogical interaction implemented on the basis of the wider repertoire of educational and pedagogical discourses (individualization, differentiation, and personalization).

In the long run, the mission of present-day education is focused on the development of skills and competencies of the 21st century.

The cultural approach to educational transformation is based on the following principle:

First one. The main purpose of teaching and learning is the development of cognitive, emotional and strategic (universal) competencies under the conditions of real cultural and social practices performed by a student.

Second one. Students are competent and rightful members of the academic community.

Third one. Every student has their own educational route to construct their own unique knowledge.

Fourth one. Students take their own decision concerning the subject they are interested to study, the ways of learning and the resources they need for that.

Fifth one. The process of learning is organized on the principles of collaboration, team activity and productive interactions with fellow students, teachers and the cultural, social and educational environment in a situation of an educational alternative and educational choice.

Therefore, it is quite evident that the center of gravity in learning *shifts from teaching (instruction) to student activity*. *His or her professional position in teaching and learning changes*. However, the role of the teacher remains, but his or her professional culture that determines his or her professional position in educational and pedagogical practice transforms.

As it is mentioned in the sociological report made by the High School of Economics [34], there is a great diversity in attitudes and teaching practices between generations of teachers. Thus, teachers over the age of 50 are much more focused on modern innovative pedagogy, and they pay much more attention to active learning than their younger colleagues.

To achieve sustainable knowledge is important for 38% of young teachers and only for 19% of older teachers; whereas teaching critical thinking and self-study is considered important by 72% of older teachers and only by half of the young ones. Differences are also expressed in educational and pedagogical practices. Teachers of the older generation are more likely to use methods focused on the development of critical thinking and learning skills, more trying to individualize students' educational experience. On the contrary, young teachers are more likely to focus on the well-known problems of behavior and checking homework [32].

At present, teachers are facing quite new educational and pedagogical functions, such as: facilitation, collaboration, metacognition, blending, authentic learning, modeling, student-active learning, assessment, support, and bridging theory/practice gap. Quite evidently, that together with teacher's digital competence, digital literacy, computer literacy

and media literacy they will characterize "digital teacher" and his or her professional culture.

2. The further we go on the path of digital transformation of education to School 4.0, the more different professional deficits of a digital teacher are experienced. More than 1 million teachers work in educational institutions, including more than 15.2 thousand teachers in non-state institutions. More than 30% of them have the first or highest qualification category. At the same time, a third of teachers note their professional deficits. A low level of computer and information technology literacy takes the first place in the rate of teacher's deficits. About 30% of teachers declare the absence of professional deficits in teaching. Only 30% of teachers are ready to accept and to implement innovations in teaching, and at the same time 55% of teachers do not have a clear position on this issue, and about 9% of the respondents totally reject these innovations.

The Deloitte Consulting LPP mentions in its study that digital natives are becoming digital teachers. It is written: "81% of teachers with 10 or fewer years of experience believe educational technology at school makes a really big or rather big positive difference on students' learning. But only 73% of teachers with 11-20 years of experience and 64% of teachers with 20+ years of experience feel similarly. Harnessing the positive attitudes of newer teachers could help spread wider use of tech for learning" [37].

The findings of the study conducted recently by the Moscow Higher School of Economics are quite similar, and they prove the fact that this is an international problem [32, 37].

As it is noted in the "Atlas of New Professions 2030", collected by specialists of the "Skolkovo" Innovation Center in Moscow, the rate of change and the complexity of professional tasks and practices increases throughout the process of the digital economy development in the beginning of the 21st century. The "Atlas of New Professions 2030" makes a prognosis that new pedagogical professions, such as: an educational moderator, a developer of educational trajectories, a digital tutor, a project training organizer, a coordinator of the online educational platform, a startup mentor, a game master (a gamificator), a coach at the mind-fitness, a developer of creating tools for teaching different states of consciousness and cognitive activity, etc. will be introduced in the educational sector within the next decade. In this aspect, the "digital teacher" problem is of great theoretical and practical importance [44].

4   Conclusion

The analysis of the problem of teaching and learning digital transformation in education allows the authors to conclude that despite the fact that teachers are aware of the importance of teaching digital transformation in the future and their professional deficits at present, the vast majority of them are not yet ready to fully accept innovations.

The results of the study were used in the design and implementation of a new educational course on Digital School and Digital University for post-graduate students at the Moscow Pedagogical State University.

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