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Theoretical article

Leadership and Innovativeness as the Basis for Developing Teachers' Digital Competences

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Abstract. The authors discuss the prospects for developing modern teacher's competences in the process of digitalization of education and several related problems. The purpose of the study is, based on the analysis of scientific research conducted in Russia and some other countries, to provide pedagogical management with a promising system for developing digital competencies in order to enable teachers to master modern educational technologies. Teachers' innovativeness and leadership as psychological characteristics that help them become digitally competent are considered from a theoretical standpoint. Based on these characteristics, as they are manifested in the educational process, a theoretical model of the structural elements of personal innovativeness is demonstrated. The practical technology for organizing a teacher's psychological and pedagogical laboratory in the form of a cycle of logically interconnected modules is described in detail. This technology will make it possible to develop teachers' digital competences in the system of a modern educational institution. The formulated main directions of the system for developing teachers' innovativeness and leadership can be used in the practice of pedagogical management of any modern school. The authors substantiate the need to introduce this system into the international practice of modern education.

Key words: information technologies, communication technologies, digital competences, digitalization of education, innovativeness, leadership, teachers

Introduction

The events of the past few years have led to rapid and often dramatic changes in many areas of professional activity. Modern specialists are faced with the need to introduce radical professional innovations and rapidly master the technologies of the digital space. Teaching has always been one of the most mobile

and innovative professions. When the teaching format was transformed due to the COVID-19 pandemic, teachers had to quickly master and apply new distance technologies, restructuring the forms and methods of teaching to the needs of the digital space.

The purpose of this article is, based on the generalized problems of transition to the digitalization of education in Russia and some other countries, as well as the analysis of numerous theoretical and empirical studies, to provide pedagogical management with a promising system for developing teachers' digital competences in order to enable them to master modern educational technologies.

Problems of transition from traditional to online education

Teachers have certainly shown a positive attitude towards digital technologies during the COVID-19 pandemic in the education system worldwide (Tomczyk et al., 2021). However, despite the fact that they have readily accepted the new format, a major challenge in education has been the way in which online learning is implemented and evaluated (Sahu, 2020; Timmis et al., 2016). Since modern technologies were used in teaching, the assessment process itself took place in the classroom, where knowledge assessments and students' assessments were carried out in the presence of teachers. In some countries, the educational process was organized not so successfully, because they did not have enough qualified staff to use such technologies. At the same time, 85% of schools and higher educational institutions in Europe were very effective in using modern technology, but only 29% of African schools and higher educational institutions were able to quickly transfer teaching and learning to online format (Marinoni et al., 2020).

The content of distance courses was not equally accessible to all students due to the lack of information and communication technology (ICT) tools, the Internet, etc. Despite the fact that the use of modern information technologies had become a mandatory part of the curriculum, most people, due to financial situation or for technical reasons, were not able to access education through online learning (Eger et al., 2020). Most universities were looking for ways to use tools and methods at the best cost, spending considerable time on understanding the remote work process, organizing the stability and availability of technical support, and developing pedagogical capabilities and teachers' digital competences on the move. According to a number of authors (Daniel, 2020; Reimers, Schleicher, 2020; Sangster et al., 2020; Thomas, Rogers, 2020), the biggest educational problems in the era of digitalization are: (1) the inability of people with low financial status to afford modern technologies needed for online learning; (2) the impossibility of accessing the Internet; (3) the technical and psychological difficulties in learning at home; (4) the insufficient digital competence of teachers who had to quickly switch to a new form of online learning; and (5) the impossibility of accessing the necessary literature.

Even before the situation created by the pandemic, L. Stošić argued that the development and application of new technologies is a necessary process that is associated with two problematic issues: "Do teachers have the opportunity to use educational technologies and are schools sufficiently equipped with all modern technical means?" (Stošić, 2015, p. 113).

Since the essence of education lies in the mutual cooperation between teachers and students, both of them play an important role in the application of ICTs in education. However, it is the teachers who make the final decision about what activities will be carried out, what content they will use and what strategies they will apply to ensure that learning outcomes are positive. Of course, the decisions made by teachers in many countries of the world do not depend on their motivations, but are carried out in accordance with the established plans and programs implemented by the ministries of education of these countries. Therefore, the use of educational technologies in the educational process depends on how teachers feel prepared and motivated to apply technological tools in their work.

Teachers' digital competences determine the success of using ICTs in the classroom. If teachers show a positive attitude towards mastering new knowledge in the field of digital technologies, their chances of success are higher. However, teachers may also experience psychological problems due to the use of ICTs; therefore, they are in no hurry to develop competences in this area. In this case, the question arises: to what extent are teachers able to digitally use modern ICTs in the classroom and in everyday duties, both in teaching and in planning didactic processes?

In a study conducted by Tomczyk and his colleagues on attitudes towards new media among pedagogical students, the authors identified four categories of attitudes: techno-optimistic, techno-realistic, techno-pessimistic and techno-ignorant ones (Tomczyk et al., 2017).

According to surveys conducted by Popadić and Kuzmanović in Serbia in 2016, 84% of fourth-graders (aged 10) had mobile phones and 87% used the Internet. Almost all high school students had mobile phones, and 95% of them used the Internet (Popadić, Kuzmanović, 2016). A study conducted by Oyelere and Tomczyk showed that, although there were various modules designed for games and various digital strategies that facilitated the learning process, the tools themselves did not initiate learning and could not solve the problem of digitalization of learning (Oyelere, Tomczyk, 2020).

Foulger et al. stated that the use of technological platforms had encouraged many users to share some aspects of their social, professional or cultural life, thus providing an opportunity to democratize education and social inclusion (Foulger et al., 2017). To be able to effectively use modern information and communication technologies, it was necessary to invest in the digital competence of the teachers themselves (Galustyan, 2020; Stošić, Stošić, 2015; Corell-Almuzara et al., 2021; Krouglov, 2021).

In the Russian scientific literature of the last few years, against the background of the introduction of distance learning during the COVID-19 pandemic, the number of articles analyzing the problems of digitalization of secondary and higher education in Russia has significantly increased (Narbut et al., 2020; Gairbekova, 2021; Kindeeva, Zueva, 2021; Ivanova, Moroz, 2022).

Several studies by Russian and European scientists noted a number of advantages of distance education and stated the need for the teaching staff to develop new competences (Ivanovskiy, 2021). It is interesting to note that a significant number of works on the prospects for the development of digitalization of educa-

tion in Russia were written by young scientists who highlighted a number of positive aspects of digitalization, namely: (1) developing a new space that allows a huge amount of information to be transferred and stored; (2) making knowledge accessible; (3) conducting convenient monitoring of the quality of education and student performance; and (4) individualizing the educational process. At the same time, school and university students rightly identify a number of problems in the process of digitalization of education, including: (1) unpreparedness of teachers to master new digital technologies; (2) technical unpreparedness of educational institutions to provide digital learning content; (3) management of perception and attention during the transfer of educational material; and (4) instability of the Internet systems (Burlakova, 2022).

The role of teachers' digital competences in the development of modern education

In many countries around the world, government authorities consider it very important that teachers be digitally competent (Arteaga et al., 2020). Digital competences include a set of knowledge, skills, attitudes, abilities, and strategies necessary for the qualitative use of information and communication technologies and digital media in order to improve teaching and learning in a thoughtful, flexible and safe way, as well as other activities related to the profession of a teacher working in online and offline formats of the modern educational process (Ferrari, 2012).

Previous studies show that the educational potential of digital technologies in education systems in Europe has been underused (Evropska komisija, 2014). Moreover, numerous studies conducted in Serbia have found that the practical use of ICTs in teaching depends on the enthusiasm and competence of the teachers themselves. If we take into account the total time that schoolchildren and students spend with ICTs, the time they devote to learning itself seems very insignificant (Džigurski et al., 2013).

Over the past few years, a significant number of scientific papers have been written in Russia on the technologies for developing teachers' digital competences and related problems (Ilina et al., 2019; Ignatyev, Shakhurdin, 2021; Syurdyukova, 2021; Golodov et al., 2022; Grunis, 2022). However, most of the models are theoretical and recommendatory in nature, and do not present specific practical technologies. For example, the teacher digital competence formation model is presented as forms for increasing the level of digital competences and blocks for implementing this model (Ignatyev, Shakhurdin, 2021).

In the work of a group of authors (E.A. Golodov, I.V. Gerlach, I.E. Kopchenko, O.N. Spirina, V.M. Khlopkova, E. Chiyanova), ICT competences of teachers are considered as knowledge, abilities and skills that allow them to freely use digital tools and information technologies to organize the educational process. The researchers note that the ICT competences are necessary in all types of pedagogical activities, from preparing for classes to creating content in a digital environment that helps build students' individual educational trajectories, motivate them to learn, analyze and predict their performance (Golodov et al., 2022). As a result of the survey, the authors of the study came to the conclusion that the risks of professional deficits in the field of ICT competences are: (1) the insuffi-

cient level of teachers' knowledge of digital technologies and tools, (2) the inadequate equipment of schools with computers and means of communication, and (3) the low Internet connection quality as an important factor in the use of modern digital technologies (Golodov et al., 2022). 2022).

International studies state that teaching how to use ICTs consists of 4 stages: (1) the potential of ICTs is determined in training; (2) the teacher learns to use ICTs; (3) the teacher understands where and when to use ICTs; and (4) the teacher is specialized in the use of ICT tools depending on the subject (Ristić, 2018, p. 1). In this regard, a number of important questions arise, including: (a) whether schools are prepared to develop students' IT competences; (b) whether schools are equipped for developing IT competences; (c) whether the methodology of teaching the subject has been sufficiently developed by teachers, taking into account the use of ITs.

No matter how hard schools try to introduce any innovative technologies, there will always be a need for teachers who are well trained in the methodology and practice of using ITs. As the development, application and deployment of new technologies grows rapidly, the question will always be about the IT competence of teachers themselves and the extent to which they can transfer the acquired knowledge to their students. Many schools are adequately equipped with modern ICTs, but they are not used properly. This is partly due to the long-standing traditional approach to using classical methods of work and the fear of introducing new modern technologies. It is well known that in human nature there are inherent barriers to the changes associated with the adoption of something new. It is very important to know and distinguish between competences for work in education and competences for everyday work and life experience (Ng, Thomas, 2007; Tigchelaar et al., 2008). Tomczyk and his colleagues state that "the potential of digital educational resources helps teachers enrich their classrooms with new methodological practices, promoting accessibility, inclusive education, participation in learning and the accumulation of knowledge" (Tomczyk et al., 2020, p. 1).

The use of ICTs has inevitably become an imperative of society and one of the main needs of modern education. To keep up with the times, teachers need to constantly upgrade their skills in using ICTs so as to be ready to master new digital technologies in teaching. The digital competences are becoming important for all members of modern society, not just for teachers. The fact that teachers must be digitally competent does not mean that these competences can be separated from other didactic competences, rather that all these competences should be synergistic. After all, if teachers are digitally competent, they contribute to their reputation and that of the school itself. Teachers need ongoing psychological support to develop their digital skills in line with the ICT trends.

Stanišić, Leković and Stošić point out that "the education system must withstand the rapid growth of world knowledge, therefore, employees of educational institutions must participate in everyday learning and lifelong learning" (Stanišić et al., 2019, p. 57). Studies conducted in Serbia have shown that not all teachers are interested in introducing modern technologies and the Internet into education (Stošić, Stošić, 2015, p. 467). However, by developing digital competences and acquiring digital knowledge, teachers have several advantages, including: (1) ex-

panding the range of application of forms and methods of teaching; (2) increasing the motivation of students in the educational process as a result of introducing the new learning technologies; (3) improving their IT competence; (4) conducting mobile communication with students as part of digital learning; (5) preparing themselves for classes in more comfortable conditions; and (6) improving the quality and efficiency of the educational process.

According to Ristić, numerous analyzes of curricula show that prior to the COVID-19 pandemic in Serbia, little attention was paid to teachers acquiring competences to apply educational technologies. He noted that there were no compulsory courses, and the number of elective courses in higher teacher education and students who attended them was insignificant (Ristić, 2018, p. 3). It can be concluded from the text above that future teaching staff should invest in their own knowledge and maintain their own desire to develop, learn and acquire digital competences for everyday work. This is not an easy process, because, due to the development of ICTs, a person must have sufficient motivation for lifelong learning.

Džigurski and his colleagues point out that, according to a study on the use of ICTs in Serbian schools, only the use and creation of digital teaching materials depends on the digital competences of teachers and the extent to which they are ready to apply them and their knowledge of the English language in order to use various tools and content (Džigurski et al., 2013). Stoković and Ristić note that students in education departments begin to acquire knowledge from the entry level in most ICT subjects because they have not acquired digital competences in previous learning cycles (Stoković, Ristić, 2016). A successful teacher, in addition to pedagogical and professional knowledge and skills, must also have digital competences in order to progress in the era of digitalization. According to Gibson (2001), the learning path consists of learning styles and technology styles.

Thus, summarizing Russian and international studies, we should note that, in the modern conditions of the development of education both in Russia and in Europe, the most important indicators in a teacher's work are: (1) mobility of knowledge, (2) efficiency of teaching methods and (3) critical thinking.

Leadership and innovativeness as the basis for developing teachers' digital competences

Currently, society needs leaders in the educational process, whose potential abilities will create the basis for new digital educational technologies. Of course, among the numerous personal qualities that characterize the effectiveness of a leader, innovation is one of the important components. In psychology, there are a number of approaches that make it possible to characterize the content of a teacher's work. These circumstances, on the one hand, indicate its complexity and, on the other hand, contribute to the terminological inconsistency of the views of researchers on this problem.

One of the most important and significant approaches involves considering the personal professional qualities and characteristics. L.M. Mitina in her works indicates several integral personal characteristics related to a teacher's work, including: emotional flexibility, competency, and professional orientation. These psychological characteristics make it possible to speak of a teacher as a subject of professional pedagogical work and a subject of life-activity.

L.M. Mitina pays great attention to teachers' professional orientation. In her opinion, the orientation of pedagogical workers is most evident in the content of their work, determining the characteristics of their teaching activity in general (Mitina, 2005). The orientation of teachers expresses their strategy of professional activity, which is influenced by their individual style of work and professional self-consciousness (Mitina, 2022).

In management, including pedagogical management, the phenomenon of leadership is seen as a process associated with moving towards a common goal, influencing others to complete the set goals (Potashnik, 2012; Gladkova et al., 2021).

Currently, modern approaches to the study of the phenomenon of leadership and the development of leadership qualities and abilities in professional activities affect the widest range of problems from personal to group ones (Abulkhanova, 2022).

In psychology, leadership is studied: (1) as an emotional quality of a person who inspires others; and (2) as a personal quality, i.e., a stable set of characteristics necessary for uniting, interacting and influencing people (Abulkhanova-Slavskaya, 1997; Meneghetti, 2006; Narimanova, 2017; Komarov, 2022).

Monitoring of scientific works and dissertations, which we have been conducting for several years, allows us to assert that in Russian psychology there are almost no theoretical and empirical descriptions of the relationship between innovativeness and leadership, especially in professional pedagogical activity.

In the South Ural scientific school of psychologists, V.G. Gryazeva-Dobshinskaya and her colleagues have made attempts to introduce the term 'innovative leadership' (Dmitrieva, Gryazeva-Dobshinskaya, 2014; Gryazeva-Dobshinskaya, 2016). The introduction of this term into the scientific vocabulary is ambiguous, because, by his (or her) nature, a constructive leader is already an innovator. Moreover, innovators must be leaders, otherwise their innovations will not be put into practice. Positive leadership qualities should be developed in the educational environment, since, in the practice of modern secondary and higher education, there are still many promising areas for obtaining new empirical data, the results of which make it possible to develop specific psychological and pedagogical technologies.

The prospects of psychological areas in the research of innovativeness are associated not only with the identification of the features of this quality in activity, but also with the introduction of effective socio-psychological and psychological-pedagogical technologies for managing personal characteristics to develop the creativity of leaders and society as a whole (Mikhailova, 2016).

Summarizing the results of theoretical and empirical studies, in our works we have identified the main criteria and methods for diagnosing the innovativeness of a person in different age periods. Relying on the structural components of personal innovativeness, outlined in the results of many years of empirical research described in monographic works and articles, we can conclude that the leading qualities of personal innovativeness are: willingness to take risks for the sake of new achievements, adaptability to change, perseverance, independence, positivity, open-mindedness, intuition, creative orientation, and constructive leadership (Mikhailova, 2012, 2013, 2016; Mikhailova, Kaminskaya, 2015).

Personal innovativeness is considered as a set of professional characteristics, which are realized in innovative activities and consisting of interrelated and mutually influencing psychological components: cognitive, behavioral and motivational-value ones (Mikhailova, Kaminskaya, 2015).

The cognitive component is represented by such qualities as: adaptability to change, open-mindedness and intuition. *The behavioral component* is expressed by the following qualities: perseverance, independence and constructive leadership. *The motivational-value component* is characterized by such qualities as: willingness to take risks for the sake of new achievements, positivity and creative orientation. The empirically identified personal qualities made it possible to construct *The Multidimensional Personality Innovativeness Questionnaire*, the content, validity and reliability of which are presented in a number of works (Mikhailova, Kaminskaya, 2015; Mikhailova, 2016).

E.V. Syurdyukova in her work presents the psychological factors in the formation of a teacher's digital competences, among which she highlights: cognitive abilities; motivational sphere; emotional-volitional sphere; communication skills; and subject-practical sphere (Syurdyukova, 2022). Based on the conducted methodological analysis, we present a model of a psychological and pedagogical laboratory designed to enable teachers to develop innovativeness and leadership in order to become professionally competent, particularly, in the field of ICTs.

Psychological and pedagogical laboratory for developing teachers' innovativeness and leadership in the educational process

In the process of mastering digital competences, teachers' innovativeness and leadership as triggers of ICT competences can be developed through the systematic organization of psychological support for the formation of professional potential. An effective form of developing teachers' professionalism in the conditions of a modern school can be a psychological and pedagogical seminar organized as a creative laboratory. We will try to give a brief description of the design of this laboratory.

This project provides for the creation of a psychological and pedagogical laboratory, the purpose of which is to maintain professional well-being and develop the professional potential of teachers, including their ICT competences. It is advisable to implement the work of the laboratory on a systematic basis, as an interactive training seminar, with a frequency of twice a month.

If the project is successful, it can become a long-term research platform for any educational institution. In the process of interaction, diagnostic and psychocorrective classes will be held for teachers in interactive training formats in the following modules: Module 1: "Myself and my health: how to live happily ever after in the profession"; Module 2: "Creativity in pedagogical activity: from pedagogical design to pedagogical innovations"; Module 3: "How to develop one's own professional potential: individual trajectories in professional growth"; Module 4: "My professional portfolio: practical methods and techniques for creative growth".

In order to fully reveal the professional potential, it is necessary to work with the psychological barriers to the formation of digital competences, which were described above in our article.

The system of organizational support for developing teachers' innovativeness and leadership consists of several main areas, including:

- Creating a professionally directed motivational environment in an educational institution.
- Modeling the school's corporate culture as a value space for maintaining an innovative climate and professional leadership of teachers.

• Carrying out individual work with psychological barriers while implementing innovations in the field of digitalization of education.

• Developing the teacher's professional identity.

• Introducing continuous psychological and pedagogical training of teachers at school.

Let us dwell on some organizational foundations for the implementation of these areas in more detail.

The motivational environment of an educational organization, according to N.V. Samoukina, is considered as a synthesis of conditions that affect employees to achieve the goals and effectiveness of their professional activities. The motivational environment provides a psychological atmosphere for a positive assessment by employees of the results of their activities (Samoukina, 2007).

As this author's believes, the motivational environment is present in an educational organization if the following conditions are met:

1) the results expected from the teachers are specifically defined;

2) a system of rewards for high results has been developed and these rewards should be significant for the teachers;

3) an objective assessment of the activities of the teachers, corresponding to the results of their work has been introduced;

4) criteria for labor assessment have been developed and implemented;

5) the effectiveness of creativity and innovativeness in professional activities is highly appreciated;

6) the teachers are systematically informed about the goals and results of the development of digitalization in the educational process;

7) successful teachers who develop digital competences become leaders in the educational process, and conditions for career growth are created for them; and

8) constructive competition and a positive attitude towards joint labor activity prevail in the relationships between the teachers (Samoukina, 2007).

To effectively overcome the psychological barriers, it is necessary to change the stereotypes of teachers' consciousness that prevent them from effectively implementing digital innovations and maintaining cooperation with their colleagues in the following areas:

1) explaining and justifying the goals for the development of ICT competences in the educational process;

2) overcoming the fear of change through systematic psychological support;

3) demonstrating and proving the advantages and benefits of upcoming digital innovations; and

4) rallying leaders and supporters of transformation and using their influence.

It is important to create conditions that would facilitate closer communication between supporters of innovations, mutual understanding, exchange of knowledge, feelings and experiences, as well as immediately include these employees in the process of implementing the digitalization of education.

Conclusion

The pedagogical management of the educational environment should create conditions for ensuring high professional achievements of teachers in the development of their digital competences. The process of developing competitiveness

and leadership can be ensured in three areas: (1) in the field of activity itself, (2) in personal terms, and (3) in communication.

Teachers' competitiveness in their professional activity must be maintained in the context digital innovations applied in the teaching methods. Opportunities for teachers' professional growth and development can be provided through the development of reflective abilities, as well as through personal development trainings.

The formation and manifestation of leadership qualities are directly related to digital competences, which can be developed through the use of methods of interactive socio-psychological collaboration with colleagues and students, for example, socio-psychological training for constructive communication. All of the above-listed forms and methods of psychological and pedagogical support for the development of innovativeness and leadership are possible only with a competent system for managing the development of the professional potential of modern teachers.

The problem of education, development and self-realization in the era of digitalization has become relevant with the development of modern digital technologies. Digital competence is, on the one hand, lifelong learning, in which end users must constantly learn to implement innovative methods, using new digital tools, to improve their work and, above all, the educational process. Today, for teachers to become digitally competent, they must apply a lifelong learning strategy, because modern information technologies are developing every day, and the knowledge gained is already partially outdated after some time. This means that once acquired digital competences do not guarantee their relevance in a few years.

Therefore, modern teachers, systematically developing their potentials in innovativeness and leadership, must have sufficient motivation to acquire new knowledge and constantly improve themselves in the field of digital technologies. Numerous studies around the world have shown that there have been, are and will be problems in the education, development and self-realization of people in the era of digitalization. The self-realization of people in the digital age will certainly depend on their personal attitudes and motivations as well as their willingness to invest in their knowledge and lifelong learning. It is equally important that modern educational institutions be ready to organize support in developing teachers' digital competences.

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Теоретическая статья

Лидерство и инновационность как основы развития цифровых компетенций педагогов

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Аннотация. Рассмотрены проблемы и перспективы развития современных компетенций педагогов в процессе цифровизации образовательного процесса. Цель работы – на основе анализа зарубежных и отечественных научных исследований предложить

педагогическому менеджменту перспективную систему развития цифровых компетенций педагогов в овладении современными образовательными технологиями. Представлена теоретическая аргументация рассмотрения развития лидерства и инновационности педагогов как психологических характеристик, способствующих формированию цифровых компетенций. На основе характеристик проявлений лидерства и инновационности в образовательном процессе продемонстрирована теоретическая модель структурных элементов инновационности личности. Подробно изложена практическая технология организации психолого-педагогической лаборатории учителя в виде цикла логически взаимосвязанных модулей. Данная технология позволит организовать развитие цифровых компетенций педагога в системе современного образовательного учреждения. Сформулированы основные направления системы организационного развития лидерства и инновационности педагогов, которые можно использовать в практике педагогического менеджмента любой современной школы. Обоснована необходимость внедрения данной системы в международную практику современного образования.

Ключевые слова: информационно-коммуникативные технологии, цифровые компетенции, цифровизация образования, лидерство, инновационность, педагоги

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