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CONTINUOUS PROFESSIONAL TEACHER DEVELOPMENT THROUGH DIGITAL EDUCATIONAL RESOURCES

Mirza N.V.[1*], Nakonechnikova K.N.[1]
[1]NJSC "Karaganda University named after academician E.A. Buketov",*
Karaganda, Kazakhstan
[*]Corresponding autor: mirza_natalya@mail.ru

Abstract

The study implemented an integrated approach to organizing continuous professional development. This approach involves making changes to the structure of the educational process, the content of professional practice, the system of advanced training, as well as the activation of forms of digital self-education and self-development of teachers. Key criteria for assessing the level of readiness of teachers for continuous professional development through digital educational resources were developed and clarified: cognitive, operational-activity, motivational-value and communication-organizational. Each of the criteria reflects a separate aspect of digital pedagogical activity and makes it possible to assess both the formation of digital competencies and personal and professional readiness for their application. Positive changes were recorded in the development levels of all components of professional training of teachers: the share of participants with high indicators of digital competence increased, motivation for self-development intensified, reflexive involvement in professional activities elevated, communication and organizational qualities expanded. The ideas, conclusions and guidelines presented in the study are focused on practical application in the system of professional development of teaching staff.

Keywords: continuous professional teacher development, digital educational resources, an integrated approach, digital competence, professional training of the teacher, self-development.

САНДЫҚ БІЛІМ БЕРУ РЕСУРСТАРЫ АРҚЫЛЫ ПЕДАГОГТЫ ҮЗДІКСІЗ КӘСІБИ ДАМЫТУ

Мирза Н.В.[1*], Наконечникова К.Н.[1]
[1]«Академик Е.А. Бөкетов атындағы Қарағанды университеті» КЕАҚ,*
Қарағанды, Қазақстан
[*]Хат-хабар үшін автор: mirza_natalya@mail.ru

Аңдатпа

Зерттеуде үздіксіз кәсіби дамуды ұйымдастырудың кешенді тәсілі іске асырылды. Бұл тәсіл оқу-тәрбие процесінің құрылымына, кәсіптік практиканың мазмұнына, біліктілікті арттыру жүйесіне өзгерістер енгізуді, сондай-ақ оқытушылардың цифрлық өздігінен білім алуы мен өздігінен дамуының нысандарын жандандыруды көздейді. Сандық білім беру ресурстары арқылы педагогтердің үздіксіз кәсіби дамуға әзірлік деңгейін бағалаудың негізгі өлшемшарттары әзірленді және нақтыланды: когнитивтік, операциялық-қызметтік, уәждемелік-құндылық және коммуникативтік-ұйымдастырушылық. Критерийлердің әрқайсысы сандық педагогикалық қызметтің жеке аспектісін көрсетеді және сандық құзыреттердің қалыптасуын, сондай-ақ оларды қолдануға жеке және кәсіби дайындығын бағалауға мүмкіндік береді. Педагогтарды кәсіптік даярлаудың барлық құрамдас бөліктерінің даму деңгейлерінде оң өзгерістер тіркелді: цифрлық құзыреттіліктің жоғары көрсеткіштері бар қатысушылардың үлесі өсті, өзін-өзі дамытуға ынталандыру күшейді, кәсіптік қызметке рефлексиялық қосылу артты, коммуникативтік-

ұйымдастырушылық қасиеттер күшейді. Зерттеуде ұсынылған идеялар, қорытындылар мен әдістемелік ұсынымдар педагог кадрларды кәсіби дамыту жүйесінде практикалық қолдануға бағытталған.

Кілт сөздер: педагогтің үздіксіз кәсіби дамуы, сандық білім беру ресурстары, кешенді тәсіл, сандық құзыреттілік, педагогтің кәсіби дайындығы, өзін-өзі дамыту.

НЕПРЕРЫВНОЕ ПРОФЕССИОНАЛЬНОЕ РАЗВИТИЕ ПЕДАГОГА ПОСРЕДСТВОМ ЦИФРОВЫХ ОБРАЗОВАТЕЛЬНЫХ РЕСУРСОВ

Мирза Н.В.[1*], Наконечникова К.Н.[1]

[1]НАО «Карагандинский университет имени академика Е.А. Букетова», Караганда, Казахстан*

[*]Автор для корреспонденции: mirza_natalya@mail.ru

Аннотация

В исследовании был реализован комплексный подход к организации непрерывного профессионального развития. Этот подход предполагает внесение изменений в структуру учебно-воспитательного процесса, содержание профессиональной практики, систему повышения квалификации, а также активизацию форм цифрового самообразования и саморазвития преподавателей. Были разработаны и уточнены ключевые критерии оценки уровня готовности педагогов к непрерывному профессиональному развитию посредством цифровых образовательных ресурсов: когнитивный, операционально-деятельностный, мотивационно-ценностный и коммуникативно-организационный. Каждый из критериев отражает отдельный аспект цифровой педагогической деятельности и позволяет оценить как сформированность цифровых компетенций, так и личностную и профессиональную готовность к их применению. Зафиксированы позитивные изменения в уровнях развития всех компонентов профессиональной подготовки педагогов: выросла доля участников с высокими показателями цифровой компетентности, усилилась мотивация к саморазвитию, повысилась рефлексивная включенность в профессиональную деятельность, усилились коммуникативно-организационные качества. Представленные в исследовании идеи, выводы и методические рекомендации ориентированы на практическое применение в системе профессионального развития педагогических кадров.

Ключевые слова: непрерывное профессиональное развитие педагога, цифровые образовательные ресурсы, комплексный подход, цифровая компетентность, профессиональная подготовка педагога, саморазвитие.

Introduction

Modern education is going through a stage of large-scale digital transformation, within the framework of which not only the nature of pedagogical activity is rethought, but also approaches to organizing its professional support. In the context of the rapid introduction of technologies and the strengthening of the role of EdTech solutions, it becomes especially important to rethink the concept of continuous professional development of a teacher integrated with the use of digital educational resources (DRC) [1].

In Kazakhstan, the digitalization of education is considered as a priority direction of state policy. The Digital Kazakhstan program, the launch of the Unified Digital Educational Environment (DSP), the development of platforms such as BilimLand, Kundelik.kz, as well as the active use of distance learning services (Zoom, Microsoft Teams, etc.) have become an integral part of educational reality [2]. These initiatives ensure not only the availability and openness of education, but also require fundamentally new competencies from teachers - including digital literacy, the ability to self-learn and flexible interaction in a digital environment.

One of the promising areas in the field of digitalization is the introduction of artificial intelligence technologies into educational practice, which allows building adaptive individual

learning trajectories. However, the full realization of this potential is impossible without a high degree of digital subjectivity of the teacher himself - their readiness to critically assess, meaningfully apply and creatively transform digital resources in educational activities.

Particular attention is paid to the issues of digital training in the Concept for the Development of Higher Education and Science in the Republic of Kazakhstan for 2023-2029, where a shortage of digital skills was identified among the weaknesses of the industry, especially in the field of informal and additional education [3]. These challenges are also outlined in the strategic Address of the President of the Republic of Kazakhstan K. Tokayev, which emphasizes the need to form a competent and digitally competent pedagogical corps as a key condition for the development of the country's human capital [4].

The relevance of the topic is also supported by global strategic priorities. According to the concept of continuing education developed by UNESCO, it is the idea of continuous professional growth that acts as the main strategy for the development of education of the future [5]. In this regard, digital educational resources are not considered as an auxiliary element, but as a backbone factor that ensures personalized, affordable, mobile and sustainable professional development of teachers throughout their professional life.

The purpose of this article: to study and analyze the practice of continuous professional development of teachers in a digital educational environment.

Research objectives:

- to determine the state of the problem of continuous professional development of teachers in a digital educational environment;
- identify criteria and indicators for assessing the level of digital competence and readiness for self-education among teachers and undergraduates.

Research methods

To conduct the empirical part of the study, modern psychodiagnostic methods were selected that make it possible to comprehensively assess the level of readiness of teachers for continuous professional development in the context of digitalization of education. The selection of tools was due to the need to cover both digital competencies and personal and professional characteristics that affect the successful integration of digital educational resources into pedagogical activities.

1. Teacher digital competence test (based on DigCompEdu model) [6];
2. Methodology for diagnosing professional motivation (K. Zamfir, adaptation of A. Rean) [7];
3. Methodology for assessing the level of professional self-development (L.N. Berezhnova) [8];
4. Test “Leadership qualities” (R. Stogdill, adaptation of E. Zharikov and E. Krushelnitsky) [9].

The advantage of the selected methods is that they make it possible to form a reasonable idea of the level of readiness of teachers for continuous professional development through digital educational resources and at the same time:

1) the testing procedure takes a limited time, which makes it convenient for use in a real educational process;

2) diagnostic tasks do not require special technical means or special conditions for conducting, which provides flexibility in organizing the study;

3) the selected tools include the necessary and sufficient components to obtain a reliable conclusion about the level of digital competence, motivation, self-development and leadership qualities of teachers in the context of a digital educational environment.

Study results

Based on the results of the psychodiagnostic study, the following sequence of analytical actions was organized:

1. There were signs of insufficient level of formation among teachers of digital competencies necessary for effective professional development and integration of digital educational resources into the educational process;

2. Possible causes of the recorded deficit were identified, including limited experience in interacting with digital platforms, insufficient motivation for digital self-learning, as well as external organizational and resource limitations;

3. An analysis of the individual and group characteristics of the study participants was carried out, a working hypothesis was formulated on the relationship between the level of digital competence of the teacher and the nature of the psychological and pedagogical conditions of his professional development;

4. Collection of additional information is organized in order to verify the hypothesis, including data from questionnaires, expert assessments and observations;

5. A comprehensive hypothesis test was carried out based on the generalization and comparison of all the data obtained.

Within the framework of this study, key criteria for assessing the level of readiness of teachers for continuous professional development through digital educational resources were developed and clarified. Each of the criteria reflects a separate aspect of digital pedagogical activity and makes it possible to assess both the formation of digital competencies and personal and professional readiness for their application.

These criteria include:

1. Cognitive criterion - reflects the level of theoretical awareness of the teacher in the field of digital educational resources, an understanding of their functions, types and potential for the implementation of the educational process.

2. Operational and activity criterion - characterizes the teacher's ability to apply the Center in teaching practice, including the design, implementation and evaluation of digital educational products.

3. Motivational value criterion - demonstrates the teacher's internal attitude towards professional development, his willingness to perceive digital transformation as a value norm and a guideline for professional growth.

4. Communication and organizational criterion - determines the ability to effectively digital interaction in a professional environment, the ability to build constructive communication with students, colleagues and the community through digital channels and platforms.

The presented criteria together make it possible to carry out a comprehensive diagnosis of the state of professional readiness of the teacher and lay the foundations for the subsequent formative impact through the introduction of a digital professional development model.

The results of the experiment were summarized based on the analysis of the distribution of teachers by levels of digital competence, in accordance with the DigCompEdu frame.

Comparative analysis shows a distinct positive trend in the experimental group. If at the stating stage the level of A1 - Novice was demonstrated by 40% of teachers, then at the control stage this figure dropped to 5%. The proportion of participants who achieved B2 - Expert (from 5% to 30%) and C1 - Leader (from 0% to 20%) increased significantly, which indicates the formation of sustainable digital skills and the development of digital subjectivity.

No significant changes were recorded in the control group: a high proportion of teachers with levels A1 and A2 (15% and 45%, respectively) remain, and advanced levels (B2 and C1) are still represented singularly. This emphasizes the effectiveness of the model of continuous professional development in the digital educational environment used in the experimental group. A comparative analysis is provided in Figure 1.

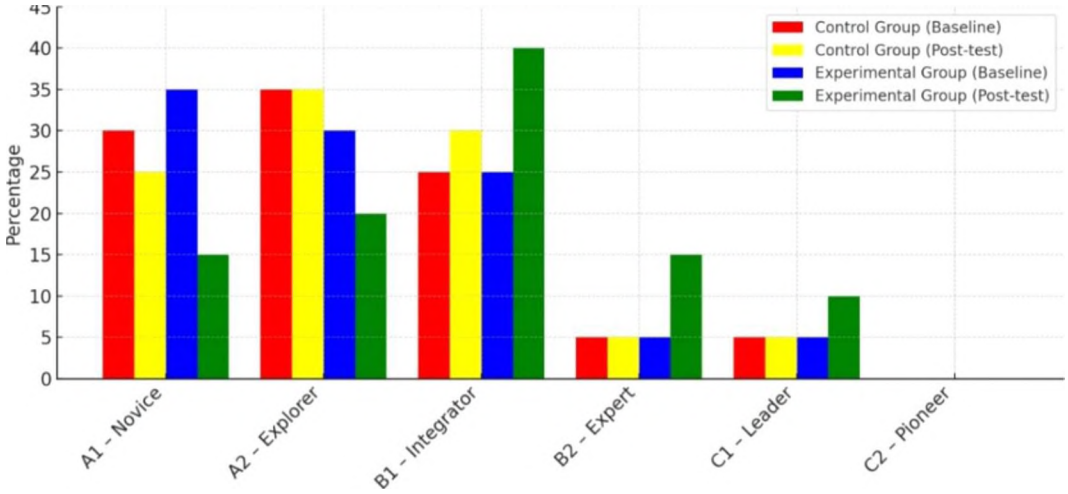

Figure 1. Comparison of digital competence levels at the stating and control stages of the experiment

Thus, the distribution of participants on the DigCompEdu scale at a formative stage suggests that the developed model of continuous professional development of a teacher in a digital educational environment contributes to the systematic development of digital competence of teachers, which confirms its effectiveness in the context of continuous professional development.

The results of K. Zamphir's technique (modification of A. Rean) made it possible to determine the dominant type of motivation among teachers of the control and experimental groups, which is a significant indicator of the motivation-value criterion of professional development.

At the reporting stage, external positive motivation prevailed in the control group (45%), internal motivation was 25%, external negative - 30%. At the control stage, the structure remained practically unchanged: internal motivation increased to 30%, external positive decreased to 40%, the level of external negative remained the same.

Positive dynamics are observed in the experimental group: internal motivation increased from 40% to 50%, and external negative decreased from 25% to 10%, which indicates an increase in professional subjectivity and a decrease in orientation to external sources of pressure. A comparative analysis is provided in Figure 2.

Thus, the implementation of the model of continuous professional development of a teacher in a digital educational environment contributes to the restructuring of the motivational profile towards a stable internal professional orientation. This creates conditions for increasing awareness, initiative and effectiveness of pedagogical activities in the context of digital transformation of education.

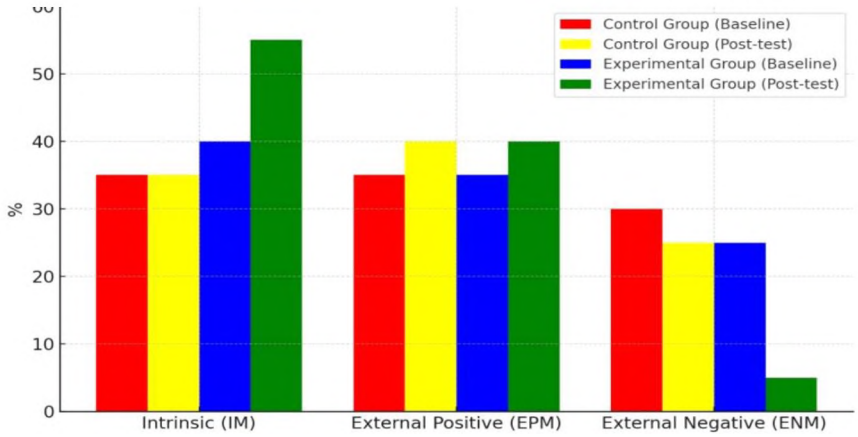

Figure 2. Comparative analysis of professional motivation of teachers at the stating and control stages of the experiment

The results of L.N. Berezhnova's methodology "Reflection on self-development", designed to diagnose the level of professional self-development of teachers, made it possible to record the level of formation of the desire for professional and personal growth in both groups, as well as the dynamics of changes as a result of the introduction of a model of continuous professional development of a teacher in a digital educational environment.

No significant changes were recorded in the control group. The "average" level decreased from 30% to 25%, the "above average" level increased from 25% to 30%, the "high" level remained at the same level - 15%. Low and below average levels also barely changed. This indicates the stability of the motivational structure, but at the same time indicates the absence of significant progress in the desire for professional self-development.

Positive shifts are observed in the experimental group. The "low" level decreased from 15% to 0%, and the "high" level increased from 10% to 20%. The number of teachers with a "below average" level has grown from 30% to 35%, which may indicate a transition from a passive attitude to self-development to more conscious participation. The "average" level remained at 25%. A comparative analysis of the professional self-development of teachers is provided in Figure 3.

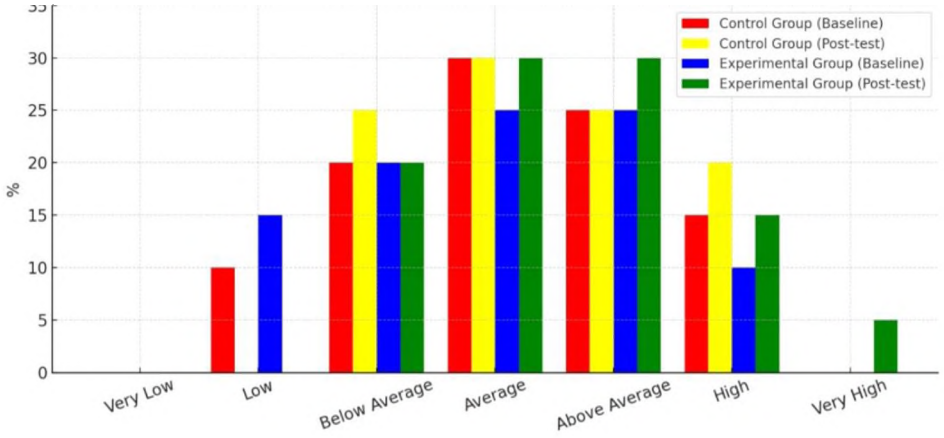

Figure 3. Comparative analysis of professional self-development of teachers at the stating and control stages of the experiment

Thus, in the experimental group there is a clear positive trend in the formation of motivation for professional self-development, which confirms the effectiveness of the proposed model of continuous professional development of a teacher in a digital educational environment.

The results of the formative stage of the experiment using the Leadership Qualities methodology (E. Zharikova and E. Krushelnitsky) made it possible to assess the dynamics of the development of the communication and organizational component of the professional formation of teachers in the control and experimental groups.

In the experimental group, the level of "very strong" was recorded in 20% of participants, and "strong" - in 35%. At the same time, 10% of respondents demonstrated weakly expressed leadership qualities. At the control stage, the percentage of teachers with "very strong" leadership qualities increased to 30%, and weakly expressed qualities were not identified at all. The number of teachers with "strong" qualities also increased - up to 30%, thereby maintaining positive dynamics.

There were no significant changes in the control group: the level of "weakly expressed" remains at around 25%, and "very strong" qualities were noted in 20% of participants at both the stating and control stages. A comparative analysis of the leadership qualities of teachers is provided in Figure 4.

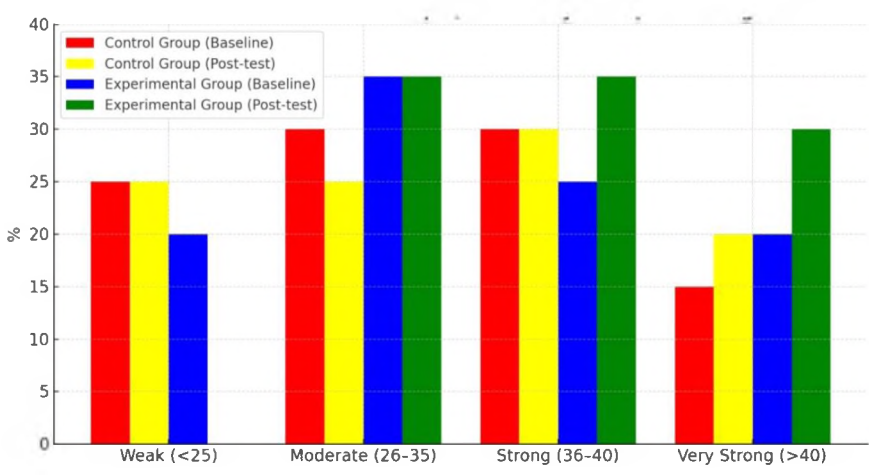

Figure 4. Comparative analysis of the leadership qualities of teachers at the stating and control stages of the experiment

Thus, the comparison of data allows us to draw a conclusion about the positive impact of the implemented model of continuous professional development of a teacher in a digital educational environment on the development of the communication and organizational criterion for the professional growth of teachers.

The results obtained allow us to make the following generalizations:

• professional development of teachers should be based on the system integration of digital technologies;

• it is necessary to rely on internal motivation, pedagogical reflection and leadership potential;

• the model of continuous professional development of a teacher in a digital educational environment requires support, support and flexible adaptation to individual trajectories.

The training of a modern teacher is impossible without an integrated approach that covers both cognitive and activity aspects, as well as value-motivational and organizational. It was this approach that was implemented as part of our research, which made it possible to achieve a qualitative growth in the professional competencies of teachers.

Discussion

The analysis of modern research shows that despite active initiatives in the field of digitalization of education, the system of continuous professional development of teachers remains fragmented and does not have sufficient structural completeness. In recent years, in the theory and practice of education, the vertical "pedagogical education - advanced training - self-education" has been consistently built, focused on ensuring the professional growth of specialists [10]. However, despite the existence of regulatory frameworks and local practices, the system still needs conceptual refinement, integration of digital formats and coordination with modern requirements for digital competencies of teachers. This leads to different interpretations of the essence and functions of continuing education.

The presence of diverse points of view on the nature and functions of continuous education creates a significant variation in research approaches, which, on the one hand, indicates a high degree of interest in the problem, and on the other, there is no single methodological basis. In domestic and foreign pedagogical science, the problem of continuing education is studied in various aspects: as a scientific category (A.N. Imanova, R.D. Ashimbetova, L.S. Almagambetova, A.E. Zeinelova, N.N. Shpigar, etc.), as a process of interaction between general and vocational education (P.R. Atutov, S.Ya.B. Atyshev, M.I. Makhmutov, V.A. Polyakov), in the context of the continuity of educational levels (J. Dewey, A.P. Belyaeva, B.S. Gershunsky, Yu.A. Kustov, L.D. Shary), as well as an environment for personal and professional development of the subject of education (E.V. Bondarevskaya, E.I. Burdina, B.A. Abdykarimov, M.V. Klarin, L.I. Savva, N.K. Sergeev, V.G. Ryndak, etc.). However, most of these approaches do not sufficiently take into account the challenges of digital transformation of education and do not always cover the psychological and pedagogical conditions for the effective development of a teacher in a digital educational environment. This determines the need for a deeper analysis of modern contexts, including digitalization, AI and EdTech, within the framework of the concept of continuous professional development.

Based on the theoretical analysis and the results of experimental work carried out on the basis of the Karaganda University named after E.A. Buketov, the following conclusions were made:

• in the practice of higher education, systemic approaches to organizing the continuous professional development of teachers using digital technologies are not fully represented;

• there is a shortage of complex digital solutions that provide not only the translation of knowledge, but also the formation of digital subjectivity, reflection, self-learning skills;

• a significant part of the study participants experience difficulties in independently navigating digital educational platforms, in organizing an individual educational trajectory, as well as in integrating AI tools into everyday professional activities.

To solve the identified problem, we substantiated the need to optimize the educational process at the university, taking into account modern requirements for the digital transformation of the professional development of teachers. Taking into account the potential of higher educational institutions in creating conditions for the formation of digital competencies and pedagogical subjectivity, an integrated approach to organizing continuous professional development was implemented. This approach involves making changes to the structure of the

educational process, the content of professional practice, the system of advanced training, as well as the activation of forms of digital self-education and self-development of teachers.

In the course of the study, we developed and implemented the following works:

- a model of continuous professional development of a teacher in a digital educational environment, providing a systematic formation of digital subjectivity and professional reflection;
- computer program “Continuous professional development of a teacher through the use of digital educational resources,” aimed at methodological support of the process of professional growth of teachers in a digital educational environment;
- special advanced training course “Digital tools for continuous professional growth of a teacher” (72 hours), aimed at developing digital and methodological competencies;
- telegram channel “Teacher of the Future,” which serves as a platform for continuous exchange of experience, receiving feedback, increasing digital literacy and the involvement of teachers in the professional community;
- video materials have been prepared for the YouTube channel “Laboratory of Early Development,” revealing the practical aspects of using digital educational resources in the professional activities of the teacher.

Conclusion

Thus, during the experimental work, positive changes were recorded in the development levels of all components of professional training of teachers: the proportion of participants with high indicators of digital competence increased, motivation for self-development increased, reflexive involvement in professional activities increased, communication and organizational qualities increased. Approbation of the model showed that its implementation provides an increase in the professional development of teachers in all key criteria. Since in our work we relied on the results of theoretical analysis, data from the pedagogical experiment, as well as current trends in the digital transformation of education, all the ideas, conclusions and guidelines presented in the study are focused on practical application in the system of professional development of teaching staff. Thus, our study confirms the possibility and need to implement a systematic approach to the continuous professional development of a teacher in a digital educational environment, providing a combination of scientific validity, technological flexibility and practical significance of the results obtained.

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Information about the authors:

Mirza Natalya Viktorovna – corresponding author, Doctor of Pedagogical Sciences, Associate Professor, Professor of the Department Preschool and Psychological and Pedagogical Training, NJSC “Karaganda University named after academician E.A. Buketov”, Karaganda, Kazakhstan; e-mail: mirza_natalya@mail.ru;
Nakonechnikova Ksenia Nikolaevna – master's student, NJSC “Karaganda University named after academician E.A. Buketov”, Karaganda, Kazakhstan; e-mail: xeniya.nakonechnikova.official@gmail.com.