

Aspects of distance learning in the system of continuous education of elementary school teachers the ukrainian context

Aspectos del aprendizaje a distancia en el sistema de educación continua de maestros de escuelas primarias el contexto ucraniano

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ABSTRACT:

The research results of the theoretical-methodological principles of distance education in the system of continuous teaching of primary school teachers were presented in the paper. Definitions of such basic concepts of the research were identified and specified: "distance education in the system of continuous teaching of primary school teachers", "preparation structure of a primary school teacher for distance education". A pattern which expresses a combination of interconnected blocks-components was designed: methodological, theoretical, teaching-methodological, effective. Theoretical principles were substantiated: regularities, principles, organizational-pedagogical conditions, etc. A teaching-methodological system of the primary school teachers' training for distance education was worked out. The introduction of a developed system of distance education and some interconnected theoretical principles into a teaching process of experimental groups made it possible to get positive dynamics of the preparation levels of primary school teachers to develop their personal professional-pedagogical competence in the conditions of distance education. The increase of the indicators of high preparation level for distance education in the system of continuous teaching by all criteria was observed in the experimental groups of primary school teachers as compared with control groups: motivational-valuable, cognitive, operational.

Keywords: elementary school, distance education, system of continuous professional development

RESUMEN:

En el trabajo se presentaron los resultados de la investigación de los principios teórico-metodológicos de la educación a distancia en el sistema de enseñanza continua de maestros de primaria. Se identificaron y especificaron definiciones de tales conceptos básicos de la investigación: "educación a distancia en el sistema de enseñanza continua de maestros de primaria", "estructura de preparación de un maestro de primaria para educación a distancia". Se diseñó un patrón que expresa una combinación de componentes de bloques interconectados: metodológico, teórico, didáctico-metodológico, efectivo. Se fundamentaron los principios teóricos: regularidades, principios, condiciones organizativas-pedagógicas, etc. Se elaboró un sistema pedagógico-metodológico de la formación de profesores de educación primaria para la educación a distancia. La introducción de un sistema desarrollado de educación a distancia y algunos principios teóricos interconectados en un proceso de enseñanza de grupos experimentales permitió obtener una dinámica positiva de los niveles de preparación de los maestros de primaria para desarrollar su competencia profesional profesional-pedagógica en las condiciones de la educación a distancia. El aumento de los indicadores de alto nivel de preparación para la educación a distancia en el sistema de enseñanza continua por todos los criterios se observó en los grupos experimentales de maestros de primaria en comparación con los grupos de control: motivacional-valioso, cognitivo, operativo.

1. Introduction

Distance education (DE) has been used in education systems, namely in the U.S.A., Europe, Japan etc., for a long period of time. DE differs in every country depending on its specific political, economic and social conditions. The current world trends of socio-economic development stimulate the further creative improvement of education systems and implementation of the advanced technologies aimed at ensuring continuous professional learning. Taking into account the above-mentioned and the need to enhance socio-economic development, Ukrainian higher schools face new challenges, they need to revive and rebuild the national education system as a tool to ensure the culture-forming progress and human development, to bring the national education branch to the level of leading world countries through radical reforms of its conceptual, structural and organizational principles, to take innovative measures with a view to democratizing and facilitating people's access to higher education; to introduce Ukraine to the global information society by using the new information technologies and appropriate technical means of communication.

Distance education is actively studied and introduced in such scientific and educational institutions of Ukraine as the Institute of Information Technologies and Teaching Aids of NAPS of Ukraine, the Ukrainian-American Liberal Arts Institute "Wisconsin International University (USA) Ukraine", the National Technical University (KhPI), Drahomanov National Pedagogical University, Sumy State University, Puliuy Ternopil State Technical University, Khmelnytskyi National University and others.

When implementing a social mandate which requires training a specialist capable of facilitating the national cultural development, these and other Ukrainian higher educational institutions develop the theoretical-methodological foundation for distance courses, study the efficient ways of organizing distance classes, ensure the logistics of the distance education network and address other issues associated with putting the distance education system in practice.

Purpose of the paper. The purpose of the paper is to present the system of distance education as part of continuous education of elementary school teachers and to experimentally analyze its efficiency.

2. Materials and methods

2.1. Theoretical Principles of DE of Elementary School Teachers and Its Organization as a Continuous Process

DE in the system of continuous learning of elementary school teachers is an inter-course pedagogical category which is characterized by a degree of individuality, intensity and controllability and is guided by the professional development of teachers' self-cognitive activity with the use of information and communicational technologies and with the tutor-supervised interaction (synchronic and asynchronic) within distant participants of the educational process.

The dynamics of the scientific and technical revolution results, rapid development of the information society on this base and fast obsolescence of knowledge gained by specialists at educational institutions are the key pre-condition for the establishment of DE in the world. Retrospectively, DE was formed based on the achievements of studying by correspondence, but it has its own specific nature, this is primarily the possibility of maintaining constant communication between the subjects of the educational process with the help of modern information communicational technologies, to ensure their direct access to database and optimize the independent work. The researchers consider the following features of DE to be essential: its open nature, accessibility for a wide range of people (including adults as subjects of education, specialists in different fields, in pedagogy in particular), great flexibility (depending on a purpose and a task, DE may use different combinations of case-technologies, manuals, TV, radio and multimedia materials, forms and methods of individual communication between a teacher and a student).

In Ukraine, DE as an object of research is still in the center of a scientific discourse. Researchers (Bykov, 2008; Spirin & Kolos, 2011) successfully study the DE-related world experience, develop (mostly at the Institute of Information Technologies and Teaching Aids of NAPS of Ukraine) its general methodological and theoretical foundation (regularities, principles and directions of its use in education), determine the necessary and sufficient conditions for a proper operation of DE centers and the organization of this process in cross-sectional higher educational institutions (HEIs), as well as accumulate the relevant practical experience.

The researchers of pedagogical HEIs and institutes of post-graduate pedagogical education have some achievements in this sphere (Kartashova, 2011; Kukharenko, 2012), but DE organization at these educational institutions does not have an integral nature. It is usually used locally as a separate form

of professional-pedagogical training (it is mostly post-graduate education or advanced training), or a pedagogical technology in some courses, or a tool for enhancing the educational activity etc.

The leading tendencies of DE development in pedagogical theory and practice are as follows:

- strengthening its link with modernization of pedagogical education on a contemporary scientific basis;
- designing and implementing the 'life-long studying and education of the population' program;
- using it as a tool to ensure a fast response to the globalization and other processes;
- improving the quality of the educational-methodological framework of DE organization.

We have established the systemic requirements of an elementary school teacher which include:

- an innovation-oriented character and readiness to introduce innovations in the professional-pedagogical process;
- readiness to interpersonal polylogue with an organizer and subjects of distant education;
- all-round competence in psychology and pedagogics of professional self-learning and self-education, individual psychology, DE theory and technology; ability to enhance the experience of creative self-developing activity.

The totality of these requirements refers to the category of elementary school teacher's readiness for DE in the system of continuous education the structure of which is classified as an integral property of a personality which shows an integral interaction between the motivational and value-based (raising the awareness of the need to learn the DE theory and technology through self-education at a self-evaluation level), cognitive (the formation of individually acquired knowledge of the modern educational information technologies, principles of its organization in elementary school, ways of professional performance on the basis of information and communicational technologies for the sake of professional growth and self-development) and operational (a range of skillful actions and operations connected with the use of DE technologies in professional activity) components.

Detailed characteristics of the preparation components of primary school teachers for DE in the system of continuous teaching were grounded in our previous paper (Mukoviz, 2016).

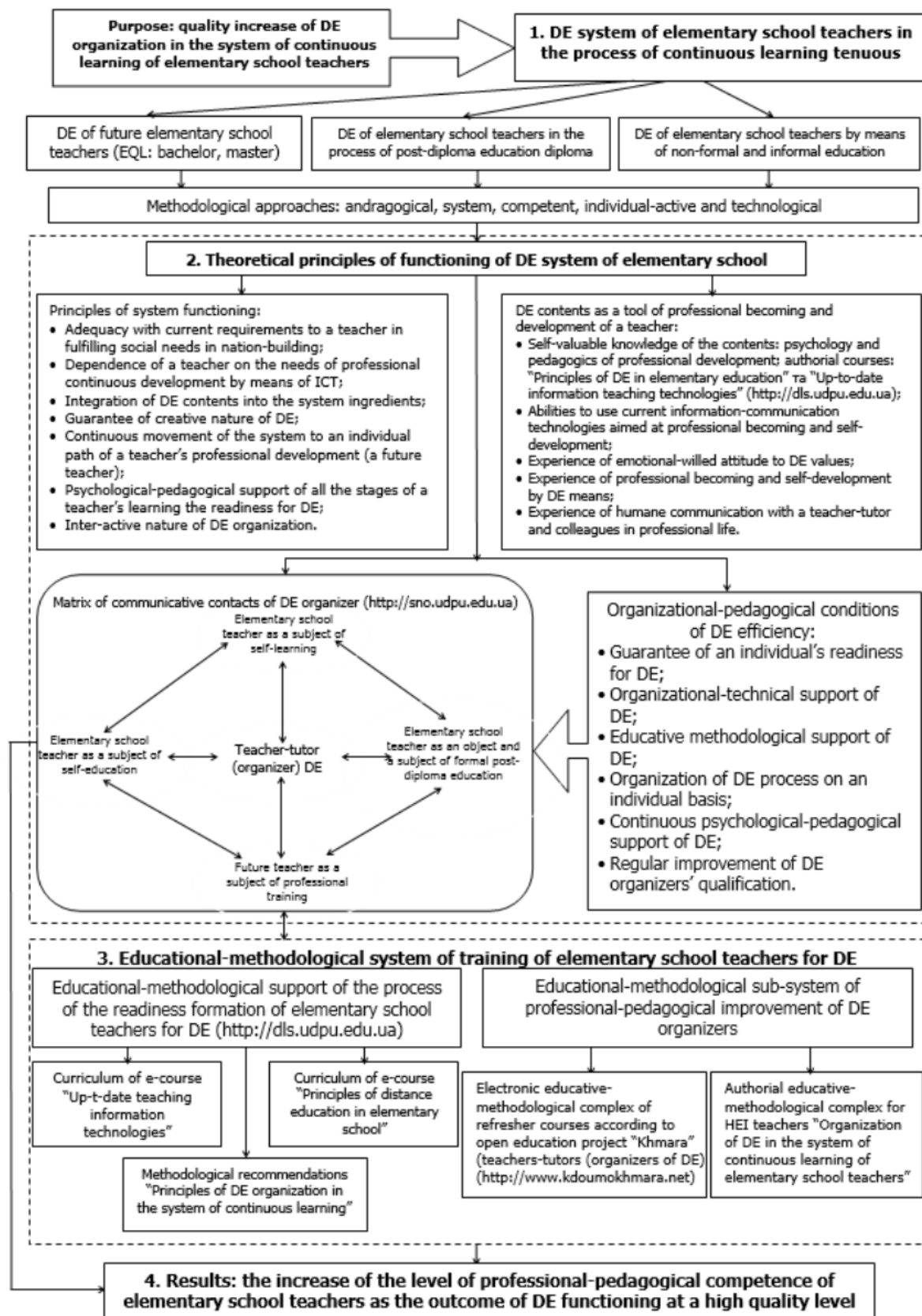
The main aspects of DE organization in the system of continuous education of elementary school teachers are as follows:

- priority shift from teaching to independent cognitive activity of an elementary school teacher;
- stressing the need to develop the elementary school teachers' readiness for DE (making sure they are computer-literate);
- changing the ways of interaction between the subjects of educational process which is conditioned by the new DE means and technologies;
- flexibility of organizational forms and methods pursuant to the levels of teachers' actual readiness for DE, time and place of classes.

We have considered the lack of any systematic approach to an elementary school teacher's DE, which stems from the groundlessness of the relevant system in the scientific and pedagogical theory.

We have designed a model of the DE system in continuous education of elementary school teachers for the sake of its theoretical and methodological substantiation (Fig.1).

Figure 1
DE Model in System of Education
of Elementary School Teachers



It makes it possible to identify the correlations inside the object of modeling, to show them graphically, to focus on the solution of the main tasks and to logically predict DE. The model components are interconnected. For example, the theoretical principles of elementary school teachers' DE system are determined by the following methodological approaches: andragogical, system, competent, individual-active and technological.

The educational and methodological system of elementary school teachers' training for DE was designed according to the theoretical principles of its functioning. What we have received is the result of the operation of a theoretical and educational and methodological system. External links with DE as a system is conditioned by the development strategy of pedagogical education in Ukraine in view of the society's nation-building needs. It is linked with the public centers of adult education, pedagogical

proficiency and components of the general higher education system in the country. Its operation is regulated by the Law of Ukraine on Higher Education.

2.2. Instructive-Technological Context of the Organization of DE in the System of Continuous Training of Elementary School Teachers

Taking the structure of E-learning as a basis (Regulation on Certification of Electronic Training Courses, 2016), the system of DE modules was expanded with heuristic ones which complemented the complexity of informative module formations and gave the overall purpose of the designed model.

The relevant informative modules were built based on the knowledge, gained earlier by elementary school teachers, and the skills which were related to professional creativity and professional self-learning and self-education. These heuristic modules meet the teacher's needs in life-long professional and cultural development with the use of DE. Teachers were asked to create electronic projects to show their own reflective attitude to professional growth and search for creative forms and ways of reaching the value-based and meaningful goals).

The opened structure has become the foundation for the development of electronic teaching course Principles of Distance Education in Elementary School Intended to train specialists so that they are able to successfully implement the DE technologies in the system of continuous education of elementary school teachers for the purpose of their professional growth. The functions of this teaching course are as follows:

- promoting the fundamentalism of basic professional and post-graduate pedagogical education,
- helping teachers develop axiological, systemic and prognostic thinking, ensure a sufficient level of their motivational, moral and practical readiness to implement DE in the system of continuous education in terms of their professional growth.

The main topics of the course curriculum are the following:

- Distance Learning in Modern Educational Field,
- Organization and Implementation of Distance Education in HEI,
- Main Competences of an Elementary School Teacher Required for Distance Education,
- Didactic Principles of Organization of Distance Learning in Elementary Education, Information-Education Area of Pavlo Tychyna Uman State Pedagogical University (<http://dls.udpu.edu.ua>),
- Organization of Distance Learning in System of Continuous Education of Elementary School Teachers (<http://sno.udpu.edu.ua>) and Individual Educational-Experimental Task (to develop a teacher's blog using Blogger).

Creating an efficient pedagogical technology of DE resulted in the awareness of the value of this course. Researchers demonstrate different attitudes to it: it is considered to be the most important element of the mechanism intended to manage the system of continuous education of elementary school teachers as well as a complicated computer-aided pedagogical system which has its specific structure and functioning regularities. It is characterized by the features of integrity, reproduction, adaptability, psychological justification, economic expediency, scientific nature, flexibility and controllability. The conceptual approach confirms creative nature of the technology expressing 'ideology' of its formation and implementation in the contexts of professional-pedagogical performance and creative self-development of an elementary school teacher on the basis of information-communication technologies. The contents-procedural approach primarily implies the availability of such contents in a teacher's professional-cultural development with the help of DE means which are consistent with the purpose of a life-long continuous professional progress. This component seeks to design and to apply the innovative forms e.g. webinars, individual-developing educational chats, e-forums, tele-essays etc.) of a distant educational process and its methods (video-lectures, video-talks, video-problem learning method, internet-contests, internet-conferences, internet-consultations and others). The next component – a professional one – correlates with achieving the highest level of the elementary school teacher's proficiency, mastering the pedagogical skills and techniques with the help of DE means, and acquiring the ability to organize oneself for professional self-learning and self-education.

We have identified the following technological means of DE organization in continuous education:

- optimal choice of electronic educational environment: Authorial Packages, Learning Management Systems – LMS, Content Management Systems – CMS and Learning Content Management Systems – LCMS;
- search of technological means as to their criteria of safety and reliability in operation, compatibility with other E-learning decisions, convenience in use, cost etc.

According to these criteria, Open Source LMS Moodle and CMS PHP-Fusion have been chosen in view of their availability and common use. We described the possibilities of further development and

improvement of these systems as well as the ability of educational institutions to use them to implement the 'life-long learning concept'.

2.3. System of DE for Elementary School Teachers in Terms of Its Renewed Strategic Goals

The DE system for an elementary school teacher in the process of continuous education is an integral complexity of interconnected actions, meaningful for his/her professional development in educational sphere of HEIs, institutes of post-graduate education and non-formal and informal education, which covers the formation of an elementary school teacher's motives (future career ambitions) regarding their professional and professional-cultural development using DE mechanisms, his/her readiness for self-organization for DE; DE organization in the context of its usefulness for teacher's professional development and needs of society in culture-formation; encouragement of designing, self-organizational, self-inspirational and self-controlling actions of an elementary school teacher towards his/her readiness for DE on the way to professional culture and proficiency; constant monitoring by organizers (tutors) of elementary school teacher's distance education, its intermediate and final results.

Based on electronic DE means (PHP-Fusion, Moodle and cloud-based technologies from Microsoft (OneDrive, Padlet)), we developed the web-site of the system of continuous education of elementary school teachers (<http://sno.udpu.edu.ua>). Its structure includes an information-education environment (<http://dls.udpu.edu.ua>) as a systemic multi-level combination of various information resources and services intended for a certain group of users (teachers' staff, students, elementary school teachers) as well as for analysis, processing, information transmission and provision of the access to different services based on personification with the help of any device connected to the Internet (Mukoviz, 2015).

The requirements to a teacher-tutor (a DE organizer) are as follows: this should be a humane, tolerant, highly professional individual who has a good command of psychology and pedagogics, education and information and communication technologies who can act creatively when it comes to the development of communicative competences.

The generalization of the approaches to the reasoning of contemporary principles of teaching and education, the consideration of peculiar aspects of the educational process of pedagogical HEIs, the results of the studied experience of elementary school teachers' training into the use of DE technologies have become the ground which determines the rules of the functioning of the developed system. DE seeks to define the needs of every teacher to constantly develop professionally during their working lifetime and the needs of society to nation-build. The DE contents is naturally designed in compliance with individual-developing and ethno-cultural development strategy of pedagogical education, the latest results of the scientific search of the improvement of information-communication technologies and the Regulations on E-Learning Certification at Universities, Ministry of Education and Science of Ukraine. The DE contents includes the teacher's valuable knowledge in psychology, pedagogics, theory of professional self-education and creativity as well as the self-valuable expertise and the ways of using the information and communicational technologies in the educational process properly. The DE technology is conditioned by its contents and purposes, and is characterized by the presence of stages, consistency, individual-developing ability and consideration of age aspects of younger students.

This paper substantiates the following principles of the system's performance:

- compliance with the current requirements to a teacher in fulfilling social needs in nation-building;
- teacher's dependence on the needs in the professional continuous development with the use of information and communicational technologies;
- integration of DE contents into the system elements; guarantee of creative nature of the DE technology;
- system's invariable movement along the individual path of a teacher's professional development (a future teacher);
- psychological and pedagogical support which is provided to a teacher at all the stages of readiness for DE;
- interactive nature of DE organization.

The central link of the theoretical principles of an elementary school teacher's DE system is its contents. It has been proven that a teacher, who is competent in DE organization in the context of its subordination to his/her own professional development, masters the information and communicational technologies distantly on the basis of self-valuable knowledge about psychology of a personality, psychology and pedagogics of creativity, psychology and pedagogics of professional development. Furthermore, as a tool of the elementary school teacher's professional development, DE contents includes the original courses Principles of DE in Elementary Education and Up-to-Date Information Teaching Technologies (<http://dls.udpu.edu.ua>); abilities to use the modern information-

communication technologies aimed at professional becoming and self-development; experience of emotional and willing attitude towards DE values; experience of professional becoming and self-development using DE means; experience of humane communication with a teacher-tutor and colleagues in professional life.

The contents of the curriculum of electronic educational and methodological complex of advanced training for the employees of HEI (scientific-research project of open education KHMARA under the program Teachers-Tutors (Organizers) DE (<http://www.kdoumokhmara.net>) is crucial for proper training of teachers for DE organization in the system of continuous education of elementary school teachers. An important aspect in teachers' training for DE organization in the system of continuous education of elementary school teachers is introducing the contents of the authorial complex of educational and methodological seminars Organization of Distance Learning in System of Continuous Education of Elementary School Teachers.

Organizational and pedagogical conditions for DE efficiency in the system of continuous education of elementary school teachers are the complex of interconnected circumstances and measures which ensure a goal-oriented control over the DE process, as well as the rules established in the system which guarantee a high quality of DE. Thus, the following conditions have been substantiated:

- Ensuring the individual's readiness for DE (by developing and introducing the educational and methodological complexity in the form of E-learning courses: Up-to-Date Information Teaching Technologies, Principles of Distance Education in Elementary Education and methodological recommendations set out in Principles of Distance Learning in System of Continuous Education).
- Adequate organizational and technical support of DE (hardware, telecommunication, software, information and logistic support).
- Personality-oriented educational and methodological support of DE (it envisages the availability of curricula developed on the basis of the standards of higher education, instructions and recommendations which describe the procedure and implementation of DE) including curricula of E-learning courses, curricula of educational, on-the-job and other kinds of training, text-books and manuals (electronic version), instructive and methodological materials for seminars, practical and laboratory classes, individual educational and experimental tasks, regularities, mid-term and final tests, methodological materials for independent work, performing individual tasks, written term and graduation papers.
- Organization of the DE process on an individual basis (fulfilling a teacher's tutoring function, making a schedule of all the events simulating the process of continuous education of elementary school teachers, taking into consideration the tasks of the State Standard of Elementary Education, introducing distance technologies, using various forms and methods of organizing the educational process in the system of continuous education).
- Continuity of psychological and pedagogical support of DE through stimulating the independent cognitive activity, creating a situation of success, creating a positive atmosphere, through creative activity of DE participants, simulation of pedagogical performance, teacher's responsive performance, reflective activity of an elementary school teacher, critical attitude to one's own experience, its evaluation and improvement.
- Systematic character of DE organizers' advanced training (it is carried out through a constantly active system of retraining and advanced training for DE organizers arranged by the specialists in information and communication technologies (DE system administrators, computer-engineers as well as DE system managers, teachers-tutors and DE organizers).

It has been established that while implementing DE into the system of continuous education of elementary school teachers, it is necessary to take into consideration the whole spectrum of closely interconnected conditions.

3. Results

The pedagogical experiment lasted from 2012 to 2018 in accordance with the developed program and had the following stages: preparatory, diagnostic, forming, generalizing (Mukoviz, 2018).

1960 people were engaged in the experiment in total (experimental groups (EG) = 960, control groups (CG) = 952); 48 teachers of s were involved at the forming stage. At the forming stage, all members of the general experimental group were divided into four sub-groups: EG 1 – third-year students of HEI in the status of elementary school teachers with diplomas of junior specialists with the specialty Elementary Education – 330 people (CG 1 – 328 people); EG 2 – fifth-year students of pedagogical HEI in the status of elementary school teachers with bachelor diplomas with the specialty Elementary Education – 318 people (CG 2 – 314 people); EG 3 – students of refresher courses at the institutes of post-graduate pedagogical education with specialist's/master's diplomas with the specialty Elementary Education – 312 people (CG 3 – 310 people); a group of DE organizers (tutors) consisting of the teachers of pedagogical HEI – 48 people.

An average age of a primary school teacher was 24 years old, although in a quantitative parameter 20-year-old teachers predominated. Among the respondents, 942 people were women; 18 people were men. The majority of the respondents had at least 1 – 3 years of work experience in primary school. An average age of teachers was 37 years old, although quantitatively 40-49-year-old and 26-28-year-old teachers predominated. 42 people were women, 6 people were men. The majority of the respondents had 10 – 20 years of work experience in pedagogical educational.

At this stage, the level of readiness of HEI teachers and elementary school teachers for DE in the system of continuous education was identified using diagnostic tools and grounded criteria which were chosen beforehand.

The following criteria were used for the diagnostics of DE readiness in the system of continuous education of elementary school teachers: motivational and value-based, cognitive and operational, as well as their indicators (motivational and value-based – raising awareness of the need to learn DE theory and technology by means of self-education at a self-value level; cognitive – completeness of self-acquired knowledge of the current information teaching technologies, principles of their use in elementary school, ways of carrying out the professional activity based on information and communicational technologies meant for professional becoming and self-development; operational – a complex of skillful actions and operations related to the use of DE technologies in professional activity).

The professional and pedagogical competence of elementary school teachers was diagnosed according to the defined criteria (theoretical-methodological and psychological-pedagogical training) (Uruskiy, 2013). We have established four levels of the diagnostics results: low, average, sufficient, high. The most productive diagnostic methods included testing, polling, interviewing, individual and group discussions of a certain topic intended to evaluate the information and communicational competence (Mukoviz, 2016).

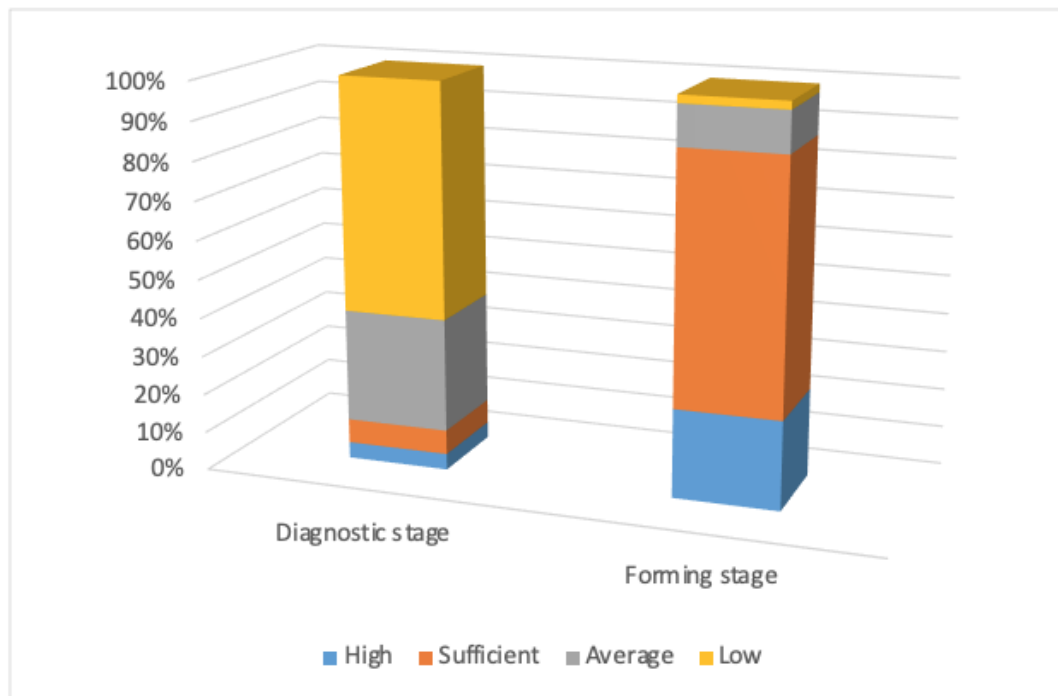
The diagnostic stage showed a low level of respondents' awareness of the need to develop the important professional and individual qualities for DE organization, it also demonstrated the necessity to organize their forming stage that would ensure integral readiness for DE, provide organizational and technical support in relation to this process and create a completely modern educational and methodological DE complexity etc.

All developed and theoretically grounded scientific principles, which were meant to enhance the professional-pedagogical competence of elementary school teachers by using DE means, were introduced in the teaching process of the experimental groups. An outstanding special feature of the forming experiment was that the students were gradually exposed to a developed educational and methodological sub-system of elementary school teachers' training for DE which mainly consisted of e-courses Principles of Distance Education in Elementary School and Up-to-Date Teaching Information Technologies, and the original complexity of materials for educational and methodological seminars Organization of Distance Learning in System of Continuous Education of Elementary School Teachers. The program Teachers-Tutors (Organizers) of HEIs – Accreditation Categories III-IV was also implemented. A complete combination of earlier actualized forms and methods of DE organization was used during the experiment.

The diagnostics results of the readiness of elementary school teachers for DE (Fig. 2) confirmed that the teachers of pedagogical HEI showed a sharp increase of the readiness level for DE in the system of continuous education of teachers.

According to the motivational and value-based criterion, the number of respondents with a sufficient level of readiness amounted to 66.7% (as compared with a diagnostic stage of the experiment, it is higher by 60.3%), those with a high level were 20.8% (as compared with the beginning of the experiment, the number of individuals increased by 16.6%).

Figure 2
General Characteristics of Readiness Levels of HEI Teachers to Organize DE
in the System of Continuous Education of Elementary School Teachers (Final Evaluation, %)



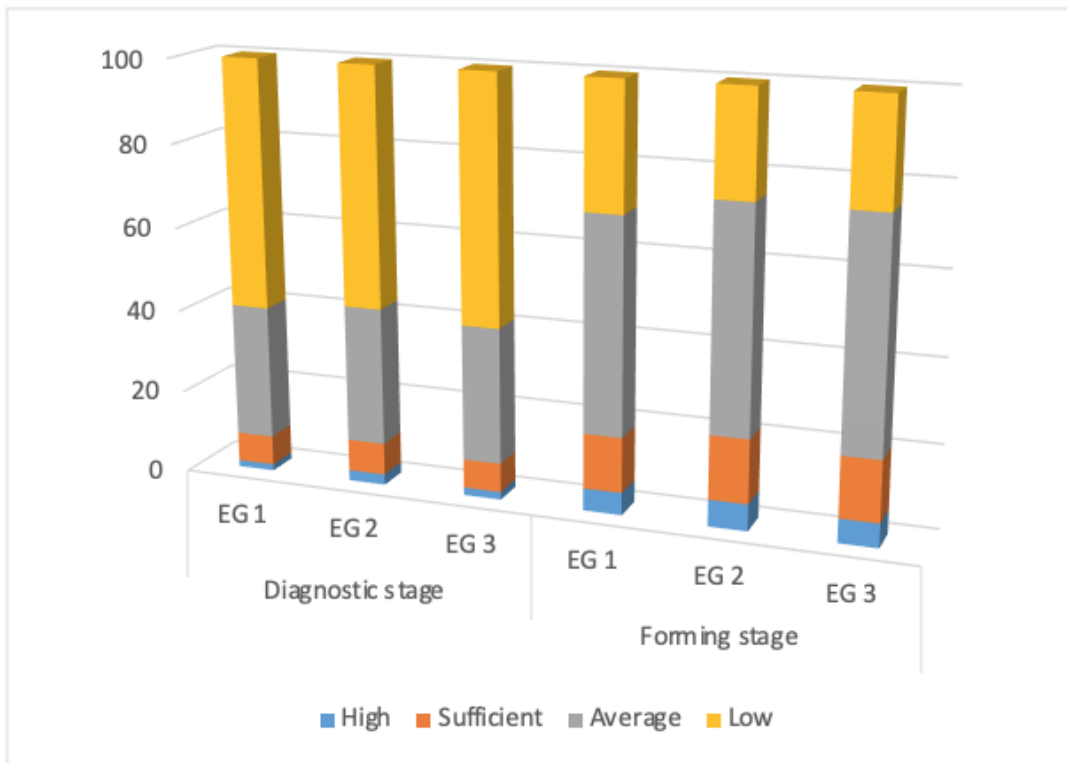
According to the cognitive criterion, the number of teachers also increased during the experiment: teachers with a sufficient readiness level – by 58.3%, those with a high level – by 18.8%.

According to the operational criterion, the number of teachers with a sufficient level of readiness for DE was increased by 56.2% and those with a high level – by 20.8%. According to all criteria, the number of respondents with a low level of readiness for distance education decreased considerably.

The experimental groups of elementary school teachers demonstrated a higher level of readiness for DE in the system of continuous education at the end of the experiment (Fig. 3).

According to the motivational and value-based criterion, we received the following data: the number of elementary school teachers with an average level of readiness for DE in EG 1 was 50.3%, EG 2 – 51.9%, EG 3 – 53.2%; those with a sufficient level: in EG 1 – 13.3%, EG 2 – 15.1%, EG 3 – 14.4%. However, there was no considerable increase in the number of elementary school teachers with a high level of readiness for DE in these groups – it requires a creative use of information and communicational technologies for the sake of professional growth which requires a long experience of creative activity which in its turn is a slow process.

Figure 3
General Results of the Levels of Readiness of Elementary School Teachers for DE
in the System of Continuous Education (Final Evaluation, %)



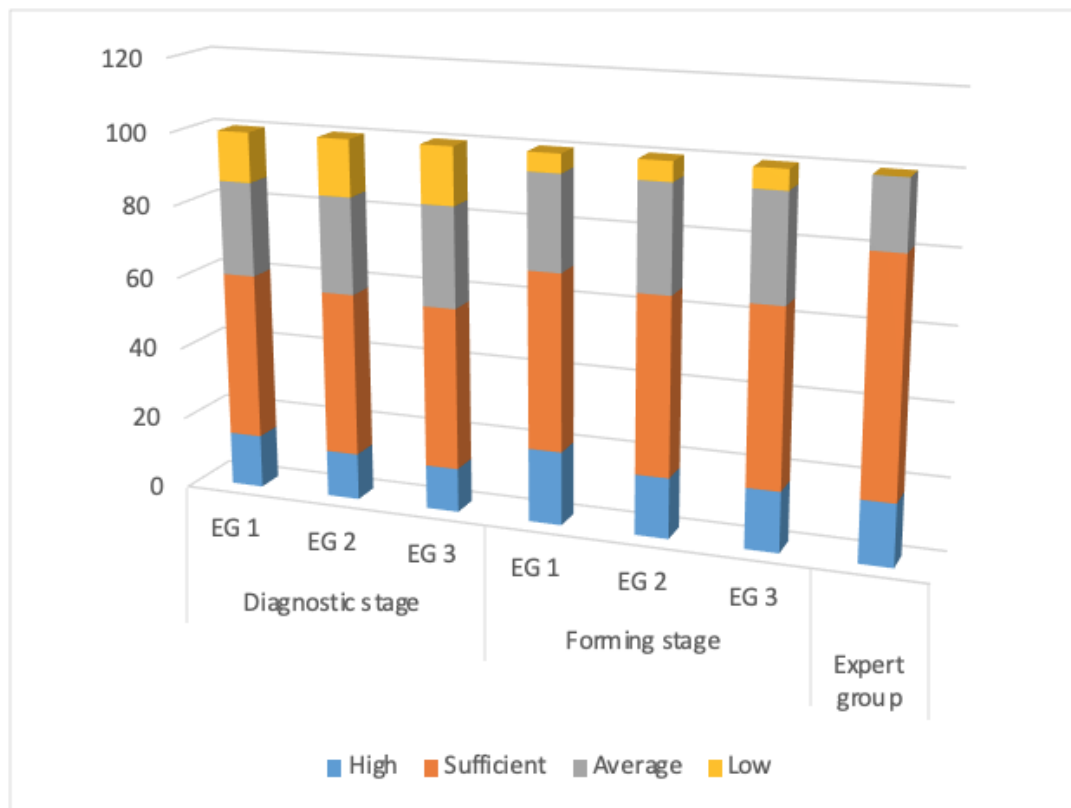
According to the cognitive criterion, the number of the experiment participants with a high level of readiness for DE increased: in EG 1 – by 2.4%, in EG 2 – by 1.8%, in EG 3 – by 2.9%. There was an increase in the number of respondents with a sufficient (in EG 1 – by 3.9 %, in EG 2 – by 5.0%, in EG 3 – by 5.2%) and average readiness level (in EG 1 – by 24.2%, in EG 2 – by 23.1%, in EG 3 – by 24.7%). We noticed a tendency towards the decrease in the number of respondents with a low level of competence for distance education.

The increasing dynamics of teachers' readiness for DE, according to an operational criterion, is confirmed by the following data: 4.9% is the relevant indicator of the number of elementary school teachers who have a high level of readiness (EG 1); 5.2% is typical for EG 2; 4.8% is the indicator of the increase in EG 3. There were more teachers with a sufficient level of readiness: in EG 1 – by 8.1%, in EG 2 – by 11.8%, in EG 3 – by 10.8%.

The increase of the number of elementary school teachers with an average level of readiness for DE was registered in accordance with the operational criterion: in EG 1 – by 12.8%, in EG 2 – by 12.1%, in EG 3 – by 17.8%. The number of the respondents with a low level of readiness was reduced by 29.4% on average which proved the efficiency of the system of continuous training of elementary school teachers for DE that we had developed.

The results of experimental testing of the DE model and the system of elementary school teachers confirmed great positive changes in the development of their professional and pedagogical competence (Fig. 4).

Figure 4
Diagram of the Development Levels of Professional and Pedagogical Competence of Elementary School Teachers (Final Evaluation, %)



On average, 5.8% of the participants from EGs had a low level of theoretical-methodological preparedness. However, there was a considerable increase in the number of teachers with a sufficient and high level of such preparedness (48.6% and 12.7%, respectively). We revealed a significant improvement of the dynamics of the respondents' psychological and pedagogical competence: 18.3% of individuals had a high level, 48.4% of EG members had a sufficient level, 5.5% of teachers (on average) had a low level. These indices confirm the efficiency of the developed DE model and system in continuous education of elementary school teachers in experimental groups.

The use of Pearson criterion for the comparative analysis of the received and critical values of each indicator gave every ground to confirm the efficiency of the implementation of the developed DE system in continuous education of elementary school teachers: critical value $\chi^2 = 7.81$ for a degree of freedom $\nu = 3$ and $\alpha = 0.05$ does not exceed a received average empiric value in all three experimental groups (17.8), and this proves significant positive changes of the statistics (the null hypothesis was rejected and an alternative one was accepted).

4. Conclusions

The evaluation of elementary school teachers' readiness for distance learning in the system of continuous education as well as their professional-pedagogical competence at the end of the experiment according to the established criteria and indices allowed us to establish the following: the introduction of the developed system of distance education and the related theoretical principles into the educational process of experimental groups led to positive dynamics of the readiness levels of elementary school teachers for the development of their professional and pedagogical competence in the conditions of distance education. Better indices of the high level of readiness for distance learning in the system of continuous education were seen in the experimental groups of elementary school teachers as compared with the control ones according to all criteria.

Bibliographic references

- Bykov, V. Yu. (2008). Models of the organization of an open education system. Kyiv: Atika.
- Kartashova, L. A. (2011). System of information technology teaching of future teachers of social-humanitarian subjects. Lutsk: Volynpoligraph.
- Kukhareenko, V. M. (2012). On the system of distance education in an open distance course. *Information technologies in education*, 11, 32-42.
- Mukoviz, O. P. (2015). System of Distance Learning Administration in Continuing Education for Primary School Teachers. *GLOKALde*, 1 (1), 7-18. Retrieved from: <http://www.glokalde.com/pdf/issues/1/Article1.pdf>.

Mukoviz, O. P. (2016). The Examination of Readiness of Primary School Teachers to Distance Learning in the System of Lifelong Education. *GLOKALde*, 2 (1), 27-44. Retrieved from:

<http://www.glokalde.com/pdf/issues/5/Article1.pdf>.

Mukoviz, O. P., Kolos, K. R. & Kolomiets, N. A. (2018). Distance Learning of Future Primary School Teachers as a Prerequisite of Their Professional Development Throughout Life. *Information Technologies and Learning Tools*, 66 (4). 42-53. Retrieved from:

<https://journal.iitta.gov.ua/index.php/itlt/article/view/2265>.

Regulation on Certification of Electronic Training Courses, 2016. Retrieved from the information and educational environment for intramural and extramural students. Retrieved from:

<https://dls.udpu.edu.ua/index.php/2018-08-12-12-56-29/2018-09-05-14-05-32>.

Spirin, O. M. & Kolos, K. R. (2011). Pedagogical experiment in the development of subject competencies of computer science teachers through distance education. *Information technologies and teaching aids*, 25 (5). Retrieved from: <https://journal.iitta.gov.ua/index.php/itlt/article/view/555>.

Uruskyi, V. (2013). Pedagogical diagnostics. Retrieved from:

<http://bcmc.kiev.ua/docs/peddiagnostika.pdf>.

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