Educational and information environment of postgraduate education institutions as a resource for designing individual educational training of teachers

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Abstract: The new Ukrainian school needs the teachers able to work on their continuous development and decide on their personal paths with regard to their interests, needs, motivation, opportunities, and experience. The educational environment of postgraduate education should fully allow for the choice of types, forms and pace of education as well as variability of programs. In the context of the national educational space, a number of professional development projects has been proposed to teachers in accordance with the declared change.

Despite the diversity of their content and forms, postgraduate educational institutions need their own educational and information environment that would play a leading role in the professional development of teachers and enable them to continuously follow their individual educational trajectories.

The article analyzes modern approaches to understanding the essence of educational and information environment of postgraduate pedagogical education institutions. Some results of sociological research on teachers’ readiness to design their own professional development are presented. The practice of individualizing advanced training and professional development of teachers through face-to-face and distance learning using the authors’ platform DLET (Distance Learning Environments for Teachers) at Volyn Institute for Postgraduate Pedagogical Education is described.

The platform is based on the principles of accessibility, understandability, personal orientation, motivation and interests; and enables organization of guided independent work of participants under regional educational projects. The article concludes by stressing the importance to update educational and information resources of postgraduate pedagogical education institutions and to use benefits of the information space objects of the industry and Internet platforms.

1. Introduction

1.1. Statement of the problem. The main provisions of educational reform detailed in the Concept of New Ukrainian School are aimed at further improving the quality of education, ensuring personal development of the subjects of the educational process on the basis of competent, personally oriented, activity-based
approaches. This focus on the new goals results in significant changes in all structural components of the educational environment of educational institutions.

Special attention is to be paid to the teacher as the most important component of this environment: the teacher should understand ways to implement new approaches in the educational process, adequately use innovative pedagogical technologies, be able to project, generate ideas, plan how to achieve their goals, rationally choose resources, monitor the educational process and objectively estimate the results.

Creating a new paradigm of education raises the issue of forming the teachers with a developed need for self-improvement, capable of continuous professional improvement, independent professional development along their individual educational trajectory in the system of formal, non-formal and informal education.

The Law of Ukraine “On Education” states that “an individual educational trajectory is a way of realizing the personal potential of students, which is formed with regard to their abilities, interests, needs, motivation, opportunities and experience, based on their choice of the study type, mode and pace, subjects of the educational process and the educational programs they offer, disciplines and the level of their complexity, training methods and means”. According to Part 6 of Article 59 of the Law, an innovative system of teacher professional development will be developed to enable the independent choice of advanced training modes, types and providers, and self-assessment of their competences and professional needs by teachers (Kremen & Bykov, 2013).

In this process, the role of trainees will change, and the functions of organizations that provide traditional advanced training in the system of postgraduate pedagogical education will be transformed. Particularly noteworthy is the problem of the relative willingness of a large number of teachers to design their individual educational trajectories, the ability to identify problems and areas of self-improvement and self-development.

These problems are difficult to solve due to the lack of necessary and sufficient conditions, forms, methods, regulatory framework and the system for coordination of this process. It is necessary to create an educational and information environment for postgraduate pedagogical education (PPE) institutions to provide the opportunity to design an individual educational route of professional development for every teacher according to their requests, needs, opportunities and experience.

Postgraduate educational institutions need to “meet the challenges of the information society with dignity and respond to the transformation of the educational inquiry regarding the training of high-quality education professionals motivated to work effectively in the face of dynamic change in different, even adverse conditions” (Oliynyk, 2017b, p. 10).

1.2. Analysis of recent research and publications. Many scientists have tried to answer the question why there is a problem of teacher self-organization for continuing education in the single educational space or in separate structured educational environments. The research of “environmental” problems in the professional training of teachers is represented by the following scientific directions: substantiation of the environmental theory (Yu. Manuilov), polysemantic approaches in education, the concept of environmentally oriented learning (T. Meng); consideration of such semantic constructs of the educational environment as: acmeological (A. Derkach, I. Solovyov), professional (A. Markov), professional and creative (Z. Kurland), informational and educational (L. Panchenko). A range of scientists (V. Bykov, V. Kremen, N. Klokar, N. Morse, V. Oliiynyk, K. Kolos) presented the methodology and tools for forming the open information environment as a prerequisite for the high-quality educational process in educational institutions.

Scientists also carried out thorough theoretical and methodological analyses of the concepts of “development”, “self-development”, “teacher professional development” (I. Androshchuk, A. Asmolov, E. Barbina, etc.), characterized new social values – self-development, self-education, self-projecting of the personality (V. Andrushchenko, I. Ziazen, N. Nychkalo, I. Beh). It has been proved that effective self-development of teachers is possible only in the context of their individual requests, needs, the ability to freely and independently design their own educational trajectories. The urgent need for continuing education compels the teacher to constantly search for the ways to form an individual educational trajectory in the open educational and information space.

1.3. Purpose of the article: to reveal the possibilities of designing the individual educational trajectory of teachers in the conditions of educational and information environment of postgraduate education institutions.

The tasks to be solved are as follows: to analyze scientific findings on development of educational space categories, educational and information environment, to study the practical use of educational and information...
environment of PPE institutions in designing individual educational trajectories of teachers, to study teachers’ willingness to design their own individual educational trajectories of professional development.

2. Results of the research

The ever-growing attention to continuing education of teachers in the educational and information environment of postgraduate education institutions is due to implementation of the strategies of the European lifelong learning context in the national education as well as the problem of insufficient readiness of a large number of teachers to participate in innovative transformations (Marynovska, 2019, p. 9).

Theoretical aspects of the essence of the educational environment, educational space, methodological foundations and principles of building a model for effective educational environments have been described by Ukrainian and foreign scientists of today, various modifications of educational environments have been proposed, and their components have been determined.

This paper considers the studied concept of computer-oriented educational environment of postgraduate pedagogical education institutions “as a controlled, artificially and purposefully constructed space in which the educational and cognitive process with the use of information and communication technology takes place and in which the necessary and sufficient conditions are created for the participants to effectively train teachers” (Oliinyk, 2017, p. 55).

The paper also takes into account the essence of the open education model, which is considered as a flexible educational system available to students without having their educational qualifications analyzed and their training periodicity and duration re-educated, and which develops by formalizing their knowledge, transferring and controlling it with the use of information and learning technologies [8, p. 3].

In our study we emphasize the term “educational” since the environment of the postgraduate education institutions is mostly “significant surrounding space of the education system, consisting of many objects, the change of properties of which may change the state of the education system” (Kolos, 2016).

At the same time, adherence to the principles of open education in the design of educational environment, the use of modern methods and ICT can significantly expand the potential space of postgraduate education institutions and ensure the formation and use of the open educational and information environment (Marynovska, 2019).

An important element of designing an individual educational trajectory in such an environment is the inclusion of the external information space. In the educational and information environment, “computer training programs of various purposes are widely used, targeted delivery and exchange of electronic information resources are provided, remote communication between students and education providers takes place, etc.” (Marynovska, 2019).

Expanding the boundaries of the educational environment of postgraduate pedagogical education institutions with information objects meets the need of developing an advanced training system in accordance with the principles of the New Ukrainian School, increases the openness and accessibility of educational services, and focuses on students’ individual needs. In the effective educational and information environment of postgraduate education institutions, teachers are supposed to use IT-driven educational resources.

This allows teachers to turn IT into a tool of the school educational process, improve the quality of education, and create the individual environment in which a new culture of professional self-development can develop. After all, the professional competence of the modern teacher should not be limited by subject knowledge and skills, and should be characterized by their ability to perform their professional functions in accordance with their students’ abilities, educational interests and social needs (Oliinyk, 2017a, p. 53).

At the philosophical level, V. Kremen, V. Bykov (2013) substantiated the natural necessity for the development of individuals along individual trajectories in the common object space (COS): When included in COS, individuals use various components of this space for their needs... It is pursuing a specific goal (conscious or subconscious) when using certain components of the COS that narrows this space bringing its composition and structure closer to the needs of individuals, makes possible the individual educational space for lifelong education of a particular person. That is, an individual educational space is a target subspace of a common object space, separated from the latter by the attribution of certain components of its composition to the lifelong education of a particular person... The model of the individual educational space is “breathing”,
reflecting the variability of the intellectual and spiritual needs of individuals, their preferences, motivation to study, and the living environment at particular stages of their stage-by-stage personal development. This “breathing” of the model suggests that intellectual and spiritual development is as vital for individuals as air is vital for their physical existence. Continuously “filling their intellectual and spiritual lungs” with the fresh air of updated knowledge and new experience, individuals do receive new energy, build on this basis their present and future, reach new peaks of their individual development, become more useful and important for the society” (Kolos, 2016, p. 8).

The above mentioned mobility of the individual educational space model and its continuous variability stresses the importance of the global educational information space resources in the structure of educational and information environment of institutions for postgraduate pedagogical education (IPPEs, Fig. 1).

![Image: Scheme of forming educational and information environment in IPPEs in the global educational information space]

Fig. 1. Scheme of forming educational and information environment in IPPEs in the global educational information space: 1. Local information and educational environment (IE) of structural units / methodological services of Volyn Institution for Postgraduate Pedagogical Education (VIPPE) ↔ 2. IE space of VIPPE and its environment ↔ 3. IE space of Volyn Oblast and its environment ↔ 4. IE space of Ukraine and its environment ↔ 5. Europe’s IE space and its environment ↔ 6. International IE space and its environment ↔ 7. Global information space

Development of the IPPE environment under the influence of the global information space and the active processes of interaction between its components demonstrates a marked shift in the emphasis on information resources (information, facts, data sets, sociological research, etc.), a decrease in the role of IPPEs as an integral part of the postgraduate pedagogical education system traditionally considered as a single professional development information and educational institution. At the same time, this is postgraduate pedagogical education institutions that, due to their experience, systematic and proven andragogical foundations of professional development, are able to provide the conditions for designing teachers’ individual educational trajectories.

Studies on innovative approaches to education, self-organization of individuals for innovation confirm this (Zakon Ukrainy Pro osvitu: pryiniatiy 5 veres, 2017). In particular, G. Yelnikova states: “If a person’s behavior, actions, and activities are based on free choice (good will) or coercion (in fact, the two components make up one whole in different ratios), the free choice (good will) is exercised by the individual through acceptance of specific decisions based on internal motives, and coercion is exerted by the external influence of the system in which this individual lives and acts, to direct these actions to support the functioning and development of the system, then the task of managers is to create appropriate conditions for directing performers’ actions by developing appropriate motivation, i.e. it is necessary to combine external requirements for individuals’ activities with their internal motives. Then the decisions made by the individuals will trigger appropriate actions meeting the needs of both the individuals and the institutions where they study / work.” (Zakon Ukrainy Pro osvitu: pryiniatiy 5 veres, 2017, p. 338).
Therefore, gaining new knowledge and experience broadens existing structures and thus moves to a higher, more complex level of development. Progressive cognitive, emotional and moral development is possible only under certain favorable conditions: sufficient motivation and a gradual continuous increase in the level of complexity (Oliinyk, 2017a, p. 54).

Postgraduate education institutions, which mainly provide training for teachers and coordinate the whole range of non-formal and informal teaching of educators, have the highest level of readiness to create the appropriate educational and information environment that can quickly adapt to the challenges of reforming the educational system, individual professions needs and social needs.

These benefits are as follows:

— there is an appropriate legislative and regulatory framework for this process and regulatory guidance;
— optimum substantive and procedural provision of advanced training has been tested for a long time;
— systematic scientific and methodological support of teachers’ professional development has been established;
— sets of training tools are available;
— purposeful interaction between the subjects of different institutions has been developed;
— effective European and international experience is used;
— personnel potential, facilities and resources are available;
— analytical resources for IPPE reforming and cases of scientific and methodological support of innovative education development are available.

It is important to note that postgraduate educational institutions have demonstrated innovative approaches to the renewal of the environment over the last decade. By examples of IPPEs (in particular, VIPPE), we can demonstrate the benefits of resources for development of teachers’ individual educational trajectories on the basis of expanding the educational and information environment, choosing the most effective and convenient continuous education paths.

We surveyed Volyn oblast teachers on the quality of educational services in accordance with current requirements for non-formal education. The surveys conducted in the first half of 2019 among trainees of advanced training courses at the Volyn Institute (858 respondents in total) showed that 74.7% of them had a real opportunity to improve their professional skills, show creativity, abilities within the environment of the institution.

However, only 56.1% of the surveyed teachers “felt the need in professional and personal development, and tried to realize it”. Respondents were aware of their personal responsibility for choosing the content and forms of professional self-development, preferring to use the Internet resources (Fig. 2).

At the same time, the forms of professional competence enhancement the students named as most effective were as follows: volunteer refresher courses at Volyn IPPE (89.9%); study of perspective practice through direct communication with practitioners (62.8%); use of Internet resources (59.3%), working with professional literature (50%). It is important that the most preferable way of interaction with VIPPO during the inter-certification period the respondents mentioned was online interaction (Fig. 3). However, 26.2% of the respondents reported the unavailability of the Internet as the most significant factor that impeded the education and self-development of teachers (57.3% in 2010).

The level of satisfaction with the technical component of the educational and information environment of the Volyn IPPE was as follows: 73.2% of the respondents were fully satisfied with the amount of multimedia equipment used during the classes 20.7% were partially satisfied, 1.5% were dissatisfied and 16% chose the option “difficult to answer”.

In open-ended questions, trained teachers identified problems with: expanding and deepening their own digital competence, ability to apply innovative teaching methods and various forms of integrated learning, acquiring skills to create a personal information and educational environment, ability to evaluate their own practice in the context of educational innovations, monitor their students’ progress by means of information and communication technologies, the integration of innovative educational services and global resources into practice.

The obtained data confirmed the expediency of revising the structure of the educational and information environment of VIPPE as a powerful resource for formation of teachers’ motivation and designing individual educational trajectories of professional development. It was obvious that in the context of constant social
change, radical reform of the educational system, educational programs for the professional development of teachers in postgraduate education institutions should be constantly adjusted and be composed of the modules in terms of new trends in the educational services market, in particular in the field of ICT.

To achieve these goals, in the first place it is necessary to expand cooperation in the educational environment and coordinate the educational content with non-formal education providers. At the same time, it is
important to bear in mind the use of global information space resources in the educational and information environment.

We overviewed the sites of the most popular and user-friendly modern educational projects recommended by the Ministry of Education and Science, a part of the courses presented being approved for use in schools and meeting professional development needs of teachers working in the New Ukrainian School (Table 1).

Table 1. Educational platform resources for building the trajectory of teachers’ professional development

<table>
<thead>
<tr>
<th>Title of online page</th>
<th>Goal</th>
<th>List of courses (samples of current topics)</th>
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<tbody>
<tr>
<td>Ukrainian Project “Quality of Education” <a href="http://yakistosviti.com.ua">http://yakistosviti.com.ua</a></td>
<td>A goal of the project is to provide professional assistance to Ukrainian educators, to disseminate authoring teaching methods, to conduct a direct dialogue with the authors of textbooks, to provide communication between leading specialists in each scientific field, methodologists, managers, teachers</td>
<td>WEB-STEM-school</td>
</tr>
<tr>
<td>Academy of Innovative Development of Education <a href="http://www.airo.com.ua/">http://www.airo.com.ua/</a></td>
<td>The main goal is to increase the competitiveness of the educational process participants in Ukraine through commercial and non-commercial cooperation, training, implementation of innovative projects. Experimental testing of a new model of training participants in the educational process (order of the Ministry of Education and Science of Ukraine dated May 22, 2014 No. 632 “On conducting a scientific and pedagogical project” Training of managerial, pedagogical, scientific and teaching staff to use innovative educational technologies”).</td>
<td>“OFFICE 365 Cloud Services as a Tool for Forming the School’s Newest Learning Environment,” Google Classroom – an online class for effective learning, Google Teacher Forms, “Use of information and communication technologies for efficient planning and execution of cases”</td>
</tr>
</tbody>
</table>
In addition, educators from any oblast of Ukraine have the opportunity to use Microsoft and Google resources designed to meet new methodological approaches, help users study ITC, provide for integrated development of personal professional competences and gaining experience of using the most widespread information technologies.

Therefore, modern educators familiar with new resources for developing individual educational trajectories can practice self-education using modern electronic educational resources in open access, use computer multimedia technologies, become willing to perform distance learning activities.

Undoubtedly, the individual educational trajectory of teachers should be implemented with regard to the reality, in accordance with the purpose and objectives of the educational reform, access opportunities and the context of the information and educational environment. Such opportunities are developed and offered by each IPPE. In particular, almost all institutions developed refresher face-to-face and distance learning courses and use Internet resources when delivering them.

In Volyn IPPE, the form of such training is optimally implemented with the help of DLET, an electronic learning resource developed as a comprehensive solution which allows students to create a virtual innovative learning environment for independent distance learning. The DLET platform fully meets the needs of the advanced training system (Fig. 4)

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**Title of online page**

<table>
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<tr>
<th>Center for Innovative Education “About the World” (<a href="http://www.prosvitcenter.org">http://www.prosvitcenter.org</a>)</th>
<th>A non-governmental organization bringing together education experts to enhance the ability of educators and educational institutions to embody change and to evolve for the sake of human potential in society</th>
<th>“About Skills”, “Design Thinking for Educators”, “Project Management in Education”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online studying Mozaik (<a href="https://www.mozaweb.com/uk">https://www.mozaweb.com/uk</a>)</td>
<td>Digital textbook tutorials with interactive 3D models, educational videos and interesting witty tasks</td>
<td>Trainings on e-learning for teachers</td>
</tr>
</tbody>
</table>

Source: developed by the authors
The design of the system is adapted to all types of devices: computers, laptops, tablets, smart phones, phones with screens larger than 300 px wide. The system is structured and offers different access levels (administrators, supervisors, trainers, students). Administrators of the system can: introduce global changes in the system settings; blog; manage forums; manage supervisors, trainers, students; view students’ activities; make course reports; review submitted practical and certification works; review test progress; organize webinars; create e-courses.

Supervising tutors and the trainers that use the platform can effectively organize and manage the teaching and learning process at the distance stage. The system toolkit enables students to receive all the necessary information from the platform, keep track of the classes, download the results of creative and practical tasks, participate in various events (forums, webinars, chats), and take tests.

At the distance stage, students’ independent work is managed indirectly – through programs, tasks, techniques, etc., and directly by supervising tutors and the trainers who use information and communication technologies and the Internet for regular feedback. At their pages, students can manage their profiles, view the course metadata – knowledge bases, textbooks, electronic libraries, teaching and research materials, audio and video files, and electronic presentations (Fig. 5).

The software used to create a distance course on the platform is of importance. The course design, the possibility to split the training content into modules, the levels of interactivity and user-friendliness, and the download speed depend on the platform.

Each course contains a large number of e-lectures, presentations, videos, didactic literature, textbooks, blocks of diagnosing questions as well as instructions and algorithms for practical and creative work.

Due to the wide range of the distance learning platform functions, elements of guided self-study have been introduced into oblast educational projects since 2017. In particular, as an innovative format of inter-course self-educational activity, an educational project for leaders of institutions of general secondary education “Leader of Educational Innovations” was implemented. The aim of the project was to lead the way in introducing alternative forms of professional development of management personnel and to promote educational reform in Ukraine by training leaders to effectively apply self-management tools when managing educational institutions and innovation.

The program specifics were as follows: the module format (3-month sessions); classroom sessions were delivered by trainers, self-study between modules took place at each student’s workplace, was supervised by trainers and participated by other students; self-study made up at least one third of the timeallotted to modules and was an important condition for being granting a certificate of participation in the project.

<table>
<thead>
<tr>
<th>№</th>
<th>Title of Module</th>
<th>Type of distance learning</th>
<th>Results of work</th>
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<tbody>
<tr>
<td>1</td>
<td>Change management</td>
<td>Creating a case</td>
<td>Creating a Blog (Mandatory Legal Page)</td>
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<tr>
<td></td>
<td></td>
<td>Performing individual tasks</td>
<td>Messages in essay format</td>
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<tr>
<td></td>
<td></td>
<td>Taking tests with use of GoogleDocs</td>
<td>Module-based questionnaire and test</td>
</tr>
<tr>
<td>2</td>
<td>Effective self-management</td>
<td>Chat conference</td>
<td>Short report on the work done (presenting the plan and topics of a seminar to be conducted for teaching staff)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emailing</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Team Leadership and Motivation Management</td>
<td>Web quest / game</td>
<td>Business theater “Role positions of the leader”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Taking tests</td>
<td>Module-based questionnaire and module test</td>
</tr>
<tr>
<td>4</td>
<td>Project Management</td>
<td>Developing projects</td>
<td>Presenting projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Taking tests test tasks</td>
<td>Filling in the final questionnaire</td>
</tr>
</tbody>
</table>

Source: developed by the authors

To be granted the certificates that indicated the hours attended, the project participants were to attend all the study sessions under the program, perform every self-study tasks, and independently develop and implement a school project.

Guided self-study used the elements of remote technologies in methodologically pre-planned virtual environments on the Volyn IPPE distance learning platform (http://dn.vippo.org.ua – face-to-face and distance learning platform DLET, Fig. 6).
The use of the developed format of guided self-study confirms that a combination of existing practice of advanced training and advanced information technology can ensure:

— flexibility of the educational process due to variability, changes in the content and training methods, training session modes;
— various levels of tasks complexity, the scope and pace of learning;
— activation of students’ educational and cognitive activity by means of game training, modeling, new types of educational material visualization;
— increasing motivation and cognitive interest in learning due to innovative methods, the space for individual learning, the use of IT potential, creating a positive emotional learning background;
— organizing flexible management of the learning process based on continuous feedback, self-assessment of learning stages, diagnosis of reflective characteristics and objectivity.

The developed platform demonstrates a new organization of the educational process based on the best traditional training methods, advanced information and telecommunication technology as well as the principles of self-study targeting general public regardless of their budget, residence and health.

The analysis of ideas on developing individual educational trajectories for teachers suggests “a significant reformatting of postgraduate pedagogical education (PPE), the transition to open educational systems that operate on the basis of network technologies, decentralization and democratization of education, open forming the structure and scope of advanced training” (Oliinyk, 2017b).

The choices available to those who project their individual educational trajectories pose challenges to the system of postgraduate education since without the appropriate response at the level of the educational and information environment of single institutions it will be unable to meet the demand of consumers of educational services. In this context, it is necessary to:

— ensure availability of information on current training programs relevant to the competency approach;
— ensure the interaction between providers of educational services in the field of teacher non-formal education at the level of educational and information environment of postgraduate education institutions;
— rebuild the educational process in postgraduate education institutions by enhancing the role of creative self-study, considering the learning and training process as guided self-study;
— determine the principles and procedure for implementing individual educational trajectories of teachers in the educational and information environment of the institutions;
— develop mechanisms for monitoring and updating the content of advanced training;
— create conditions for variability, flexibility of learning, mobility of consumer of educational services using advanced information and communication technologies;
— create an effective system to motivate all the teachers to follow their individual educational trajectories.
3. Conclusions and prospects of further research

Therefore, we see the educational and informational environment of postgraduate education institutions as the means for: ensuring continuing teacher training process and creating the conditions for designing and following individual educational trajectories by very consumer of educational services; combining resources of subjects of the educational and information space of the national education system to coordinate provision of teacher non-formal and informal education, improving the quality of the educational process through the use of ICT as a tool for professional development and organization of training and learning in educational institutions.

The findings reveal the need for further development of approaches to forming the educational and information environment of PPE institutions as the main resource for designing individual educational trajectories of teachers.

References


