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Information Support of Educationalists as an Important Function of a Postgraduate Education System

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Abstract: The conducted research on the status of information support of educationalists made it possible to install that such basic functions of scientific and pedagogical information as analytical-prognostic, integrative, and a function of operational and purposeful formation of various categories of specialists at present are not sufficiently implemented. This can be accounted for by the versatility and complexity of pedagogical process itself, as well as by a low level and limited range of developing operational systems differentiated scientific and methodological services to various categories of teaching staff. The research classified the types of information required in the system of postgraduate education of teaching staff.

Based on the theoretical analysis of information access in the system of postgraduate pedagogical education (PPE), and programs of information and library service of teaching staff, it has been rationalized that there is a great necessity for establishing centers of scientific and information support aiming at improving the qualification of teaching staff. With this in view, ways of improving the informational function of PPE have been thoroughly studied and revealed. The most significant of them suggests that an automated corporate information system and a corresponding Internet site must be created. This can ensure the remote search and delivery of electronic materials from the funds of the State scientific and pedagogical library, and the libraries of educational institutions; an exchange of resources with other libraries and organizations; developing information and telecommunication technologies in institutions of postgraduate education; training teachers to use computer technologies, etc.

Keywords: *Postgraduate pedagogical education; information support; teachers; computer technologies.*

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1. Introduction

In modern society, the importance of information in all social sectors increases: education, economics, management, culture, etc. Increasingly, the definition of the current state of society as "informational," (Pryima, Anishchenko, Dayong, & Ivanova, 2019) or "digital age" (Sánchez-Sordo, 2019).

The relevance of this problem concerns the importance use of information technology in the development of education, on the one hand, provides avenues for creation teaching staff, increases the opportunities for resolving professional and scientific needs, and on the other hand, has placed enormous demands on teacher quality it is ready for use information technology in professional life.

These days, information support of professional teachers is one of the most significant functions in the system of institutions of higher and postgraduate education. To solve the problem of providing information support while implementing educational innovations in the advanced training requires creating a specially organized system, which, as it is deemed, is called for making a unified structural representation of all information elements incorporated in the process of implementing educational innovations, as well as the meaningful content of this system (Horash, 2010). At present, conventional print sources of information are supplanted by information and telecommunication systems with unlimited possibilities. Information makes it possible to integrate human efforts not only in individual links, but also in all spheres of manyfaceted human activities (Klyasen & Lytvynenko, 2014).

Different concepts of "information" are discussed in the book of L. Floridi (2010). Important are the mathematical, semantic, physical, economic and ethical contexts of information consideration.

The problem of organization and information provision of teachers postgraduate education covered by the scientific developments of scientists.

In the dissertation of S. Krysiuk (1996) it is for the first time complex, in the wide chronological limits the process of postgraduate education development of teaching staff in Ukraine as a separate subsystem of continuous education is analyzed. The research is revealed and characterized the scientific knowledge on the development of the domestic postgraduate education of pedagogical workers is systematized and deepened, the essence of this process is revealed, the leading tendencies, national specifics. This research opens a practically new direction in Ukrainian historical and pedagogical science.

The research of N. Protasova (1998) is determined the andragogical principles of functioning of this system, regularities and trends of its development, structure, deterministic factors of theoretical and practical education of educators, the value of pedagogical experience. Postgraduate education is outlined as a non-linear, complex organization.

A fundamental study on the creation and development of a system for the development of the pedagogical staff of the Soviet comprehensive school P. Hudominsky deserves attention, where the author emphasizes that short-term courses were the leading form of improving their qualifications. In order to organize a full-fledged course form of advanced training, goals and objectives were clearly defined, curricula and programs developed on this basis, and lecture staff were selected. The students provided the necessary literature, and effective methods of teaching were used in the classes.

The research of Reid and Horváthová (2016) is covered up the problems of teacher training for the gifted students.

The article (Ion Iucu, 2016) substantiates the positive impact of postgraduate training on the professional level of teachers.

A number of studies are devoted to the use of various types of information resources in education.

The problem of the use open data as a learning resource in the Spanish education system is devoted to the article of Rivas-Rebaque, Gertrudix-Barrio, and de Britto (2019)

In the article of Yezhova, Pashkevich, and Manoilenko (2018), as a result of the models analysis the training of specialists in the fashion industry, it has been established that all specialists must know professionally oriented software.

The research (Yezhova, Pashkevich, & Gryn, in press) is covered up the problem of forming the information and communication competence of technology teachers and educators of vocational education in the study of professionally oriented software, in particular fashion CAD systems.

Purpose of the article. This paper aims at identifying the theoretical basis in information support of professional teachers in the system of postgraduate pedagogical education (PPE) in Ukraine. With this in mind, it seems relevant to expound on theoretical and methodological principles of information support, to substantiate prospective areas and basic ways of its improvement as a constituent of the system of continuous pedagogical education.

2. Methods of the study

In this study, under information, we understand the totality of information and considerations that reflect the various aspects of the processes carried out in the management system and necessary for the performance of its functions and life of the institution.

To complete the research tasks, a complex of complementary methods has been employed: historical and systemic (to investigate the historical background and evolution of PPE, logical-historical (to explore scholarly fundamentals of PPE), chronological and diachronic (to reveal the process of advancing PPE); a functional-structural analysis, which enables to trace cause-effect and historical conditionality that triggered off the forming research issues, and to identify the patterns and trends of its development; a component-structural and system-structural analysis to examine PPE and its constituents as a system comprising various subsystems; a method of systematization and synthesis of processed data to make conclusions, recommendations, and implications for further development of information technologies of PPE in Ukraine.

With reference to the foregoing, it seems relevant to note that working with flows of scientific, pedagogical and methodological information, and selecting materials requires following definite principal provisions, specifically, concreteness, planning, control and self-control, consciousness, autonomy, and efficiency, which create proper conditions for the optimal functioning of the system of PPE of teachers. The carried out analysis of the structure and principles of the functioning of the system of PPE indicate that a choice of the optimal mode of information support for teachers. Generalizing the experience of organizing professional growth courses for educationalists allows draw conclusions that at present, there are required conditions for implementing the system of adaptive information support, which takes into account the needs of teachers.

Conducted observations, experimental and creative search allowed developing a program aimed at providing optimal information and bibliographic support of teachers, which implies combining the process of improving the qualification of teachers, ensuring access to scientific, pedagogical and methodological information, studying information needs and outcomes of pedagogical activities. The analysis of materials of implementing the program resulted in creating a model of promoting information requests of head managers of educational institutions. This model incorporates such information requirements: taking managerial

decisions, increasing professional growth, implementing innovative technologies, carrying out separate errands.

When providing educationalists with novelties in literature, a system of selective distributing information is modified with the consideration of the following features:

• information is based not only on new entries, but also on the study of information requests of teachers;

• since teachers self-education occurs simultaneously related to the transfer of knowledge to students and other teachers, selective dissemination of information is organized so that required new literature and other information materials arrive before preparation for the course, as well as for a communicative interaction with the subjects of the pedagogical process, that is, delivery of information should be done in advance;

• lists of literature and information resources offered to teachers should incorporate not only new entries but also familiar ones, which can be utilized for advancing the level of educational work.

On balance, the conducted research shows that in different periods of PPE the maximum amount of information requests of teachers is possible on the basis of effective use of flows of scientific, pedagogical information, and high-quality execution of functions by libraries.

The results of the research confirm that in the intercourse period successful completion of pre-curricular and post-curricular tasks.

The analysis of the flows of scientific, pedagogical and methodological information have made it possible to implement broader use of information materials on pedagogy, psychology, education and related fields of knowledge, to define the value of various sources of information to improve the competencies of the teaching staff. The qualitative analysis of publications reveals that the acquisition of reference and information funds should be carried out in a fairly wide range of branches of knowledge, including, above all, specialized interdisciplinary publications.

3. Results of the study

It is universally acknowledged that information activities are an integral part of all spheres of public life, characterized it definite goals and tasks. A number of methods are commonly employed to accomplish those tasks and obtain necessary results. In Ukraine, there are special information institutions, which constitute a system of information support of users who utilize documentary information of universal, sectoral, and problem-thematic content. Furthermore, special conditions conducive to obtaining

professional education in this field are created: training specialists for dealing with various units of information. Simultaneously, information structures are formed as an integral element of the many agencies, organizations, companies. Information activities cover all branches of science, education, industry, as well as economics, politics, culture, technology, natural history, etc. Consequently, it is not only a separate function of society, but also an integral element of human life.

Scientific information activities are considered a key priority for information work (Zakharova & Filipova, 2013). The analysis of scientific and informational activity in the field of pedagogy and education allows distinguishing its following functions:

- documentary-factual, which is implemented by a system that searches, detects and systematization certain data and facts that are contained in the relevant sources, and get them to a certain category of specialists. These data become the basis for obtaining new knowledge, and making theoretical generalizations;
- analytically-prognostic, which directs the system of scientific and pedagogical information at studying the flow of scholarly and educational literature and priorityzing new trends and ideas;
- integrative that serves as an interlink between the field of management, pedagogical science and practice. This interlink is carried out at the expense of expedient and purposeful informing various categories of educationalists about the achievements of pedagogical science, practice and management;
- differential - the opposite is integrative: it is aimed at selecting information in accordance with objective systematization and subjective information needs, which are formed during the pedagogical activity;
- transformational, intended for collecting necessary and important data from different branches of knowledge. In this respect, achievements of various sciences in pedagogy and education are transformed more intensively in comparison with other branches of knowledge.

Simultaneously, equally important are such functions as proactive, invariant-synthetic, and pragmatic, which facilitate both the implementation of new scientific ideas into practice and the use of accomplishments of innovative and advanced experience.

The aforementioned functions emphasize a growing role of scholarly and pedagogical information in the system of PPE. Hence, operational, complete, accurate, and targeted information that meets objective and subjective needs becomes an important interlink between management, pedagogical science and practice.

The results of recent research indicate that its current level does not ensure the full implementation of these functions, since PPE does not have a unified information system. Information systems are being systematically developed by branches: higher education. technical and vocational education and secondary education. The existing industry system of scholarly and pedagogical information does not fully fulfill its communicative functions: methods and technologies of collecting and disseminating information are not efficient enough, there is no necessary coordination of scholarly and informational activities, there is unjustified duplication of individual actions, and there exists a low level of technical maintenance of information agencies and their interaction. It adversely affects the information service of various categories of teachers in the process of their professional activities. In this connection, it seems relevant to develop the information system of PPE and its institutions, to create a corporate Internet site for organizing the remote search and delivery of electronic copies of information from the funds of the State scientific-pedagogical library and libraries of educational institutions, to exchange electronic resources with other book depositories and organizations (Kuz′mins′kyy, 2003).

Information utilized in the management process can be classified by many parameters: external (like scientific, directive and recommendatory) and internal. External information comes from scientific institutions, government bodies and other organizations, and comprises curricula and programs, as well as socio-political, scientific and pedagogical, methodological information. Internal information includes data on the condition of the institution, laboratories, and offices. In fact, it is a complex system of voluminous data, which covers all aspects of institution activities and its management. In this system it is necessary to distinguish the main link – core information around which a system of intra-institutional information is united.

By the degree of stability, information can be divided into constant and variable. The former includes instructions, standards, curricula, and programs. The latter encompasses the current information and the information about the results of work. Furthermore, information is supposed to ensure the fulfillment of three conditions: timely receipt of information, its completeness and comprehensiveness.

Increasing the efficiency of the management requires theoretical and practical mastery of ways of obtaining, storing, processing, and transmitting information. Theory and practice of information transmission has become the subject of research relatively recently. The main directions of communication development, and information process in the educational

system combine the efforts of psychologists, sociologists, educators, and IT programmers. It is likely that the main thing in this system is that each employee, the subject of a pedagogical process, is both a source of information and its consumer at the same time, depending on the nature of functional relationships.

For efficacious management of the teaching staff activities it is deemed important to make use of variable, current information, which reflects a dynamic educational and methodological process. Collecting this type of information is a rather complicated matter. Effective use of information requires its speedy processing. Variable information, as well as conventionally constant, falls into primary and derivative. Primary information is collected in the process of activities of the institution and is not subject to processing for a response. The management of the educational institution utilizes derivative (secondary) information, obtained as a result of processing conditionally constant and variable information in accordance with a given program. Derived information is made use of mainly for decision making. Depending on the functions of the management, information is categorized into planning, accounting and others.

The educational system is characterized by the following structural distribution of all information: up to 70% falls on teaching and methodological information, up to 20% – on planning information, 10% – on analytical and prognostic information, and normative calculations. A high proportion of non-systematic information in the field of education is explained by specificity of the educational and methodological process. This is determined by a large number of educational, administrative, and governmental institutions, as well as related institutions, which deal with certain issues in conjunction with educational institutions. The increasing dynamism of the educational process requires further reduction of time for processing information and decisions. Under these conditions, existing accounting and reporting systems do not provide fast and objective collection of information and its processing, and therefore, sometimes incoming data lose their value at the time of their receipt by the management. A positive solution to this problem is connected with an extensive use of modern methods of processing and transferring information on the ground of its standardization and automation of basic processes utilizing such means as electronic computing, video, fax, microfilm, etc.

Types of information required in the system of post-graduate education of teaching staff are classified and presented in Fig. 1.

Complex processing information also involves the use of unified standards of primary documents that meet the requirements of all units and departments. The transition of the process of collecting and processing information to such a method is possible on condition that all primary documents are unified. Therefore, the unification of documents is an important factor of the effective organization of the information system.

In practice, there are simple (direct) and complex (mediated) information systems. In a simple system, information comes directly from the place of collection to the place of use. Such information is transmitted by communication channels as a one-time message. It is characterized by a lower level of management. Normally, when such information arrives, a management order is issued without thorough data processing. Sometimes when one-time information is received, the easiest way to process it is to record received data, compare them, etc. Manual information processing does not always ensure timely issuing an order that would enable the analysis of an event that has taken place. In today's dynamic development of events and their rapid changes, untimely receipt of and inappropriate access to information may bring harm. At mechanized information processing, the gap is much smaller, and the cost of mechanization is quickly repaid. Complex information systems can be classified in accordance with various identifiers. But the determining factor is the level of mechanization and automation of information processing, which increases its quality and, accordingly, the quality of management. The

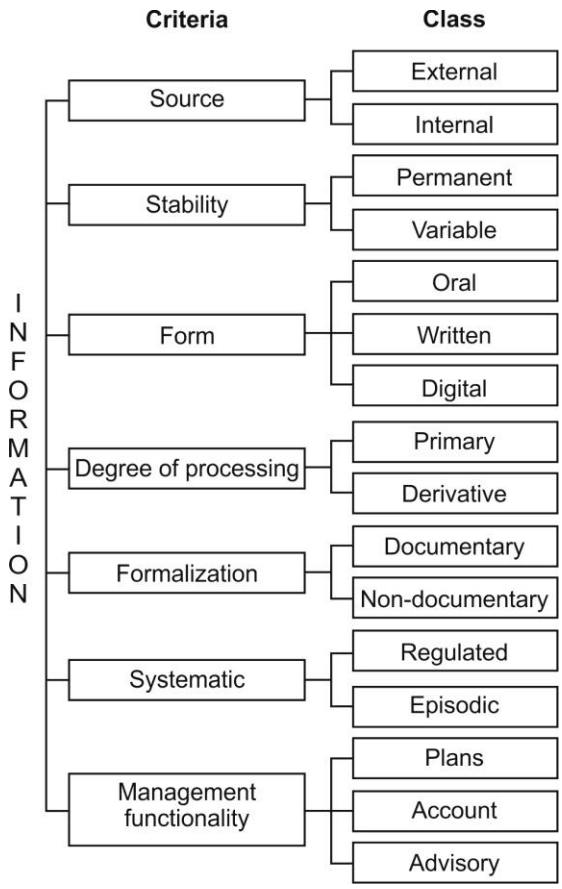


Fig. 1. Classification of information in the system of postgraduate education teachers

widespread use of modern computer technologies for information processing makes it possible to achieve synchronization of its collection and processing.

Depending on the ways of processing information, information systems are grouped into centralized and decentralized. In terms of volumes they fall into complex, in which the whole set of management is combined, and local – for identification of separate monitoring functions. Based on the experience of many institutions and bodies of education management it may be inferred that information support is improved by (1) establishing linear and functional relationships of different kinds and (2) specific, clear terms of feedback.

In particular, to obtain specific information about the educational process in institutions of PPE, closed television systems are used. As a rule, six installed video cameras allow keeping track of three educational classrooms. Each of them has one fixed camera on the front of the classroom and a board, and one movable camera – in the right corner of the front wall. The second video camera provides an overview of the entire classroom. Video cameras allow doubling the size of the monitor if necessary. A video recorder that records image to the security tape and a sound transmitted on a separate channel is connected to the system. The obtained "picture" can be transmitted to several TV receivers in the classroom, where observers (commentators) are placed, to separate departments, which have portable remote control panels. The installed system can conduct a hidden observation of the learning process, allows maintaining the maximum "purity" of research work in the classroom where there are no outside observers who by their presence would embarrass or even fetter the teacher and the learners. In addition, the teacher, methodologist, and manager would have an opportunity to communicate with a group of students directly in the educational process. Such an installation was utilized to monitor classes while testing the effectiveness of experimental textbooks by methodologists and educators, as well as recording the most interesting classes and outside the classroom activities in terms of the content and structure during courses and seminars. The installation enables the institution staff to conduct direct observation of classes for different purposes, in various aspects and directions.

Television in terms of specifics induces in viewers-researchers a sense of presence in the classroom allowing them to be part of the process of pedagogical creativity. This circumstance should be taken into account by the teacher: comments should not hinder the observation process, the teacher has to see and hear everything. Therefore, the motion of the camera

and the comment are not synchronous. Methodological remarks are appropriate during working pauses. It is also possible to view a certain targeted stage or part of the lesson (for example, the analysis of the employed methodology of teaching or the problem presentation of the new material in class, etc.). The use of video technologies allows being exposed to a valuable practical situation and exciting creative work. The managers of information support of PPE and its substructures employ technical aids to get familiarized with a course of classes and students' activities outside the classroom.

The improvement of the system of information support in the field of education involves quality improvement of overall information systems, but it is possible to achieve this goal by applying scientific principles of information organization. These include the optimal correlation between indicators and documents, maximal informativeness, sufficiency of documents, speeding up the transferring of information. These principles determine the ways of making information management more effective. Among these ways the main seem to be the improvement of the organizational structure of information systems, a streamlining of document circulation, unification of document forms, and mechanization of information processing.

Nowadays, information and telecommunication technologies penetrate into all spheres of pedagogical activities, including the system of PPE. The problem of informatization has become a key axis around which the entire system of work of the educational institution of PPE is built. New achievements and trends in the area of information technologies, a possibility to get connected to the global computer network of the Internet, determine basic functional tasks of the structural units of the educational institution, which are also changing; moreover, their advisory function is strengthened as well. The widespread use of information technologies in the system of PPE on the ground of a thorough computer training of students enhances their competitiveness on the labor market of pedagogical work. With this in view, for participants it is recommended to take special courses, which will increase their information culture. These are, in particular, "Modern Information Technologies in Education", "Information Technologies of Education," "Pedagogical Foundations of Computer Technologies," et al. For teachers there are permanent scientific seminars on the problems of informatization of the educational process. Students of PPE are familiarized with the benefits of using the Internet.

With regard to the aforementioned, due to the Internet, the implementation of distance learning has become a reality. A possibility of

intensive communication between those who learn and those who teach, and individualization of learning raise this form to a qualitatively new level in the education system. One of the main constituents of information technologies in distance learning is a virtual learning environment as a systematically organized set of means for transmitting and processing information, information resources, hardware-software and organizational and methodological support, aimed at satisfying educational needs of teacher. This environment provides broad access to educational materials from different courses, and support for communication of participants in a distance learning process.

Schematically, the division of information flows in the system of postgraduate pedagogical education is presented in Fig. 2.

According to the results of the research (Bykov & Soroko, 2015), the use of modern information technologies can increase the awareness of teachers, their professionalism, the quality and depth of interdisciplinary connections, and improve the content of PPE, methods and forms of the educational process.

For institutions of PPE, providing a high level of teachers' information culture necessary for their professional activity should be considered as a social order of information society. We define information culture as an ability to purposefully work with information, utilize information technologies and contemporary technical aids for receiving, processing, storing, and transmitting information. An integral part of teachers' informational culture is understanding the essence of concepts; a capacity to work with reference, scientific and methodological literature, and periodicals; a capability to apply information technologies, make use of the possibilities of the Internet, in particular cloud-based technologies.

The modern system of PPE of teachers comprises institutions of different types. They are organizationally grouped into a hierarchical system that unites all-Ukrainian, regional, city, district levels, educational institutions, which allow holding (at least once every five years) a qualification improvement course for each educationalist. At that, a special emphasis is placed on various forms and methods of providing teachers with library and information support (Kuchai, 2014, 2015).

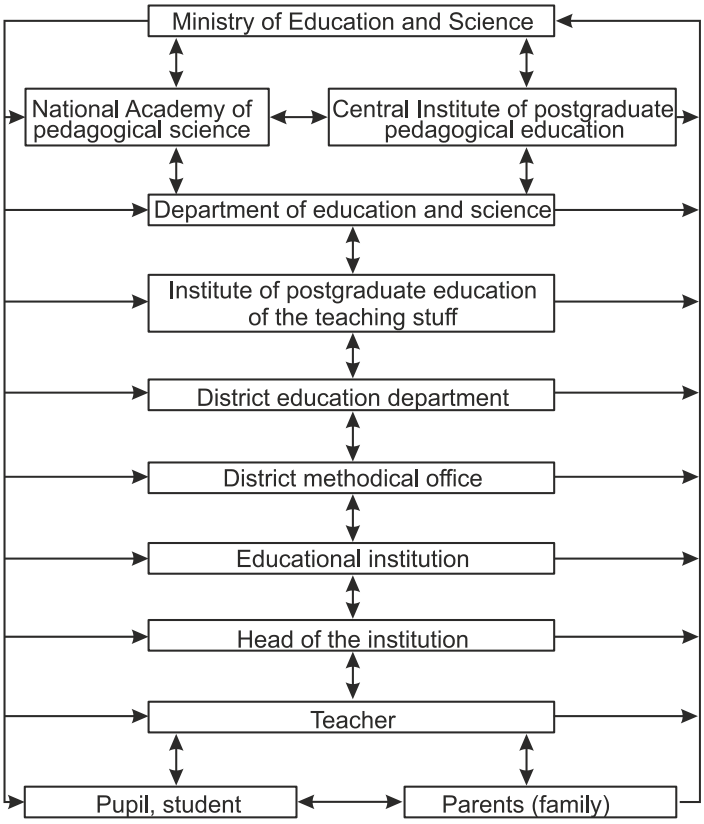


Fig. 2. Scheme of information movement in the system of postgraduate pedagogical education of Ukraine

The experience of regional institutes of postgraduate education of the teaching staff of Ukraine testifies to the necessity and usefulness of familiarizing teachers with techniques of practical application of new information technologies. After a course training, teachers began to actively utilize their skills in working with new information technologies in the educational process. The results of using new information technologies by the pedagogical staff are represented in Table 1.

Table 1. Comparative results of using new information technologies by teachers of postgraduate education institutes of Ukraine (1468 respondents)

Forms of use of information technologies in the educational process	Frequency of application (%)	
	Before the training	After the training
Use of curricula in various subjects (computer options)	4	36
Use of educational games	2	38
Use of test, graphic, music editors	0	18
Employing creative tasks with the application of information technologies while solving them	0	19
Creating individual tasks for information technologies	0	12
Using telecommunications	0	6
Using information technologies to enhance students' creative activity	4	36
Use of video clips and video blocks in outside the classroom work	1	23

In the activities of institutes of postgraduate education of the teaching staff and their substructures (regional and local teaching rooms) there appeared an effective system of information support of one of the main areas of work – the study, synthesis and implementation of advanced pedagogical experience on the diagnostic and prognostic basis.

Clearly adjusted feedback of all subsystems provides an informative introduction that lights up the real level of achievement by the subsystem of the planned results, decision-making by the employee of the institutes of postgraduate education of the teaching staff; synchronization of informing all subjects of the process of studying, generalization and implementation of the best pedagogical experience; the application of forms and methods that enable active and appropriate scientific-theoretical level to master the ideas of experience, the ability to practically use its achievements; the relationship of scientists, methodical staff, governing bodies; changing the forms and methods of work for mastering advanced pedagogical experience; studying the level of mastering advanced pedagogical experience.

4. Conclusions

On the ground of the carried out analysis of information support of teaching staff in the system of PPE, it was established that: 1) informational

support of teaching staff as a constituent of activities of postgraduate education institutions is an important organizational-pedagogical, and methodological-scientific precondition of the efficient functioning of both the system of PPE, and the entire educational sphere. Given numerous users of information in the areas of pedagogy and education, and a broad thematic scope of objective and subjective information needs, it is necessary to develop large-scale information systems based on the use of information technologies; 2) basic functions of scientific and pedagogical information – analytical and prognostic, integrational, operational and purposefully-informational (which implies timely informing different categories of professional teachers) at present are not sufficiently realized. These factors are accounted for by the complex and versatile nature of the pedagogical process, as well as by the fact that the systems, which provide differentiated operational service of various categories of pedagogical workers have a low level and a limited range of development; 3) observations, experimental work, and creative search have allowed working out the programs for providing optimal informational and bibliographic support of the teaching staff, and devising a model aimed at forming and satisfying information requests of the head managers of educational institutions to take managerial decisions, enhance a professional level and implement innovative processes.

The types of information required in the system of postgraduate education of pedagogical workers are classified according to the following features: source, stability, form, degree of processing, formalization, systematic, managerial functionality.

As a result of the theoretical analysis of the flow of information in the system of postgraduate pedagogical education, the ascending and descending streams of information are distinguished.

The conducted research is far from being conclusive, consequently, it provides implications for further study of the aforementioned problem based on the experience of the European Union countries, which advocates the implementation of their productive ideas in the domestic system of postgraduate education of pedagogues.

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