FORMATION OF FUTURE SPECIALISTS’ PROFESSIONAL ANALYTICAL COMPETENCE AT ESTABLISHMENTS OF HIGHER EDUCATION

Abstract. The article deals with the specific features of formation of future specialists’ professional analytical competence at establishments of higher education. The following competencies are singled out in terms of future specialists’ professional analytical competence: the ability to effectively search for information on the Internet, the ability to evaluate and classify data, the ability to turn information into knowledge, to analyze it, to store, to effectively apply and share the knowledge gained; to understand the basic principles of the development of the information environment, the ability to independently master new means of communication and work with information flows; the ability to conduct an effective discussion on the Internet, to present and defend their written work, including work in foreign-language online communities; skills to constantly monitor advanced scientific achievements in the field of their specialization; skills in working with basic statistical packages and network analysis programs. Another component is competency profiles related to the analysis and synthesis of the educational situation, include the following competencies: the ability for a comprehensive theoretical and situational analysis of pedagogical, socio-economic and cultural processes in the educational environment; ability to comparative analysis and synthesis; the ability to combine multidisciplinary analytical tools in application to the solution of a specific theoretical problem; the ability to independently expand the portfolio of analytical tools; knowledge of the main global trends in the development of education and taking into account their impact on local institutions; the ability to visualize the data obtained in the framework of the analysis, the ability to scientifically interpret the data obtained; the ability to determine and develop indicators of the activities of educational communities, to build independent evaluation systems on their basis.
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ФОРМУВАННЯ ПРОФЕСІЙНОЇ АНАЛІТИЧНОЇ КOMPETЕНТНОСТІ МАЙБУТНІХ ФАХІВЦІВ У ЗАКЛАДАХ ВИЩОЇ ОСВІТИ

Анотація. У статті розглянуто особливості формування професійної аналітичної компетентності майбутніх фахівців у закладах вищої освіти. У межах професійної аналітичної компетентності майбутніх фахівців виокремлено такі компетенції: вміння ефективно шукати інформацію в Інтернеті, оцінювати та класифікувати дані, перетворювати інформацію на знання, аналізувати її, зберігати, ефективно застосовувати та поширювати отримані знання; вміння усвідомити основні принципи розвитку інформаційного середовища, самостійно опановувати нові засоби комунікації та працювати з інформаційними потоками; вміння вести ефективну дискусію в Інтернеті, презентувати та захищати свої письмові роботи, в тому числі роботу в іншомовних інтернет-спільнотах; навички постійного моніторингу передових наукових досягнень у галузі своєї спеціалізації; навички роботи з основними статистичними пакетами та програмами мережевого аналізу. Іншим компонентом є компетенційні профілі, пов'язані з аналізом і синтезом освітньої ситуації, що включають такі компетенції: здатність до всебічного теоретичного й ситуаційного аналізу педагогічних, соціально-економічних і культурних процесів в освітньому середовищі; здатність до порівняльного аналізу й синтезу; здатність комбінувати багатодисциплінарні аналітичні інструменти в застосуванні до вирішення конкретної теоретичної проблеми; можливість самостійно розширювати портфоліо аналітичних інструментів; знання основних світових тенденцій розвитку освіти та врахування їх впливу на місцеві інституції; вміння візуалізувати отримані дані в межах аналізу, науково інтерпретувати отримані дані; вміння визначати й розробляти показники діяльності освітніх спільнот, будувати на їх основі незалежні системи оцінювання.

Ключові слова: професійна аналітична компетентність, заклади вищої освіти, компетенція, дані, знання, інформаційне середовище.

Keywords: professional analytical competence, establishments of higher education, competency, data, knowledge, information environment.
Problem statement. Over the past few years, universities have faced the task of transitioning to a new education system focused on a competency-based approach. The idea of a competency-based approach is currently considered as a symptom of a change in the value orientations and goals of education in connection with the emergence of an open order for its content on the part of society [1]. New conditions for the existence of the educational environment, updating the content of education, innovative forms and methods of teaching, ever-increasing requirements for the quality of knowledge, the complication of the forms of organization of classes – all this requires increasing of the future teacher’s professional competence and the formation of his/her readiness for professional thinking and professional activities.

L. A. Melnikova in her article [10] notes that professional teachers’ analytical competencies are of particular relevance, which contribute to a specialist’s complete orientation in the pedagogical field, modeling full-fledged activities, and the ability to achieve real results. In [2] it is noted that one of the main abilities that are formed in the process of training teachers is analytical. The ability to analyze in a teacher’s professional activities lies not only in working with the educational literature of the subject being taught, but to a greater extent – with scientific literature when conducting research and when analyzing activity situations.


The purpose of the article is studying specific features of formation of future specialists’ professional analytical competence at establishments of higher education.

Presentation of the main material. The spread of the “competence-based approach” in education means “a gradual reorientation of the dominant educational paradigm from the predominant transmission of knowledge, the formation of skills to the creation of conditions for mastering a set of competencies, meaning a graduate’s potential, ability to survive and sustainable life in the conditions of modern multifactorial socio-political, market and economic, information and communication-saturated space” [4]. A professionally competent teacher has a positive impact “on the formation of creative students in the process of educational work; can achieve better results in their professional activities; contributes to the realization of their own professional opportunities [4].

In Ukrainian educational reality, the situation is poorly represented when education, especially higher education, is regarded as the main, leading factor in social and economic progress. At the same time, there is an understanding that the most important value and fixed capital of modern society is a person capable of searching for and mastering new knowledge and making non-standard decisions. In our opinion, the “acquisition” of these abilities is achieved in the presence of formed analytical competence.
L.A. Melnikova, raising the issue of the relevance of analytical competence, notes that one of the components is competency profiles related to information and knowledge management, which include, but are not limited to, the following competencies: the ability to effectively search for information on the Internet, the ability to evaluate and classify data, the ability to turn information into knowledge, to analyze it, to store, to effectively apply and share the knowledge gained; to understand the basic principles of the development of the information environment, the ability to independently master new means of communication and work with information flows; the ability to conduct an effective discussion on the Internet, to present and defend their written work, including work in foreign-language online communities; skills to constantly monitor advanced scientific achievements in the field of their specialization; skills in working with basic statistical packages and network analysis programs [10]. Another component is competency profiles related to the analysis and synthesis of the educational situation, include the following competencies: the ability for a comprehensive theoretical and situational analysis of pedagogical, socio-economic and cultural processes in the educational environment; ability to comparative analysis and synthesis; the ability to combine multidisciplinary analytical tools in application to the solution of a specific theoretical problem; the ability to independently expand the portfolio of analytical tools; knowledge of the main global trends in the development of education and taking into account their impact on local institutions; the ability to visualize the data obtained in the framework of the analysis, the ability to scientifically interpret the data obtained; the ability to determine and develop indicators of the activities of educational communities, to build independent evaluation systems on their basis [10].

All of the above mentioned aspects of analytical competence expand the teacher’s analytical capabilities and professional competence, this opinion confirms the need for a high level of analytical literacy in the pedagogical undergraduate and pedagogical master’s programs.

Following the paradigm of education throughout life, it can be argued that the formed analytical skills will be necessary for a bachelor in further professional activities, as a teacher, or when studying for a master’s degree.

Having some gaps in the formation of analytical skills as professional ones at the undergraduate level, the future master will experience difficulties when working with scientific literature of a more complex nature.

V. Slastyonin and I. Isayev note that the structure of a teacher’s professional competence can be revealed through pedagogical skills. The model of a teacher’s professional competence acts as a unity of his/her theoretical and practical readiness. Theoretical activities, manifested in the generalized ability to think pedagogically, presupposes that the teacher has analytical skills [12].

Formation of analytical skills is one of the criteria of pedagogical skill, because with their help, knowledge is extracted from practice. It is through analytical skills that the generalized ability to think pedagogically is manifested. This skill consists of a number of sub-skills: 1) dismember pedagogical phenomena into constituent
elements (singling out a fact or phenomenon, its isolation from other facts and phenomena; establishing the composition of the elements of a given fact or phenomenon; disclosing the content and highlighting the role of each of the elements of this structure; penetration into the process of development of a holistic phenomenon; determining the place of this phenomena in the educational process); 2) to comprehend each part in connection with the whole and in interaction with the leading parties; 3) to find in the theory of training and education ideas, conclusions, patterns that are adequate to the logics of the phenomenon under consideration; 4) to correctly diagnose the pedagogical phenomenon; 5) to find the main pedagogical task (problem) and ways of its optimal solution [12].

Thus, professional competence, expressed in the teacher’s active participation in research activities, in relation to analytical competence can be defined in the generalized ability to think pedagogically. This skill extends to various types of the teacher’s analytical activities: work with educational literature, analysis of pedagogical situations, research activities [12].

Thus, it can be noted that the formed analytical skills are in demand, both when studying in a pedagogical bachelor’s degree, and in the future – when studying in a pedagogical master’s program or in pedagogical activities.

Here a contradiction arises. The Bachelor and Master of Pedagogy have a need for the development of analytical competence necessary for the implementation and improvement of the level of professional activities, but the educational program of the university does not provide the formation of this competence to the required extent. This raises the problem of the discrepancy between the existing organizational and pedagogical conditions for the formation of the analytical competence of Bachelors and Masters of Pedagogy with the needs of their professional training.

The activity of the Master of Pedagogy differs from the activity of the Bachelor of Pedagogy in its research orientation. Taking into account this thesis, we believe that in order to carry out professional activities, a Bachelor of Pedagogy needs professional analytical literacy, and a Master of Pedagogy needs to have professional analytical competence.

Discussing the issue of the formation of professional analytical literacy and professional analytical competence within the framework of a competency-based approach, it is necessary, on the one hand, to separate the concepts of competence and literacy, and, on the other hand, to define the concept of professional competence. As noted in the article [3], being literate does not yet mean being competent, since “literacy is only a cognitive characteristic and it is not at all necessary that the subject is ready to use it in the process of activity”. The authors note that these concepts are related as a whole and a part: competence includes literacy, but is not limited to it [3]. One general approach to literacy is given under the international PISA program. The international group of researchers implementing this program, when determining the literacy of schoolchildren at the turn of the main school, considering mathematical and natural science literacy, as well as reading literacy, defining it as the ability to use written texts as the main resource of
self-education, does not give a general definition of literacy [8]. Nevertheless, PISA reflects the trend of the last decade to check “... the state of knowledge and skills that may be useful to students in the future, as well as the ability to independently acquire the knowledge necessary for modern adaptation in the modern world” [8]. In the article [3], it is noted that such an interpretation of the term literacy additionally includes the ability to independently acquire knowledge. Often, professional competence is understood as a set of knowledge, skills and abilities necessary for specialists in a particular professional field. It seems to us that the opinion of V. I. Baidenko and S. H. Molchanov. V. I. Baidenko defines “professional competence” as: “mastery of the knowledge, skills and abilities necessary to work in a specialty, with simultaneous autonomy and flexibility in terms of solving professional problems, developed cooperation with colleagues and a professional interpersonal environment”, “willingness and ability to act expediently in in accordance with the requirements of the case, methodically organized and independently solve problems and problems, as well as self-evaluate the results of their activities” [5]. S. H. Molchanov formulates the concept of professional competence as a range of issues in which the subject has knowledge, experience, the totality of which reflects the socio-professional status and professional qualifications, as well as some personal, individual characteristics that make it possible to implement certain professional activities [11].

The definitions of professional competence given here have a similar meaning: in addition to the knowledge and skills necessary for professional activities, a teacher must have some personal qualities that contribute to his/her self-education and self-development as a professional. Therefore, the formation of the future specialist’s professional analytical competence suggests that training in the magistracy should form special skills that would contribute to the teacher’s self-development, his/her advancement along the professional ladder, that is, active participation in research activities.

To understand the structure of the process of formation of analytical skills, we turn to Ye. S. Haidamak’s research article [6]. N. A. Slyadneva provides in the article a definition of the concept of “analyst” as an activity that involves the organic synthesis of three components: 1) possession of analytical methods (functional component); 2) knowledge of the subject area (industry component); 3) a certain type of personality structure (personal component). Such a structure is typical, in particular, for research and teaching activities. As noted above, the formed analytical skills will be necessary for the bachelor and master in their further professional activities as a teacher.

For further discussion of the need indicated at the beginning of the article, we introduce the concept of professional-and-pedagogical analytical literacy. In our opinion, professional analytical literacy includes the following components: firstly, a Bachelor of Pedagogy must have a certain set of general cultural competencies (related to analytical abilities); secondly, a Bachelor of Pedagogy must have the
ability to apply knowledge in practice; thirdly, a Bachelor of Pedagogy must have the ability to extract knowledge from practice (one’s own or another).

Bachelor’s degree is the education of the first stage of the level system of higher professional education. Bachelor’s education aims to supply the labor market with literate entry-level and middle-level workers.

The bachelor’s degree takes four years. The bachelor carries out research activities in the third and fourth years. And profiling begins in the second year. Therefore, the passage of the stage of self-determination in the third year becomes impossible. This stage should be completed by the end of the first course.

Thus, a problem arises in the preparation of bachelors, which consists in a mismatch in the study of specialized disciplines and the entry of students into research activities.

In our opinion, the main initiative for the development of professional analytical literacy comes directly from the bachelor. As noted earlier, the bachelor is interested in developing his/her own analytical skills necessary for the implementation of professional activities. In our work, we distinguish two levels of the formation of professional analytical competence: the first level is the formation of professional analytical competence at the undergraduate level and the second level is the formation of professional analytical competence at the master’s level. An analysis of the literature that reveals the concept of literacy allows us to assume that a first-year undergraduate student already has a certain level of analytical literacy, which can serve as the basis for the development of professional analytical literacy.

The formation of a bachelor’s professional analytical literacy is inextricably linked with the academic space at the university, which implies the presence, on the one hand, of a number of disciplines that ensure the emergence (education) of professional analytical literacy, and a number of disciplines that provide a connection with professional activities, on the other hand. Thus, the formation of professional analytical literacy is a complex process, the implementation of which takes place in the educational space through a certain way of organized activities, and involves two levels of development.

Considering the issue of the formation of professional analytical literacy, it is important to understand at what stages it appears and develops. We assume that the emergence of professional analytical literacy in undergraduate studies can occur in the first year of study, development – in the second and third years, and formation – in the fourth year of study.

It is important to note that due to the specifics of pedagogical activities, for a successful, effectively carried out professional activities, it is not enough for a teacher to master theoretical thinking, he/she needs to master practical thinking, which allows him/her to ensure the relationship between theory and practice. The teacher’s ability to apply knowledge in practice and to extract knowledge from practice is achieved in the presence of a formed professional analytical competence.

In our opinion, the main action of practical thinking is a professional test. In A. M. Aronov’s works it is noted that the concept of “test” is inextricably linked with the concept of “experience”. The test is exploratory in nature, i.e. the person making
the test does not yet know how to do it ideally, correctly, but he/she tries, searches for and formalizes the result. At the same time, reflection of one’s own actions and results in terms of the definition of theoretical concepts is necessary. In order for experience to be framed as the result of one’s own actions, special procedures are needed. The implementation of procedures is carried out within the framework of an organizational and activity game when bachelors pass distributed practice.

In modern socio-economic conditions, a teacher in his/her professional activities needs to think freely and actively, model the educational process, independently generate and implement new ideas and technologies for teaching and educating, to be able to make decisions related to the implementation of pedagogical tasks. The formation of these abilities is ensured by analytical competence.

Thus, if the above mentioned conditions are met, the bachelor will fully develop professional analytical literacy, which will allow, without experiencing difficulties in this area, to start professional pedagogical activities, and which will be the basis for the formation of professional analytical competence in the performance of professional pedagogical activities.

The transition to the second level of the formation of analytical competence occurs within the framework of the master’s program. As noted above, the activities of the Master of Pedagogy differ from the activities of the Bachelor of Pedagogy in their research focus, respectively, in order to carry out professional activities, the Master of Pedagogy must have professional analytical competence.

The article [2] discusses the conditions for the formation of professional analytical competence. The authors note that one of the conditions may be the work of a master student with scientific texts, and one of the possible schemes for organizing the process of information-and-analytical activities may be the following scheme (represented as an algorithmic sequence of procedures): 1. Definition of the object, subject and problem of analysis. This stage includes familiarization with the problem as a whole, as well as with related issues, the study of which may be useful; drawing up a general work plan indicating the deadline, performers and main sources that can presumably be used; 2. Building an ideal model of an object. Provides the creation of a regulatory framework for subsequent analytical activities; 3. Collection of factual data. Here it is necessary to clearly define the concepts used and the most extensive source base. When selecting sources, be critical of the information found; 4. Evaluation of factual material. The main task at this stage is to evaluate the data obtained, to select from the mass of the described facts those whose analysis it is advisable to continue. This stage includes assessment, classification, analysis and clarification of facts; 5. Revealing the meaning of facts. It must be borne in mind that a fact carries a large semantic load if it is considered in conjunction with other facts or if its value is additionally indicated, therefore it is necessary to achieve the most complete disclosure of the meaning of each fact; 6. Hypothesis. At this stage, it is necessary to construct a hypothesis about the relationship of individual facts. Understanding hypotheses is exploratory in nature. The subject “imposes” on the hypothesis the prism of his/her ideas, due to personal
experience and knowledge of the subject area. The construction of hypotheses is inherent in any analytical work; 7. At this stage, you must select the type of analysis; 8. The chosen type of analysis predetermines the choice of specific methods of analytical activities; 9. Proof. At this stage, it is necessary to prove or disprove the validity of the working hypotheses; 10. Conclusions. Here the final conclusions are formulated, which are the goal of any information analysis; 11. Reliable and clear presentation of the results of the study. Drafting a final document. It is necessary to ensure that the final document is written in a language accessible to the consumer of information products.

The complete scheme of analytical technology is applicable not only in the analysis of a separate scientific text, but also in the process of working on a master’s thesis. In terms of the problem considered in the study, the following types of analysis are most rationally applicable.

Problem analysis. Under the pedagogical problem, in this case, one should understand the form of existence and expression of the contradiction between the urgent need for certain pedagogical actions and the still insufficient conditions for their implementation. The procedure of problem analysis leads the researcher to the emergence of a hypothesis for solving the problem.

System analysis is based on the laws of the system integrity of the object, on the interdependence of structure and function. There are two types of system analysis: descriptive and constructive. Such a reciprocal analysis can be carried out when evaluating the productivity of the intended outcome of the study.

Causal analysis is based on the concepts of “cause” and “effect”, which describe the relationship between phenomena. The causal analysis allows to substantiate the choice of the type of analysis, research methodology; and also contributes to the proof of the hypothesis, the formulation of analytical conclusions.

Praxeological or pragmatic analysis in the pedagogical sense involves the characterization of an object, process or phenomenon in terms of more effective use in the pedagogical process. The use of praxeological analysis in the analysis of the text makes it possible to identify, at the stage of determining the object and subject of analysis, a stable and non-random characteristic and connection of phenomena.

Axiological analysis involves the analysis of one or another object, process, phenomenon in the system of values. With regard to scientific pedagogical literature, axiological analysis can be useful to the researcher in the process of proving one or another research hypothesis. Namely, when it becomes difficult to assess the advantages and importance of one scientific fact or phenomenon over others.

Situational analysis is based on a set of techniques and methods for understanding the situation, its structure, factors that determine it, development trends, etc. The situational analysis algorithm when working with scientific texts can be used if the text describes a problematic pedagogical situation or if the researcher needs to provide a solution to this pedagogical situation.

Prognostic analysis has epistemological, logical and ontological aspects. Predictive analysis should be carried out at the stage of formulating the research hypothesis.
Advisory analysis is focused on developing recommendations regarding the behavior of actors in a certain situation. Recommendation analysis plays a special role in the system of interaction between a researcher and a practitioner. This type of analysis will help the master to cope with the difficulty of formulating the provisions of the study in a language understandable to the reader.

Program-target analysis is a further development of recommendatory analysis in terms of developing a program to achieve a specific goal. It focuses on developing a detailed model for achieving the future. Conducting a program-target analysis is advisable at the stage of initial planning of work on the study.

Thus, the above list of types of analytical methods can be useful to the Master of Pedagogy at the stage of conducting research work and writing a master's thesis on its basis. For rational and meaningful independent use, application of the above types of analysis in the process of working with scientific texts or working with a master's thesis, it is necessary to provide examples of the practical implementation of these guidelines.

As a pedagogical tool that ensures the implementation of the conditions for the formation of the analytical competence of the teacher, the authors propose to use pedagogical cases (case study). The advantage of case studies is the ability to optimally combine theory and practice, which seems to be quite important in the training of specialists of any profile. According to the degree of influence of the main sources, cases are classified into practical ones, which reflect real life situations; training cases, the main task of which is the modeling of learning; research cases focused on the implementation of research activities.

Within the framework of the problem under study, a research case is considered. The main meaning of the research case is that it acts as a model for obtaining new knowledge about the situation and behavior in it. Its educational function is reduced to teaching the skills of scientific research through the application of the modeling method. The case is built according to the principles of creating a research model. Therefore, it is best to use it as a method of advanced training. The dominance of the research function in it makes it possible to use it quite effectively in research activities [7].

Thus, this statement confirms the assumption that the use of a research case in the preparation of a Master of Pedagogy will help to increase the level of his/her analytical abilities. As an example, a case was created, the work with which, according to the authors, will contribute to the development of analytical skills to distinguish between scientific and educational literature. In the process of creating a case, the following main stages are distinguished [9]: 1. Formation of the didactic goals of the case. This stage includes determining the place of the case in the structure of the educational process; formulation of goals and objectives; identification of the “zone of responsibility” for the knowledge, skills and abilities of masters; 2. Definition of a problem situation; 3. Construction of a program map of the case, consisting of the main points that need to be embodied in the text; 4. Collection
of information in the institutional system regarding the theses of the program case map; 5. Choice of case genre; 6. Preparation of guidelines for the use of the case: development of tasks for students and possible questions for discussion or presentation of the case.

In the article [2] it is noted that the above list of types of analytical methods can be useful to a master student of pedagogy at the stage of conducting research work and writing a master’s thesis on its basis.

Thus, consistently performing all the stages of information-and-analytical activities when working with scientific texts, the master’s analytical competence will be fully and professionally formed. Summarizing the above mentioned, it can be noted that the Bachelor of Pedagogy and Master of Pedagogy must have professional analytical competence to solve scientific-and-educational and professional problems.

Conclusions.
1. The formation of professional analytical competence has two levels: the first level is the formation of professional analytical competence at the bachelor’s level and the second level is the formation of professional analytical competence at the master’s level.

2. The structure of the analytical activities of the teacher must include two blocks of competencies: the first includes the ability to analyze educational and scientific literature, the second – the ability to analyze specific activities situations related to professional activities: to be able to analyze pedagogical situations, to make decisions, to be able to build relationships with colleagues, parents, administration of educational institutions.

3. Due to the specifics of pedagogical activities, for a successful, effectively carried out professional activities, it is not enough for a teacher to master theoretical thinking, he/she needs to master practical thinking, which allows him/her to ensure the relationship between theory and practice. The ability of a teacher to apply knowledge in practice and to extract knowledge from practice is achieved in the presence of a formed professional analytical competence. The main action of practical thinking is a professional test.

4. The quality of training a teacher of a classical university requires an initiative position, which in its turn is inextricably linked with the formation of analytical skills.

5. Educational standards do not characterize the formation, the development of the professional analytical competence. And this gap is the problem of higher pedagogical education.

References:


Література: