CHAPTER 13. PEDAGOGICAL SCIENCES

THE SYSTEM OF METHODICAL TRAINING OF FUTURE TEACHERS OF BIOLOGY

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Abstract. Methodical training of future biology teachers is an important part of the professional training of students of pedagogical universities. Methodical training plays a decisive role in the professional formation of students, as it directly affects the development of the professional qualities of a future specialist and the choice of a further professional path. The aim of the research is theoretical substantiation of the author's system of methodical training of future teachers of biology in pedagogical universities. The methodical training of future biology teachers is determined as the purposeful mastering the system of methodical knowledge, skills and acquirements of future specialists in the context of solving methodical tasks from the school biology curriculum. It was ascertained that the structural components of the system of methodical training are: goal (system-based component, on which all components depend on); content (basic subject – "Methods of teaching biology", and subjects of methodical area); technologies, forms, methods and training aids; results of training (level of methodical readiness, individual methodical style). The conceptual model of the system of methodical training of future teachers of biology in pedagogical universities is developed and theoretically substantiated. It consists of five interconnected blocks: theory-methodological, motivational-value, substantial, process-technological and control-correctional. The theoretical and methodological block of the model consist of regularities, approaches and principles that determine the strategy of methodical training of future

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biology teachers, regulate the tactics of its implementation and theoretically substantiate the aim, structure, content, technology, pedagogical conditions and the result of the training. The motivational-intentional unit provides comprehension the goals and objectives at each stage of the methodical training and form positive attitude concerning methodical activities. The substantial block of the model describes the content of methodical training, which supposes improving the content of discipline "Methods of Teaching Biology", introducing in the educational process elective methodical disciplines, which suppose deepening, expansion, generalization of methodical knowledge of students, the formation of a methodical thesaurus, the involvement of future specialists in quasi-professional activities. Process-technological block of the model determines the forms of organization of training, as well as a set of traditional and innovative methods, means and technologies of teaching, types of research activities, pedagogical conditions whereby the content of methodical training is implemented. The process-technological block of the model is closely connected with the control-correctional block, which determines the level of methodical readiness of future biology teachers, characterizes the criteria, indices and levels of the formation of methodical readiness, forms and methods of control of students' methodical competencies.

1. Introduction

The National Doctrine of Education Development in Ukraine postulates that the training of pedagogical workers is an important condition for the modernization of education [15, p. 5]. One of the main tasks of pedagogical education development is to adjust the content of basic, psychological and pedagogical, methodical, informational and technological, practical and social-humanitarian training of pedagogical and scientific workers in accordance with the requirements of the information and technological society and the changes which take place in the social, economic, spiritual and humanitarian spheres, in pre-school and general education institutions [14].

Traditional pedagogy needed teachers who honestly performed their pedagogical work and promote learning and formation of skills and acquirements. Today we need creative teachers who will bring up the future generation, teachers with non-standard approach to life situations, teachers who can show cognitive activity and initiative, teacher who can critically analyse their own actions.

The subject teacher should have such grounding which can provide the full development of the student's personality. Therefore, the teacher himself should be an example for imitation – extraordinary, erudite, initiative, and capable of reflexive activity and constant self-improvement.

First of all, teacher schools have to prepare teachers and not just biologists or physicists. These professions have a completely different object of activity and another scientific basis. In order to become not only a biologist, but a true teacher of biology, qualitative methodical training is required.

Native education needs a teacher who will implement his own methodical style in the educational process and promote the development of students' cognitive interests, their individual peculiarities.

On the basis of Ukrainian higher educational institutions' experience along with universities of other European countries (Poland, Czech Republic, Slovakia, Hungary, Slovenia, Bulgaria, Rumania, Germany, Belgium, France) principal tendencies of future biologists' methodical training enhancements has been determined: realization of competence oriented training, update of method training content, implementation of innovative methods and educational techniques, transition to informational and communicative techniques, development of new educational maintenance and distance training, increasing of the self-preparation role, strengthening of the connection between pedagogical theory and practice [6].

New trends in the development of school education, innovative pedagogical technologies, and the development of modern training aids stipulate for modernization of methodical training of future biology teachers.

In modern scientific researches, methodological training is considered as a system-based component of the professional training of future specialists. Thus, today it is important to review the traditional methodical training of future biology teachers, to fill it with new content, innovative forms, methods and training aids.

Methodical training plays a decisive role in the professional development of students, because it directly affects the development of professional qualities of the future specialist and the choice of a further professional path.

Methodical training of future teachers of natural sciences was studied by N. Burynska, M. Grinova, V. Onipko, L. Rybalko, N. Chaichenko, G. Chernobelska, O. Yaroshenko.

The system of methodical training of the subject teacher was the subject of studies of Ukrainian (M. Krylovets, L. Mykhailenko, N. Morse, V. Sharko) and

foreign (V. Zemtsova, N. Zelenko, O. Tamoznia, W. Stawiński, L. Tuszyńska, M. Švecová, K. Ušáková, E. Buchcic, I. Żeber-Dzikowska) scientists.

The problem of methodical training of future teachers of biology was studied by methodologists M. Verzylin, I. Moroz, D. Traitak and others.

In Ukraine the problem of methodical training of future teachers of biology in institutions of higher educational was studied by T. Bondarenko, N. Hrytsai, V. Verbytskyi, S. Vovk, G. Zhyrska, M. Kolesnik, L. Mironets, N. Mishchuk, I. Moroz, A. Stepaniuk, Ya. Fruktova, O. Tsurul. But today the system methodical training of future teachers of biology in institutions of higher educational was not the subject of special scientific researches of native scientists.

There is no clear definition of the concept of "methodical training", as well as understanding the importance of methodological education in the professional formation of the future teacher. Debate about the status of the methodology of teaching biology as an independent science does not fade.

The *purpose* of the research is theoretical substantiation of the author's system of methodical training of future teachers of biology in pedagogical universities.

The *objective* of the study is to find out the essence of the concept of "methodical training", to describe the system of methodical training of future teachers of biology, to develop a model of this system in order to introduce it into the educational process.

During the research the content of educational literature for students on the methods of biology training, educational programs of future biology teachers training, the educational and methodical support of the discipline "Didactics of Biology" and the elective courses of methodical direction were analysed. The model of the system of methodical training of future teachers of biology was developed.

2. The concept of methodical training

Methodical training is an important part of the professional training of future biology teachers.

According to N. Morse, methodical training at a pedagogical university is regarded as an "applied professional component" of the system of professional pedagogical education [12, p. 150]. L. Mykhailychenko believes that the methodical component synthesizes professional training [11, p. 38].

Methodical training of future biology teachers provides synthesis of objective biological, psychological, pedagogical and professionally sig-

nificant methodical knowledge, abilities, personal qualities of the future teacher of biology. Despite the importance of methodical training in the professional development of students, there is no clear definition of this concept in the scientific literature nowadays.

Thus, methodical training is regarded as mastering by the future teacher the basics of methodical activity [13, p. 54].

According to T. Borovskikh, methodological training can be interpreted as a set of methodological competencies that provide successful work in a particular profession [3, p. 59].

According to G. Sarantsev, the methodical training of the future teacher is in mastering the activity, which is determined by the structure and functions of the teaching methodology of the subject as an independent scientific field [17, p. 63].

I. Levchenko believes that the fundamental methodical training of teachers is aimed at the acquisition of methodologically significant, systematic and invariant knowledge in the field of theory and methodology of education, which contributes to the formation of readiness for teaching students, the development and realization of the teacher's creative potential, his dynamic adaptation to the constantly changing social, economic, informational and technological conditions and provide new level of intellectual, emotional and moral culture of a teacher, creates an internal need in continuous self-development and self-education [10, p. 24].

So, the concept of "methodical training of a teacher" is often interpreted as a purposeful process of forming a system of methodological knowledge, skills and abilities. However, we agree with the Russian scientist L. Bulavintseva that methodical training cannot be reduced to a set of knowledge and skills about a certain fragment of objective reality, which are fixed in the curriculum and serve only as a means of solving methodological problems. That is why the researcher interprets the methodological training as "mastering the ways of solving professional problems in the format of teaching the subject" [4, p. 276].

Within the framework of the research, the methodical training of future biology teachers is determined as the purposeful learning of the system of methodological knowledge, skills and abilities of future specialists in the context of solving methodological problems of the school biology course.

According to N. Vereshchahina, methodical training should be considered as interrelated, complementary and interdependent processes:

1) the formation of methodical knowledge and skills as the basis of the formation of methodical competence;

2) mastering the basics of methodical activity, which results in readiness for such kind of professional activity;

3) the formation of the personal and professional position of future teachers [5, p. 18].

So, methodical training is a kind of bridge between pedagogical theory and practice that promotes the professional formation of future teachers of biology. In modern conditions methodology as a science becomes of special importance, since the methodically correctly constructed educational process at school provides a high-quality biological education of students. Hence, institutions of higher education have to pay more attention to the methodical training of future biology teachers.

3. System of methodical training

The system of methodical training of future biology teachers is a set of interrelated components of students' training in institution of higher educational, aimed at forming the methodical readiness to perform professional activity in the context of teaching a school biology course.

The structural components of the system of methodical training for future biology teachers are:

– purpose (system-based component, on which all other components depend on);

– content (basic discipline – "Methods of teaching biology", methodical discipline);

– technologies: forms, methods and training aids (interactive technologies, contextual technologies, project learning, methodical workshop, case technology, portfolio, multimedia technologies, etc.);

– training results (level of methodical readiness, individual methodical style).

The important role in the system of methodical training play requirements for subjects of educational process (the list of methodical competencies, professionally significant and personal qualities etc.).

In order to modernize the traditional system of methodical training of future biology teachers in pedagogical universities, first of all it is necessary to develop its theoretical model, i.e. mentally form an ideal idea of rational ways of forming the required level of methodical readiness of

future teachers. In the proposed model of the system of methodical training it is necessary to take into consideration the current trends in the development of education and the requirements for the personality of the teacher of biology.

The method of modelling is the subject of consideration of philosophers, psychologists, teachers, and others. As a result of the theoretical analysis of scientific literature it was discovered that simulation is a method of research, which consists in learning the qualities of an object, phenomenon or process through its model.

Modelling is the main category in the theory of cognition, which is based on theoretical and experimental methods of scientific research. This method is inextricably linked with abstraction and idealization. It allows separating those aspects of a simulated object, phenomenon or process that are reflected in the model. Modelling is considered as a method of indirect study of an object, during which not the object, but a specially created model is explored.

According to V. Zahviazynskyi, modelling is a process of creating models, schemes, sign or real analogues that represent the essential properties of more complex objects (prototypes) [7, p. 199].

The simulation method is used to in-depth study and comprehension of complex systems, the functioning of which depends on many factors and interconnections. Due to simulation, it is easier to get information about a particular object.

The New Dictionary of Foreign Words gives several definitions of the term "model": 1) a sample of any new product, exemplary copy for serial production; 2) a scheme, a layout of something in a reduced form; 3) type, design mark; 4) the material for the artistic image [16, p. 394]. According to V. Kraievskyi, the model is a "system of elements, which reproduces some aspects, connections, functions of the observable object" [9, p. 333].

In pedagogical researches, model is considered as a prototype, an analogue (scheme, sign system) of an object, process or phenomenon, which is used to extend knowledge about the original. The model reflects in a simplified form the structure, properties, interconnections and relations between the elements of the observable object, the individual essential qualities of the original. Excessive detail, secondary phenomena complicate the model and interfere its theoretical study. V. Yahupov notes that "the model of the educational process is a reference idea of learning and its designing in conditions of specific educational institutions" [18, p. 227].

In the context of the research, the model serves as a mean of scientific cognition and as a prototype of the pedagogical process of methodical training of future biology teachers in pedagogical universities, as a model by which students can be trained in methodological work.

Conceptual model of the system of methodical training of future biology teachers is considered as integral vision of personal and professional development of the future teacher of biology and methodical support of his activity in accordance with the author's conception of the system of methodical training of future biology teachers. The main purpose of the development of the model is to improve and correct the system of methodical training of students-biologists which corresponds modern requirements.

V. Bezrukova states that pedagogical modelling (model creation) is the development of goals (general idea) of creation pedagogical systems, processes or situations and the main ways to achieve them. She believes that simulation is the first stage of pedagogical design. If in technology the model is a model that serves as a standard for serial production, then in pedagogy the model is the idea of organizing the educational process, the concept or pedagogical theory. The pedagogical model is a target ideal [1].

Based on the considered ideas about model and modelling, the study attempted to simulate the process of methodical training of future biology teachers.

4. Pedagogical conditions of innovative methodical training

The leading pedagogical conditions for the implementation of the future biology educators' methodical training system are the updating of methodical training content, the introduction of innovative teaching technologies and the creation of an individualized methodically oriented learning environment in pedagogical universities.

The content of methodical training includes the following components: cognitive (methodical competence), active and operational (experience and skills), personal (motives of pedagogical activity, values, professional qualities). Methodical training of students assumes simultaneous development of each of these components, namely, strengthening of students' methodical literacy, development of methodical competencies, formation of values as well as professionally significant qualities of a teacher, creative abilities, methodical reflection and motivation to methodical activity.

It is also important to form the subjective experience of methodical activity and develop an individual methodical style during the methodical preparation of the future biology educators. The individual methodical style is a collection of personal and professional qualities of an individual, which determines the peculiarities of its methodical activity (means and methods) in relation to the implementation of the educational process in biology, providing the highest educational effectiveness.

The organization of the methodical training of future biology teachers at a higher educational institution involves lecture courses on the methods of teaching biology and other methodical disciplines, practical and laboratory classes, independent work, the implementation of individual teaching and research tasks, course and qualification works, pedagogical practice.

The "Methods of teaching biology" discipline ("Didactics of biology") is a backbone element of future biology specialists' methodical training. Structuring of discipline content is conducted in accordance with a real educational process at school and pedagogical university with a strong focus on achieving professional tasks, connection between theoretical preparation and the results of students' pedagogical practice.

Learning the "Methods of teaching biology" discipline as a key component of students' methodical preparation along with mastering of other methodology oriented disciplines combine the incorporation of traditional forms, teaching methods, and new technologies. Methodical disciplines include: "Methods of teaching biology", "Methods of excursions on biology", "Fundamentals of naturalistic work at school and extrascholastic establishments", "Innovative technologies of teaching biology".

A prominent place in the system of methodical training of future biology teachers is pedagogical practice, which provides an opportunity to determine the real level of students' psychological and pedagogical, professional and methodical proficiency, to deepen and generalize this knowledge, to improve methodical skills, to identify pedagogical abilities and to gain experience in professional activities.

The introduction of educational resources for methodology directed disciplines, developed on the basis of modern approaches to methodological training of future biology educators contributes to the increasing of future teachers' methodical readiness level.

Within the given experiment the textbooks of "Methods of teaching biology", "Methods of teaching biology with a help of tables and charts", "Meth-

ods of teaching biology in question-answer form", "Innovative technologies of teaching biology", "Methods of nature excursions preparation", "Methods of preparation and conducting of biology excursions", a working notebook with a printed basis for independent students' work on "Methods of teaching biology", guidelines for laboratory studies, teaching practice, writing term papers and dissertations that increase the quality of methodical preparation of future biology teachers have been developed, experimentally tested and practically implemented at higher pedagogical educational institutions.

Innovative teaching technologies (interactive technologies, contextual learning technologies, project technology, case technology, the "methodical workshop" technology, portfolio technology, information and communication technologies, distance learning technologies that contribute to the methodical formation of the future educator has been introduced into educational process.

The technologies indicated above are practice oriented and allow students to discover professional activity better, to reveal their pedagogical abilities and objectively evaluate them, to develop the necessary methodical competencies, to form positive motivation for the future profession and to create their own methodical product (manuals, lessons outlines, didactic cards, visuals).

The introduction of the distance learning elements, particularly through the uniquely designed site, containing educational and methodical materials on method related disciplines is definitely effective (http://grytsai.rv.ua).

An essential aspect of the future biology teachers' methodical training in higher education institutions is the designing of such an environment that would develop the student's personality along with the creation of conditions for his professional growth. During the methodology courses, students are immersed in an individualized methodically oriented learning environment in which they, as subjects of study, carry out certain inherent activities of biology teacher, and also realize their own trajectory of methodical formation. The content of methodical training compulsively involves methodical problems solving, organizing research activities of students (namely, working in the laboratory of biology teaching methods), studying the perspective pedagogical experience of biology teachers. One of the components of this environment is a specially equipped office of the biology teaching methodology, which encompasses the necessary textbooks, devices, equipment and technical recourses that promote the formation of the future biology teachers' ability to organize an educational process on biology in a secondary school.

5. Structure of the model of methodical training system

In the predicted model of methodical training system of future biology teachers, the following interconnected blocks are distinguished: theoretical and methodological (defines the strategy of methodical training); motivational and purposeful (specifies the purpose and tasks of the methodical training of future teachers of biology, their motivation and the final training result); content (defines the content of methodical training of a biology teacher); procedural and technological (reveals the basic methods, means and forms of methodical training of students); control and correctional (defines control methods, level of methodical readiness of students, predicts the results of methodical training). The given model reveals features of the content and structure, the sequence, interconnection and mutual influence of all components of the process of methodical training of students-biologists in pedagogical universities.

The developed conceptual model of the system of methodical training of future biology teachers in pedagogical universities is presented in the form of a scheme (Fig. 1).

The theory-methodological (conceptual) block reflects the main ideas that underpin the methodical training of future biology teachers. The methodological base of the model consists of the regularities, approaches and principles that determine the strategy of methodical training of future biology teachers and regulate the tactics of its implementation, theoretically justify the purpose, structure, content, technology and result of the training of future teachers.

Among methodological approaches to modelling the methodical training of future teachers of biology, the following are: systemic, personally oriented, competent, active, context, environmental, reflexive and technological.

Such approaches are implemented during the selection of the content of education, determining of teaching technologies, the establishment of methods for quality control methodical training etc.

The regularities of the methodical training of future biology teachers include the following:

a) the interdependence of the purpose, content, methods and forms of methodical training, predefined level of development of the methodology of teaching biology, the requirements of educational standards and the real state of pedagogical practice;

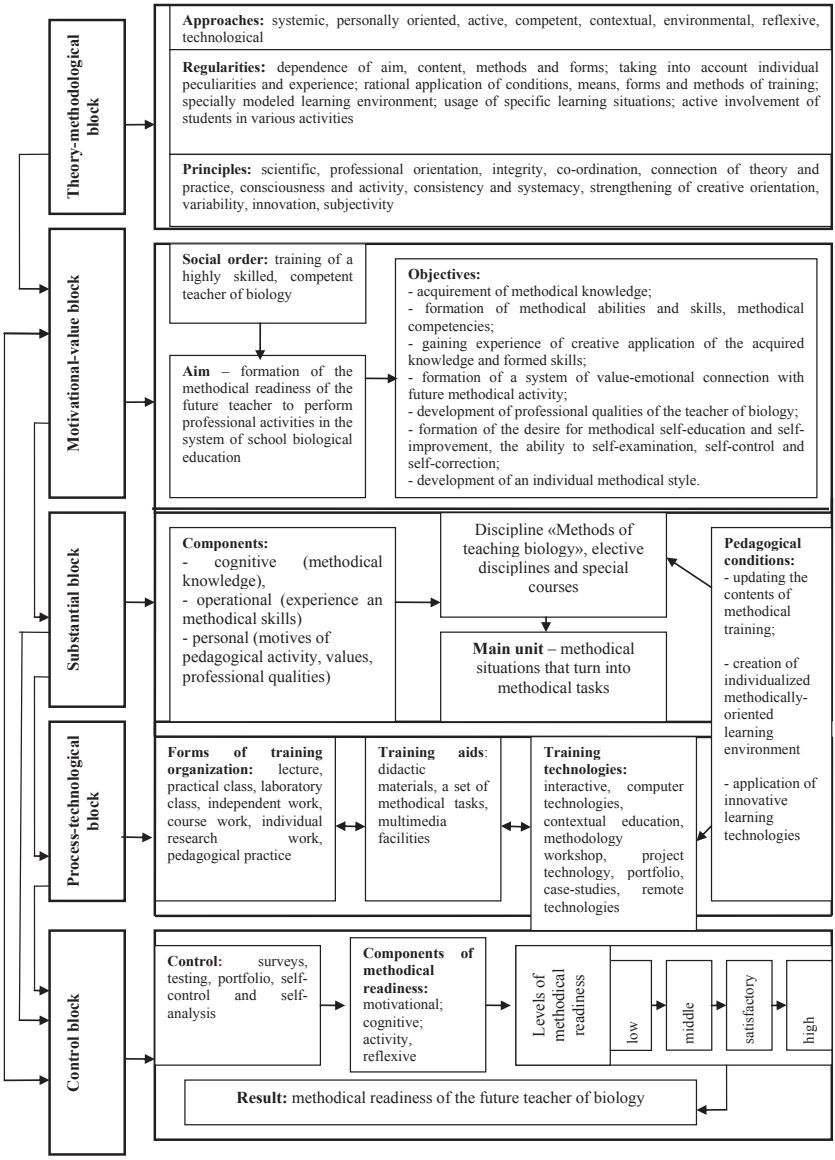

Fig. 1. Conceptual model of system of methodical training of future biology teachers in pedagogical universities

b) the dependence of the results of methodical training on the students' awareness of the purpose and tasks of learning, the personal significance of the educational material;

c) the dependence of the effectiveness of methodical training on the motivation of students and taking into account their individual characteristics and experience;

d) the dependence of the effectiveness of methodical training on the rational use of conditions, means, forms and methods of teaching in their interrelation;

e) the dependence of the results of methodical training on a specially modelled methodically oriented educational environment;

f) the dependence of the effectiveness of methodical training on the use of specific learning situations from future pedagogical activity (contextual learning);

g) the dependence of the quality of methodical training on the purposeful interaction of the teacher and the student, the active involvement of students in various activities.

Important role in model creation play scientific principles – certain initial statements, regulatory requirements for the organization and conduction of the educational process. In the context of the study, the principles of methodological training of future biology teachers are: the principle of science, the principle of professional orientation, the principle of inerrability, the principle of coherence, the principle of theory and practice of communication, the principle of consciousness and activity, the principle of consistency and systemacy, the principle of strengthening the creative orientation, the principle of variability, the principle of innovation, the principle of subjectivity.

The *motivational-target block* of the model ensures that future specialists will be aware of the goals and objectives at each stage of the methodical training and forms a positive attitude regarding methodological activity.

The system of methodical training is focused on the tasks of teaching system – the teacher's training. The main goal of the system of higher pedagogical education is the professional training of high-qualified teachers in accordance with the social order, the formation of readiness for the future pedagogical activity.

We support the idea of N. Zelenko that the methodical training of future biology teachers should be based on the integrative unity of the educational

strategy of universities (the tasks of vocational and pedagogical education), on the one hand, and the professional interests and intentions (tasks) of students, on the other hand, which ensures the progress (advance) of future teachers from the basics teaching methods to the formation of author's methodical style [8].

Therefore, the motivation-target block of the model of methodical trainings was developed in accordance with the requirements of the educational institution, as well as the needs of the future teacher's personality.

The formation of a positive attitude of students towards professional activity in general and methodical activity in particular begins from the motivational-target block. Execution of any work is impossible without the motivational value spheres of the personality of the future teacher formed in a certain way. Therefore, the complex of tasks should be supplemented with the tasks of forming the motivation to master certain skills and qualities necessary for the professional activity of a future specialist.

We agree with N. Vereshchahina that the purpose of methodical training should be connected with the purpose of general, professional and postgraduate education, so that its implementation allows to build an individual educational route, taking into account the inclinations towards pedagogical profession, and its mastering it in institutions of higher educational and its further improvement in methodical activity [5, p. 58]. In addition, the goal must be correlated with some ideal, predicted result of methodological training, which determines the content and structure of the activity of teacher of biology.

The purpose of methodical training of future teachers of biology in modern conditions is the formation of methodical readiness of students to perform professional activities in the system of school biological education.

Motivational-target block of methodical training is represented by the unity of the main goal and system of tasks, the complex solution of which will ensure its achievement. In accordance with the goal specific tasks of methodical training are determined:

a) acquiring methodical knowledge;

b) the formation of methodical skills and methodical competencies;

c) acquiring experience of creative application of the acquired knowledge and skills;

d) formation of a system of value-emotional attitude towards future methodical activity;

e) development of professional qualities of the teacher of biology;

f) formation of the desire for methodical self-education and self-improvement, the ability to self-examination, self-control and self-correction;

g) the development of an individual methodical style.

The *content block* of the model of the system of methodical training of future biology teachers is a relatively independent component of the content of pedagogical education, which creates conditions for mastering the methodical aspects of pedagogical activity, mastering of basic knowledge, skills and abilities, values, norms and rules in the field of biology teaching techniques. In particular, this block is represented by three components: cognitive (methodical knowledge), activity-operational (experience and methodical skills) and personal (motives of pedagogical activity, values, and professional qualities).

So, the content of the methodical training of future biology teachers is a pedagogically adapted system of methodical knowledge, skills and abilities, methods of methodical activity, experience of its creative implementation and value-emotional attitude, which ensures the formation of methodical readiness of the future specialist.

The above-mentioned content is structured in the curriculum of the discipline "Methods of Teaching Biology", as well as elective disciplines and special courses of methodical direction. In addition, the content of methodological training is realized during the pedagogical practice.

The content of the methodical training of future teachers of biology is presented by a special methodical thesaurus, based on which are the key methodical concepts that are formed during the study of methodical disciplines.

The selection of the content of methodical training is determined primarily by the peculiarities of studying the discipline "Methods of Teaching Biology", which combines educational, quasi-professional and educational and professional activities. The content of this discipline is determined by the specifics of the teacher's professional functions. In consideration of this, the acquiring of methodical knowledge and the development of methodological skills should take place in the context of future pedagogical activities.

The basic unit of the content of methodical training in the context of professional activity is the pedagogical situation (according to A. Verbytskyi, V. Ziahviazynskyi, etc.). One of the conditions for successful methodolog-

ical training is to turn these situations into methodological tasks and their solving by students.

In the content of methodical training it is necessary to combine theoretical and practical training, learning and research activity, implement interdisciplinary connections with other disciplines, provide continuity, systematic and continuous methodological training, optimal correlation between classroom work and independent work in non-auditing time, etc. In addition, it is necessary to organize the content of the methodical training of future biology teachers so that knowledge and skills are personally significant for each student [2, p. 25].

Thus, the content unit of the model describes the content of methodical training, which involves improving the content of the discipline "Methods of Teaching Biology", parallel implementation into the educational process of elective disciplines, within which occur deepening, expansion, generalization of methodological knowledge of students, the formation of methodical thesaurus, the involvement of future specialists to the imitative types of professional activity.

The *process-technological block* of the model is based on the specifics of the content of the biology training methodology. This block determines the forms of organization of student training, as well as a set of traditional and innovative technologies, methods and training aids, types of research activities with the help of which the content of methodical training is implemented.

The application of contextual learning technologies, the use of interactive technologies, work in the methodological workshop, the development of methodological projects, the analysis of methodical cases, the creation of methodological portfolios will ensure not only the acquiring of methodical knowledge and the formation of skills, but also the development of research creative work, actualization of personal and professional experience, realization of an individual trajectory of methodical formation, formation of methodical reflection, development of individual methodical style.

Process-technological unit of the model provides realization of three components of methodical training:

– theoretical (lectures, independent work, writing essays, course papers);

– practical (laboratory lessons, pedagogical practice, solving methodical problems, game teaching methods);

– personal (drawing up of methodical portfolio, authorizing pedagogical experience, self-regulation of methodical knowledge and skills).

This block is implemented during the interaction between students and teachers, the interaction of students with computers, methodical literature, etc. The methodical training of future biology teachers takes place in a purposefully modelled individualized methodically oriented learning environment during the whole period of studying at universities.

The main means of methodical training is a complex of teaching and methodical tasks. In addition, the means of training are textbooks, teaching aids, reference books, educational and methodical complexes of disciplines, notebooks with a printed matter, collections of tests etc.

The model indicates the leading pedagogical conditions that will promote improvement the quality of methodical training of future biology teachers.

The operating and technological unit of the model is closely connected with the *control-correction block*, which determines the level of formation of the methodical readiness of future biology teachers. This block describes the criteria and levels of the formation of methodical readiness, the forms and methods of controlling students' methodical competencies. The control and correction unit is aimed at finding out the effectiveness of methodical training of future biology teachers and stipulates for pedagogical diagnostics of the methodical readiness of the future teacher at various stages of methodical training, studying the effectiveness of each component, timely adjustment of the educational process.

6. Conclusions

The conceptual model of the system of methodical training of future biology teachers in pedagogical universities is developed in the unity of the theory-methodological, motivational-target, content, process-technological and control-correction blocks, in a concise form, presents information on the structure and content of methodical training, the main organizational forms of the educational process, technologies and training aids, diagnostics of methodical readiness of future specialists.

The model provides the use of traditional and non-traditional forms and methods of control, such as oral and written surveys, testing, protection of project, portfolio, etc. An important place takes self-control and self-examination, the development of methodical reflection of students.

As a result of the implementation the model of the system of methodical training of future biology teachers is formed methodical readiness for methodical activity which is the part of pedagogical activity. The organization of the educational process on the basis of the presented model will provide improving the quality of methodical training of future biology teachers in pedagogical universities.

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