Role of biological disciplines in formation of professional competence of future teacher of biology

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Abstract. In article the role of biological disciplines locates in formation of professional competence of future teacher of biology in the conditions of upgrade modern pedagogical education. As a theoretical and methodological basis of formation of professional competence of future teacher of biology the competitive approach to construction and research of the educational processes, considering problems of readiness for professional activity is offered. Process of formation of professional competence of future teacher of biology during studying the biological disciplines which essence consists in mastering by professional competences of areas of the educational, research, organizational, social, educational and technological activity, and necessary for work of the teacher of biology locates. Ability to use this biological knowledge locates in professional activity of future teacher of biology for the solution of problems of the biological education considering specifics of specialty biology Professional competences of future teacher of biology from a position of formation of knowledge of biological disciplines**.**
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Introduction

In modern conditions of education modernization introduction in practice of higher education of the new contents and new forms and technologies of training is represented actual. In these conditions formation at future teacher of biology of professional competence, high mobility becomes the purpose of biological education, abilities independently to make crucial decisions and to realize them in specific conditions of biological education.

Modern biological education is recognized as one of strategic vectors of formation of innovative model of education. As researchers Kathleen A. Brown-Rice and Susan Furr [1, p.224], Marissa Harle, Marcy H. Towns [2, p.369], Fariza Achcaoucaou, Laura Guitart-Tarrés, Paloma Miravitlles-Matamoros, Ana Núñez-Carballosa, Mercé Bernardo and Andrea Bikfalvi [3], Harold B. White, Marilee A. Benore, Takita F. Sumter, Benjamin D. Caldwell and Ellis Bell [4, p.297], Alejandro Tiana, José Moya and Florencio Luengo [5, p.307], Tracey Arnold Murray, Pamela Higgins, Vicky Minderhout and Jennifer Loertscher [6, p.405], Schantz, E.A [7, p.383], Thomas Eberlein, Jack Kampmeier, Vicky Minderhout, Richard S. Moog, Terry Platt, Pratibha Varma-Nelson and Harold B. White [8, p.262], Nicolas Fernandez, Valerie Dory, Louis-Georges Ste-Marie, Monique Chaput, Bernard Charlin and Andree Boucher [9, p.357], Michael F. Antolin, Kristin P. Jenkins, Carl T. Bergstrom, Bernard J. Crespi, Subhajyoti De, Angela Hancock, Kathryn A. Hanley, Thomas R. Meagher, Andres Moreno-Estrada, Randolph M. Nesse, Gilbert S. Omenn and Stephen C. Stearns [10, p.1991], . Sakenov, D. Zh. [11, p.1431], Ishanov, P., Bekmambetova, Z. [12, p.902], Aviv Shachak, Sara Fine [13, 719], Ross H. Nehm, Sun Young Kim and Keith Sheppard [14, p.1122] a special urgency, ideas of interdisciplinary teaching of biological disciplines and continuity, i.e. ensuring continuous biological education get. In the conditions of upgrade of biological education and dynamic development of modern technologies of training of biological disciplines, the labor market in education demands much of vocational training of future teacher of biology. Today teachers of biology competent, competitive are necessary, focused on professional growth and self-improvement the professionals aspiring to achievement of success and able independently to build the professional activity, capable to solve innovative problems of training and the education possessing professional competences of areas of educational, experimental, research, organizational, administrative, social, psychological, pedagogical, educational, technological activity, abilities creatively to carry out productive subject and pedagogical activity in the organization of biological education.

In research of vocational training of students of higher education institution the role of biological disciplines in formation of professional competence of future teacher of biology is insufficiently studied.

Biological disciplines study life as a special form of movement of a matter, laws of its existence and development. A subject of biological disciplines are live organisms, their structure, functions, and also natural communities of organisms. Biological disciplines treat:

- morphological disciplines (anatomy, histology), describing a structure of organisms;
- physiological disciplines (physiology of a cage, animals, plants);
- all-biological disciplines (cytology, genetics, evolutionary doctrine etc.);
- ecological disciplines (biogeography, parasitology);
- boundary and methodical disciplines (biochemistry, biophysics, anthropology, molecular biology, technique of teaching of biology etc.).

Studying of biological disciplines allows to create at students as future teachers of biology the main of professional competence, professionally significant components of biological culture, to reveal an educational component of the main biological disciplines.

In our opinion, formation of professional competence of future teacher of biology when studying biological disciplines is process of mastering by biological knowledge and the competences necessary for professional activity of the expert.

According to scientists Kathleen A. Brown-Rice and Susan Furr [1, p.224], Marissa Harle, Marcy H. Towns [2, p.369], Alejandro Tiana, José Moya and Florencio Luengo [5, p.307], Sakenov, D. Zh. [11, p.1431], Ishanov, P., Bekmambetova, Z. [12, p.902], Aviv Shachak, Sara Fine [13, 719], Ross H. Nehm, Sun Young Kim and Keith Sheppard [14, p.1122], biological disciplines help to master the content of biological education and promote formation of professional competence of future teacher of biology. There is a need to analyze the content of vocational training of future teacher of biology and a role of biological disciplines from the point of view of their assistance on formation of professional competence of future teacher of biology.

The purpose of our research is justification of a role of biological disciplines in formation of professional competence of future teacher of biology.

For achievement of a goal of research the following methods were used: the theoretical analysis of pedagogical, biological literature, normative documents on a research subject; design, modeling of conditions of formation of professional competence of future teacher of biology; diagnostic methods (supervision, conversations, questioning, and analysis of products of creative activity of students); methods of statistical processing.

Main Part

Biological disciplines as means of preparation of students to professional activity will provide mastering, development, formation of professional competence of future teacher of biology in areas of educational, experimental, research, organizational, administrative, social, psychological, pedagogical, educational, technological activity, and ability of technolizing subject, innovative and pedagogical activity in the education organizations. In this context there is a need of development of practical creative tasks to students to biologists with application of a method of situation analysis - a case task which gives the chance to put theoretical knowledge into practice, to investigate alternative options of a way out, to develop analytical skills. The basic principles of biological education is the between disciplines, continuity, integrity, integration.

Biological disciplines promote development of professional competence of future teacher of biology through the contents, the organization of their studying, through the corresponding nature of interaction of subjects. Within a competitive approach in biological education the special attention is given to problem creation of the content of biological disciplines, use of modern educational technologies and various forms of manifestation of results of educational process.

Professional competences of future teacher of biology is a complex characteristic of personal qualities of the student, as future teacher of the biology, including professional competences of areas of the educational, research, organizational, social and educational and technological activity, providing effective and expedient implementation by the teacher of biology of professional activity in various spheres of the biological education, characterizing existence of organizing abilities, skills of the methodical analysis and forecasting of results of professional activity, knowledge of the most effective ways of its implementation. Professional competence at students of biologists in unity of the motivational, cognitive and activity parties of future teacher of biology is shown.

The motivational component includes aspiration of future teacher of biology is system to perceive pedagogical reality and to operate in it, showing the positive relation to biological education, realizing its value.

The cognitive component is knowledge, level of their formation. At the heart of the leading characteristic of future teacher of biology the cognitive component will include free orientation in data domain.

The Activity component is shown through training behavior. It is formed through accumulation

by future teacher of biology of experience in professional activity that allows seeing and finding non-standard solutions of pedagogical tasks.

These components of professional competence of students of biologists define levels and criteria of their sformirovannost.

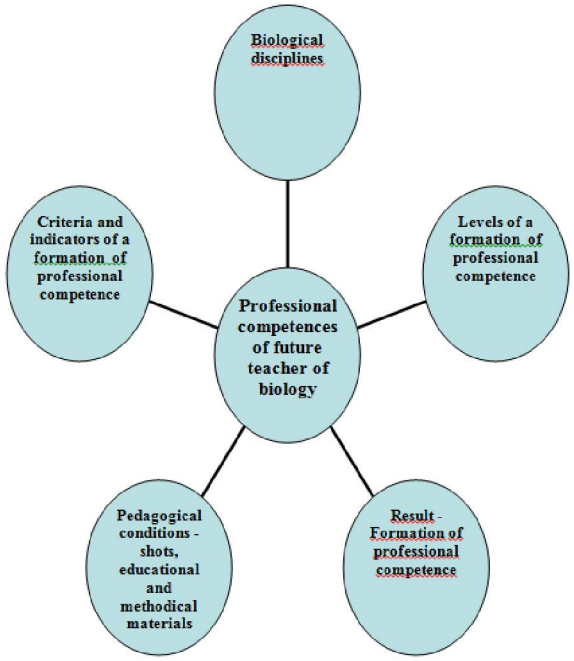
Levels of a formation of professional competence at future teacher of biology: high, average, low.

Criteria and indicators of a formation of professional competence at future teacher of biology: cognitive (assimilation of biological knowledge, level of professional literacy, mastering by a complex of biological concepts, categories, laws); motivational (qualities and properties of the personality, interest, requirement, readiness); activity (mastering by the actions having a professional orientation, existence of abilities of the rational organization of work, use of biological knowledge in non-standard situations, skills of design, the organization and implementation of professional activity of the teacher of biology).

Pedagogical conditions - Scientific and pedagogical shots, educational methodical materials, material base.

Analysis of researches of Schantz, E.A [7, p.383], Michael F. Antolin, Kristin P. Jenkins, Carl T. Bergstrom, Bernard J. Crespi, Subhajyoti De, Angela Hancock, Kathryn A. Hanley, Thomas R. Meagher, Andres Moreno-Estrada, Randolph M. Nesse, Gilbert S. Omenn and Stephen C. Stearns [10, p.1991], Ross H. Nehm, Sun Young Kim and Keith Sheppard [14, p.1122], establishes that fact that today, in system of biological education prevails not innovative training to biological disciplines [3 ; 4; 5]. Future teachers of biology in practice cannot independently use possibility of biological disciplines for the innovative solution of actual professional problems of biological education. On the basis of the carried-out analysis of works of Kathleen A. Brown-Rice and Susan Furr [1, p.224], Marissa Harle, Marcy H. Towns [2, p.369], Ishanov, P., Bekmambetova, Z. [12, p.902], Aviv Shachak, Sara Fine [13, 719], Ross H. Nehm, Sun Young Kim and Keith Sheppard [14, p.1122]we offer Model of formation of professional competence of future teacher of biology during the studying biological disciplines in drawing 1.

We represent results of experimental work on realization of Model of formation of professional competence of future teacher of biology during studying biological disciplines. 97 students of faculty of Natural sciences of the Pavlodar State teacher training college took part in experiment divided into control (CG) and experimental (EG) of group. During experiment on a platform of this research all structural components and the put conditions of Model of formation of professional competence of future teacher of biology were approved during studying biological disciplines.



Drawing 1. Model of formation of professional competence of future teacher of biology during studying biological disciplines

The set of criteria put in model and indicators, such as cognitive (assimilation of biological knowledge, level of professional literacy, mastering by a complex of biological concepts, categories, laws); motivational (qualities and properties of the personality, interest, requirement, readiness); activity (mastering by the actions having a professional orientation, existence of abilities of the rational organization of work, use of biological knowledge in non-standard situations, skills of design, the organization and implementation of professional activity of the teacher of biology) it was applied at an ascertaining stage of experiment and at carrying out forming experiment to check of efficiency of formation of professional competence of future teacher of biology during studying biological disciplines.

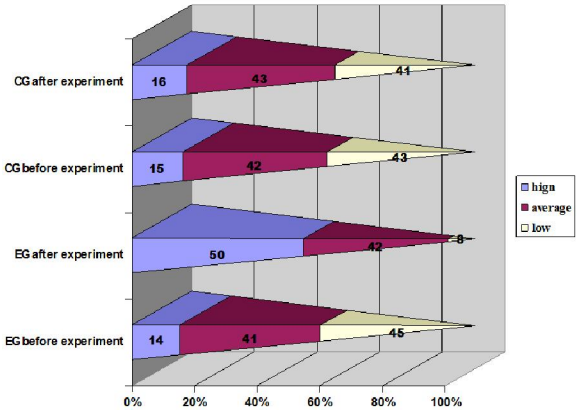
The ascertaining stage of experimental work was directed on identification of real level of formation of professional competence of future teacher of biology. Research showed that students face information barrier in biological knowledge, inability to see in the future professional activity a training context, to model professional situations in out-of-class activity.

Experimental work at a forming stage was constructed by means of realization of all structural

components and the put conditions of Model of formation of professional competence of future teacher of biology during studying biological disciplines**.**

Students were included in such kinds of activity as, training according to programs of courses of biological disciplines; participation in competitions, the Olympic Games on biological disciplines, an assignment of practical creative tasks to students to biologists with application of a method of situation analysis - a case task which gives the chance to put theoretical knowledge into practice to investigate alternative options of a way out, to develop analytical skills.

Diagnostics of level of formation of professional competence of future teacher of biology during the studying biological disciplines was carried out with use of the ball and rating monitoring system which allowed to reveal steady increases of level of formation of professional competence of future teacher of biology when studying biological disciplines to what results of experiment in experimental (EG) and control (CG) groups before experiment (drawing.2) testify.



Drawing 2. Diagnostics of level of formation of professional competence of future teacher of biology during the studying biological disciplines of level

The analysis and processing of results of experiment revealed that in experimental groups the number of students with high level of formation of professional competence of future teacher of biology after experiment increased by 36 %, number of the students who have reached middle tier of formation of professional competence of future teacher of biology – for 1 %, the number of the students having low level of formation of professional competence of future teacher of biology – decreased for 37 %.

Results of experiment in control groups testify to increase in number of students with high level of formation of professional competence of future teacher of biology for 1 %, average level of formation of professional competence of future teacher of biology – for 1 %, reduction of low level of formation of professional competence of future teacher of biology by 2 %.

Thus, the obtained experimental data confirm efficiency of the developed Model of formation of professional competence of future teacher of biology during the studying biological disciplines and the conditions of formation of professional competence of future teacher of biology put in Model during the studying biological disciplines.

Results of research demonstrated that change of character and the organization of vocational training of students of biologists of experimental groups at the expense of realization of all structural components of Model of formation of professional competence of future teacher of biology during the studying biological disciplines became considerable distinction between control (CG) and experimental (EG) groups.

Conclusion

As a result of the carried-out research the role of biological disciplines in formation of professional competence of future teacher of biology is proved. The content of process of formation of professional competence of future teacher of biology is experimentally opened during the studying the biological disciplines which essence consists in mastering by professional competences of areas of the educational, research, organizational, social and educational and technological activity, necessary for work of future teacher of biology. The intrinsic characteristic of professional competence of future teacher of biology from a position of formation of knowledge of biological disciplines, ability to use this biological knowledge in professional activity of future teacher of biology for the solution of problems of the biological education considering specifics of specialty biology is opened.

During experimental work the developed Model of formation of professional competence of future teacher of biology is approved and introduced during the studying biological disciplines**.** Statistical processing of results of experiment confirmed educational efficiency of Model of formation of professional competence of future teacher of biology during the studying biological disciplines.

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