Thesis Abstract
of Gulsana Zalkyzy Shaimerdenova
for the degree of Doctor of Philosophy (PhD) in the specialty 6D011300 - Biology «The method of creating and applying virtual laboratory work in the preparation of future biology teachers»

Research justification. Due to the fact that at the given time the tasks of industrial and innovative development of the state are being solved, the improvement of the quality of education to the level of conformity of the world experience is a demand of time. Because modern needs of society require a high professional efficiency that satisfies the labor market, training of specialists capable of independently orienting themselves to scientific, technical and modern information. In this regard, before higher educational institutions is the task of a multifaceted study of the problem of personal training, capable of self-education as a professional specialist, creatively applying the acquired knowledge in the learning process and in a life situation capable of self-development and self-management.

Vocational education for prospective biology teachers is not limited to educational materials on a scientific basis, but also aims to improve the competitiveness of learners, their willingness to study independently, and the ability to use the knowledge gained in life situations. The mobility of the future professionals with social, economic, pedagogical changes, education, and new thinking are the prerequisites for achieving any results.

Positive trends aimed at improving the quality of modern education are the development of new trends in education and human capital formation. In this regard, the basis for solving the issues of increasing the efficiency of the educational process is the activation of educational and cognitive activity of the students. Head of State N.Nazarbayev in his Address to the Nation "Kazakhstan's Third Revival: Global Competitiveness" said, "First of all, the role of the education system should change. Our task is to make education a central part of the new model of economic growth. The focus should be on developing critical thinking skills and self-help skills. " It requires training to improve the educational and cognitive activity of students, ie, self-employment, development of creative abilities, effective use of information. The improvement of educational and cognitive activity of students is largely related to the creative ability of future teachers.

Development of creative ability of future teachers will be the basis for innovative educational technologies. Issues of innovation in the field of education, i.e. learning, generalization, mass use of pedagogical experience, pedagogical innovation and its introduction in the educational process were the study object of Russian scientists, such as V.I. Zagvyazinsky, V.A. Kan-Kalik, N.D. Nikandrov, N.V. Nadikov, N.V. Kuzmina, M.M. Levina, N.E. Steniakova, I.Z. Zazun and others. occupied. At the same time, the issues of education content and the

formation of professional training of future teachers in the educational process of higher education institutions were discussed in the works of Kazakhstani scientists- A.E. Abylkasymova, N.D. Khmel, K.S. Uspanov, D.M. Zhusupalieva, A.A. Kalyuzhnyi, S.T. Kargin, A.A. Moldazhanova and others.

In fact, innovation in education is determined by the results of theoretical and practical use in pedagogical process. In this regard, there is a need for creation of a virtual laboratory work in the preparation of future biologist teachers for innovative activity. This, in turn, will require future biological teachers to conduct experimental studies, develop author's programs, and incorporate them into the learning process.

Innovative activity of students is closely linked to effective methods of active learning in the process of biological education. Russian scientists N.M. Versilin, V.M. Korsunskaya, G.M. Goltsova and others modeling the studies in theoretical and methodological foundations of the effectiveness of biological teaching. Methodological problems of biological education and upbringing were also discussed by domestic biologists-methodologists K.A. Aimaganbetova, K. Kaiym, N.Tormanov, Zh.B.Chilipbaev, K. Zhunisova, R.Alimkulova, K.Zhumagulova, S. E. Kuanysheva's works and are widely studied and analyzed. Analyzes of scientists focusing on biological education require the development of biology education and innovative teaching approaches.

One of the grand issues in the education system in developed countries is the informatization of learning, i.e. the use of information technology in the learning process. It is well known that in our country there is no innovation in the system of information space creation. General informatics - ensures the systematization of knowledge and is the cornerstone of intellectual activity of the modern information-computer revolution. Continuous education, education transparency, self-education, educational process optimization, distance learning, etc. educational ideas are being implemented.

The basis of creation of virtual laboratory work in biology is computing information technologies. In this regard, problems of consideration of bases of creation of unified methodical system of creation and development of information and educational environment of higher education institution have arisen. Russian scientists A.G. Agrosimov, S.G. Grigoryev engaged in the field of training of innovative specialists, including the introduction of computer technologies in the educational process, and in the field of general and higher education, the development and use of distance learning technologies and e-learning resources The pedagogical and organizational conditions of I.B. Gotskaya, the use of distance learning technologies are demonstrated in the study works of Yuri Kapustin.

In addition, the e-learning system in the Republic of Kazakhstan are demonstrated in the studies, such as: E-Learning is a new paradigm of learning (G.K. Nurgalieva), e-Learning - Internet and multimedia training (M.D. Zhusubaliyeva), modern education mega-courses - the teaching of information technology in the Republic of Kazakhstan (A.K. Mynbaeva), pedagogical principles of structuring of electronic textbooks, methodology and technology of

education informatization (G.O. Tazhigulova), methodical system of professional training of future specialists in the conditions of informatization of education (B.D.Sıdıqov),

Analyzing research and innovations related to innovative technologies, today's study of the actual issues of computer use in the learning process has been widely studied. Theoretical and methodological basis of the use of computer technology is determined by the conceptual approaches to the development of students' self-education activities in higher education institutions, as well as professional identification in the modern information society. These studies, in turn, helped to clarify the interpretation of the information and educational environment.

However, the lack of studies in theoretical and practical aspects of biology, arises *contradictions* between the development of techniques for the creation and application of virtual laboratory work in the preparation of future biologist teachers and the need for its implementation in the teaching process

In order to effectively resolve these *contradictions*, we decided to choose the "Methodology of Using Virtual Laboratory Work in Teaching Future Biologists Teachers" topic as the subject of our research.

The goal of the research is to analyze the theoretical and methodological foundations of the creation and use of virtual laboratory work in the preparation of future biologist teachers.

The research object- processes of biology teaching at the higher education institutions.

The research subject - methods of creation and application of virtual laboratory works for specialties biology.

The scientific look-aheads: If the role of virtual laboratory work in future biology teacher training, and its methodology are developed and implemented in the future, it will allow students to fully utilize it in future professional activities and learn to work independently through laboratory experiments as virtual laboratory work is a component of biological education.

The research tasks:

- description of pedagogical conclusions of teaching biology through innovative technologies;
- theoretical substantiation of the importance of virtual laboratory work in the preparation of future biologist teachers;
- defining the criteria for the creation of virtual laboratory work in teaching biology;
- Development of the technique of creation and use of virtual laboratory works in teaching biology, its practical training.

Research methods:

- Theoretical analysis of philosophical, psychological, pedagogical, methodological and medical literature on research issues, as well as concepts of biology, educational standards, typical educational programs, textbooks and methodological tools;

- monitoring, questioning, interviewing, analysis;
- Detecting and teaching experiments.

Methodological bases: the theory of the action methods; the theory of an individual; the theory of education content; biological education theories; the basic principles and attitudes of the theory and methodology of biology teaching.

Theoretical basis of the research: scientific works on philosophical, psychological, pedagogical, methodological and biological studies; methodological foundations and methods of professional orientation of biology teaching at the higher education institutions.

Sources: studies of scientists, philosophers, psychologists, pedagogues, didactics and methodologists in the field of biological education and upbringing; The Law of the Republic of Kazakhstan "On Education"; State program of education and science development in the Republic of Kazakhstan for 2016-2019; The state obligatory standard of the higher education of the Republic of Kazakhstan; Typical educational programs, textbooks, educational-methodical complexes, achievements and experience of teachers, as well as pedagogical experience of the dissertator and scientific and pedagogical researches conducted at the university.

Scientific novelty: description of pedagogical conclusions of biology teaching through innovative technologies; the role of virtual laboratory work in the training of future biologist teachers was theoretically justified; the criteria for the creation of virtual laboratory works in teaching biology, the technique of using virtual laboratory work in teaching biology and virtual learning and cognitive laboratory instructions on the topic "Sarcosporids of rodents" were presented.

Thesis defense principles:

- The description given to the pedagogical conclusions of biology teaching through innovative technologies is the basis for the development of creative abilities of future teachers as well as the implementation of innovative educational technologies in the learning process;
- virtual laboratory work in biology teaching increases the level of biological readiness of the students and forms the ability to use them in future professional activities;
- criteria for the creation of virtual laboratory works in teaching biology are aimed at determining the level of knowledge of students in the specialty biology;
- The technique of using virtual laboratory work in teaching biology is provided with the use of future teachers in their professional activities.

The research theoretical significance:

The following researches will be carried out:

- Description of the pedagogical conclusions of future biological teachers in higher education institutions;
- Theoretical justification of the importance of virtual laboratory work in the preparation of future biologists;
- Definition of the criteria for creating virtual laboratory work in teaching biology;

- Designing the technique of using virtual laboratory work in teaching biology.

The research practical significance:

According to the results of the research, the tasks of theoretical knowledge on biological content, test questions for self-study of students, virtual labs for creative and research were prepared. Also, the additional lecture materials included in the working curriculum of the elective course "Zoology of Invertebrates", and virtual learning and cognitive laboratory guide on "Sarcosporides of rodents" were developed and introduced into the educational process of the technique of virtual laboratory use.

The results of the research can be widely used in higher education institutions, institutions of secondary vocational education, in the professional training and professional development of teaching staff.

Research base: Department of Botany and General Biology, Institute of Natural Sciences and Geography of Kazakh National Pedagogical Univeristy named after Abai, and the Department of "Biology and the methods of biology teaching " of Taraz State Pedagogical University.

Discussion and implementation of research results

According to the main concept of the dissertation and its practical results, 17 articles have been published. Among them: in the editions recommended by the Monitoring Committee in the system of education and science of the RK - 4, in the publications included in the Scopus - 1 database, in Russian international scientific journals - 2, in domestic international scientific journals - 1, practical conferences - 3 (including in the materials of foreign conferences - 6).

At the following international scientific and practical conferences, the materials were presented and evaluated: Cohas, Complexity and Leadership (Shpirling, 2014), "Biological and Environmental Education in Secondary and Higher Education: Status, Problems and Prospects for Development" (St. Petersburg, 2014), "Mastery of Teacher and Innovation in Education (Moscow, 2015)," Integration of Science and Practice in Ensuring Veterinary Success "(Almaty, 2015)," Natural Zones under Special Protection and Biodiversity "(Almaty, 2015)," Actual problems and research results in field of biol (St. Petersburg, 2015), "Actual problems in and results of research in the field of biological and environmental education" (Kiev, 2016), "Actual problems of biological education in secondary and higher schools: innovation and practice" (Almaty , 2016).

Based on the results of the research work, electronic methodological recommendations of the virtual laboratory on the "Sarcosporidia of rodents" theme were published.

Structure and content of the dissertation

The thesis consists of normative references, reference books, notations and abbreviations, introduction, two sections (31 tables, 21 figures), conclusions, a list of references and an appendix.