

ANNOTATION

dissertation on the topic "The use of information and computer technologies in the game teaching of chemistry" for the degree of Doctor of Philosophy (PhD) in the specialty 6D011200 - "Chemistry"

Salima Adambekovna Medetbayeva

Research topic: The use of information and computer technologies in the game teaching of chemistry.

The purpose of the study is to:

theoretically substantiate, develop and experimentally test the model of readiness of future teachers to use information and computer technologies in the game teaching of chemistry.

The object of research is the process of professional training of future chemistry teachers.

The subject of the study is the preparation of future chemistry teachers for the use of information and computer technologies in the game teaching of chemistry.

Research hypothesis: The research hypothesis is based on the assumption that the level of preparation of future chemistry teachers for the use of information and computer technologies in game learning will increase if a model of readiness of future chemistry teachers for the use of information and computer technologies in game learning is implemented in the learning process, provided that future chemistry teachers are motivated to play activities; ensuring subject-subject teacher-student interactions; development of information and computer technologies, in particular educational computer games of an open educational environment.

In accordance with the purpose and hypothesis of the study, **the main objectives** of the study are determined:

1. To carry out a theoretical analysis of the basic concepts of the study and determine the essence of game-based teaching methods with the simultaneous use of information and computer technologies that ensure the readiness of future teachers to use computerized game-based learning.

2. To determine the criteria and indicators of the formation of the readiness of future chemistry teachers to use information and computer technologies in game learning.

3. Develop and experimentally test the effectiveness of models that promise a rough preparation for the offer of information and computer technology in game-based teaching and identify pedagogical conditions for its successful implementation.

4. Develop methodological support for the use of information and computer technologies in game-based learning in chemistry through specially professionally oriented tasks and assignments for the implementation of specific and group projects on the proposal of information and computer technologies in game learning in the process of studying educational disciplines and selecting the most functional learning of computer games, depending on on the form of organization of educational activities.

Research methods:

theoretical: study of scientific-theoretical and educational-methodical literary

sources, normative documents in the field of education, analysis, comparison, systematization, generalization, synthesis - in order to clarify the state of development of the studied problem, disclosure of the essence of the concept of "game learning", "gamification"; "pedagogical, didactic, educational computer games", "information and computer technologies", modeling to substantiate and develop the formation of the readiness of future teachers to use information and computer technologies in the game teaching of chemistry;

empirical: pedagogical experiment (ascertaining and forming stages), observation, survey, conversation, testing, questionnaire, expert evaluation method - to test the effectiveness of the formation of readiness for the use of information and computer technologies in game teaching by future chemistry teachers and to identify the level of its formation; statistical: descriptive statistics and Pearson's criterion for processing quantitative experimental data and confirmation of the reliability of the results of the study.

Substantiation of the novelty and significance of the results obtained and compliance with the directions of scientific development or state programs:

- for the first time, a model has been developed for the formation of the readiness of future chemistry teachers to use information and computer technologies in game training in the unity of conceptually-targeted (approaches, tasks, principles of formation of the readiness of future teachers to use information and computer technologies in the game teaching of chemistry), content-procedural (content of the disciplines "Analytical Chemistry", "General Chemistry", "Active Learning Methods"; stages, forms, methods and means of readiness of future teachers to use information and computer technologies in the game teaching of chemistry) and reflexive-evaluative (criteria, indicators, levels and result of readiness of future teachers to use information and computer technologies in the game teaching of chemistry) blocks;

- pedagogical conditions for the implementation of the developed technology have been identified (motivation of future chemistry teachers to play activities; provision of subject-subject interaction between the teacher and students; development of information and computer technologies, in particular educational computer games of an open educational environment);

- the content and methodological support of the process of formation of the readiness of future chemistry teachers for the use of information and computer technologies in game training have been improved; the author's classification of educational computer games has been proposed, their role and place in the educational process have been clarified; criteria and indicators of the formation of the readiness of future chemistry teachers to use information and computer technologies in game training;

- further development was acquired by the educational games "Electronic Formula", "Determine who it is?/What it is?", "Analytical lotto" with computer programs created for their use.

The practical significance of the research lies in the development of a set of educational computer games "Electronic formula", "Determine who it is?/what is it?",

"Analytical Lotto", adapted to the current educational programs "6B01510 - Chemistry", "6B01513 - Biology", "7M01510 - Chemistry", methodological recommendations for the implementation of individual and group projects on the use of information and computer technologies in the game teaching of chemistry, methodological support for the study of disciplines "Analytical Chemistry", "General Chemistry", "Active teaching methods".

Scientific provisions and research results were introduced into the educational process of the Kazakh National Pedagogical University named after Abai, Republic of Kazakhstan, (Appendix P), in the Poltava National Pedagogical University named after V.G. Korolenko, Republic of Ukraine (Act of Implementation No. 2005/01-38/85 06.10.2022), (Appendix P).

The main provisions submitted for defense (scientific hypotheses and other conclusions that make up the novelty have been proven):

1. The process of educational computer games in classes in chemical disciplines, corresponding to the goals and content of education, improving the quality of educational computer games created and the effectiveness of their use;

2. Professional training of future chemistry teachers for the use of information and computer technologies in game learning within the framework of a holistic, purposeful process of forming students' readiness for the use of game learning in the conditions of using information and computer technologies;

3. The model of readiness of future chemistry teachers to use information and computer technologies in game learning is considered as an integrative quality, realized through motivational-value, cognitive, operational-activity and reflexive components and criteria for assessing the levels of formation of readiness to use information and computer technologies in game learning and pedagogical conditions for the implementation of the developed technology, including the motivation of future chemistry teachers to play activities; provision of subject-subject interaction between the teacher and students; development of information and computer technologies, in particular educational computer games of an open educational environment;

4. Methodological support for the formation of the readiness of future teachers to use information and computer technologies in game learning in the process of studying chemical disciplines through a system of professionally oriented tasks and assignments for the implementation of individual and group projects on the use of information and computer technologies in game learning in the process of studying chemical disciplines and selection the most functionally suitable educational computer games, depending on the form of organization of educational activities.

Description of the doctoral student's contribution to the preparation of each publication (the share of the author of the dissertation is indicated as a percentage of the total text):

According to the results of the study, 10 papers were published, including 1 article with a percentile of 74 in an international peer-reviewed journal included in the scientometric database Scopus.

1. Psychological and Pedagogical Problems of Computeraided Teaching of Natural Sciences. International Journal of Emerging Technologies in Learning. 2021, Vol. 16 Issue 20, pp.208-222. (Co-author: Akhmetov N.K., the share of the doctoral student is 90%)

3 articles published in publications recommended by the Committee for Quality Assurance in Education and Science and the Ministry of Education and Science of the Republic of Kazakhstan:

1. Psychological and pedagogical problems of the use of information technologies in game learning. Scientific and methodological journal "Pedagogy and Psychology", Kazakh National Pedagogical University No. 4(41)2019, pp.240-249 (Co-author Akhmetov N.K., the share of doctoral students 90%)

2. Problems and prospects of using educational computer games in the process of teaching chemistry. Journal No. 3 Bulletin of the APN of Kazakhstan, June 2020, pp.105-111. (co-author Akhmetov N.K., the share of the doctoral student is 90%)

3. Gaming technologies as an effective means of teaching chemistry. Bulletin of the L.N.Gumilev Eurasian National University. No. 4(137)2021 pp.275-286. (co-authors Akhmetov N.K., Shiyani N.I., the share of the doctoral student is 80%).

6 articles in the materials of international scientific and practical conferences, including far and near abroad:

1. Information and computer technologies in Game training of analytical chemistry. International scientific and practical conference "XII Mendeleev readings" - Poltava: V. G. Korolenko Poltava national Pedagogical University. February 27-28, 2019, pp. 51-54. (co-authors: Akhmetov N. K., Kaumbaev S. A. doctoral student share 80%)

2. Information technologies as a means of digitalization of Game training in Analytical Chemistry. International scientific and practical conference " professional education and employment of young people: XXI Century. training of personnel for the digital economy "-Kemerovo: GBU DPO" KRYRPO " April 11, 2019, - pp. 6-8. (co-author: Akhmetov N. K. doctoral student share 90%)

3. Psychological and pedagogical issues of computerization of teaching educational games in chemistry. Materials of the international scientific and practical conference "theory and practice of implementing the goals of updated content of Natural Science Education" November 14-15, 2019, 25-29. (co-author: Akhmetov N. K. doctoral student's share 90%)

4. Gamification as a means of increasing students ' motivation in the educational process of chemistry. Internauka: scientific journal-No. 17 (146). Part 1.Moscow, Ed. Internauka publ., 2020, 92 P.Elektron. version. Pech. public. – I'm sorry. <https://www.internauka.org/journal/science/internauka/146> (co-authors: Akhmetov N. K., Kauimbaev S. A., doctoral student's share 80%)

5. Influence of gamification on the motivation of students in chemistry training. XV Mendeleev readings: collection of scientific works of the All-Ukrainian scientific and practical conference, (Poltava, March 2, 2022) / Ministry of education and science of Ukraine, Poltava. Nat. PED.Un-t named after V. G. Korolenko, Poltava: in.] [and Editorial and Publishing Department of PNPU named after V. G. Korolenko.

2022. - P. 99 - 105. (co-authors: Akhmetov N. K., Shiyan N. I., doctoral student share 80%)

6. Features of using information and computer technologies in chemistry training. VI international scientific and practical Internet Conference "Chemistry, Biotechnology, ecology and education" PGAU 2022. pp. 151-156. (co - authors: Akhmetov N. K., Shiyan N. I., doctoral student share 80%)

2 copyright certificates were obtained.

1. Educational game "Analytical lotto", Computer program. National Institute of Intellectual Property of the Republic of Kazakhstan. № 4240 dated June 26, 2019

2. Educational game "Electronic formula" National Institute of Intellectual Property of the Republic of Kazakhstan. № 12497 dated October 12, 2020