Academic Research in Educational Sciences
ISSN: 2181-1385
DOI: 10.24412/2181-1385-2022-2-804-808

Volume 3 | Issue 2 | 2022
Cite-Factor: 0,89 | SIS: 1,12
SJIF: 5,7 | UIF: 6,1

METHODS OF INCREASING THE NATURAL SCIENCE LITERACY OF STUDENTS IN TEACHING CHEMISTRY ORGANIZATION OF PEDAGOGICAL EXPERIMENTAL TESTING AND RESEARCH RESULTS

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ABSTRACT

In the context of the renewal of higher chemical pedagogical education, its construction on the basis of a competence-based approach, the contribution of all components of university training to the formation of the professional competence of a future chemistry teacher is important. However, we assign a special place to teaching chemical disciplines (disciplines of subject /profile training in chemistry), the role of which is to form special professional "chemical" competencies of the future teacher, implementing key and basic competencies in the subject area of chemistry.

Keywords: chemical disciplines, educational achievements, methodological and theoretical research, theoretical conclusions

The implementation of a competence-based approach in teaching chemical disciplines to students of chemical and natural sciences specialties and directions of schools are impossible without the development of theoretical concepts and the introduction into practice of teaching methodological systems adequate to achieve the goals of the formation of special professional competencies of the student.

The formation of competencies manifested in the form of knowledge in a certain area, the ability to reasonably judge and act effectively in it, is associated with the use of the potential of interactive learning, implementing methods of constant and diverse interaction of the student with the learning environment, stimulating his activity and independence, the formation of experience, the development of reflection. We practices that lots of regions: Samarkand, Tashkent, Andijan..

The results of the information search showed that a modern scientifically based 8-9% methodological system of teaching chemical disciplines to students of a pedagogical university has not yet been proposed, which holistically uses the didactic potential of interactive learning and implements the methodology of a competence approach. In the theory and methodology of teaching chemistry, the tasks of creating a concept and

methodological system of interactive teaching of chemical disciplines have not been set and developed.

The relevance of the research is due to the need to solve the contradictions identified on the basis of the analysis of literary sources and the study of problems of educational practice:

- between the relatively stable content, unchanged methods and forms of teaching chemical disciplines and the changed requirements for the process and results of teaching schools;

- between the goal of forming the professional competence of schools and the lack of scientifically based means of achieving and diagnosing it in the practice of teaching chemical disciplines;

- between the didactic possibilities of interactive learning and its lack of study as a means of forming professional competence in teaching chemical disciplines to schools.

The theoretical significance of the research is determined by the creation of the concept and theoretical model of interactive teaching of chemical disciplines. The concept of interactivity in teaching is investigated, a critical analysis of works on interactive learning, its methods and forms is given; the categorical apparatus of interactive learning in relation to teaching chemical disciplines is clarified. It is proved that interactive teaching of chemical disciplines is an integral part of competence-oriented chemical pedagogical education. The main directions of modernization of teaching chemical disciplines at a pedagogical university are determined. It is shown that the role of teaching chemical disciplines to students of chemical and natural sciences specialties and areas of pedagogical university is to promote the formation of professional competence through the formation of special professional competencies in close connection with key and basic competencies. The composition and structure are described, the levels of formation of special professional competencies of students in teaching chemical disciplines are determined; the objectives of teaching chemical disciplines are correlated with the results in terms of the formation and development of special professional competencies, as well as with the methods of teaching and evaluation. The methodology of interactive teaching of chemical disciplines has been developed, which is a step-by-step process reflecting the levels of formation of special professional competencies and the stages of activity of subjects. A methodology for assessing the educational achievements of

students of a pedagogical university in chemical disciplines based on a competence-based approach has been developed.

The reliability and validity of the research results are due to the consistency and methodological validity of the initial provisions, consistent with the fundamental principles and theories of philosophy, pedagogy, psychology and methods of teaching chemistry. The criterion determining the validity of the implemented ideas is the criterion of consistency of the hypothesis, objectives, main provisions and conclusions of the study with the trends in the development of higher chemical and pedagogical education. The criterion of reliability is the approbation of the main ideas and features of their use in the practice of building an educational process based on conceptual provisions, a theoretical model and a methodological system of interactive teaching of chemical disciplines created on their basis. The validity and reliability of the obtained scientific results is achieved by using a set of complementary theoretical and experimental methods adequate to the logic of the study, a deep theoretical analysis of the problem, the correctness of the pedagogical experiment and statistical processing of its results, the integrity of the qualitative and quantitative analysis of experimental data.

It was found out that the composition of special professional competencies of students of chemical and natural sciences specialties and directions of pedagogical university includes knowledge of a certain theoretical field of chemistry (knowledge of basic facts and theories, the ability to competently use terminology, nomenclature, symbolic and graphic language, units of measurement), practical (cognitive and experimental) application of knowledge to specific situations (state of matter, chemical processes, their study and practical use) and tasks, requiring a practical or experimental solution, a valuable and responsible attitude to the acquired knowledge and skills in professional, social, moral and environmental contexts.

The experimental method of interactive teaching of colloidal chemistry, based on the concept of interactive teaching of chemical disciplines, made it possible to improve the quality of students' training in this discipline from the perspective of a competence approach. The improvement of the quality of students' training was expressed in an increase in the level of training, which was assessed by the results of special control works, as well as the degree and level of mastery of special competencies in the subject area of colloidal chemistry, which were evaluated according to the developed methodology for assessing special competencies. b. Tested in the practice of teaching the disciplines "Physical Chemistry" and "Colloidal Chemistry", the developed

system for evaluating students' academic achievements in chemical disciplines based on a competence-based approach, based on the results of the current modular and integrated control, fixing the student's mastery of specified competencies. The assessment is based on objective, clear and open criteria for the student.

The special professional competence includes knowledge (theoretical knowledge of the academic field "chemistry"), activity (practical application of knowledge to specific situations of the state of matter, the flow of chemical processes, their study, application and practical use) and value (value and responsible attitude in social, professional, moral and environmental contexts) components. The structure of special professional competencies of students of chemical and natural science specialties and areas of pedagogical higher education has been developed, which is a complex of special cognitive competencies related to solving intellectual problems in the field of chemistry, special practical competencies related to work in an educational chemical laboratory, and special competencies directly related to future professional activity. In the process of forming special professional competencies in teaching chemical disciplines, the levels of familiarization, mastering knowledge and skills, and mastering competencies are highlighted.

A system has been developed for evaluating the results of interactive teaching of chemical disciplines based on a competence-based approach, based on the results of the current modular and integrated control, which records the student's mastery of special professional competencies. The assessment is based on objective, clear and open criteria for the student. A step-by-step methodology for assessing special professional competencies has been developed, quantitative parameters of the degree of mastery and the level of formation of special professional competencies have been introduced.

The following areas are promising: methodological and theoretical research in order to identify and substantiate the most optimal and effective approaches to the process of interactive teaching of chemical disciplines; development of new methods of interactive teaching of chemical disciplines in a pedagogical university, creation of new models of the process of formation of special professional competencies based on the theoretical conclusions presented in this study; design of interactive teaching in other educational conditions; creation of private methodological systems for interactive teaching of chemical disciplines.

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