

## METHODS OF FORMING NATURAL SCIENCE LITERACY OF PUPILS IN CHEMISTRY LESSONS (SECONDARY SCHOOLS)

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### ABSTRACT

In recent years, the problem of the quality of chemical education has become Central to the theory and methodology of teaching chemistry due to a real decline in the quality of the school chemical education process. The light went out work to assess the quality of training of pupils, which sets out the mandatory minimum content of education, requirements to level of preparation of pupils.

**Keywords:** FLS, methodological and theoretical foundations, social structures.

### INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

This serves as a prerequisite for the development and implementation of methods for evaluating the functional literacy of students (FLS) in chemistry. However, its creation and use in teaching chemistry was not fully implemented due to a number of unresolved theoretical and methodological issues, in particular:

1. The Lack of a single conceptual framework on the problem of evaluating FSU in chemistry.
2. Lack of development of theoretical and methodological foundations and theoretical model of FLS assessment in chemistry.
3. Scientific unreasonableness of the leading goals and functions of FSU assessment in chemistry.
4. Uncertainty of the structure and content of the FLS in chemistry.
5. There is No generally accepted methodology for assessing the level of education of students in the process of teaching chemistry.
6. Lack of modern forms, methods and tools for assessing the level of education of students in chemistry.

The results of the analysis of the problem of quality assessment of the result of the chemical educational process strongly indicate the need for the creation of the modern theory and methodology of evaluation of the FLS in chemistry: this new socio-cultural conditions of our society, the crisis of former systems of values and priorities of chemical education, the transition of the educational system to progressive models and technologies of evaluation of quality of subject training.

The relevance of our research is that the development of the problem of assessing the FLS in chemistry is not only scientific (disclosure of the content and structure of the FLS in chemistry, methodological and theoretical foundations of its assessment in the process of teaching chemistry in primary school), but also social, associated with the formation of a chemically educated, functionally literate person, as well as applied significance associated with the development and implementation of a theoretical model and methodology for evaluating the FSU in chemistry. The research is based on the need to solve the following main contradictions:

\* between the modern requirements of the state, society, family, individual, educational institutions, social structures to the quality of chemical education in primary schools and the limitations of applied methods and technologies for evaluating the quality of its results;

\* between the need to ensure the quality of chemical education in primary schools and the lack of a holistic methodology for its objective and comprehensive assessment;

\* between the traditional method of evaluating the quality of the results of the chemical educational process in the main school and the need to include a step-by-step method of evaluating the quality of students' functional literacy in chemistry.

The relevance, lack of development and insolvability in the theory and methodology of teaching chemistry of the above-mentioned scientific problems and contradictions determined the choice of the research topic.

The purpose of the research is to develop and implement a methodology for evaluating the functional literacy of students in chemistry, which ensures a stable quality of teaching chemistry in primary schools.

The object of research is the process of evaluating the functional literacy of students in chemistry in primary school.

The subject of the research is the structure and content of functional literacy of students in chemistry.

In accordance with the selected goal and subject of the study, a hypothesis was put forward'.

The quality of assessment and teaching of chemistry in primary schools will be ensured if the assessment of students' functional literacy in chemistry, based on the principles of objectivity, integration, content validity, continuity and comprehensiveness, implements in its entirety at the stages of diagnosis, monitoring and certification specific methods of rapid, systematic and comprehensive assessment.

To achieve the goal and test the working hypothesis, the following tasks were set:

1. Carry out an information search and analysis of philosophical, psychological, pedagogical and didactic-methodical literature sources on the problem of evaluating the functional literacy of students in the learning process.

2. Clarify the conceptual framework for the research topic.

3. Scientifically substantiate and formulate theoretical and methodological foundations of the methodology for evaluating the functional literacy of students in the process of teaching chemistry.

4. Identify the structure and content of the FLS in chemistry that are adequate to the modern educational standard in chemistry.

5. Develop a theoretical model and based on it, a methodology for evaluating FLS in the process of teaching chemistry.

6. Determine the methodological conditions for the optimal functioning of the developed methodology for evaluating FLS in chemistry.

7. carry out an experimental test of the effectiveness of the proposed method of evaluating FLS in the process of teaching chemistry.

To solve these tasks, the following research methods were used: analysis and synthesis of philosophical, psychological, pedagogical and methodological literature on the problem of research, study of normative documents, modeling and design, generalization, comparison; questionnaires, conversation, observation, pedagogical experiment, written tests, element and

post-operative analysis, qualitative and quantitative assessment of respondents' responses, graphical and tabular presentation of results, methodological interpretation of results.

The scientific novelty of the research is that for the first time in the theory and methodology of chemical education, a step-by-step method for evaluating the functional literacy of students in chemistry in primary school has been developed in the context of a competence approach.

The theoretical significance lies in the fact that:

- the necessity of modernizing the methodology for evaluating the quality of results of teaching chemistry in primary schools and creating a modern methodology for evaluating FLS chemistry is justified;

- the main contradictions are identified, the resolution of which contributes to the formulation of a new urgent scientific problem and its solution;

- \* the methodological and theoretical bases of the FLS assessment methodology in chemistry are defined: methodological approaches (competence-based, functional-activity-based, complex), leading ideas (modernization, standardization, humanization of education) and principles (integration, content validity, continuity);

- \* clarified and expanded the conceptual framework of the system for evaluating the quality of chemistry teaching results in primary school, necessary for optimal use of the author's assessment methodology, including the following concepts: quality of education, literacy, level of education, functional literacy of students, functional literacy of students in chemistry, assessment of functional literacy of students in chemistry, the purpose of evaluating FLS in chemistry;

- \* priority functions (diagnostics, monitoring, certification) of FLS assessment in chemistry are defined, which serve as the initial prerequisites for creating the content and methodology of FLS assessment in the process of teaching chemistry in the main school;

- \* the content and structure of the Federal state University in chemistry that is adequate to the modern educational standard in chemistry of the main school, and includes 4 main components: basic invariant knowledge, subject skills of a reproductive and productive-creative nature, value relations of students to chemical and other objects;

- the author's model of assessment of FLS in chemistry was developed and based on it, a step-by-step method was built and tested, which implements the original versions of methods of Express, system and complex assessment at the stages of diagnostics, monitoring and certification in the process of current, intermediate and final assessment of students' functional literacy in chemistry.

The practical significance lies in the fact that:

- \* the key chemical concepts and 7 groups of subject skills (intellectual, communicative, evaluative-methodological, computational-computational, chemical-experimental, symbolic-graphic, constructive-modeling) that form the FLS in chemistry, necessary and sufficient for the educational practice of a primary school chemistry teacher are identified;

- \* chemical tasks - measuring instruments of an evaluative nature, which serve as an organizational and managerial tool in the evaluation activities of chemical education subjects, have been compiled and applied;

- installed and successfully tested methodological evaluation conditions FLS chemistry: the adequacy of phased integrative method for the assessment of a 4-component content of the FLS in chemistry; the continuity in diagnosis, monitoring and evaluation, as well as current, intermediate and final assessment; phased use of rapid, systematic and comprehensive job-meters evaluative. The reliability of the results is provided by a thorough and comprehensive analysis of the psychological, pedagogical and didactic-methodological prerequisites for evaluating FLS in chemistry; the adequacy of the applied research methods to the goal, objectives, hypothesis, object and subject of research; correct conduct of pedagogical experiment and the choice of appropriate modern methods of qualitative and quantitative evaluation of its results.

Certification of functional literacy of students in chemistry is the determination of the final level of functional literacy of students at the end of class, after studying the topic (section, module), chemistry course 8, 9 classes, primary school Diagnosis of functional literacy of students in chemistry is the determination of the level of functional literacy of students at the beginning of class, before the study of the topic (section, module), chemistry course 8, 9 classes of Measurement is a quantitative expression of the quality of knowledge and skills of students in conventional units. The result of measurement, its quantitative, conditional-formal (sign) expression is a mark.

The quality of functional literacy of students in chemistry is a certain level of assimilation by students of the content of teaching chemistry in the main school, corresponding to the modern standard. We distinguish four levels of functional literacy of students in chemistry: unacceptable, acceptable, sufficient, high quality of chemical education - an external and internal certainty of the process and result of chemical education, reflecting compliance with the current educational standard in chemistry actually achieved by students Monitoring of functional literacy of students in chemistry— this is a systematic, continuous monitoring of the quality of functional literacy of students at the intermediate stage of the lesson and the educational process in General the Evaluation of functional literacy of students in chemistry is the process of determining the extent to which the students achieved level (quality) functional literacy, educational standards in chemistry of the primary school assessment of the quality of functional literacy of students is the result of the expression of attitudes among the subjects of chemical education process quality of pupils ' knowledge, skills and character of their value-relations.

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