

ANNOTATION
of PhD thesis on the theme "Didactic bases of developing of textbooks and teaching materials in chemistry" of Ilyassova Gulzhakhan Ualibekovna, candidate for a PhD degree on specialty "6D011200 – Chemistry"

The relevance of research. At present education of the Republic of Kazakhstan is carried out according to requirements of state programs, particularly, intended for the development of pupils. From this point of view, every year the content and structure of knowledge at secondary schools are reconsidered and improved in the country depending on the results of pedagogical, psychological and methodological research.

President of the Republic of Kazakhstan N.A. Nazarbayev in the Message to the People of Kazakhstan "New opportunities of development in the conditions of the fourth industrial revolution" of 2018 has paid special attention to development of the human capital, particularly education, knowledge and skills of the younger generation. Therefore, Kazakhstani education has to be adapted to the level of development of modern science and technology and all innovative knowledge should be included in the content of education. In "Strategy of Kazakhstan – 2050" – the new political policy of the developed state" it is also said that" education and vocational training are the basis of modern education, training and retraining, we have to become the country with high level of literacy. Much attention is paid to functional literacy of all younger generations".

In the article of the state leader "Orientation to future: spiritual revival" it is emphasized that" everyone has to know that knowledge is the most important and fundamental factor of success, and it has to be always first among priorities of our youth because only the nation with preference of knowledge in the system of values achieves success".

The leader of the nation in Message to the People of Kazakhstan "The third modernization of Kazakhstan: global competitiveness" emphasized the need of change of education role and system," our task is to make education the central link of new model of economic growth. Academic programs should be aimed at the development of abilities of critical thinking and skills of independent information search"

And all this demands increasing responsibility for education of the younger generation in the republic. Each subject of secondary education has its purposes and tasks. Rates of science progress in the society assume further development of scientific level of natural sciences, particularly chemistry.

The reason is that young people who have finished a secondary school should have profound knowledge not only in subjects, but also in relations between a person, society and nature, that is to have a materialistic view of the world unity. All this strengthens requirements to pupils' training at secondary schools. In turn, the textbooks conforming to these requirements have to be developed. Requirements are imposed: to a textbook contents, the logical sequence of themes, valuable orientation, access to Kazakhstani content, etc.

It also concerns modernization of the purpose and objectives of chemistry. Chemistry is one of the main branches of natural sciences. In recent years in Kazakhstan textbooks in chemistry of new generation for secondary schools have been published and many of them are being introduced into educational process now.

A change of society at the end of the XX century has led to large breakthrough in the general education system. There were radical changes in society – Kazakhstan was included into world educational space which have influenced the development of chemical industry.

At a secondary school studying of chemistry begins in the 7th form and is directed to teaching students knowledge of substances, chemical theories and laws, chemical production. If the new generation of society doesn't possess a certain degree of "chemical" knowledge, then it won't be able to create a true view of "material world". Development of many branches of the country depends on evolvement of chemistry.

Achievement of this purpose needs implementation of several requirements: full assimilation of the theory in chemistry by school pupils, readiness of pedagogical society, availability of the established professional competence for training at high level. And implementation of requirements for increasing level of knowledge of the personality is based on this and demands organization of pupils' independent work in the experimental, observation and research direction, in particular. It is impossible to limit pupils by assimilation of knowledge only from a textbook materials, and it is necessary to teach them to use additional manuals. All this will allow teachers to organize correctly educational activity and to master contents of a textbook.

Chemistry is a multidisciplinary science, it is essentially practical in all natural disciplines. All this should be considered and included in a textbook. Textbooks prepared in this subject are not only a source of pupils' additional knowledge, but also have to be a basis for developments of scientific research in other directions.

Today in connection with integration of Kazakhstan into world educational space the new education system is being established. This process, along with change of the theory of pedagogics and upbringing, demands a new view on educational activities in the country, development of trainees' creative abilities and the new organization of actions. Education in the country is focused on a human being, it depends on pupils' creativity, search, self-control and fast adaptation of educational methods to real conditions.

Research in the field of pedagogics is directed to harmonization of educational content, increase of an educational role of teaching and pupils' interest to learning. Therefore, the objective of teaching chemistry at school can be achieved due to use of innovative educational technologies, analysis of development of chemistry as science.

One of present imperatives to chemistry, from the scientific point of view, is development of the system of increasing interrelation and complementarity of contents, structure, methodology of textbooks and teaching manuals.

There are Russian scientists who have studied theoretical bases of writing and drawing up textbooks depending on their contents, structural features, didactic principles of education: V.G. Beylinson, D.D. Zuev, P.G. Buga, V.V. Krayevsky,

N.F. Talyzina, L.V. Zankov, S.G. Shapovalenko, V.P. Bespalko, I.K. Zhuravlev and others. Besides, the educator G.M. Donskoy analyzed development of textbooks contents, A.M. Sokhor investigated didactic processing of scientific materials in textbooks. I.P. Tovpinets, Y.K. Babansky, V.V. Sorokin, L.S. Guzey, R.P. Surovtseva, V.P. Maksakovsky, A.Z. Rakhimov, N.I. Kondakov, M.N. Skatkin and others in their works have conducted analysis of a textbook structure and ways of its compilation. The scholar Dainieko suggests ways of increasing efficiency of a textbook, K. Shvinge, L.Y. Zorina, L.M. Kuznetzova have made conclusions on impact of textbook functions to its structure. L.A. Tsvetkov, Z.E. Gelman, D.A. Epstein have stated issues of inclusion of subject- scientific knowledge from the content of teaching chemistry in school textbooks. Scientists B.A. Birimzhanov, K.A. Akhanbayev, I.N. Chertkov, A.V. Lavrentyeva and L.S. Pontak, G.N. Osokina, Shvinge and G. Mayendorf, E.E. Minchenkov, E.K. Reoli and others have conducted research on the first textbooks in chemistry.

Quality of textbooks of new generation in Kazakhstan is provided with results of works by K.A. Aymagambetova, A.E. Abylkasymova, A.K. Kusainov, U. Asylov and others. K.A. Aymagambetova is the author of basic educational textbooks on natural sciences and knowledge of nature, as well as methods of teaching. Zh.A. Shokybayev has defined didactic fundamentals of manuals in chemistry intended for the higher education, and I.N. Nugymanov has determined the importance of chemical language in a chemistry manual. At secondary schools of the RK, the textbooks in chemistry prepared by I. Nugmanov and N. Nurakhmetov are generally used. Today many academics and educators deal with an issue of updating of contents of textbooks in chemistry according to new requirements. B.A. Mansurov, N.K. Akhmetov, K. Bekishov, A. Sarmurzina, R. Zhumadilova and other scientists are among them.

Considering ample research and analyses which have been carried out up to this point it can be noted that the theoretical and methodological description of textbooks in chemistry used today at schools demand further improvement of their contents.

Due to changes of social values and development of present technology it is necessary to improve preparation of additional manuals in chemistry. Proceeding from world practice there was a need of production of textbooks of new generation which demand change of contents and systematization, logical structuring of textbooks and manuals.

For writing textbooks of new generation, which are in demand with consumers it is necessary to analyze the current state of development of chemistry in the country, to prove their contents scientifically, i.e. to proceed from simple to difficult. The analysis of textbooks and manuals which are available till today has shown the following contradictions in chemistry textbooks of the 7- forms:

- they are drawn up according to the state educational standard and subject program, but their contents do not completely cover all studied themes;
- methodological section (questions and instructions) of the presented textbooks has the low level of connection of the offered techniques with data on

life, chemical sciences in Kazakhstan;

- interrelation of chemistry with physics, geography and mathematics is not considered;

- incomplete list of independent tasks for the pupils during lessons and out-of-school activities;

- lack of questions to motivate pupils to carry out research works.

We are far from the thought that present school textbooks in chemistry don't conform to qualifying requirements and standards of educational programs of the Ministry of Education and Science of the RK. However, at studying of chemical knowledge in comparison with other sciences of natural sciences, it would be possible to consider an issue of improvement of their contents. In this regard, the subject of our research is "**Didactic fundamentals of drawing up textbooks and teaching materials in chemistry**" for the effective solution of the above-mentioned tasks.

Object of research is the system of structural contents of textbooks in inorganic chemistry for the secondary school.

Subject of research: didactic fundamentals of textbooks use in inorganic chemistry for senior forms of the secondary school.

Research purpose: to analyze the psychological and pedagogical basis of studying of textbooks and teaching manuals in chemistry, to create the system of independent works motivating pupils to research, to strengthen the correlation of a textbook and teaching materials and preparation of additional materials for lessons, introduction of the presented results in a pedagogical experiment.

Research objectives:

- to analyze pedagogical and psychological fundamentals of drawing up textbooks and training materials for secondary school;

- to study didactic functions of textbooks and their current state and opportunities;

- to develop system of implementing independent works in inorganic chemistry by pupils ;

- introduction into pedagogical experiment and presentation of results on use of textbooks and manuals in inorganic chemistry.

Scientific forecast of the research: the didactic basis of preparation of textbooks and manuals in chemistry will be analyzed, and methods and ways of the organization of independent works of the pupils motivating to research activity will be set through connection between them.

Research methods: review of theoretical, pedagogical, psychological, methodological literature and research works; analysis of scientific publications, experimental observations; pedagogical experiment; conducting surveys; analysis of textbooks and teaching materials contents ; conversations with teachers, questioning, analysis of the received results, conclusions.

Practical methods: pedagogical experiment, control, questioning.

Scientific novelty:

- developed a manual on chemistry and methods of its compilation, in accordance with the needs of modern society in the field of education;
- a prepared manual on chemistry it was proposed to introduce into the educational process;

Practical significance of the research: as a result of the research and collaboration of O.S. Gabriyelyan, Zh. Shokibayev and G.I. Ilyassova the textbook "Introduction to Chemistry" has been written which is now used as an experiment at secondary schools of Almaty.

Results of the research can be used for pupils of secondary and specialized secondary schools in teaching chemistry.

Recommendations on defending:

- pedagogical and psychological fundamentals of formation of textbooks and teaching manuals at secondary schools;
- didactic functions of textbooks in chemistry, their current state and opportunities;
- the system pupils' self-training in chemistry by means of textbooks and teaching manuals;
- introduction into pedagogical experiment and presentation of results on the use and guide to inorganic chemistry.

Research base: Comprehensive secondary school No. 41 named after A. Karsakbayev of Almaty.

Methodological and theoretical bases of the research: the need of preparation of textbooks and teaching manuals in Kazakhstan in the evidence-based directions, taking into account state policy in education, interrelations of theoretical and pedagogical directions of textbooks with philosophy, psychology and methods of teaching.

Accuracy and reliability of research results were provided with theoretical and scientific- methodological tasks of the dissertation, the research contents, use of effective methods of research, planning of practical work, accuracy and efficiency of the received results.

Discussion and realization of research results .

The main conclusions and practical results of the dissertation were published in the following international scientific conferences in 2015-2018: "Role of electronic textbooks in training of future teachers of chemistry" (Astana, 2017), "Role of electronic training programs in educational process" (St. Petersburg, 2017), "Didactic fundamentals for development of textbooks" (Almaty, 2017), "Fundamentals of objective control of students evaluation" (Almaty, 2017), "Fundamental functions of the main books" (Almaty, 2017). In total 26 scientific works on the content of dissertation work have been published.

Results of the research have been generalized, presented at scientific and methodological seminars at the Institute of Natural and Geographical Sciences, Kazakh National Pedagogical University named after Abay.

Publications: 26 scientific works have been published on the content of dissertation work. Among them 10 - are in publications of the Committee on

control of science and education of the Republic of Kazakhstan , 2 - are in "Scopus" scientific edition, 5 - are in the materials of the international scientific and practical conferences, 2- are in foreign scientific publications , 1- is in the textbook for students in English, 1- is the teaching manual for the 7th form in Kazakh.

Structure and contents of the dissertation: The dissertation consists of introduction, two chapters, conclusion, the list of the used literature and appendix.

Introduction presents justification of research topicality, defines purposes, tasks, methodological and theoretical bases and the practical significance of the research, makes suggestions on didactic fundamentals of drawing up textbooks and teaching manuals for secondary schools, gives description of the main investigation stages.

In chapter 1 "**Scientific and pedagogical fundamentals of drawing up textbooks and manuals**" psychological and pedagogical fundamentals of drawing up textbooks and manuals are analyzed:

- theoretical bases of drawing up textbooks and manuals are studied;
- contents of structural questions and didactic functions are considered;
- the main directions of the theory of textbooks and manuals development are considered;
- the structure of textbooks and teaching manuals in chemistry and their place in education are determined.

In chapter 2 "**Methodology of textbooks and teaching manuals use in teaching chemistry and result of its practical experiment**" methods of textbooks and manuals application in teaching chemistry at secondary school are considered and the conclusion of results of a pedagogical experiment is drawn.

In **conclusion** findings and suggestions based on results of theoretical and experimental works are given.