ABSTRACT

of the dissertation for the degree of Doctor of Philosophy (PhD) in the educational programme: 8D01702 – "Foreign Language – Two Foreign Languages" by Yulia Timurovna Chizhevskaya on the topic "Scientific and methodological foundations for the development of high school students` functional literacy based on CLIL-teaching"

Relevance of the study. The action plan for implementing the Concept for the Development of Secondary Education in the Republic of Kazakhstan until 2029 sets a target indicator of achieving a share of students who have exceeded the threshold level of scientific literacy according to the results of PISA-2029 of at least 57%.

A number of measures are envisaged to achieve this target, including updating educational standards with an emphasis on competence development, expanding the academic autonomy of schools by strengthening the variable component of the curriculum, and intensifying and improving the quality of teaching in senior classes of natural sciences, mathematics and English by increasing the number of hours.

However, at this stage, most initiatives are still in the planning and regulatory and methodological development phase, which objectively makes it difficult to achieve the stated results within the set time frame. In this regard, it is particularly important to find pedagogical solutions that can improve scientific literacy and be implemented even before the official revision of standards, including through the variable component of the curriculum.

One promising solution to this problem is CLIL (Content and Language Integrated Learning) – integrated subject and language teaching as a technology that allows for the simultaneous development of subject competencies, scientific literacy and foreign language communication skills.

A study of the practices of leading domestic educational organisations (Nazarbayev Intellectual Schools, Daryn, Bilim-Innovation Lyceums), as well as international experience, shows that the systematic implementation of CLIL in grades 8–11 provides:

- targeted development of PISA competencies (explanation of phenomena, interpretation of data, evaluation of scientific information and modelling) based on relevant subject content;
- development of scientific language as a tool for thinking and communication;
- increased learning autonomy among students and the transfer of acquired skills to non-academic contexts (project and research activities).

The object of the study is the process of developing functional literacy among senior secondary school students in the context of updating the content of secondary education in the Republic of Kazakhstan.

The subject of the study is a methodology for developing natural science literacy among senior secondary school students based on CLIL-teaching, presented as a set of interrelated didactic units.

Given that it is impossible to comprehensively cover all components of the holistic concept of functional literacy within a single dissertation, the focus of the study has been deliberately narrowed to scientific literacy as one of the priority components of functional literacy that can be most effectively developed using CLIL-technology. This narrowing of the subject area of the study determines the choice of the subject of the dissertation.

The aim of the study is to provide theoretical and methodological justification and to develop a methodology for developing the natural science literacy of senior school students based on CLIL-teaching, presented as a set of interrelated didactic units.

The research is based on the following **hypothesis**: if a scientifically based methodology for developing scientific literacy based on CLIL is introduced into the teaching process for senior school students, presented as a set of interrelated didactic units aimed at the simultaneous mastery of subject-specific language content and the development of scientific literacy, this will ensure a statistically significant increase in the indicators of the desired literacy through targeted training in the three components of PISA: explanation of scientific phenomena, interpretation of data, evaluation and modelling of scientific information, since in this situation not only linguistic and content integration is ensured, but also the creation of conditions in which each element of learning (from the formulation of subject-language tasks to the evaluation of results) contributes to the development of scientific literacy.

To test the hypothesis and achieve the research goal, the following **tasks** have been defined in accordance with the object and subject of the study:

1. to determine the theoretical and methodological foundations for the development of functional literacy in senior secondary school students based on CLIL-teaching;
2. to develop a model for designing didactic units that make up the methodology for developing the scientific literacy of senior school students based on CLIL-teaching;
3. to develop a methodology for developing the scientific literacy of senior school students based on CLIL-teaching, presented as a set of interrelated didactic units;
4. to experimentally test the effectiveness of the developed methodology for developing natural science literacy in senior school students based on CLIL-teaching, presented as a set of didactic units.

The theoretical and methodological basis of the study was formed by the provisions developed in the works of domestic and foreign scientists in the field of:

- theory of personality, activity and communication (Asmolov A. G., Vygotsky L. S., Leontiev A. A., Kagan M. S., etc.);
- the competence-based approach to teaching (Lebedev O. E., Khutorskoy I. A., Tangyan S. A., Kusainov A. K., Abylkasymova A. E., etc.);
- functional literacy (V. A. Ermolenko, Yu. V. Kuzmina, V. Matskevich, Scribner S., S. G. Vershlovsky, Eaton S., Binkley M., etc.);

- age and sociocultural psychology (J. Piaget, L. S. Vygotsky, J. Bruner, Stepnova L. A., et al.);

- integrated subject and language teaching methods (D. Marsh, D. Coyle, O. Meyer, P. Hood, et al.);

- development of foreign language and multilingual education (N. D. Galkova, E. I. Passov, S. S. Kunanbaeva, B. A. Zhetpisbayeva, A. E. Kubeyeva, T. A. Kulgildinova, G. K. Tleuzhanova, L. S. Syrymbetova, et al.);

- the formation of foreign language professional communication competence in students of non-language specialities (Uzakbaeva S. A., Byrdina O. G., Pustovalova Zh. S., Uteubaeva E. A., etc.).

The scientific novelty of the study lies in the fact that:

- the essence of the concept of 'functional literacy' has been defined as an integrative quality of personality, including a value-oriented component;

- the comparability of the PISA natural science literacy framework and the 4C components in the context of updating the content of secondary education in Kazakhstan has been scientifically substantiated;

- a system for assessing the increase in natural science literacy in CLIL-teaching has been developed;

- a system of prerequisites for the introduction of Hard CLIL in senior classes of mainstream schools has been institutionalised;

- a model for designing didactic units that make up the methodology for developing the natural science literacy of senior high school students based on CLIL has been developed;

- a methodology for developing the natural science literacy of senior high school students based on CLIL-teaching has been developed, presented as a set of interrelated didactic units.

The theoretical significance of the study lies in expanding the theoretical and methodological foundations for the development of scientific literacy, clarifying and developing scientific ideas about the processes of forming scientific literacy in senior secondary school students, and substantiating effective methods for its development.

The practical significance of the study lies in the development of the following didactic units:

- an elective course programme entitled 'Physical experiments as a tool for developing natural science literacy in senior school students based on CLIL-teaching' for students in grades 9-10;

- a workbook for the elective course 'Physical experiments as a tool for developing natural science literacy in senior school students based on CLIL-teaching' for students in Year 9;

- Workbook for the elective 'Physical experiments as a tool for developing natural science literacy in senior school students based on CLIL-teaching' for 10th grade students;

- electronic teaching and learning package for the course 'Physical experiments as a tool for developing natural science literacy in senior school students based on CLIL-teaching'

- methodological recommendations for teachers implementing CLIL-technology;

- a system of control measures (entrance, mid-year and exit diagnostic tests) and criteria for assessing student achievement.

The teaching units developed in the course of the dissertation research can be used in the future to scale up CLIL-technology in the secondary education system of the Republic of Kazakhstan.

Research base: the main research base is MSI ‘General Education School No. 62’ in Karaganda, where the CLIL laboratory operates. Experimental pedagogical activities were also carried out at two other secondary education institutions in Karaganda: MSI 'Academic E. A. Buketov General Education School' and MSI ' Gymnasium named after Kanyash Satpayev', which are part of a unified network community for the exchange of pedagogical experience.

The following provisions are presented in defence:

1. Theoretical and methodological foundations for developing students' functional literacy based on CLIL-teaching, including the following provisions:

- the socially conditioned nature of the phenomenon of functional literacy;
- CLIL as a methodological basis for developing scientific literacy;
- the methodological essence of CLIL;

2. A model for designing didactic units that make up the methodology for developing scientific literacy in senior school students based on CLIL-teaching;

3. a methodology for developing natural science literacy in senior school students based on CLIL-teaching, presented as a set of interrelated didactic units focused on solving experimental problems as the core of the learning experience;

4. The results of experimental pedagogical work on the development of natural science literacy in senior school students based on CLIL-teaching, confirming the effectiveness of the proposed methodology.

Structure of the dissertation research: The dissertation consists of an introduction, two chapters, a conclusion, a list of references and appendices.

The introduction presents the relevance of the topic, the object, subject, purpose and objectives of the research, the hypothesis, scientific novelty and theoretical significance, practical significance, provisions put forward for defence, stages of research, testing and implementation of the results in practice.

The first chapter, Theoretical and methodological foundations for the development of functional literacy of high school students based on CLIL-teaching’, reveals the genesis of the concept of ‘functional literacy’ in domestic and foreign pedagogy and analyses approaches to its formation. CLIL-technology is justified as a methodological basis for the development of natural science literacy among senior high school students in the context of the updated educational content of the Republic of Kazakhstan; a pedagogical design for the development of scientific literacy based on CLIL is developed, including a model for the design of didactic units taking into account the principles of design through understanding, the level structure of educational goals and the characteristics of students' cognitive and speech activities.

The second chapter, ‘Experimental pedagogical work on the development of natural science literacy of high school students based on CLIL education’, presents a developed methodology for developing natural science literacy in senior high school students using CLIL, and reveals the content and structure of the variable course ‘Physical experiments as a tool for developing natural science literacy in senior school students based on CLIL-teaching’, describes the organisation, stages and tools of experimental pedagogical work in three schools in Karaganda, and presents the results of initial, mid-term and final diagnostics, as well as an analysis of the dynamics of natural science literacy and subject-specific language skills in the experimental and control groups.

The conclusion summarises the results of the study, formulates the main conclusions on the theoretical, methodological and practical results, and outlines prospects for further research and the implementation of the developed methodology in school education.