

## ANNOTATION

of the dissertation work of Raikhanova Danara Kurmanovna  
for the degree of Doctor of Philosophy (PhD) in specialty  
8D01703 - Foreign Language: Two Foreign Languages on the topic  
«ESP Curriculum Development for Science (Chemistry-Biology) Students in  
Kazakhstani Higher Education»

**Research topic:** ESP Curriculum Development for Science (Chemistry-Biology) Students in Kazakhstani Higher Education.

**The aim of this research:** To develop a theoretical and methodological framework for an ESP curriculum tailored to the needs of future chemistry-biology teachers in Kazakhstani higher education.

**Research objectives:**

- to study and analyse the theoretical and methodological foundations of teaching English for Specific Purposes (ESP) and curriculum development in the context of modern foreign language education;
- to conduct a needs analysis of students of combined major: chemistry-biology in learning English for Specific Purposes (ESP);
- to develop the methodological framework for designing an ESP curriculum model for chemistry-biology students;
- to implement the developed curriculum model within an ESP course for chemistry-biology students, supported with newly designed compiled materials “English for Specific Purposes (for Chemistry-Biology Students)”;
- to experimentally test and evaluate the effectiveness of the developed ESP curriculum model in real educational settings and determine its practical applicability and alignment with educational goals and expected outcomes.

**Research methods:** The study is based on a pragmatic paradigm and follows a multi-stage mixed-methods approach. Theoretical methods included analysis of scientific and methodological literature, Kazakhstani and international regulations and standards regarding higher education, and modelling. Empirical methods included questionnaires, testing, classroom observation, and semi-structured interviews. Quantitative data were analysed statistically: descriptive statistics, paired-samples t-test, Cronbach’s alpha coefficient, and Cohen’s d effect size. Qualitative data were analysed through inductive thematic analysis. The research comprised stages of needs analysis, a quasi-experimental pedagogical experiment, and evaluation of results.

**The main scientific provisions for defense:**

- 1) The designing ESP curricula in higher education should align with the concept of ESP and its classification into two broad types: EAP (English for Academic Purposes) and EOP (English for Occupational Purposes).

2) The effective development of ESP curriculum requires a comprehensive needs analysis of future chemistry-biology teachers;

3) The theoretical framework for developing ESP curriculum model for future chemistry and biology teachers integrate a learner-centered, competency-based and experiential learning approaches designed to achieve the expected outcomes of the major program;

4) The implementation of ESP curriculum model is supported with newly designed compiled materials "English for Specific Purposes (for Chemistry-Biology Students)";

5) The effectiveness of the developed ESP curriculum model in real educational settings determines its practical applicability and alignment with language, academic and professional needs of chemistry-biology students.

**Main research results:**

- the necessity of developing an ESP curriculum for future teachers of combined major: chemistry-biology has been scientifically and practically substantiated;

- the concept and classification of English for Specific Purposes (ESP) for curriculum development were clarified;

- the needs of chemistry-biology students for learning English for Specific Purposes (ESP) were identified;

- the theoretical and methodological framework for ESP curriculum model for future teachers of combined major: chemistry-biology was developed;

- the teaching and learning material "English for Specific Purposes (for Chemistry-Biology Students)" was created;

- the effectiveness of the developed ESP curriculum model was confirmed through a pedagogical experiment.

**The scientific novelty of the study:**

- For the first time in the context of higher education institutions of Kazakhstan, the theoretical and methodological foundations of ESP curriculum development were substantiated for students of the combined chemistry-biology major, taking into account the interdisciplinary nature of their academic and future professional training;

- A comprehensive Needs Analysis model was developed and implemented to identify the linguistic, academic, professional, and pedagogical needs of chemistry-biology students as a basis for evidence-informed ESP curriculum design;

- An original ESP curriculum model consisting of goal-setting, theoretical, methodological, implementation, and evaluation blocks was designed for chemistry-biology students and proposed as a replicable methodological framework for ESP and EMI practitioners;

- A constructive alignment mechanism linking students' identified needs,

intended learning outcomes, teaching content, learning activities, and assessment tools was developed and adapted for interdisciplinary ESP instruction;

- A new discipline-specific didactic materials collection titled *English for Specific Purposes (for chemistry-biology students)* was created to support the formation of professional foreign-language communicative competence of future teachers;

- The pedagogical effectiveness of the developed curriculum model was experimentally verified in real educational practice, demonstrating positive influence on students' learning outcomes and practical applicability within the modernization of higher education in Kazakhstan.

**Alignment with scientific development directions and state programmes:** State Programme for the Development and Functioning of Languages in the Republic of Kazakhstan (2011-2020) (Decree No. 110 of 29 June 2011), State Programme for the Development of Education in the Republic of Kazakhstan (2011-2020) (Decree No. 1118 of 7 December 2010), Strategic Development Plan of the Republic of Kazakhstan until 2025 (Decree No. 636 of 15 February 2018), Analytical Report on the Bologna Process by the National Center for Higher Education Development (Astana, 2022), and the Self-Certification Report on the compatibility of the National Qualifications Framework of Kazakhstan with the European Higher Education Area Qualifications Framework (Astana, 2020).

**Approbation and implementation of research results:** The results of the research have been published in 10 scientific papers, including: 2 articles in a foreign journal indexed in the Scopus database (Q3, Percentile 38%); 6 articles in journals recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan; 2 articles in the proceedings of international and national scientific-practical conferences. In addition, a copyright certificate was obtained for the teaching and methodological manual entitled *“English for Specific Purposes (for Chemistry-Biology Students)”*, registered in the State Register of Copyright Objects under No. 52368 dated December 9, 2024.

Furthermore, the research results were approved and presented during the following scientific and practical events: participation as a junior researcher in the project *“English Medium Instruction (EMI)”* (IRN: AP19676131) implemented under the grant funding of the Ministry of Science and Higher Education of the Republic of Kazakhstan (2023-2025); participation as a moderator and speaker in teacher training seminars organized jointly with the National Center for Professional Development “Orleu”; completion of a two-week professional development program for English for Academic Purposes instructors at the University of Leicester, United Kingdom (2019); and presentations at conferences organized by Nazarbayev University and the international ELINET network (June-July 2024).

### Publications:

1. Raikhanova, D. K., & Bakić-Mirić, N. (2023). Developing an outcome-based learning curriculum in ESP. *The Journal of Teaching English for Specific and Academic Purposes*, 11(2), 567-579. <https://doi.org/10.22190/JTESAP230728041R> (Co-author: N. Bakić-Mirić. 85%);
2. Raikhanova, D. K., Kassymova, G., & Bakić-Mirić, N. (2025). Developing needs analysis-based ESP curriculum for chemistry-biology students in higher education. *The Journal of Teaching English for Specific and Academic Purposes*, 13(2), 351-360. <https://doi.org/10.22190/JTESAP250310027R> (Co-authors: G. Kassymova, N. Bakić-Mirić. 70%);
3. Raikhanova, D. K., & Kassymova, G. (2020). Formation of professionally - oriented competence in teaching English for academic purposes for chemistry-biology students. *Bulletin of KazNPU*, 1(65), 125–131. (Co-author: G. Kassymova. 85%);
4. Raikhanova, D. K. (2020). Peculiarities and challenges of an ESP course for chemistry/biology students in Kazakhstani universities. *Bulletin of Kazakh National Women's Teacher Training University*, 1(81), 126-132. (Sole author. 100%);
5. Raikhanova, D. K., & Kassymova, G. (2020). English for specific purposes course design parameters for chemistry-biology students. *Bulletin of Toraighyrov University*, 3, 428-439. (Co-author: G. Kassymova. 85%);
6. Raikhanova, D. K., Seidaliyeva, G., & Ismailova, D. (2024). Developing outcome-based English for specific purposes curriculum for chemistry-biology students. *Bulletin of Toraighyrov University*, 4, 158-172. (Co-authors: G. Seidaliyeva, D. Ismailova. 70%);
7. Raikhanova, D. K., & Kassymova, G. (2024). Analysing Instagram's pedagogical dimensions as an educational tool for ESP: Insights from higher education science students. *Pedagogy and Psychology*, 61(4), 145-158. (Co-author: G. Kassymova. 85%);
8. Raikhanova, D. K., Gaipov, D., Korzhinbayeva, A., & Tulepova, S. (2025). "Speaking without fear, thanks to EMI": Insights from a collaborative content and language intervention. *3i: Intellect, Idea, Innovation*, 1, 382-389. (Co-authors: D. Gaipov, A. Korzhinbayeva, S. Tulepova. 70%);
9. Raikhanova, D. K., & Kassymova, G. (2019). Implementing project-based learning in English for specific purposes for science students. *Eurasian Conference on Language and Social Sciences*, 6, 65-75. (Co-author: G. Kassymova. 85%);
10. Raikhanova, D. K., Ospanova, R., & Mukhilis, Zh. (2023). Game-based learning as one of the methods of teaching science students. *Proceedings of the 1st International Scientific Conference "Current Issues in Foreign Language Education"*, 10-14. (Co-authors: R. Ospanova, Zh. Mukhilis. 50%);

11. Raikhanova, D. K. (2024). *English for specific purposes (for chemistry-biology students)*. Almaty: Lantar Books. ISBN 978-601-361-534-9. Certificate of state registration of copyright objects No. 52368 (09.12.2024). (Sole author. 100%).

**Outline of the research:** The dissertation consists of seven chapters, a list of references, and appendices containing documents and instructional materials related to the research. Chapter 1 (Introduction) outlines the relevance of the study, its aims and objectives, research questions and hypothesis, as well as its scientific novelty and theoretical and practical significance, including the approbation and implementation of results. Chapter 2 examines global practices of English-medium instruction in higher education, analyzes language policy and teacher education reforms in Kazakhstan, and identifies gaps in curricula for chemistry-biology majors. Chapter 3 provides a comprehensive review of the theoretical and methodological foundations of ESP and curriculum development, integrating principles such as constructive alignment, learner-centred and competency-based education, and experiential learning, and proposes a conceptual model. Chapter 4 describes the research design, including the methodological framework, research stages, participants, intervention programme, data collection and analysis methods, and issues of ethics, validity, and reliability. Chapter 5 presents the findings of the study, including needs analysis results, formulation of learning outcomes, ESP materials development, and evaluation of effectiveness through pre- and post-tests, interviews, and surveys. Chapter 6 discusses the findings in relation to theoretical frameworks and previous studies, highlighting the effectiveness and pedagogical significance of the proposed curriculum model. Chapter 7 concludes the study by summarizing key findings, outlining theoretical and practical contributions, and providing recommendations for educational practice and future research directions.

**Internal Scientific Supervisor:**



**Doctor of pedagogical science,  
SDU professor,  
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