

INTEGRATED TECHNOLOGY IN FORMING CHEMISTRY STUDENTS' FOREIGN LANGUAGE COMMUNICATIVE COMPETENCE

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Abstract. This study investigates the possibility of using the Content Language Integrated Learning (CLIL) method to develop organic chemistry students' foreign language skills and subject content. The relevance of the research is explained by the lack of theoretical and methodological training tools related to the use of CLIL teaching technology for pedagogical universities. The goal of the scientific article is to prepare study organization modeling focusing on the formation of foreign language professional communicative competence (FLPCC) of future chemists based on CLIL and justify its effectiveness. To accomplish this goal, the paper shows the outcomes of implementing the author's model of cultivating pedagogical university students and the effectiveness of teaching and learning utilizing CLIL in various chemistry classes. In addition, the Quasse research method was applied to implement this approach. Interviews, observations, and data analysis from questionnaires were employed to obtain information. The research can be beneficial for university teachers in CLIL practice, as well as for teachers dealing with the issue of students' formation of FLPCC. Moreover, the research findings confirm that using the proposed approach will enhance the quality of training for aspiring chemical specialists who can freely communicate in the professional sector in English and have honed their speaking skills.

Key words: competency, integrated learning, professional communicative competence, CLIL technology, foreign language competence, non-linguistic specialties, chemistry, modeling

Introduction

Globalization requires the cultivation of English communication skills from an international perspective. In addition, information on science, medicine and technical subjects is available in English. In the wake of the new millennium, new challenges associated with teaching English communication skills require solution focusing on practical application of language in real-life situations. It is imperative to streamline the learning process, meeting students' demands in uncomplicated manner, to ensure the acquisition of English communication skills.

Proficiency in a foreign language equips graduates to effectively utilize their skills and qualifications in professional settings. Given that a significant portion of scientific and technical literature is presently published in foreign languages, lacking fluency forces modern specialists to depend on translated resources, which often provide only basic information in the realm of professional education.

According to the study findings, the key points are as follows:

1. Methods have been devised to equip modern graduates with the ability to read and comprehend professional texts, integrating a foreign language with chemistry for diverse communication purposes.

2. Methodological tools have been developed under integrated learning approaches to enhance English communication skills within the chemistry teaching process.

3. A series of exercises has been designed to model the organization of teaching processes, aimed at developing students' foreign language proficiency in professional communication.

4. Implementing CLIL in teaching has boosted student motivation and contributed to improved fluency.

5. Our research focuses exclusively on the methodology of training prospective chemical specialists.

In today's world, a crucial measure of professionalism across various fields is a specialist's ability to communicate effectively in a foreign language. The success of engagements with international partners often hinges on this proficiency. Therefore, preparing students to communicate proficiently in a foreign language has become integral to professional training. Proficiency in a foreign language not only grants access to foreign information sources but also serves as a vital tool in professional activities. Mastering a foreign language enables individuals to engage in authentic literature, involving skills such as text comprehension, critical thinking, summarization, analysis, and assessing reliability.

In modern times, there is a growing emphasis on a professional-oriented approach to learning foreign languages within non-linguistic faculties of higher education institutions. This approach aims to develop proficiency in foreign languages tailored to specific professional, business, and scientific contexts. Simultaneously, it focuses on cultivating students' abilities to work with texts, translating abstract information, and extracting valuable insights from authentic literature in relevant formats.

S.S. Kunanbaeva underscores the relevance of vocational education in the current era, considering the socio-economic achievements of independent Kazakhstan on the global stage, increased international cooperation, and the country's integration into a globally interconnected world [1].

We would like to emphasize the development of communication skills as one of the important objectives, considering their significant role in the success of negotiations and business conversations with international partners. Consequently, we believe that fostering effective communication stands out as a basic objective in professionally oriented foreign language education.

When instructing a foreign language to students from non-linguistic faculties, various goals such as practical, educational and developmental should be successfully implemented.

I.I. Lushnikova claims that today, the objectives for educating foreign languages at a non-linguistic higher education are determined primarily on the foundation of the competency paradigm [2]. In the meanwhile, as O.A. Almabekova correctly noted, foreign language activity "comprises the indirect influence of foreign language competence on a specialist's professional competency" [3, 548 p.].

S.A. Yrsaliyev et al. reviewed 150 global studies covering the last 50 years, disclosing advantages and features of multilingual education [4]. Scientific

investigations into multilingual education within the country have been conducted only in the last 10-15 years. Therefore, there are clear issues for further research.

Consequently, the relevance of scientific paper is determined by the imperative to resolve the following inconsistencies:

- between the absence of enthusiasm for learning chemistry and unfulfilled communicative English skills in language and subject integrated teaching

- between the traditional regular content of the curriculum in chemistry and the need to demonstrate the entire range of communicative competence along with subject and language skills;

- the need for a communicatively competent specialist capable to discuss scientific topics in English comparing with the lack of an adequate methodology for fostering this competence among modern students who are equipped with a standard set of subject knowledge and skills.

Hence, the mission of pedagogical institutions is to equip students to excel as professionals, focusing not only on mastering chemistry content but also on broader professional competencies. The goal of our study is to investigate effective methodologies for formation of FLPC to train professionals for teaching students in English or multilingual groups.

In accordance with the aim of the study, several objectives of the article are set: to examine the importance of formation of FLPC among students; to evaluate the effectiveness of subject-language integrated learning in the fostering foreign language communicative skills; to develop a methodology for the formation of FLPC in CLIL education.

Materials and methods

Theoretical methods were applied to determine the relevant issues in the study. The method of analysis, the inductive method and comparison of the collection made it possible to reveal the meaning of the studied pedagogical phenomena in summarizing the data.

Through the theoretical exploration, it was determined the need to analyze the scientists' works dedicated to these issues to gain a deeper understanding of the importance and theoretical foundations underlying the formation of communicative competence and to consider the effectiveness of CLIL teaching technology in enhancing the teaching skills.

Considering that knowledge of a foreign language is essential for a non-philologist, first, as a means of obtaining professionally important information, teachers often emphasize the development of reading and translation skills. Oral communication is often overlooked.

D. Hymes was a pioneer who suggested the phrase "communicative competence (CC)". Grammar was deemed ineffective by the researcher, who found that language is dependent on the specific context of communication in various circumstances [5, p. 287].

In the fields of pedagogy and psychology, O.E. Shishova examines communication processes from various angles, highlighting the multifaceted nature of

communicative competence (CC), which holds a significant place in defining a teacher's personality. On the one hand, this involves professional communicative competence, central to a teacher's role, encompassing pedagogical knowledge and skills applied in educational communication within the "teacher-learner" dynamic. On the other hand, in today's context, there is a growing need to cultivate communication skills as part of a teacher's social competence, as only teachers with well-developed social intelligence can effectively address the challenges posed by society [6, pp. 344-345].

Additionally, according to the researcher's findings, fostering a culture of pedagogical communication within educational institutions enhances students' systematic and purposeful acquisition of professional skills, thereby facilitating their adaptation to future careers. Therefore, preparing teachers for effective communication and collaborative creativity should be prioritized as a central pillar of the professional education system. Unfortunately, this aspect is often overshadowed by subject-specific education within higher education systems. One of the primary challenges faced by educators in the learning process stems from deficiencies in communication skills among students. These challenges include:

- Difficulty in articulating coherent ideas, resulting in incomplete sentences.
- Lack of a conceptual framework within the subject matter.
- Inability to effectively express thoughts in writing.
- Difficulty in listening to lectures, often resulting in transcribing without comprehending the lecture content.
- Overuse of vague language and poor articulation in speech [6, p. 345].

E. Kovacikova emphasizes speaking as a productive skill that develops through many tasks, methods, work forms and approaches. Speaking as a productive language skill includes language systems such as vocabulary, pronunciation and grammar [7]. Also, content-language integrated learning is recognized as a philosophy, as well as a methodology that aims at many goals in terms of the relationship between the linguistic and non-linguistic subjects to enrich the educational experience. However, E. Kovacikova underscores that a carefully prepared and guided CLIL lesson can greatly forward the advancement of speaking skills. This fact is confirmed by an investigation conducted to discover optimal CLIL practices among European educational institutions. The main aim of the research was to highlight specific tasks, methodologies, forms of work and evaluation methods to foster speaking skills in CLIL classes in primary schools. A two-year project in primary schools involved direct, non-participant observations and interviews with pupils. The aim was to map and evaluate speaking opportunities in CLIL classes to effectively foster speaking skills through different work forms, tasks and methods. Secondly, to find out the opinions of students about their participation in CLIL classes, students' views were determined through questionnaires, and its advantages, challenges and disadvantages were indicated [7, p. 17].

Additionally, E.A. Yurina, S.V. Pakhotina, and I.K. Tsalikova emphasize the significance of offering students' opportunities to engage in thinking and tackle intellectually stimulating communicative tasks, encouraging them to explore potential

solutions. They emphasize that students should focus on the substance of their ideas, with thought taking precedence, while language serves as a direct tool in shaping and articulating these thoughts [8, p. 72].

Furthermore, O.G. Byrdina et al. in their scientific work investigated the challenge of formation of FLPCC in CLIL. According to the authors, one of the crucial areas of modern pedagogical higher educational institution activity is the education of professionals who effectively utilize a FL in their specific field [9].

Petrova G. A. attributes linguistic, socio-linguistic, verbal-cognitive, subject, professional, discursive parameters as the components of the FLPCC and, accordingly, intellectual-cognitive, personality-motivational, reflective-evaluative, activity-behavioral skills to the criteria for the formation of the FLPCC [10, p. 10].

According to Y.Y. Timkin, the structure of the FLPCC is still the object of research by some researchers, and she attributes linguistic, pragmatic, strategic, socio-cultural and discursive competencies to the supplementary competencies [11].

In addition, D. Coyle et al. developed the concept of "four C" (4Cs Framework), one of the main characteristics of the CLIL methodology. The 4Cs Framework includes interrelated elements of content-content, cognition-cognition, and communication - communication embedded in a cultural context. Content refers to the subject or subject being taught, cognition refers to the cognitive processing necessary for learning activity, communication refers to the learning and use of language, and culture refers to how learning contributes to intercultural and interpersonal understanding [12].

I. A. Cimermanová notes in her study that CLIL is based on dual objectives such as subject content and Language Teaching, and that its basic principles often involve the development of skills with the acronym 4Cs¹ or extended 5C (content, cognition, communication, culture and competence) described above [13, pp. 193-194]. Thus, CLIL is not only about language proficiency and knowledge of content.

Based on the research work, the following components of the FLPCC of future chemistry teachers based on CLIL technology have been identified:

- speech competence - the ability to fully, competently express thoughts in various communication situations and skills of speech, listening, reading, writing in the content of chemistry;
- linguistic competence - knowledge of phonetic, spelling, grammatical language tools depending on the conditions of communication;
- professional competence - the ability to form chemical concepts and master chemical terminology; the ability to speak chemical language; chemical thinking;
- subject content - mastering chemical terms in a foreign language, development of vocabulary in content and skills of communication in English in the context of chemistry;
- cognitive competence - knowledge of the sources of obtaining information in English and the means of conducting independent research and perception, analysis, generalization, evaluation, logical systematization of information.

The following evaluation criteria and its indicators have been identified, which allow a systematic assessment in accordance with the identified components:

- mastering the content of the discipline: chemical thinking, formation of concepts in accordance with the content of chemistry, mastering chemical terminology;
- mastering reading skills: understanding the content of the educational text in English on chemistry;
- understanding the meaning of the text heard in English: the ability to understand and analyze the information heard in chemistry content.
- qualification of the written presentation of information: qualification of the ability to logically form sentences, grammatical literacy;
- communication skills in terms of speech: the ability to build phrases and logically complete sentences in English on the subject of chemistry, the ability to consistently convey information in oral form, participate in various communication situations and confidently convey the game;
- cognitive skills: the ability to perceive, analyze, generalize, synthesize, evaluate, logically systematize, explain and prove one's point of view.

In order to systematically organize the course of training, on the basis of the identified components and the 4Cs of the CLIL methodology, a set of exercises for universities in the discipline "Organic Chemistry" was prepared, consisting of 4 stages described below:

1. Motivation-preparatory stage;
2. Educational stage;
3. Pragmatic stage;
4. Cognitive stage;

In the *motivation-preparatory stage*, the teachers aim to motivate students to communicate in English while engaging with the subject matter, encourage them to complete educational and cognitive tasks and foster a supportive environment conducive to effortless conversation.

The educational stage aims to form the FLPCC in the framework of listening, reading, speaking, and writing by setting professional-communicative objectives. It is not imperative only to learn new material through the text, but also to enrich a professional vocabulary in a foreign language.

The *pragmatic stage* focuses on summing up the learned information to implement communication and be able to use it in conversational circumstances.

The cognitive stage includes finding responses to problematic questions according to the topic and enhancing critical thinking; learning how to openly express their views, quoting given information.

For instance, to enhance the ability to speak a foreign language, it is necessary to prepare exercises for the development of 4 aspects of language learning: speaking, writing, listening, and reading.

An essential branch of current investigation in theory and practice of teaching foreign languages is the study of the most effective methods, approaches, and utilization of technologies in teaching English as a foreign language.

For instance:

- Role-playing games serve as simplified models of human interaction engaging players in the roles [14]. For example, they employed a method where one person was designated as the group leader, acting as the teacher, while the others assumed the roles of students, engaging in topic-related dialogues or group discussions to enhance their communication skills.

- Brainstorming, a widely used method, includes learners with a single stimulus that serves as a reference to many responses. Motivation can be a question with many possible answers [14]. In the first stage of the lesson, for the purpose of recalling the topic or for the purpose of motivation, question answers, misunderstanding (close to the truth but wrong concept), quotation related to the topic, content-related framework or mind map, and other methods.

Furthermore, *cooperative learning* methods enhancing learning progress were applied. In this approach, students collaborate and assist each other instead of engaging in competition. Cooperative learning groups benefit both proficient and struggling students alike. Proficient students can share their knowledge while struggling students receive support.

As a result, three types of cooperative learning methods were utilized: STAD (Student Teams-Achievement Divisions), Jigsaw, and Co-op.

- The STAD (Student Teams and Achievement) method was effectively applied by dividing the group into 4 groups of five students. A topic was selected according to the content of organic chemistry, and material task sheets and approval questions were prepared. Based on the terms of this method, information was provided by the first teacher and explained to the students (via video, and slides). Next, each group was given assignments and questions according to the topic (in English). To master the topic and develop communicative skills and analytical thinking, students searched for answers to questions using Internet resources and accompanying materials and discussed the questions in pairs and then in groups. Afterwards, the group was assessed by assigning individual tasks to the students in the group, evaluating each student individually, and adding the scores of each student in the group.

- The Jigsaw method includes dividing the content of the topic into four subtopics and preparing materials accordingly. Students were divided into 4 groups (of 5 students each) and materials were distributed to each group according to different topics. For instance, if the topic was alkanes, group assignments might involve methods of production, physical and chemical properties, use and distribution in nature, isomers and homologous series. Within each group, students read, translate and explain information to each other in English according to the given topic. Subsequently, each group selects 3 students as experts and sends them to 3 other groups. The goal of the experts is to master and understand the information discussed in the group they visited. Meanwhile, the students remaining in their group should explain to the experts from the other group the part that was allocated to them. After the experts return to their groups, each expert shares what they learned from each group.

At the last stage of the lesson organization, students were assigned individual tasks and had the opportunity to evaluate individually and, as a result, the group, as employed in the STAD method.

- Co-op method provides group formation. Within this approach, students cannot cooperate at their own will, that is, different methods of forming a group are used. In addition, sub-topics are offered according to the topic which students choose themselves. However, if a group is created by selecting sub-topics, then there is no need to select a topic. In the next stage, students of the group divide the topic into smaller sub-topics, and everyone reads and translates their information and discusses it in the group. The peculiarity of this method is that a student from each group is ready to explain and present the work of the group to all students in front of the audience. Each group can use various presentation materials (video, discussion, demonstration, visual aids) with their idea. Also, at the end of the lesson, 5-10 minutes are suggested for asking questions and discussing. Students are given the opportunity to ask questions and other students answer them.

Applying the "Cooperative learning" method fosters the reading skill through the text, the learning new words through translation, the listening skill through showing a video or the teacher explanation and listening to each other, and the speaking skill through the discussion. Every student is engaged in the group discussion, providing the acquisition of the topic, and enhancing proficiency. Besides, the best thing is the development of responsibility feeling, as each student has a specific mission. Consequently, this method has a great contribution to the development of the ability to discuss chemistry content in English.

Moreover, separate assignments were prepared directly according to the text to develop speaking, writing, listening, reading skills, and vocabulary. As a result of the research, other "Case study" and "Problem-based learning" methods and original works were utilized. Furthermore, the *Quasse* research method was utilized in the experiment organization. The peculiarity of this research method is that the course of the lesson is organized based on modeling through a set of prepared exercises. Notably, no pedagogical experiment was conducted among any participants. According to Quasse, similarity in the age of the control and experimental group students, the subject teacher, the level of education, and the direction of the field of study is important. Therefore, the students were selected as chemistry majors studying at universities according to the direction of their research work. According to this method, during the experiment, control and experimental groups were taken, pre-test and completed post-test were prepared according to the criteria defined above, and the level of students was checked.

Results

During the sixth semester of the 2022-2023 academic year, the second segment of exercises focusing on "Organic Chemistry" was piloted with third-year students enrolled in the "Chemistry Teacher Training" program (6B01504) at South Kazakhstan State Pedagogical University. The study involved 20 students in both the control and experimental groups.

The results of pre-test and post-test of the control group are illustrated in Table 1.

Table 1 - Pre-test and post-test results of control group

Assessment criteria	Pre-test results (%)			Post-test results (%)		
	low	medium	high	low	medium	high
Mastery of subject content	25	50	25	10	30	60
Formation of reading skills	50	35	15	40	30	30
Comprehension of listened materials in English	70	20	10	65	25	10
Ability to provide writing information	60	20	20	60	20	20
Communication skills	50	35	15	40	35	25
Cognitive skills	40	40	20	20	25	55

Upon reviewing the test results of the control group as depicted in Table 2, significant enhancements are observed in reading and cognitive abilities, notably with 35% of medium-level students advancing to high-level proficiency. However, there was minimal improvement in speaking and writing skills, with only 5-10% of low-level students progressing to the medium level. Importantly, no noticeable changes were observed in writing proficiency.

Pre-test and post-test results of the experimental group are shown in Table 2, indicating a very high level of proficiency in speaking skills, as evidenced by the fact that only 20% of participants are classified as low-level or medium-level.

Table 2 - Pre-test and post-test results of the experimental group

Assessment criteria	Pre-test results (%)			Post-test results (%)		
	low	medium	high	low	medium	high
Mastery of subject content	20	30	50	10	30	60
Formation of reading skills	35	30	35	20	25	55
Comprehension of listened materials in English	45	25	30	20	30	50
Ability to provide writing information	30	40	30	15	40	45
Communication skills	20	30	50	10	10	80
Cognitive skills	20	25	55	10	15	75

A notable increase is noticed in reading, listening and cognitive skills. Particularly, 20% of students improved their skills from medium to high level. In addition, 15% of the low-level learners have enhanced their skills of providing information in writing to medium level. Meanwhile, the writing ability of the medium-level students increased by 15%.

When comparing the post-test results of the research groups, the experimental group demonstrates excellent performance according to the identified criteria.

Furthermore, during the lesson, the time necessary to complete one module (one topic) took 4 hours due to the large number of tasks.

Discussion

Analyzing the research results, it was observed that the set of exercises on the subject "Organic Chemistry" fosters the FLPC and contributes to the ability to fully reveal, understand, analyze the content of the subject, to retain it in long-term memory, and to recall it in case of forgetting.

Examining the research, associated with integrated learning, conducted by Shumaila Jalal and Ali Nawab, who observed several lessons instructed by a 7th grade chemistry teacher. The observation is focused on determining the instruction strategies, concentrating on the content and language integration [15, p. 5].

The first lesson was held in the subject of inorganic chemistry on the topic "Concepts of acids, bases and salts". This topic was chosen in cooperation with the teacher. The objectives of the lessons and activities are designed to introduce and demonstrate concepts using English and then to engage students in activities related to the 4 Cs. 4 Cs, namely content, communication, cognition and culture, were introduced for students through group and pair work.

During the data collection and analysis, it was found that students face challenges in expressing their thoughts in English. Accordingly, at the beginning, a teacher did not pay attention to the content but considered effective methods and tried to enrich vocabulary. However, there was concern that if researchers continued to emphasize language and communication, students might not develop an understanding of scientific concepts.

Consequently, in our research, we instructed chemistry in English and selected students who had mastered at least elementary level to cultivate speaking skills.

Moreover, Shumaila Jalal and Ali Nawab concluded that classes should be held without breaks, as they observed that students return to their old habits and routines according to the two-day break between each lesson [15, p. 6]. Since our research was aimed at English intermediate students aged 20-21 years, the presence of a break was not a hindrance.

The research findings led to the conclusion that "To develop not only professional foreign language communicative competence but also to fully grasp the subject content, teaching a single topic for 1-2 hours, aligned with its content, is insufficient." As outlined earlier, mastering a single topic required 4 hours (some topics even 5-6 hours).

Conclusion

In conclusion, investigation and analysis of scientific works on the formation of FLPC showed that there are different directions of its research. Performing exercises for the advancement of CC, students tackle speech challenges, such as disputing something, clarifying, concurring, and so on, for which a speech act is required. In the meantime, it is required to consider what to say, how to construct a phrase, what lexical units and grammatical structures to select.

In the scientific paper, it was proposed to model the organization of the teaching process to foster the student's learning ability in CLIL instruction. The components and evaluation criteria of FLPC were defined, and based on that, a set of exercises in the subject "Organic Chemistry" was prepared. A set of exercises aimed at enhancing foreign language professional communicative competence was tested and the findings were discussed.

During the experiment, after the experimental training, a post-test was taken to determine the effectiveness of the modeling specifically proposed for CLIL instruction. As a result of the post-test, the advantages and disadvantages of modeling the organization of the teaching process were determined.

So, in the course of scientific research we suggest the following conclusions:

- The importance of developing the ability to speak English in the scientific field in our country has been determined;
- The theoretical basis of formation of foreign language communicative skills has been considered;
- The effectiveness of integrated learning to foster the FLPC has been studied;
- Modeling of lesson organization through integrated learning has been proposed;
- A set of exercises on the subject "Organic Chemistry" has been developed in accordance with the stages of lesson organization indicated in the modeling;
- A set of prepared exercises has been tested during the experiment;
- The findings of the experiment were determined and analyzed by pre-test and post-test.

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ХИМИЯ МАМАНДЫҒЫ СТУДЕНТТЕРІНІҢ ШЕТ ТІЛІ КОММУНИКАТИВТІ ҚҰЗЫРЕТТІЛІГІН ҚАЛЫПТАСТЫРУДАҒЫ КІРІКТІРІЛГЕН ТЕХНОЛОГИЯ

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Аңдатпа. Бұл зерттеу органикалық химия пәні бойынша студенттердің шет тілі дағдылары мен пән мазмұнын дамыту үшін интеграцияланған мазмұн мен тілді оқыту (CLIL) әдісін қолдану мүмкіндігін зерттеуге бағытталған. Зерттеудің өзектілігі педагогикалық ЖОО үшін CLIL оқыту технологиясының қолдануға байланысты теориялық және әдістемелік оқу құралдарының жоқтығымен түсіндіріледі. Ғылыми мақаланың мақсаты – CLIL негізінде болашақ химик мамандарының шет тілі кәсіби коммуникативті құзіреттілігін (ШТККК) қалыптастыруға бағытталған оқытуды ұйымдастыру моделдеуін даярлау және оның тиімділігін негіздеу. Осы мақсатқа жету үшін мақалада педагогикалық ЖОО студенттерінің ШТККК қалыптастырудың авторлық моделін енгізу нәтижелері және әртүрлі химия сабақтарында CLIL арқылы оқыту мен оқудың тиімділігі көрсетілген. Сондай-ақ, осы тәсілді жүзеге асыру үшін Quasse зерттеу әдісі қолданылды. Мәліметтерді алу үшін сұхбаттар, бақылаулар, сауалнамадан алынған деректерді талдау қолданылды. Зерттеу CLIL тәжірибесіндегі ЖОО мұғалімдеріне, сондай-ақ студенттердің ШТККК қалыптастыру мәселесімен айналысатын оқытушыларға пайдалы болуы мүмкін. Сонымен қатар, зерттеу нәтижелері ұсынылған моделдеуді енгізу, ағылшын тілінде кәсіби салада еркін қарым-қатынас жасай алатын, сөйлеу дағдылары қалыптасқан болашақ химик мамандарды дайындау сапасын арттыратынын растайды.

Тірек сөздер: құзіреттілік, кіріктірілген оқыту, кәсіби коммуникативтік құзіреттілік, CLIL технологиясы, шетел тілі құзіреттілігі, тілдік емес мамандықтар, химия, моделдеу

ИНТЕГРИРОВАННАЯ ТЕХНОЛОГИЯ В ФОРМИРОВАНИИ ИНОЯЗЫЧНОЙ КОММУНИКАТИВНОЙ КОМПЕТЕНТНОСТИ СТУДЕНТОВ-ХИМИКОВ

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Аннотация. Это исследование направлено на изучение возможности использования интегрированного метода обучения содержанию и языку (CLIL) для развития навыков иностранного языка и содержания предмета студентами по органической химии. Актуальность исследования объясняется отсутствием теоретических и методических пособий, связанных с применением технологии CLIL для педагогического вуза. Цель научной статьи – подготовить моделирование организации обучения, направленное на формирование иноязычной профессиональной коммуникативной компетентности (ИПКК) будущих химиков на основе CLIL и обосновать его эффективность. Для достижения поставленной цели в статье показаны результаты реализации авторской модели формирования студентов педагогических вузов и эффективность преподавания и обучения с использованием CLIL на различных уроках химии. Также для реализации данного подхода был использован метод исследования Quasse. Для получения информации использовались интервью, наблюдения и анализ данных анкет. Исследование может быть полезно преподавателям вузов, практикующим CLIL, а также преподавателям, занимающимся проблемой формирования ИПКК студентов. Кроме того, результаты исследования подтверждают, что реализация предложенного моделирования повышает качество подготовки будущих специалистов-химиков, свободно коммуницирующих в профессиональной сфере на английском языке и имеющих развитые разговорные навыки.

Ключевые слова: компетентность, интегрированное обучение, профессиональная коммуникативная компетентность, технология CLIL, иноязычная компетенция, неязыковые специальности, химия, моделирование

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