Data analysis: The results of the experiment were tested using the mathematical method of the ratio scale, Pearson's t-criterion, and depicted using histograms, polygons, diagrams, and tables.

Results. The experimental group was attended by 32 students in the 3rd year of the educational program 6B01303 Primary education with information and communication technologies and 60 undergraduates in the 1st year of the educational program 7M01301Pedagogy and methods of primary education. To determine their knowledge of national value, the question "What is National value?" the question was asked. As a result, 42 out of 92 students in the experimental group answered the question completely correctly, 46%, and 50 out of 54% wrote only a partial answer. The result of the question is shown in Figure 1.

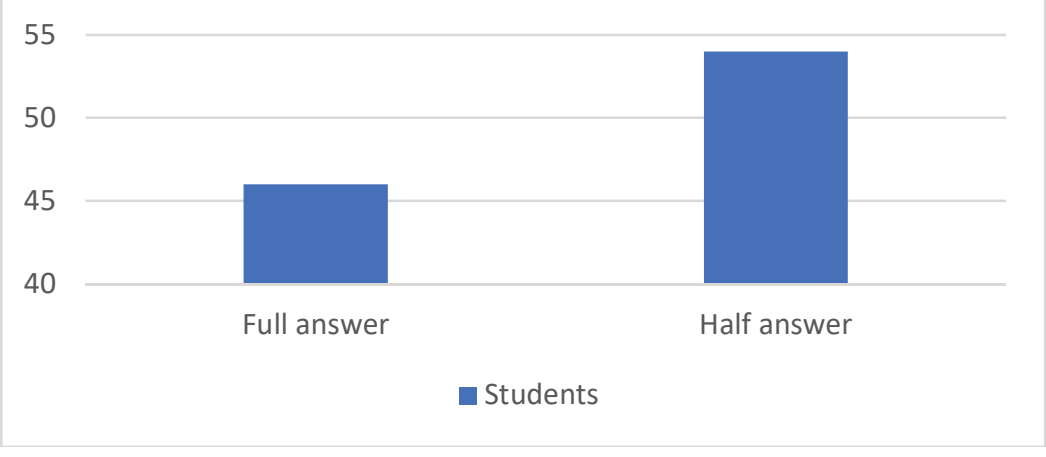

Figure 1: Result of question 1 of the survey

To determine the knowledge of students about the types of national value, the question "Describe the types of national value" was asked. 32 of the respondents correctly indicated 35% of the type 6, 26% of the type 28% of the type 5, 18% of the type 19% of type 4, and the rest of the type 3. The result of the question is shown in Figure 2.

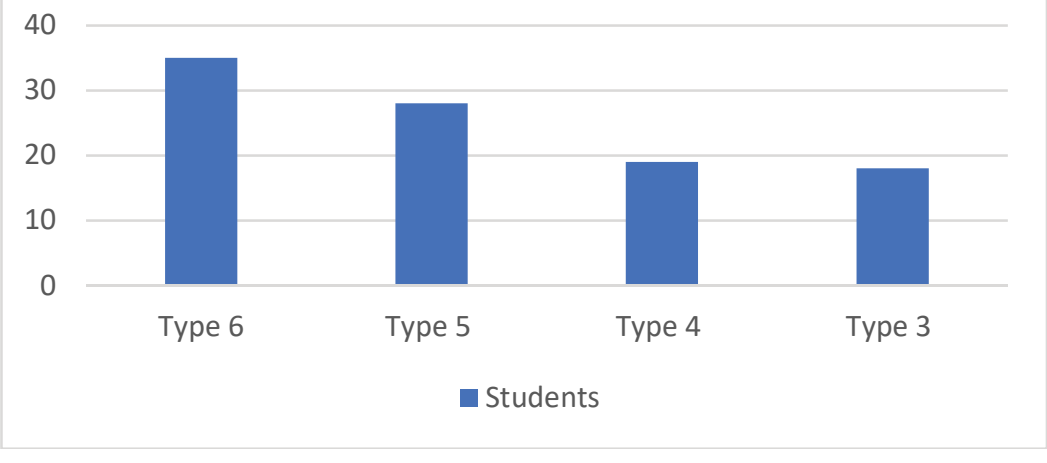

Figure 2: Result of question 2 of the survey

To determine the respondents knowledge of fairy tales, songs of heroes, misleading, mysterious, Proverbs, traditions, customs, history of the country, language, patriotic songs, etc., 10 questions were asked. Its result can be seen in the following *Table 1.*

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THE PILOT STUDY OF THE CLIL LESSONS IN CHEMISTRY AND BIOLOGY FOR LOWER SECONDARY SCHOOLS

Abstract

In recent years, CLIL technology has been widely used around the world as a tool for studying various disciplines. However, there is a significant lack of its applications in chemistry and biology lessons. This method improves the study of chemical and biological terms and concepts, contributing to the improvement of communication abilities. Therefore, this study aimed to develop and pilot study the CLIL lessons in chemistry and biology based on a subject-language integrated approach for 7-8 grades. The experiment was conducted at Lyceum-Internet from 1.03-14.04.2023. The study developed CLIL lessons on the following topics: «Movement», «Coordination and regulation», «Human body», «Oxides», and «Chemical bonds» for students of grades 7-8. The lessons developed by the authors were successfully used in chemistry and biology classes, as evidenced by an increase in the academic level of knowledge of the experimental group in chemistry and biology. In addition, a questionnaire was conducted after the experiment to determine the students' attitudes towards CLIL lessons. The study found that the students enjoy working in CLIL lessons, which has a positive effect on the acquisition of knowledge in the subjects.

Keywords: CLIL, trilingual education, questionnaire, secondary school, chemistry, biology.

Basic provisions. The approach known as Content and Language Integrated Learning (CLIL) involves the integration of content subjects with the learning of a second or foreign language. CLIL involves integrating content and language, developing language proficiency, using support strategies, assessing language and content, and aligning with curriculum standards. The articles presented discuss the scientific and methodological foundations of CLIL-learning technologies, as well as the types and prospects for using CLIL technologies in teaching chemistry and biology. CLIL lessons in chemistry and biology for 7th and 8th-grade students were developed and pilot-tested. In these classes, the CLIL methodology incorporated authentic materials and resources from educational English-language websites. The author successfully implemented CLIL lessons in chemistry and biology, leading to an improved academic level of knowledge in the experimental group for both subjects.

Introduction. The educational process should aim to cultivate specialists with qualities such as flexibility of thought, mobility, competitiveness, initiative, and constructiveness. A specialist needs to possess a range of competencies, including the ability to self-educate, knowledge of innovative technologies and their potential applications, independent decision-making skills, adaptability to new social and professional environments, teamwork abilities, and stress management skills (Sadykov & Ctrnactova, 2019).

Kazakhstan is currently developing a new education system aimed at global integration (Ïsmaïlova et al., 2023; Ismailova, Karabazar & Alimzhanova, 2023). This shift involves significant changes in both instructional theory and practice. Our country prides itself on being highly educated, with a population fluent in three languages: Kazakh as the official language, Russian for interethnic communication, and English for effective participation in the global economy. Currently, proficiency in the English language is considered essential for expanding professional knowledge and opportunities.

The use of CLIL technologies in chemistry and biology will help both students and teachers understand the current world situation (Mambetalina et al., 2021). The integration of computer technology into education should

not prompt the immediate abandonment of traditional teaching methods. The combination of traditional and innovative teaching methods with modern information technologies is the only way to achieve tangible results in the development of skills and abilities to work with professional materials (Carrión Candel et al., 2021). Free access to modern computer technologies is a favourable fact for their application in chemistry and biology teaching. The computerization of the process of pedagogical knowledge control allows for a comprehensive and objective assessment of students' knowledge levels. Internet access freedom helps address the lack of authentic resources needed for presentations and interactive lessons. Free content enables the use of authentic texts, as well as access to audio and video materials in different languages for listening and viewing (Sadykov et al., 2023; Satayev et al., 2022).

Main part. The Czech philosopher and pedagogue John Amos Comenius proposed the approach of learning a language via content, emphasizing the significance of successful foreign language education (Gejdoš & Pošteková, 2023). Bilingual and multilingual persons might have been found in the most affluent and privileged families in the 1890s. Rich families either sent their children abroad to learn a foreign language or hired tutors (male instructors for boys and female teachers for girls) to tutor their children. The deployment of CLIL served two main purposes at the time: political and educational. The political aim was to ensure a higher level of language proficiency in the specified dialects, in line with the transferability requirements across the European Union (Ball, 2009). The pedagogical driver, influenced by successful multilingual programs such as those in Canada, aimed to improve and modify current dialect teaching approaches to provide better proficiency levels to a diverse range of students. CLIL has recently gained popularity as a means of introducing innovative methodologies into the curriculum while also promoting access to different languages (Dalton-Puffer, 2014).

In 1965, Canada saw the emergence of contemporary CLIL for the first time. Parents of English-speaking children in French-speaking Quebec were worried about how their kids would fare in a French-speaking environment and inquired (Chun, 2015). Matthias Bel (as cited in Jwman, 2021) was involved in teaching, philosophy, philology, and history. Bel directed two grammar schools in a bilingual area, to make the process of learning many languages easier. He tried to broaden his vocabulary to better understand the world and its reality (De la Fuente et al., 2019).

In 1966, a new technique for studying foreign languages called Language Across the Curriculum (LAC) was introduced in England. The approach is cross-curricular and aims to support children's language learning through bilingual education. In 1970, subject and language-integrated learning systems were introduced in various linguistic areas. Following that, language immersion systems, which were designed to teach both the subject and a non-native language, became widely used in Canada, the USA, and other countries (Madrid & Perez-Canado, 2018).

Cummins' (2013) concept is referred to as the «BICS/CALP» model. BICS represents a general language proficiency in interpersonal communication, while CALP represents a cognitive language proficiency. Cummins'(2013) approach is based on B. Bloom's taxonomy of cognitive skills. He identified lower-order thinking skills (knowledge, comprehension, and application) as basic skills and higher-order thinking skills (analysis, synthesis, and evaluation) as cognitive skills. Cummins (2013) developed a two-factor communication model based on the 'BICS/CALP theory, which is commonly regarded as the theoretical foundation of the CLIL model in higher education. This model can aid in identifying didactic methods and tools for distinguishing between ESP and CLIL. ESP is a form of context-supported learning, located in the first quadrant of Cummins' (2013) theory (context-conditioned learning). On the other hand, CLIL involves the development of cognitive skills, such as analysis, synthesis, and evaluation of the phenomenon being studied, and is considered context-unconditioned learning (Coyle & Meyer, 2019). The success of these

projects prompted a new attempt to enhance the quality of language education, as outlined in a 1983 European Parliament Regulation. CLIL is a general education technique that teaches students a school regulation while instructing them in a foreign language. The term CLIL was developed by a group of linguists who investigated a bilingual and multilingual educational program initiated by the European Commission in the late 1990s (Mehisto et al., 2008).

CLIL was coined by David Marsh in 1994 (as cited in Marsh, 2013) to describe a system that is distinct from, but similar to, language immersion or content-based learning. Its supporters aimed to create a «generic term» that would describe the different ways language is used as a medium of education. It is widely recognized as an effective method. After a pan-European discussion among experts in Finland and the Netherlands, there is a focus on how to bring the high-quality language learning found in certain types of schools to mainstream state-funded schools and universities. This approach is being used to expedite the teaching of corporate executive management issues in English in Italy. Marsh (2013) put forth the idea of using the term CLIL to describe a variety of two-way learning strategies that focus on content and language. Recently, CLIL research has largely concentrated on the language component of technology. This integrated approach involves the collaboration of linguists, educationalists, psychologists, and other professionals. The objective of studying 2-way learning (subject and language) is to gain insight into students' cognitive abilities. It's worth noting that many European universities already offer teacher preparation courses in CLIL (Marsh & Frigols, 2012).

Coyle et al. 's (2023) «4Cs Framework» comprises four key concepts that teachers can use to develop CLIL courses, blending content, communication, cognition, culture, and context with the 4Cs technique. According to the conceptual framework, it is critical to foster cognitive capabilities, creative learning, and cooperative social interaction.

The 4Cs Framework:

- content gives a platform for analysis and interpretation, which promotes cognitive skill development. Instead of accumulating knowledge, this perspective considers disciplinary content knowledge to be the creative construction of knowledge through idea formation, planning, and output.

- communication is viewed as social, cultural, and personal (i.e., interpersonal contact involving scaffolding, mediation, and meaning and form negotiation).

- cultural aspects, it is believed, are unavoidably connected to the merger of content and language. CLIL's goal is to promote cultural awareness and comprehension of the traditions formed in the subject's language.

- context. The remaining three components – content, communication, and cognition – are also considered part of context. The framework recognizes the complex relationships that exist between these four components, each of which supports learning (Villabona & Cenoz, 2022).

It is becoming increasingly common for students to learn a second language alongside their main subject. It might be the case that science lessons are taught in English. In this way, you will not only learn science but also the required language and vocabulary. Learning English using the CLIL technique can be a helpful way to learn subjects like biology and chemistry. This approach encourages students to familiarize themselves with biological vocabulary, which can improve their critical thinking and communication skills. It's important to note that CLIL doesn't involve teaching students what they already know in a new language or limiting the topic (San Isidro, 2018).

The purpose of the study is to develop and pilot study the CLIL lessons in chemistry and biology based on a subject-language integrated approach for 7-8 grades.

Research materials and methods. In teaching chemistry and biology in English: writing, listening, reading, and speaking are all used. Teachers and students engage in discussions, critiques, and corrections of the covered content. CLIL in the classroom aids in the development of student's critical thinking abilities, which in turn helps them assimilate the material they are learning. It is important to outline the key stages that a CLIL-based lesson

should include, depending on the training material (figure 1).

When developing lesson plans, it's important to set both content and language objectives. A lesson should meet the SMART criteria, that is, objectives should be specific, measurable, achievable, relevant, and time-bound. While working with text is a primary method, various speaking activities should also be incorporated into the sessions. Texts should include images and diagrams to help readers visualize what they are reading. Students need structural markings in the text, such as line numbering, paragraphs, headers, and subheadings, when working with a foreign language. This makes working with the text much easier. Texts should be presented in diagram form to aid understanding and description of the text's concept and material.

Group: 8B	Time: 40 min
CLIL Lesson Plan: 9.2 IONIC BOND	
Previous knowledge - Outer shells of an atom - Electron dot representation - Line representation	*Previous skills* - Observing and taking notes - Counting, describing signalling - Making inferences
Aim(s)	
- develop students content knowledge - foster language skills such as speaking and listening - understand how atoms or ions gain/lose of electrons; - draw the dot and cross diagrams of ionic compounds; - understand the mechanism of formation of ionic bond and predict the properties of ionic compounds	
Teaching objectives	Learning outcomes
A. Content	**A. Content**
- Gain or lose of electrons - Drawing dot and cross diagrams for ionic bonding. Ionic crystalline networks	Students acquire the vocabulary related to the unit Students become acquaintance with ionic bond and how gain and lose electrons.
B. Cognition (functions)	**B. Cognition**
Evaluate: determine the possible outcomes of processes ***Analyse***: (draw connections and differences among varied occurring events and phenomena) ***Understand:*** report ionic bonding	- Students are able to draw dot and cross diagrams for ionic bonding. - Students understand how gain or lose of electrons - Students identify and arrange
C. Communication	
Terminology ionic bond – иондық байланыс / ионная связь; to transfer – ауыстыру / переводить; melting – балқу / плавление; freezing – қату / замораживание; dot and cross – нүкте мен крест / точка и крест; crystalline network – кристалдық тор / кристаллическая решетка; neighbor – көрші / сосед.	
Language for learning (=language needed to operate in the learning environment or in a particular lesson – discuss, justify, explain, etc.) *arrange* *cut out* *Paste* *discuss*	
D. Culture/Citizenship	
Ionic bonds are important because they allow the synthesis of specific organic compounds.	
Materials & resources	Interactive board Worksheets Images for cutting and labelling Notebooks Colours and pencils

Figure 1: CLIL lesson plan on the topic: «Ionic bond»

The pilot study was conducted at the lyceum-internet «Bilim-Innovation № 2» of Karaganda, in the period from 1.03.2023 to 14.04.2023. Students of 7th and 8th grades took part in the approval of the CLIL lessons, there are a total of 48 students in 7th grade and 46 students in 8th grade.

Lessons in grades 7 «A» and 8 «A» (group 1 – control) were conducted in a traditional style. Traditional teaching involves the passive acquisition of information from the teacher.

Lessons in grades 7 «B» – 8 «B» (group 2 – experimental), the CLIL method, and tasks were used in class. Students following the CLIL approach learn a second language and a subject at the same time. In CLIL teaching, it's important to develop four language skills: listening, reading, speaking, and writing, as well as subject knowledge, skills, and understanding. The same final test was designed for all classes. The exams were given out on A4 pieces of paper. Students in seventh

grade had 30 minutes to complete the final test, which consisted of 20 questions in biology. Topics included in testing: «Movement», «Coordination and regulation, Human body». Students had 20 minutes to complete the final test, which consisted of 10 questions in chemistry. Topics included in testing: «Oxides» and «Chemical Bonds».

Result. Figures 2-3 show the average score and grades for the final test in grades 7 "A" (group 1- control group) and 7 "B" (group 2 – experimental group).

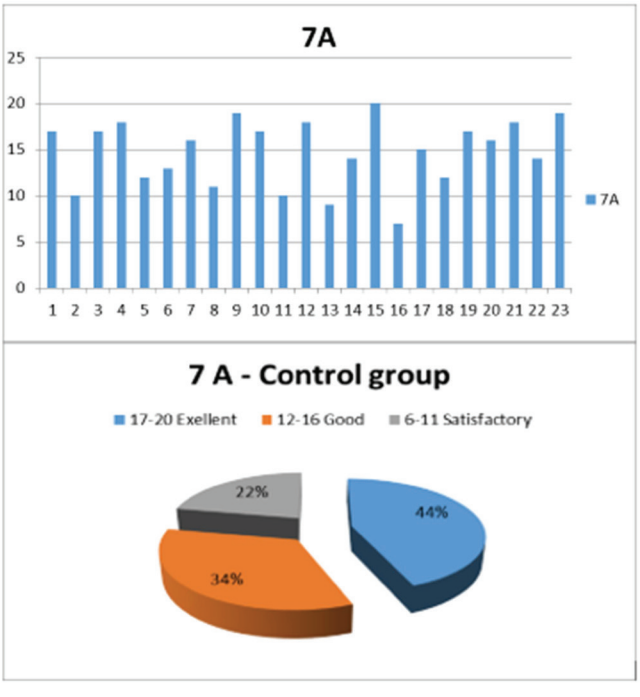

Figure 2: Results of final testing in grade 7 "A" (group 1 – control)

5 students – satisfactory (22%);
8 students – good (34%);
10 students – excellent (44%).

The average score was 13 points. The level academic of knowledge is 78%.

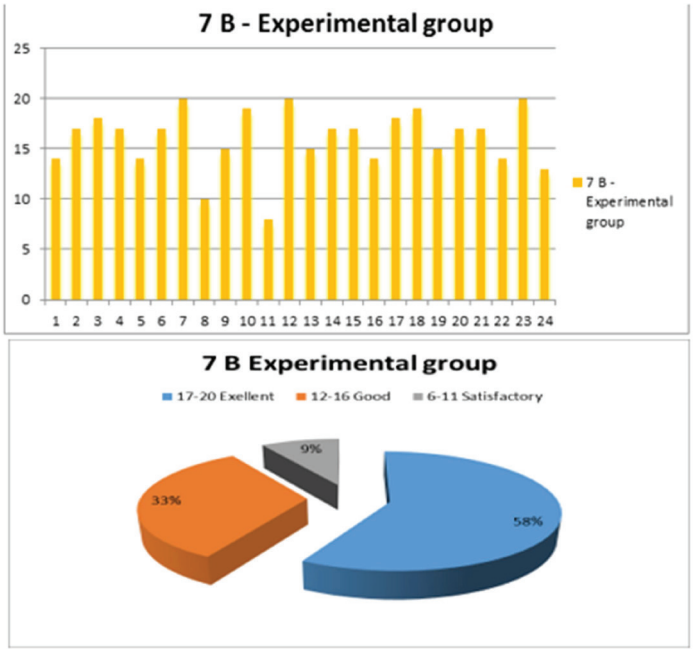

Figure 3: Results of final testing in grade 7 "B" (Group 2 -experimental)

2 students – satisfactory (9%);
8 students – good (33%).
14 students – excellent (58%)

The average score was 17 points. The level academic of knowledge is 91%. Comparing two groups the average score increased by 4 points. The level academic of knowledge increased by 13%.

Analysis of results of CLIL lessons in chemistry. Figures 4-5 show the average score and grades for the final test in grades 8 "A" (group 1- control group) and 8 "B" (group 2 – experimental group).

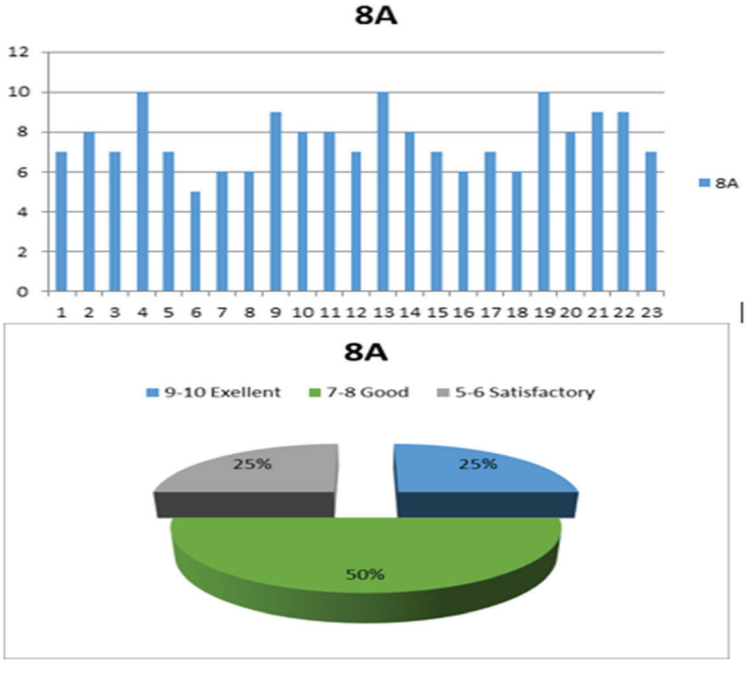

Figure 4: Results of final testing in grade 8 "A" (group 1 – control)

6 students – satisfactory (25%);
12 students – good (50%);
6 students – excellent (25%).

The average score was 7.5 points. The level academic of knowledge is 75%.

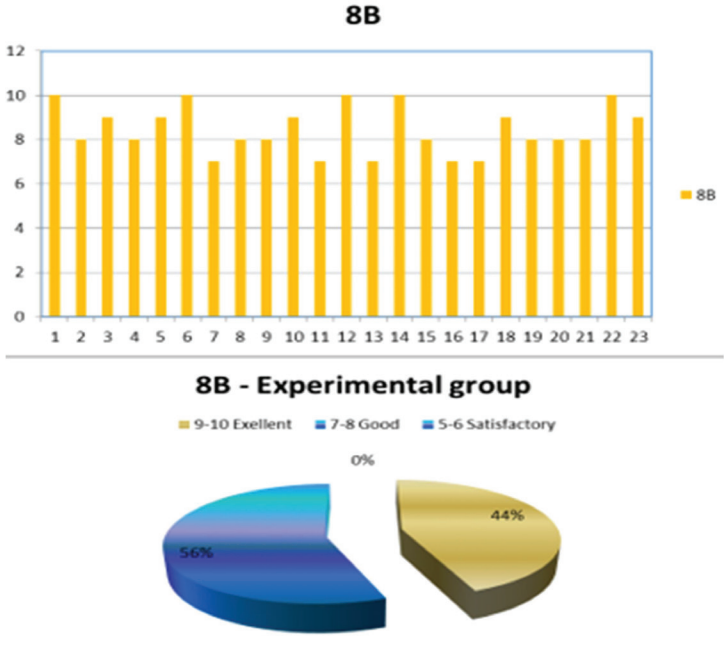

Figure 5: Results of final testing in grade 8 "B" (group 2 – experimental)

13 students – good (56%);

10 students – excellent (44%).

The average score was 8.7 points. The level academic of knowledge is 100 %.

Comparing two groups the average score increased by 1.2 points. The level academic of knowledge increased by 25%.

Analysis of the results to determine the attitude of students towards CLIL lessons. To determine the attitude of students towards CLIL lessons, a questionnaire was conducted after the experiment. The study's questionnaire comprised nine questions:

1. Do you find lessons with the use of CLIL methodology engaging?

2. Does the lessons with the application of CLIL methodology be more engaging than traditional lessons?

3. Do you find the explanations in the CLIL lessons to be sufficiently clear to enable you to understand the topic well?

4. Do you believe the CLIL lessons had too much information, graphs, and photos, making them difficult to understand?

5. Do you believe the knowledge gained in CLIL lessons was applied in real life?

6. Would you wish to participate in more CLIL lessons like these?

7. Do you enjoy the Wordwall.net game? Is it easy and enjoyable, and does it allow you to evaluate your knowledge?

8. Do you believe that performing CLIL issues in this form is more fascinating than using the traditional method?

9. Would you prefer CLIL tasks like this to be performed more frequently?

The researchers used a three-point answer scale, with "yes" (1), "neutral" (2), and "no" (3). Figure 6 illustrates overall 7 «B»-8 «B» grades students' opinions toward CLIL lessons before the experiment. It shows separate answers for all questions. The students' answers to the question were as follows:

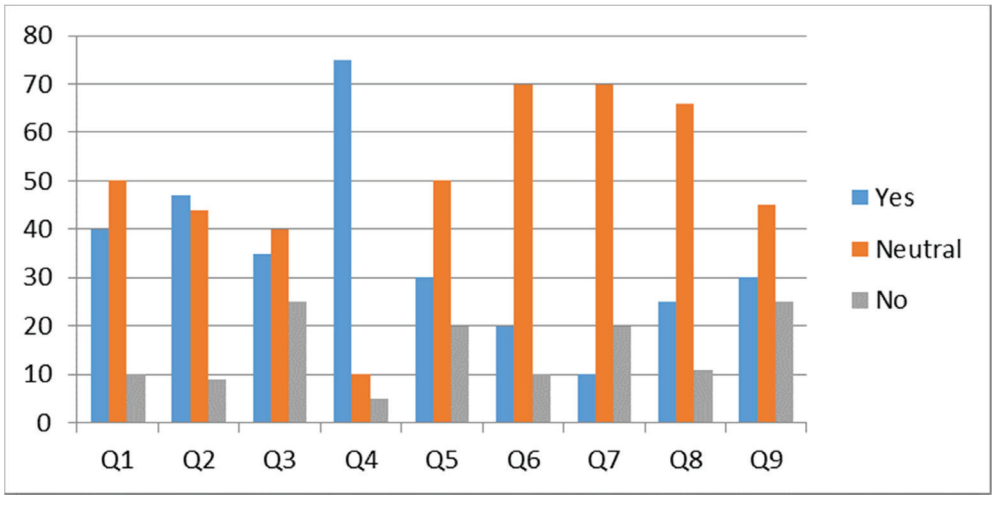

Figure 6: The overall 7 «B» -8 «B» grades students' opinions toward CLIL lessons before the experiment

More than 45 % of students think that CLIL lessons are more interesting than the traditional, compared to just 8 % saying they "disagree" in this area. Similarly, more than 35 % of the students like lessons with the use of CLIL methodology and would like the CLIL lessons carried out more often, while less than (40 %) say, they have "no opinion" in this area. Only 10 % of students rate themselves as "disagree". In comparison, the proportion who prefer CLIL tasks instead of traditional solving and would like to solve CLIL tasks more often is 25 %. It is interesting to note, that more than 70 % of students think that the CLIL tasks had too much information, diagrams, and images.

Figure 7 illustrates overall 7 «B»-8 «B» grades students' opinions toward CLIL lessons after the experiment. It shows separate answers for all questions. The students' answers to the question were as follows:

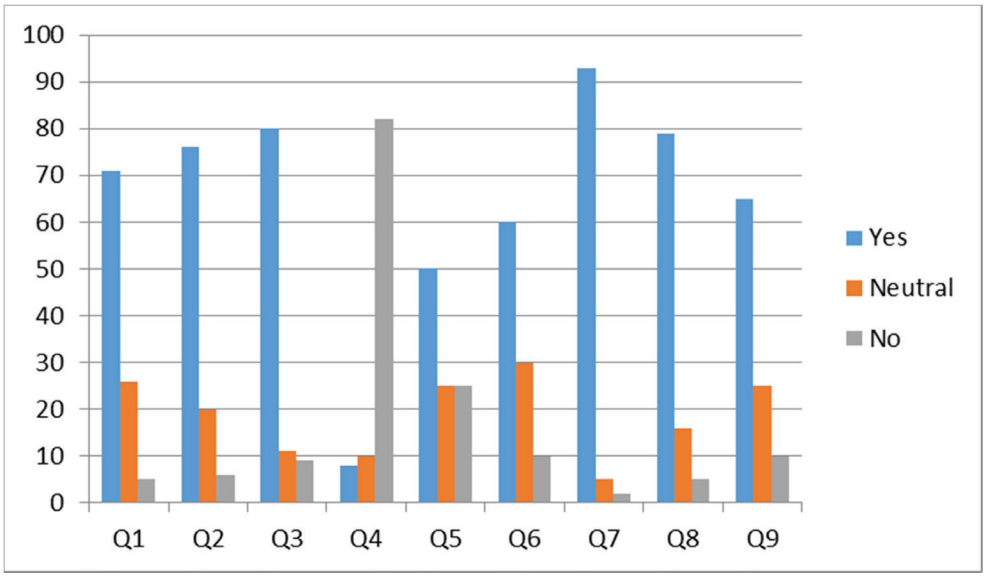

Figure 7: The overall 7 «B»-8 «B» grades students' opinions toward CLIL lessons after the experiment

According to Figure 7, it is clear that the highest proportion (70 %) of 7 «B»-8 «B» grades students like lessons with CLIL methodology and believe that they are more interesting than the traditional lessons. We can also see that the greatest proportion of students would like CLIL lessons could be carried out more often. Similarly, the majority of students (80 %) like the game wordwall.net and think CLIL tasks are more interesting than traditional solving. Only 4 % of students rate themselves as "disagree". There is a smaller percentage of students (5 %) who believe that the CLIL lessons had too much information, diagrams, and images.

Discussion. The present pilot study extends the small and so far, limited evidence on the effects of CLIL on science learning. The reasons for the development of CLIL lessons in this article are threefold:

1. Teaching and learning biology and chemistry through the CLIL approach exposes students to the target language since it serves as the medium of instruction not as a language lesson. That is why this immersion aids in developing language skills more naturally and contextually hence enhancing fluency as well as comprehension. This accords with the findings of Juan-Garau & Salazar-Noguera (2015) and Pimmer et al., (2016).

2. Our pilot study confirms the findings by Hüttner et al. (2013), and Döring (2020) that CLIL teaching subjects through a foreign language may be more interesting for lower secondary school students.

3. CLIL linked to better academic outcomes. Tavares (2015) and Surmont et al., (2016) attributed this to the deeper understanding and retention of content when learning a second language. Following our test results obtained, students can achieve higher results not only in language proficiency tests but also in the subjects taught through the CLIL approach.

According to the student's opinions in this survey, the reasons are learning materials that were more stimulating and varied for the CLIL approach than those for traditional education. While students in CLIL teaching worked collaboratively, writing on a worksheet and a computer, students in traditional learning focused primarily on the text and virtually entirely without the use of a computer. It would be beneficial to carry out research with students from other populations. In addition, most CLIL design research involves participants being exposed to only a few lessons over a short period. The relationship between performance during instruction and performance on criterion measures also needs to be investigated.

Conclusion. The pilot study of CLIL techniques has led to the conclusion that the use of this approach in educational practice varies across different countries due to national specifics. Therefore, it is essential to consider the particular characteristics of the environment in which CLIL will be applied. A pilot experiment was conducted with 7th and 8th-grade students. After calculating the percentages, it was found that the academic level of knowledge in the experimental group increased by 25% in chemistry and 13% in biology, respectively.

Our study, however, showed that more than 75 % of the students enjoy working with CLIL lessons and this positively affects their opinions towards the subject. We suggest that CLIL lessons are sizeable teaching material, and its verification in practice will require quite demanding and extensive research.

In recent years, we have noticed a steady increase in the usage of the CLIL approach in school instruction across the great majority of European nations, as well as Kazakhstan. Educators and instructors believe that CLIL is an effective way to provide students with the greatest possible preparation for their future lives, and mobility will become more common. In the future, improving and spreading this approach at the higher school level will face challenges due to globalization and internationalization of education, academic mobility, changes in the technological structure of society, and the need for professional communities to respond quickly to these changes.

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