

Master's Dissertation/
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**PECULIARITIES OF CLIL FOR
STUDENTS MAJORING IN
NON-LINGUISTIC SUBJECTS
AT AN INITIAL STAGE**

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INTRODUCTION

In the contemporary world, fluency in a foreign language is recognized as a fundamental asset for broadening one's professional horizons and prospects. With the ongoing process of globalization and integration, a multitude of language learning methods and approaches have gained significant traction. The integration of these methods into the educational system is expediting the acquisition of foreign languages and elevating the overall standard of language education. In this evolving landscape, researchers are actively investigating modern teaching methodologies from various corners of the globe, with the objective of incorporating them into educational institutions.

Adherence to the Bologna Process injects fresh momentum into the modernization of higher education. It opens up additional avenues for universities to participate in European Commission-funded projects and offers students, postgraduates, doctoral candidates, and university instructors opportunities for academic exchanges with European counterparts. To capitalize on these prospects, the development of foreign language skills becomes imperative.

In the present day, it is imperative for today's graduates to possess foreign language skills that enable them to effectively communicate verbally and in writing in an international context within their future careers. Despite the heightened emphasis on foreign language instruction in recent times, the proficiency levels of students still fall short of the desired benchmarks. Consequently, there is a pressing need to introduce alternative teaching methodologies to enhance the effectiveness and outcomes of foreign language education.

The methodology of Content and Language Integrated Learning (CLIL), also known as subject-language or context-language integrated learning, is widely recognized as a promising approach for instructing foreign languages to students specializing in non-linguistic fields. Its core aim is to develop students' communicative proficiency in a foreign language within the specific academic context where they are also acquiring general knowledge and skills. Presently, a significant body of academic literature supports the incorporation of CLIL into higher education institutions, highlighting its importance and benefits (Gudkova S. A., 2016; Koss E. V., 2016; Popova N. V., 2018; Sidorenko T. V., 2017; Harrop E.; Lasagabaster D. & Sierra J. M., 2015; Pérez-Cañado M. L., 2012).

The relevance of this research stems from the inadequate development of both theoretical and practical foundations for implementing Content and Language Integrated Learning (CLIL) in the educational context.

The originality of this work is reflected in its efforts to elucidate the distinctive characteristics of the CLIL methodology and in the formulation of methodological guidelines for the incorporation of CLIL into the educational process for students majoring in non-linguistic fields, particularly at the initial stage of their studies.

The object of this study is directed towards the process of foreign language acquisition by students who are pursuing majors in non-linguistic disciplines.

The subject of investigation within this research is Content and Language Integrated Learning.

The aim of this study is to establish methodological recommendations grounded in scientific principles for the effective implementation of CLIL in the educational process of students specializing in non-linguistic areas, particularly at the initial stage of their academic journey.

To fulfill the overarching aim of this study, the following specific **objectives** were pursued:

1. establish the position of CLIL within the framework of a competence-based approach to education;
2. identify and elucidate the distinctive characteristics and particulars of CLIL in the context of foreign language learning activities;
3. define the role and significance of CLIL within the broader learning process;
4. categorize and describe the various modes of learning that align with CLIL;
5. formulate methodological recommendations for the practical integration of CLIL into foreign language instruction for non-linguistic students, particularly at the initial stage of their education;
6. present and provide rationale for the practical application of the methodological guidelines for implementing CLIL in foreign language classes for students majoring in non-linguistic fields.

Theoretical significance in this study is evident in its contributions to a clearer understanding of the distinctive features and specific aspects of CLIL methodology, with a particular focus on highlighting the psychological and pedagogical principles underpinning its effectiveness.

The practical significance of this study lies in its potential for the application of the developed methodological recommendations in real-world educational settings, specifically in the context of courses designed for students majoring in non-linguistic fields.

The research was conducted using the following methods:

1. Theoretical and methodological methods, which relied on the analysis of specialized methodological literature related to the research topic. These methods encompassed techniques such as analysis, comparison, generalization, and systematization to comprehend and evaluate existing theories and methodologies.
2. Empirical methods were employed to collect, synthesize, and structure data that was obtained through theoretical analysis. This included the analysis and synthesis of the pedagogical experiences of leading experts in the field of research, as well as an examination of the researcher's own pedagogical experience. These methods helped to ground the theoretical insights in practical realities.

1. THEORETICAL FOUNDATIONS OF CLIL IMPLEMENTATION IN THE CONTEXT OF PROFESSIONAL CENTERED FOREIGN LANGUAGE TEACHING

1.1. Historical background of the emergence and development of CLIL pedagogical method in European educational institutions

Presently, European educational institutions have embraced the concept of the integrated subject-language approach. The adoption of this approach is fueled by the globalizing forces and the increasing demand for foreign language education on a worldwide scale. It has paved the way for the pedagogical methodology known as Content and Language Integrated Learning (CLIL), which harmoniously combines subject-specific content with language instruction.

The term CLIL was initially introduced by D. Marsh in 1994. According to D. Marsh's definition of integrated content and language learning (CLIL), it pertains to situations in which academic disciplines or specific subject matters within them are taught using a foreign language. In this approach, two complementary objectives are pursued: the acquisition of subject-specific knowledge and the development of proficiency in the foreign language.

In contemporary European scientific and methodological literature, there are more than 40 distinct definitions of CLIL. For example, the European Commission views CLIL as a framework in which a foreign language functions as a teaching tool.

D. Marsh's interpretation, in our perspective, is more comprehensive as it underscores that the utilization of CLIL serves the dual purpose of acquiring both subject-specific content knowledge and proficiency in the foreign language.

In the broader sense, CLIL can be construed as an instructional approach aimed at nurturing linguistic and communicative skills in students in a non-native language within the same educational context where their general knowledge and skills are cultivated in their native language.

The Cambridge textbook on TKT (Teaching Knowledge Test) (2015) provides several definitions of CLIL:

- a learning methodology whose main components are languages, intercultural knowledge, understanding and skills, and preparation for internationalisation and improved learning as such (Marsh D., 2002);
- a content-oriented teaching method which aims at learning a subject and a foreign language at the same time;

- an umbrella term used to describe bilingual learning programmes;
- an evolving methodology of teaching and learning subjects through a non-native language (TKT: CLIL Handbook).

The TKT Course: CLIL Module (2011) addresses the following CLIL objectives:

- to introduce learners to new concepts and ideas by learning the programme in a non-native language;
- to increase the use of the foreign language in academic subjects;
- to improve student performance in both the subject area and the language they are learning;
- to increase the confidence of students in using the mother tongue and the target language;
- provision of learning materials aimed at the development of cognitive abilities;
- to stimulate the development of learners' civic and cultural values;
- to put academic disciplines at the forefront of the development of learning materials.

To gain a deeper understanding of the CLIL methodology, it is essential to examine the collection of historical circumstances that have contributed to its development in various countries.

The concept of learning a foreign language through subject content was explored by two prominent educators from Central Europe. The first was the famous Czech educator Jan Amos Komenský. At that time, when scientific works were written in classical languages: Latin and Greek, J. S. Kamenský believed that science could be brought closer to the people through the mother tongue. In preparation for the opening of schools in Hungary, he insisted that all Latin textbooks must be printed in Hungarian and oversaw their printing. More than once in his didactic works the scholar expressed the important idea that words should not be taught and studied except with the things (in other words, the subject). His primary school textbooks "The World of Sensual Things in Pictures" and "The Open Door of Languages and All Sciences" were written in Latin and the native language. They were meant to teach objects, phenomena of the world in two languages. Thus, Bilingual education was born on the basis of the principles of "naturalness" and the "golden rule" of visualization.

The next Slovak educator who lived in the 18th century and who should be mentioned is Matthias Bell. He was a teacher and headmaster in two grammar

schools located in a multilingual region with German, Hungarian, Slovak, and Czech, where he tried to make it easier for students to learn foreign languages.

For M. Bell, language served as a tool for students to grasp the subjects within the educational curriculum. His guiding principle was, "Learn words in order to comprehend the reality and the world that surrounds us." In the case of his Latin students, they were tasked with describing various paths using Latin verb structures like "enter the cave, crawl inside, measure it." Bell was dedicated to conducting lessons with the aid of numerous visual aids, maps, and by vividly narrating stories, thus encouraging active imagination among his students. Furthermore, M. Bell reduced the number of grammatical rules and directed students' attention toward the cultures of the countries whose languages they were studying. This included texts related to geography, history, and legislation.

In the 1980s, B. Mohan and M. van Naerssen (1997) voiced criticism against the established approaches to foreign language learning. They contended that these approaches did not adequately consider the integration of subject content into language learning. According to their perspective, language learning was often viewed merely as a source of examples within language programs. However, they argued that if phrases were detached from their context or message, they lost their meaning. Similarly, if linguistic form was disconnected from its function, it hindered the development of functional grammar. Furthermore, when language was separated from conversation, meaningful dialogue became impossible. In their view, it was essential to recognize language as a means for learning subjects, emphasizing the importance of integrating language and content in the learning process.

They (1997) have put forward a set of didactic conditions when language acts as a means of learning subject content:

- meaning and form are equivalent in the process of language learning;
- dialogue is a means of expressing meaning, at the same time dialogue creates meaning;
- the linguistic development of an individual is a continuous process that continues throughout life, especially in the process of learning;
- new knowledge contributes to language development because new areas of language and meaning are discovered.

One of the early adopters of bilingual education in the 20th century was Canada. In 1965, a community of English-speaking parents residing in Quebec recognized the

necessity of creating an educational program for kindergarten students. This program aimed to provide their children with the opportunity to:

- learn to speak, read, and write in French;
- achieve good results in the subjects (English, among others);
- appreciate and respect the culture of French- and English-speaking Canadians (Baker C. & Jones S. P., 1998).

In response, these parents reached out to the authorities for a solution. Consequently, foreign language programs were established in schools throughout Quebec, offering students the chance for immersive language experiences. By choice, English-speaking students engaged in studying subjects in French alongside their French-speaking peers. During the 1970s and 1980s, the term "language immersion" became synonymous with bilingual education.

Following that, language immersion programs, originally designed to teach academic subjects and non-native languages, gained popularity and expanded to various regions, including Canada, the United States, and other countries. From the 1960s until 1998, approximately 300,000 Canadian children participated in such programs (Marsh D., 2002). By 2007, the USA had 317 bilingual immersion programs integrated into its mainstream schools, offering instruction in 10 different languages.

In 1966, another approach to foreign language learning was introduced in England: the Language Across the Curriculum (LAC) method. LAC involves incorporating cross-curricular connections when studying a foreign language. The inspiration for this methodology stemmed from secondary school teachers who began to recognize the significance of conducting discussions in English classes. It all began with a conversation about how thoughts are expressed through language, the societal functions of language, and the process of foreign language acquisition (Parker R., 1978). The LAC concept demonstrated remarkable coherence and logic, leading to its swift adoption in England, Australia, and Canada.

The success of the integrated learning programs mentioned earlier played a significant role in shaping European language policy. In 1978, the European Commission proposed the idea of promoting multilingual education (Marsh D., 2002). Canadian language immersion programs and British Language Across the Curriculum (LAC) programs served as the foundation for the development of the CLIL (Content and Language Integrated Learning) bilingual methodology. The core

concept of this methodology was to teach academic subjects through a foreign language.

The acronym CLIL was coined by D. Marsh, a researcher specializing in multilingualism and bilingual education, while affiliated with the University of Jyväskylä in Finland in 1994. D. Marsh, who originally hails from Australia and received his education in Britain, established his career in Finland. He attributed the introduction of the CLIL concept in Europe in 1994 to the prevailing political and educational context of that period. In the political sphere, there was a growing consensus that achieving social mobility within the European Union required a high level of foreign language proficiency. Concurrently, in the realm of education, it became evident that existing teaching methods needed to be rethought and incorporated into the learning process, drawing inspiration from the Canadian experience. Consequently, during the 1990s, the acronym CLIL gained prominence as the most widely used term in Europe to describe programs that integrated foreign language learning with subject content education.

Eurydice has identified a number of criteria to analyse the situation of bilingual CLIL methodology use in different European countries:

- language policy in the state (number of state languages, their functions, etc.);

According to Eurydice, factors such as high population density and the small size of the continent have led to intensive integration of the cultural features of the European people, including languages. In most countries, the languages of those countries with which it shares borders are given the status of national language. In several European states, two languages have the status of an official language at the same time.

This linguistic diversity and the gradual promotion of CLIL as a learning methodology has led to a large number of CLIL courses being developed in the European Union (EU), either in local languages or in courses focusing on the subject and the state language by national minorities.

- the level of education required for the application of CLIL;

There are three main age levels for the implementation of CLIL in EU schools: pre-primary, primary, and secondary.

In most European Union (EU) countries, the integration of subject and language learning is a common practice in both primary and secondary schools (Wolff D., 2007). For instance, bilingual schools in Hungary, Austria, and Germany introduce

the integration of language and subject matter starting from the first grade. Typically, CLIL is initially implemented when teaching a single subject and then gradually expanded to encompass more subjects. In Poland and Slovakia, there are educational institutions where content and language integration begins in preparatory classes in kindergarten. In the Czech Republic, the integration of foreign language and subject studies now commences in secondary school. This shift is a result of research indicating mixed results regarding the application of this methodology in primary schools in the Czech Republic.

- the subjects that are integrated with the learning of foreign languages;

When analysing the subjects taught on the basis of CLIL, D. Wolff (2007) tentatively identifies three groups of disciplines – humanities subjects, science subjects, and those aimed at developing the students' creative abilities.

In Hungary, according to J. Kovacs (2007), foreign language learning is often integrated with the study of subjects such as physical education, art, and music at the primary stage.

As students transition to secondary school, science subjects are introduced in the second language, while subjects like history and computer science are less frequently taught in a bilingual manner.

In Austria, bilingual teaching is applied to all compulsory subjects at the primary level, with a preference for French over English in some cases. At the secondary level, subjects such as geography, biology, and history are conducted in a second language. Notably, there has been a recent increase in programs that integrate foreign language instruction with science subjects like mathematics, physics, and computer science (Sygmund D., 2005).

In Germany, initially, humanities and geography were taught in a bilingual manner, but over time, it became possible to study most subjects in the school curriculum bilingually.

- European languages used in teaching;

A survey of languages used in education within the European Union (EU) reveals that English is typically the primary foreign language of instruction. However, depending on the specific social and ethnic context of each country, students may also study minority languages and the languages of neighbouring countries.

For example, in Hungary, German is often studied more frequently than English, and in some schools, Italian, French, and Russian are also offered as language options.

In Austria, Slovakia, and Germany, the languages of instruction predominantly include English and French. Poland employs a two-stage foreign language teaching system: English is the primary language taught at the primary school level, while at higher educational levels, additional foreign languages such as French, German, and Russian are provided.

- number of hours in the curriculum allocated to learning with CLIL;

The amount of time allocated to bilingual education varies from country to country in the EU. In Hungary, CLIL has 5 classes per week. The country also organises preparatory classes (zero-classes) where students learn a foreign language intensively before joining the CLIL programme (Kovac J., 2007). Similar courses are organised in Poland, where students receive 18 hours of intensive language training per week during the year.

In Austria different lesson formats are used for the implementation of CLIL, ranging from mini projects to fully bilingual courses. In schools that have implemented CLIL methodology, more than half of the classes have to be organised on a bilingual basis. Bilingual schools in Slovakia usually have 2-3 classes per week.

- the situation of teacher training.

The situation for teachers in EU countries exhibits considerable diversity. In Hungary and Germany, there is a deliberate effort to provide training for teachers with dual qualifications.

In Austria, there are no specific requirements for teachers involved in bilingual education; possessing a teacher training qualification is typically sufficient. However, many teachers choose to acquire additional language qualifications to effectively teach in a foreign language. In Austria, a common approach known as "team teaching" is prevalent, involving the presence of two teachers simultaneously in the classroom—a subject teacher and a foreign language teacher working in tandem.

In Poland, most graduates of teacher training institutions are in the same field of study, therefore graduates seek to improve their foreign language skills by participating in further training programmes or by obtaining a second degree. Since 2003 there has been a requirement for teachers in Poland to continuously improve their foreign language skills. There is also a list of documents entitling teachers to teach subjects in a second language (Zielonka B., 2007).

In Slovakia, to implement bilingual education, teacher qualification requirements stipulate that educators must hold a diploma in higher pedagogical education for both

a subject and a second language. Bilingual schools often follow the practice of employing native speakers as teachers. Additionally, in some schools, native speakers may serve as consultants, and group teaching methods are also employed, where subject teachers collaborate with native speakers.

The CLIL methodology is widely recognized as an essential pedagogical approach in the field of education. The polylingual nature of Europe and the high degree of integration among European states have made CLIL a fundamental tool in the EU's educational landscape. This approach is utilized across all educational levels and is prevalent in most EU countries.

Thus, the following conclusions can be drawn:

- English is most often used in the process of Content and Language Integrated Learning.
- There is a tendency to use CLIL in the early stages of learning.
- In terms of the ratio "number of schools with CLIL to the total number of schools in the country", small states lead the way.
- CLIL is popular in states where a large proportion of the population consists of national minorities (Danilov A. V., 2020).

1.2. The role of CLIL within the competence based approach

The competence-based approach and standardization have emerged as responses to the European community's call for reforming national education systems in alignment with the core principles outlined in the Bologna Declaration. In the realm of foreign language instruction, the competence approach aims to align the foreign language proficiency of university graduates with two primary objectives. First, it seeks to meet the individual's requirement to integrate effectively into the global professional community. Second, it addresses society's need to harness the potential of each individual to foster economic, cultural, and political self-development.

The primary catalyst for the development of CLIL is the globalization of education and the heightened academic mobility it entails. Consequently, universities are confronted with specific challenges stemming from the internationalization of education. These challenges necessitate communication in a foreign language as an integral component of professional interaction.

The competence approach stands in contrast to the knowledge-centered approach, which primarily emphasizes knowledge acquisition (involving teacher-led translation and learner-based information accumulation related to a specific academic subject). The integration of the competence approach into the normative and practical aspects of education addresses the issue where students may excel in mastering a set of theoretical knowledge but encounter significant challenges when applying this knowledge to solve specific problems or complex situations. The development of the competence-based approach emphasizes the orientation of learning activities towards fostering practical skills and gaining experience in utilizing the entire spectrum of theoretical knowledge (Vopiyashina S. M., Kirillova A. V., 2016).

According to L. P. Khalyapina (2015), foreign language proficiency according to the requirements of this level is considered as one of the conditions for free movement of people and ideas on the territory of the European continent and a base for further language learning with the aim of professional communication. In this regard, the educational process acquires a vector of orientation of specialist training towards mastering such qualities as business-like, flexibility of mind, activity, self-learning, and entrepreneurial spirit. A professional also needs to be stress-resistant, able to find solutions quickly and easily, adapt to a new workplace and unfamiliar working conditions; possess state-of-the-art methodologies and teamwork skills. The CLIL methodology implies formation of such competences (Grigorieva K. S., 2013).

CLIL fosters the enhancement of students' linguistic competencies to a level essential for effective communication and conducting professional tasks in a foreign language. Furthermore, CLIL enables a departure from conventional communicative scenarios typically covered in school-level General English programs. Instead, it facilitates the exploration of communicative situations that align with students' future professional communication needs within the context of higher education.

As per R. R. Zaripova (2014), the primary goal of the CLIL methodology is to cultivate the cognitive or academic language competence of students, with a focus on developing their ability to synthesize thinking skills and express them verbally in a foreign language. The concept of "cognitive/academic language competence," introduced by D. Cummins (2008), refers to an individual's preparedness to engage in learning and cognitive tasks using a foreign language as the medium of communication.

Cognitive language competence includes 3 components:

- Cognitive competence is evaluated based on the extent of the development of thinking skills within the specific academic field. This includes the capacity to synthesize information, assess its significance, analyse research findings, construct logical arguments, articulate one's perspective, provide explanations, and evaluate phenomena, all while effectively articulating one's opinions;
- Academic competence entails the capability to recall, apply, and comprehend the vocabulary learned and to provide commentary on it both in the native language and in a foreign language. It also involves possessing a fundamental understanding of discipline-specific terminology and typical language structures used in the field of study;
- Linguistic competence is contingent upon one's proficiency in the studied language and their understanding of its underlying system and structure (Cummins J., 2008; Zaripova R. R., 2014).

The efficacy of the CLIL approach in cultivating cognitive language competence has been substantiated through a multitude of experiments and research studies (Baturina N. V., 2017; Glukhova L. V., 2013; Gudkova S. A. 2015; Kozhevnikova O. V., 2012; Popova N. V., 2018; Ball P., 2013; Zaripova R. R., 2014). Research has indicated that the CLIL methodology yields several advantages, including heightened motivation for learning both the subject and the foreign language, expansion of vocabulary, and enhanced proficiency in the professional use of the foreign language. This approach immerses learners fully in the language environment, facilitating a profound understanding of scientific terminology. Learners become familiar with concepts and their connection to corresponding terms concurrently. In addition to imparting a substantial inventory of scientific vocabulary, CLIL also emphasizes the development of language skills like listening comprehension, fluency, and oral expression.

In summary, the CLIL approach is founded on the principle of merging subject matter and language acquisition within the education of prospective professionals. The core concept of the CLIL methodology posits that language is not the sole focus of learning; rather, it serves as a vehicle for teaching the subject. This approach affords students the opportunity to concurrently study both the language and specialized subjects, facilitating a deeper level of professional training at the higher education level without the need for additional language learning hours.

Modern pedagogy considers integration in foreign-language educational activities as one of the main didactic principles that generally determine the organisation of educational systems. This understanding has allowed scholars to put forward a new educational paradigm. It sounds as follows: since the existing education is subject-centric, in other words, the principle of intrasubject integration is implemented, while integration forms the basis of any educational system, the transition of education in modern conditions to a qualitatively new level is in fact a movement from intrasubject to inter-subject integration. This transition does not imply a change but rather a supplementation of one principle by another.

As it was noted in A. Y. Arkhipenkova's work (2012), foreign language, like no other discipline, is open to numerous interdisciplinary connections, to use information from other fields of knowledge.

According to K. S. Grigorieva (2014; 2013), the main methodological principles which ensure successful implementation of the CLIL methodology are as follows:

- Multiculturalism is a significant aspect of the CLIL methodology, as it offers the opportunity to present educational material while considering the diverse perspectives and perceptions of various cultures;
- Sustainable learning – students' long-term memory should be engaged in the learning process;
- The CLIL methodology aims to foster the development of higher-order thinking skills by integrating content, cognitive, and linguistic components. The ability to effectively articulate complex thought processes is not innate but necessitates a systematic approach and dedicated training;
- The CLIL methodology promotes intensive and productive foreign language proficiency by employing a range of methodological techniques that encourage active and authentic communication in the classroom. Effective foreign language learning is best achieved through communicative objectives and meaningful communication situations;
- The CLIL methodology advocates the use of authentic teaching materials that are rich in content and information. New texts and tasks should present a certain level of cognitive challenge. Interactive authentic materials are instrumental in creating a language-rich environment and crafting tasks with a high degree of cognitive complexity. These materials

may encompass creative assignments and resources for independent and differentiated learning.

The main objectives of the CLIL methodology can be identified as follows:

- development of intercultural communication skills;
- learning the professional terminology of the target language;
- learning thematic disciplines from different perspectives;
- improvement of general language competences;
- development of oral language skills;
- diversity of methods and forms of classroom instruction (Filipovich I. I., 2015).

One of the primary advantages of the CLIL methodology is its ability to boost learners' motivation to acquire a foreign language. The emphasis on communication skills in a professional context becomes paramount, affording learners the opportunity to gain a deeper understanding of the culture associated with the language they are studying. This, in turn, contributes to the development of socio-cultural competence. Complete immersion in a natural language environment enables learners to grasp specific terminology and particular language structures, thereby preparing them for the subsequent application and utilization of the knowledge and skills they acquire (Tsarenkova V. V., 2016).

Consequently, the main advantage of CLIL is that this methodology provides an opportunity to learn and use language for a real purpose – to solve professional problems.

Among the advantages of the CLIL methodology in its use in universities are also the attraction of foreign teachers, academics, and students, achieving a higher level in international rankings, and the competitiveness of graduates.

While there are numerous advantages to introducing the CLIL methodology in higher education institutions, there are also challenges associated with its implementation. Teachers must possess both language competence in foreign language teaching methodology and expertise in the methodology of teaching academic subjects. Language teachers need to acquire knowledge in specific disciplines. Additionally, to effectively implement the innovative CLIL methodology, educators should be well-versed in the psychological aspects of bilingual education, create a supportive psychological classroom environment, and remain committed to continuous

professional development. In essence, implementing this methodology in higher education demands highly qualified teachers capable of delivering lectures and conducting practical, seminar, or laboratory classes. Furthermore, it's important to note that a low level of language proficiency among learners can impact the quality of subject matter mastery.

Another challenge in implementing the CLIL methodology is the need for curriculum development and the creation of teaching materials. Beyond foreign language proficiency, subject-linguistic teaching methodology necessitates an innovative approach to conducting classes, involving various methods of presenting content and organizing activities that promote individual and creative engagement among learners. Therefore, teachers employing the CLIL methodology must possess specific professional competencies to effectively implement it.

Furthermore, there are challenges such as insufficient funding for teacher internships abroad and the recruitment of foreign teachers. Despite these difficulties, the CLIL methodology is a functional approach to foreign language instruction that offers the potential to address a wide range of educational objectives and tasks.

Globalization and the expansion of international interactions necessitate modern educational institutions to adopt innovative approaches to foreign language acquisition. These approaches should center around learner motivation, tailored curricula, and adequate teacher training. It's important to acknowledge that there are currently no universally recognized criteria for assessing whether learners' knowledge has improved or declined after the implementation of the CLIL methodology.

Nevertheless, the use of the CLIL methodology aligns with a functional approach to foreign language teaching and has demonstrated high efficiency in language acquisition (Kochenkova A. N, 2018).

The CLIL method boasts numerous distinctive features and represents a relatively new and unique technique. As a result, it has piqued the interest of foreign language educators and is steadily gaining popularity as a means of teaching professional communication in a foreign language. European countries have already demonstrated the effectiveness of implementing subject-language teaching in educational institutions.

In conclusion, the integrated training of non-linguistic students can significantly enhance the effectiveness of their foreign language education, leading to increased

competitiveness and contributing to the growth of a country's innovative economy. Achieving this objective necessitates a focus on productive interdisciplinary learning techniques. The goals of subject-linguistic integration can be realized through the CLIL methodology, which entails the simultaneous teaching of a foreign language and subject content, essentially utilizing a foreign language for practical purposes. CLIL fosters proficiency in using a foreign language for professional communication, enriches vocabulary, incorporates specialized terminology, and imparts knowledge for effective professional communication in a foreign language context.

1.3. Peculiarities of CLIL in foreign language educational activities

The concept of CLIL was introduced in 1994 by David Marsh, a researcher in multilingual education. It was created to describe an approach to teaching and learning where general education subjects are taught in a foreign language. One of the most widely accepted definitions of CLIL today is as follows: it's an educational method that enables students to develop their linguistic and communicative abilities in a foreign language while simultaneously acquiring general knowledge and skills (Klets T. E., 2015). This means that CLIL involves studying non-language subjects such as geography, mathematics, and physics in a foreign language, typically English. Initially, CLIL referred to bilingual teaching methods.

One of the key characteristics of the CLIL methodology is its holistic approach to both subject content and language instruction. It seamlessly combines the learning of subject matter with the acquisition of a foreign language, and vice versa. By employing the CLIL methodology, learners have the chance to cultivate intercultural communication skills and foster a global perspective, emphasizing the equality of diverse nations and cultures.

This approach not only enables students to examine a subject from various angles but also facilitates access to specialized terminology in a foreign language. Additionally, it contributes to the enhancement of proficiency in the target language, the development of oral communication skills, and the enrichment of teaching methods for the subject at hand (Yurasova E. S. & Gorbacheva E. A., 2015).

When creating a course based on this methodology, it is necessary to take into account the peculiarities of the use of CLIL conditioned by the 4 "C" principle developed by D. Coyle (2014). This principle is fundamental in the theory of integrated subject-linguistic learning. It is contained in four components: content,

communication, cognition, culture. Each component is characterised by a specific content:

- the "content" aspect involves translating the content component into practical application by acquiring knowledge and honing skills in the realm of professional communication. Its primary objective is to enhance the process of knowledge absorption by closely aligning it with the subject matter of the training program;
- "communication" involves enhancing one's overall language proficiency. Learning a foreign language is accomplished through communication, which employs specific terminology, with a focus on clarity and accessibility. It is essential to emphasize that interaction within an educational setting plays a crucial role in the learning process. Therefore, the primary focus in the classroom should be on communicative activities for both oral and written communication in a foreign language. This entails using interactive tasks, group activities, pair work, a variety of creative and developmental exercises, and employing the language in diverse ways;
- "cognition" constitutes a content component that pertains to the cultivation of thinking skills essential for engaging with both content and language, as well as for various approaches to knowledge processing. This component involves using texts for analytical and critical reading, as well as tasks that require students to identify the main ideas, make comparisons, make educated guesses, and discern cause-and-effect relationships, among other cognitive processes, within the classroom setting;
- "Culture," or cultural knowledge, involves acquiring intercultural awareness, which forms the foundation of CLIL. This is because comprehending the characteristics, commonalities, and distinctions among various cultures equips students to engage more proficiently in today's multicultural environment. It also aids them in gaining a deeper insight into their own culture and serves as a catalyst for its preservation and evolution.

The key components of CLIL that have been emphasized define elements of the learning process, and their implementation can vary depending on the learner's age, their socio-linguistic environment, and the extent to which they are immersed in the CLIL approach:

- the cultural dimension (involving the use of CLIL to enhance learners' general culture, to develop intercultural skills, to broaden their horizons and to acquire knowledge of the culture and characteristics of other countries);
- the social dimension (involving the enhancement of the educational level, training for internationalisation, preparation for international examinations);
- the linguistic dimension (using CLIL to develop communication skills in a foreign language and general linguistic competence);
- the subject aspect (implies a multidisciplinary study of the discipline, teaching professional terminology in a foreign language, preparation for professional activities);
- learning aspect (implies increasing motivation to learn a foreign language, the possibility to use different forms, methods of work and teaching strategies) (Baturina N. V., Rukvishnikov Y. S. & Batunova I. V., 2017; Klets T. E., 2015).

The authors also highlight the following didactic principles of CLIL:

- principle of duality – reliance on the native and foreign languages; in the process of implementing the CLIL methodology, learners relate the concepts mastered in the native language to their equivalents in the foreign language;
- the principle of gradual complication of the content. First of all, for successful mastering of the material by students it is necessary to take into account the level of their subject and language preparation; gradual complication of the material with increasing knowledge level of students leads to better results;
- the principle of integration of foreign language and subject content; this principle is key for higher education in general, as it contributes to the acquisition of academic foreign language for communication in the professional sphere;
- the principle of focus on mastering specific subject knowledge with the help of two languages; this principle takes into account the strict time frame for learning a foreign language in higher education institution, assumes mastering a certain knowledge base on the subject and professional foreign language by students;
- the principle of developing motivation for the ability and readiness to use a foreign language for specific purposes; motivation to learn a foreign language

increases as students realise that they will need a professional foreign language as future professionals;

- the principle of unity of thought and speech activity in a foreign language. Language acquisition develops speech and thinking activity; thinking activity is inseparably connected with speech, as it contributes to the perception, comprehension, and use of acquired foreign language knowledge ("Young Scientist: Modern Technologies of Teaching Foreign Languages". 2018; Filipovich I. I., 2015; Zaripova R. R., 2014).

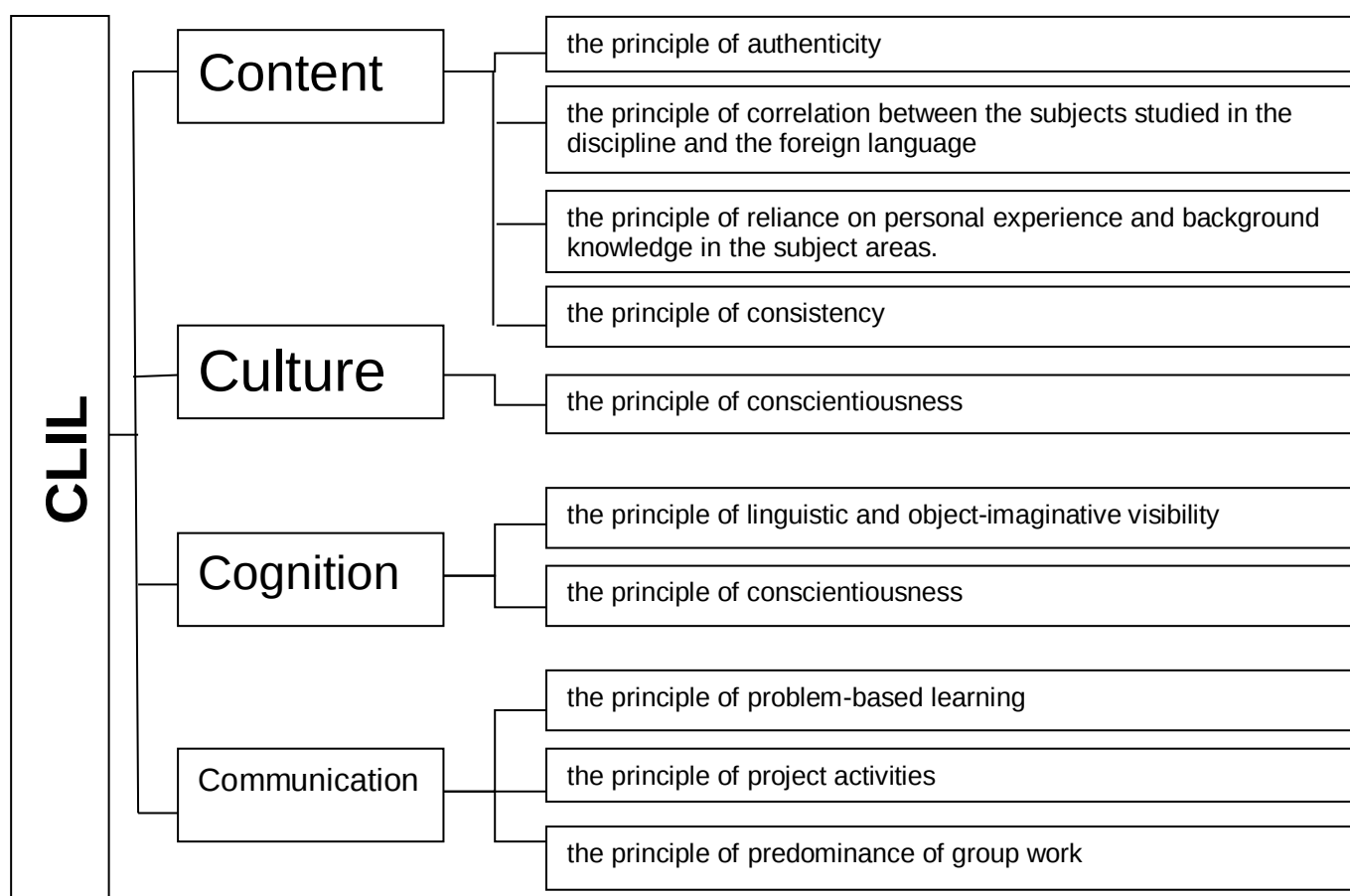


Figure 1. The CLIL principles

Our analysis has allowed us to identify the nomenclature of psychological and pedagogical principles that should underlie the organisation of CLIL teaching (Figure 1):

- 1) The principle of conscientiousness at any stage of learning. Conscious acquisition of language implies that learners are aware of the actions and operations they perform to solve a particular communicative task. For example, students are supposed to consciously participate in the selection of necessary lexical units as a result of their correlation with the lexical units of

their native language, their relevance and frequency of use in the professional sphere.

Regarding the CLIL methodology, the principle of conscientiousness also finds expression in the awareness of the development of cognitive skills, cognitive strategies of analysis, synthesis, and evaluation. The principle implies awareness in the students' processing of the material in a foreign language, development of the students' skills of analysis and generalisation of the passed material in the process of independent work, development of a tolerant attitude towards another culture and expansion of the students' worldview.

- 2) The principle of consistency. The study of the material is characterised by continuity and consistency. A certain consistency in learning material by students, with a gradual complication of language material, speech operations and actions with it, leading to an increase in learning outcomes and more effective acquisition of knowledge by students in a foreign language and subject, and bringing them into a system.
- 3) The principle of reliance on personal experience and background knowledge in the subject areas. Students are expected to take into account the knowledge acquired in their native language in mastering a foreign language.
- 4) The principle of predominance of group work. This principle is used to involve learners in the learning process, to share knowledge between learners, to increase speech and intellectual (cognitive) and emotional activity.
- 5) The principle of linguistic and object-imaginative visibility. Visualization in CLIL methodology is used both for semantization of foreign language words and situational illustration of speech material in a foreign language and for activation of speech and thinking activity. The use of diagrams, tables, pictures when introducing new material and actualization of existing knowledge of students is supposed to contribute to the process of formation of strong cognitive links between the studied concepts in the native and foreign languages.
- 6) The principle of authenticity. The principle consists in the use of authentic materials in the classes, which will ensure the formation and development of communicative competence of students in the professional sphere.
- 7) The principle of problem-based learning. During the learning process, students acquire new information by solving theoretical and practical problems.

- 8) The principle of project activities. The principle promotes students' application of the acquired knowledge in practice, development of creative abilities, and preparation of students for professional activity.
- 9) The principle of correlation between the subjects studied in the discipline and the foreign language. This principle should contribute to the most effective memorisation of learning material in the foreign language, lexical units, as there is a comparison of material and units in the mother tongue and in the foreign language.

Thus, summarising the above, the main features of subject-linguistic integrated teaching can be identified:

- learning a foreign language is integrated into the content of the subject itself – learners learn professional disciplines in a foreign language;
- this methodology can be used in teaching people of all ages, at different levels of education – CLIL meets all European educational standards, it can be used both for pre-school and school education, and for teaching professionals at a higher educational institution;
- the methodology aims at developing linguistic, social, cultural, academic and other skills that help in the acquisition of knowledge in the discipline itself and the foreign language – CLIL promotes not only the development of general linguistic and professional communicative competences but also the acquisition of the countries cultural knowledge of the target language;
- the CLIL methodology allows developing oral communication skills in a foreign language in the field of professional communication, diversifying the methodology of the subject taught;
- this methodology contributes to the formation of an international outlook, which implies the equality of nations, as well as the development of intercultural communication skills.

1.4. Role and place of CLIL in the educational process

The analysis of universities' practices shows that the main methods for teaching non-linguistic students are those that increase interdisciplinary links, using foreign language both as a subject and as a medium of instruction. Such methods include CLIL (Content and Language Integrated Learning), ESP (English for special purposes) and EMI (English as a Medium of Instruction). However, the specifics of

the application of these methods are still poorly understood. We will look in more detail at the differences between these methods (Table 1).

Methodology	Subject of study	Teacher	Materials	Level of language proficiency of the students
EMI	Study of the content of the discipline	Subject teacher	Authentic	High
CLIL	Learning a foreign language through the content of an academic discipline	Foreign language teacher/ Tandem of two teachers/ Teacher who is a specialist in two areas	Adapted	Intermediate
ESP	Learning English	Foreign language teacher	Teaching materials	Low

The ESP (English for Specific Purposes) methodology primarily centers on the acquisition of the English language, with the content component taking a secondary role. ESP is designed to cater to various domains of human activity. This methodology emerged as a response to the need for learning English with a specific purpose in mind, aligned with the learners' individual interests. When implementing the ESP methodology, foreign language instructors do not delve deeply into the broader aspects of the learners' chosen professions, which can essentially be seen as supplementary information for English instruction. In essence, the primary emphasis of the ESP methodology lies in enhancing students' language proficiency. ESP includes courses such as Business English, Technical English, Scientific English, English for Health Professionals, English for Waiters, English for Tourism, English for Artistic Purposes, etc. (Marsh D., 2012).

In T. Hutchinson's (1987) classification ESP is divided into three categories: English for business and economics (EBE); English for social studies (ESS); English for

science and technology (English for science and technology – EST). In this situation, the teacher is a linguist, and the emphasis is on learning professional vocabulary.

EMI (English as a Medium of Instruction) is a method that employs English as the primary language for conducting seminars and lecture courses in subjects like physics, mathematics, and others. This approach is typically utilized in countries where English is not the first language spoken by the population. Consequently, it necessitates a high level of language proficiency among the students. The principal objective of EMI is to impart subject-specific content, which means that English language acquisition occurs concurrently with the students' native language learning. In the EMI methodology, the teacher does not primarily focus on explaining the intricacies of the English language. Instead, the teacher should possess expertise in the subject matter and may or may not be a native English speaker. EMI bears similarities to the "solid CLIL" model, wherein a significant portion of the curriculum for specific subjects is delivered in a foreign language.

One of the most applicable methodologies is the CLIL methodology. According to the definition, the CLIL methodology is equally focused on learning special content and learning a foreign language, which distinguishes it from EMI and ESP. The advantages of this methodology in the context of language learning intensification are:

- development of multilateral professional knowledge (learners acquire sustainable knowledge of terminology and typical language clichés characteristic of a given subject area and scientific language in general, they learn to identify, analyse, classify, order, compare the studied processes and phenomena in their native and foreign language, draw conclusions, generalise, evaluate, and interpret phenomena and trends in the chosen professional direction);
- development of intercultural communication skills (internationalisation takes place, strengthening the position of the university and graduates in intercultural and international space);
- motivation to learn a foreign language (mastering a foreign language is necessary to understand the content of the studied discipline) (Coyle D., 2012).

In the context of implementing the CLIL methodology, it is generally expected that the teacher should have both subject-area expertise and a high level of foreign language

proficiency. For instance, if the goal is to teach mathematics in a foreign language, the teacher is ideally someone with a background in mathematics (for example, a profile education) and, simultaneously, possesses a strong linguistic qualification. This dual expertise is crucial as the CLIL methodology places significant importance on both subject content and language proficiency as fundamental principles.

Hence, the teacher is expected to possess a dual competence, being a specialist in both the subject matter and the foreign language. In practice, it is often observed that the CLIL methodology is carried out by language teachers who work across various fields or through a collaborative effort involving two teachers: one with expertise in the subject area and the other with strong linguistic qualifications. Consequently, when implementing the CLIL methodology in higher education institutions, particular emphasis should be placed on foreign language training, not only for undergraduate, graduate, and postgraduate students but also for the teaching staff. This approach ensures that both students and instructors can effectively engage with the CLIL method.

Another difference is that the language of instruction in EMI and ESP methods is English. In CLIL, the language of instruction can be any non-native language.

Thus, the choice of teaching methodology should first of all depend on the learning objectives, since all the listed methods have a different degree of interdisciplinary alignment between the professional content component and the foreign language component.

Many methodologies do not adequately focus on the academic discipline, or conversely, do not focus on foreign language learning, which may not match the profile of the learners in a particular programme and the policy of the higher education institution.

The CLIL methodology serves as a crucial bridge for shaping an effective language policy, particularly because it caters to those learning a foreign language for a specific purpose. The central tenet of the CLIL methodology lies in utilizing the foreign language as a medium of communication for learning subject-specific content.

In order to ensure a harmonious alignment between the study of subject content and foreign language it is necessary to apply the CLIL methodology, which remains under-researched within the higher education environment. When implementing CLIL

at a higher education institution, interdisciplinary integration is the most grounded and concrete.

Therefore, CLIL facilitates the achievement of the primary objective of learning a foreign language in higher education: developing practical language skills for everyday academic communication, encompassing linguistic and culture-specific nuances. In essence, it equips students with comprehensive linguistic, academic, and professional communicative competencies.

This methodology offers students, undergraduates, postgraduates, and instructors the chance to apply their foreign language skills in the study of various university subjects. In doing so, it bolsters their confidence in their language abilities, eliminates language barriers in communication, and enhances their motivation to acquire foreign language competencies.

Conclusion on chapter 1

The primary objective of the CLIL methodology is to foster the learner's cognitive or academic language competence. This approach offers several benefits, including time savings, heightened student motivation for both the subject and the foreign language, enhanced competitiveness and proficiency in academic foreign language skills among graduates, vocabulary expansion, and the attraction of foreign students and teachers.

The core characteristics of Content and Language Integrated Learning in foreign language education include integrating the foreign language into the content of the subject being studied, cultivating social, cultural, academic, and linguistic skills, developing oral communication abilities in a foreign language for professional communication, and instilling an international perspective. The CLIL methodology is adaptable for use at various educational levels since it aligns with European educational standards.

A comparative analysis of CLIL with other teaching methods, such as EMI and ESP, has revealed key distinctions: CLIL involves the use of any foreign language as the medium of instruction, simultaneous and equal emphasis on the foreign language and the subject being taught, and the requirement for the teacher to possess dual competence or the collaboration of two teachers.

2. THE IMPLEMENTATION OF CLIL

2.1. Types of learning according to CLIL

As we've discussed in the theoretical section of our research, the concept of employing the Content and Language Integrated Learning (CLIL) methodology has emerged due to the growing demand for foreign language proficiency, especially when there are time constraints for language instruction. This challenge is encountered by educators across various nations. CLIL provides the unique opportunity to simultaneously instruct two subjects, with the primary emphasis being either on the foreign language or the core subject matter. Under this approach, the specialized subject isn't simply taught in the foreign language; it is learned through it. In this context, the foreign language functions as a tool for comprehending another discipline that lies beyond the realm of linguistics. Consequently, CLIL represents a significantly broader approach than conventional foreign language instruction. Therefore, the objective of Content and Language Integrated Learning is to enable the concurrent acquisition of expertise in a specialized subject and proficiency in the foreign language through which the subject is being taught (Litvishko O. M., 2015).

The incorporation of a foreign language in CLIL education is contingent upon the specific educational aims and objectives established for each subject, necessitating varying levels of foreign language integration. CLIL amalgamates a multitude of theories and methodologies that are implemented in diverse educational settings. Several terms are employed to delineate various approaches to introducing CLIL, such as full language immersion, 'language shower,' and other descriptors.

Foreign language immersion is a learning model based on full or partial use of a foreign language in the learning process (Krasheninnikova A. E., 2018). Partial and full language immersion are distinguished.

Full immersion entails the complete utilization of a foreign language in the classroom, excluding the use of the mother tongue. In contrast, partial immersion represents a more "comfortable" form of CLIL, where the study of the subject matter is synchronized with foreign language acquisition. Consequently, in partial immersion, the educational objectives encompass both the mastery of subject content and the acquisition of the foreign language. In full immersion, the foreign language is exclusively employed in the classroom, whereas partial immersion allows for occasional switching to the native language. This learning model proves effective and

relatively straightforward since it immerses learners in the foreign language across all sensory modalities. Students engage with foreign language speech through listening, visual perception, and communication. The emulation of foreign intonation, gestures, and pronunciation occurs most rapidly when learners consistently encounter foreign language speech, making this process often more enjoyable than conventional learning approaches. Thus, full language immersion can significantly facilitate the implementation of Content and Language Integrated Learning. Nonetheless, the extent of language immersion hinges on the specific goals, objectives, and perspectives related to foreign language acquisition (Lasagabaster D. & Sierra J. M., 2015).

Depending on the degree of integration of the foreign language in the learning process, several models of CLIL teaching are commonly distinguished:

- multilingual learning (known to European researchers as the C1 model); at the end of the course, the learner acquires professional knowledge not only in the mother tongue but also in the foreign language; this model attracts motivated, capable and hard-working learners;
- supplementary subject and language teaching (called the C2 model in European studies); this model emphasises the development of skills to use language in order to ensure higher-order thinking processes, in other words, foreign language teachers only provide external support in the learning process of future graduates;
- subject matter teaching with the inclusion of a foreign language (European researchers call it the C3 model); this model implies support throughout the training and, accordingly, the development of special programmes to enhance not only professional skills but also the development of language competence (Litvishko O. M., 2015).

Consequently, a foreign language can be mastered in tandem with a subject, serving as both a tool for comprehending a non-linguistic specialty and the foundation for subject instruction. The extent to which the foreign language is integrated into the learning process can be adjusted by the teacher to align with the specific learning objectives (Litvishko O. M., 2015).

Foreign researchers propose a different classification of CLIL models, in other words, a "soft" and "hard" version of CLIL models.

The "soft" variant of the CLIL model places a strong emphasis on language, and it is predominantly driven by the language itself. In this approach, foreign language usage is more frequent in the classroom compared to traditional programs. The primary focus of the learning process is language-centered, with language acquisition being a key goal. This concept of the "soft" CLIL model is particularly relevant for teachers of language subjects, who typically present their materials within academic or professional contexts.

Conversely, the "soft" version stands in contrast to the "hard" CLIL model. This variant is tailored for educators teaching non-linguistic subjects. In this case, teachers grapple with the dual challenge of conveying the subject's content and imparting academic language skills.

Different CLIL models are categorized based on the learning goals, the learners' proficiency in the foreign language, and the teacher's qualifications. In the initial stages, it is advisable to utilize the "soft" CLIL model.

In the application of the Soft CLIL or Language-driven CLIL approach, specific elements from the curriculum of a professional field are examined in a foreign language. Soft CLIL represents a model that permits a degree of language immersion. It stands out as one of the most effective methods for non-linguistic students to acquire proficiency in a foreign language. It is customary to differentiate between partial and full immersion. Full immersion entails being in an environment where all communication exclusively occurs in the foreign language, whereas partial immersion allows for transitions to the native language as needed. Partial language immersion not only fosters intercultural competence but also serves to enhance student motivation and broaden their linguistic horizons. Within the "soft" version of the CLIL model, learning is guided by the language itself, and the entire curriculum of the discipline is structured around this language-centered approach.

2.2. Use of CLIL in modern educational environment (lesson planning)

The findings from our examination of the characteristics and variations of CLIL, as outlined in the theoretical section of our research, along with the principles we have emphasized, formed the foundation for the methodological design of a CLIL application approach during the early education phase of non-linguistic students. This approach comprises four distinct stages.

1. **Analysis and selection of material.** The first stage assumes the coordinated planning by the study department of the working interdisciplinary curricula and the appropriate number of hours to study the topics. Based on the work programme of the professional discipline, teachers need to select the material appropriate to the cognitive abilities of the students. At the initial stage of training, teachers are required to select the material corresponding to the basic knowledge of the students in the core discipline.

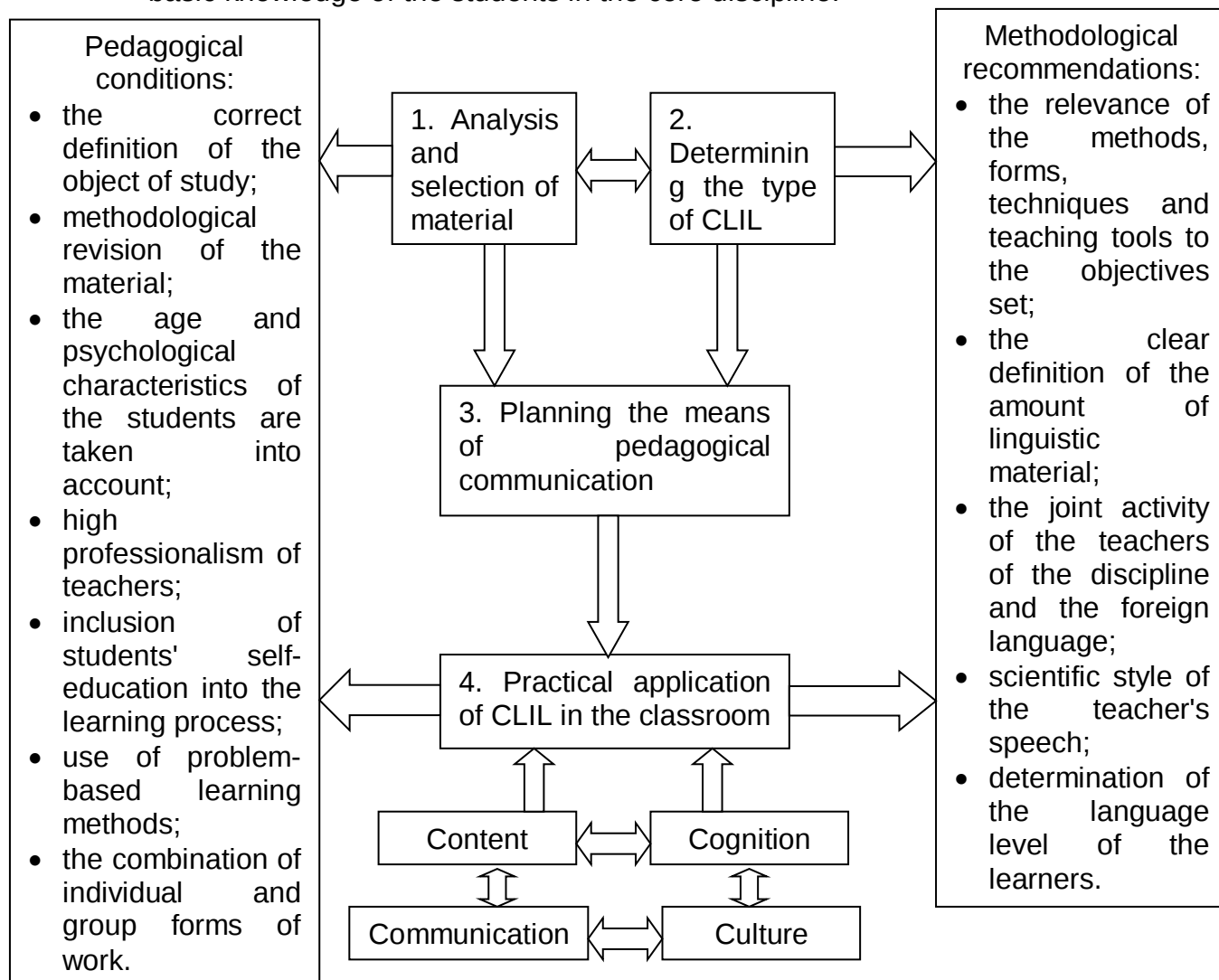


Figure 2 - Technique for applying the CLIL methodology at the initial stage of training of non-linguistic students

2. **Determining the type (model) of CLIL suitable for implementation.** At the initial stage, the soft (language led) CLIL model is predominantly used, which implies a focus on the specifics of the particular (professionally oriented) context.

3. **Planning the means of pedagogical communication.** Systematic work is not possible without planning, which helps to distribute teaching material and manage the development of students' skills. Planning involves the use of special CLIL lesson maps. The selected material is allocated to the different activities. In this way, teaching packages and practical exercises are developed. In order to use CLIL in the learning process, it is recommended to resort to a visual template for the development of a work unit. The unit should consist of several lessons on a specific topic and for a specific period of time. This template should be based on the building blocks of CLIL methodology (4C) which are essential for the learning process: content, cognition, culture, communication. The topics in the units should be diverse and relevant to the curriculum of the professional discipline.
4. **Practical application of CLIL in the learning process.** The work at this stage depends on many aspects: material and technical base of the institution, clear organizational and methodological work, professionalism of the teacher, their competence.

In line with the psycho-pedagogical principles of the CLIL methodology, the following educational conditions should be adhered to during the initial training stage to ensure the effective implementation of integrated lessons.

In the analysis and selection of material, selection of the CLIL model:

- accurate definition of the subject of study, and meticulous selection of lesson content;
- methodological review of the material, considering the psychological aspects of students' cognitive processes;
- obligatory consideration of the age and psychological traits of the students.

At the stages of planning and practical application of the CLIL methodology:

- the teachers' high level of professionalism, fostering creative collaboration between foreign language instructors and subject-specific educators in lesson preparation;
- incorporating students' self-directed learning into the educational process;
- employing problem-based learning methods and stimulating mental engagement at every phase of the lesson;
- a balanced integration of individual and group work formats.

In order for a CLIL-based foreign language lesson to be successful, according to the 4 "C" principle, the following is required:

- **Content** of the educational material, facilitating the acquisition of knowledge and skills in a specific subject area.
- **Communication**, which entails using a foreign language to discuss the subject matter, and conversely.
- **Cognition**, encompassing the advancement of logical thinking and the capacity to integrate gained knowledge with the articulation of one's own thoughts in a foreign language.
- **Culture**, which encompasses the exploration of diverse approaches to studying the material, ensuring in-class comprehension, deepening students' self-awareness and understanding of those around them, and fostering a broader understanding of the world as a whole.

The following methodological guidelines should be followed when organising the learning process using Content and Language Integrated Learning.

In the stages of analysing and selecting information, choosing the CLIL model and planning:

- the selection of instructional materials should be meticulous in aligning with the learning process's goals and objectives.
- the methods, forms, techniques, and tools chosen must be well-suited to the intended objectives and aligned with the expected outcomes.
- introducing a foreign language too abruptly can potentially adversely affect student motivation. Hence, instructors should clearly specify the extent of language integration within non-linguistic subject instruction.
- collaborative efforts between subject teachers and foreign language instructors are instrumental in ensuring the successful execution of Content and Language Integrated Learning (CLIL).

In the practical application phase:

- when teaching a class, special emphasis is placed on the teacher's scientific style of speech;
- before starting to work with a particular group of students, the teacher determines their language level.

This approach requires a great deal of teacher training. It is a rather time-consuming process that requires constant creative exploration. We have highlighted the following recommendations for teacher training in the application of CLIL:

1. the students should be explained the algorithm of activities in the classroom when applying the Content and Language Integrated Learning;
2. information delivery within the subject domain of study should be conducted using the English language. This can encompass various forms, such as written materials, videos, audio content, as well as oral communication, including conversations and dialogues;
3. while implementing Content and Language Integrated Learning, it is essential to guide students in comprehending the methodology and its application;
4. to facilitate effective learning, students should be equipped with didactic materials, dictionaries, reference books, and visual aids in the form of charts to enhance their understanding;
5. subject matter and language work should be constantly monitored and supervised by the teacher;
6. the teacher should organise summaries of the students' subject matter and language work.

In the early stages, implementing a teaching model based on full immersion in a foreign language can be quite challenging. Therefore, teachers often incorporate elements of CLIL into their lesson plans. For instance, the following exercises and activities are suitable for elementary-level students:

- *highlighting key words*; learners are offered scientific texts in a foreign language related to their non-linguistic specialisation, in which they need to highlight the most important terms and concepts; this can also include independent selection of lexical units which learners consider to be the most important in mastering the material;
- *searching for analogues of language terms in the proposed text*; receptive type of exercise; the teacher makes a list of terms in the mother language, and then invites the students to find their analogues in a scientific text in a foreign language;
- *filling in the blanks*; reproductive kind of exercise. The students are offered exercises aimed at filling in the gaps with terms that fit the meaning;

- *mind-map*; reproductive kind of exercise; students are encouraged to create an associative map based on a key idea and its instantiation; in the future students will be able to use this mind-map as a visual support to retell the material, do exercises or prepare for a lesson;
- *true-false statements*; a reproductive type of exercise; this type of exercise helps to control the comprehension of the text read and also involves further access to the spoken word;
- *questioning*; a reproductive type of exercise; in order to learn the vocabulary most effectively, the teacher can offer the students a list of terms to be questioned in such a way that these terms serve as answers; this not only reinforces the vocabulary learned, but also trains the grammatically correct construction of questions in the foreign language;
- *project development*; utilizing the project-based method, students acquire essential skills and competencies in various forms of oral communication. Additionally, this approach fosters independence in learners;
- *creative tasks*; these tasks are designed to nurture and enhance students' creative capabilities.

Hence, in the planning and execution of CLIL methodology during the initial stages, a specific sequence of steps is observed: the analysis and selection of content, the choice of an appropriate CLIL model, and the development of pedagogical communication tools for the practical application of CLIL methodology. To enhance the effectiveness of Content and Language Integrated Learning, it's essential to consider methodological instructions for teacher training and structuring the learning process. Soft CLIL emerges as the most effective model for teaching at the primary level.

2.3. The practical application of methodological recommendations for implementing CLIL in foreign language classes for non-linguistic majors students

The author's methodological guidelines for applying the CLIL methodology have served as the foundation for creating instructional materials for first-year Biology students at the College. The selection of the topic is based on the principle of aligning the subject matter with the foreign language, and it corresponds to the "Foreign Language" working program. To exemplify the practical implementation of this developed methodology, we have chosen one of the initial topics in the first year

of the Faculty of Biology, namely, "Biology and Life." In keeping with the authenticity principle, we have selected the article "How can GM tomatoes help fight cancer?" (See Appendix 1) from the popular science magazine "Science Journal for Teens" (Alimohammadi M et al., 2018).

Based on the text, a system of exercises corresponding to the initial stage of work with the CLIL methodology was developed. The aim of the methodological development was to acquaint the students with the new vocabulary on the topic "Biology and life", to form the ability to perceive the text and make a visual support (mind map) based on it, which was reflected in the developed training exercises. The training exercises were aimed at understanding and analysing the content plan of the text, analysing lexical and grammatical structures, learning new lexical material, and working with the mind-map structure which is new for the students.

Practical tasks were aimed at developing the ability to perceive the text as a unified semantic whole and to share their opinions in groups. Educational objectives included stimulation of creative activity, fostering the ability to work as a team, fostering tolerance and a sense of respect for other views and cultures. General educational tasks: development of a general and linguistic outlook.

Developmental objectives: advancement of analytical skills, enhancement of oral communication proficiency, cultivation of students' capacity to discern pertinent information in a text, promotion of personal initiative, attention, and imaginative thinking.

The training exercises were designed in accordance with the generally accepted stages of working with a text.

During the pre-text stage, the exercises were designed to prepare students for reading the text and to address potential challenges. Adhering to the principle of drawing from personal experience and prior knowledge in core subjects, as well as emphasizing group collaboration, the first task was formulated as follows:

Exercise 1

In small groups (3-4 people) make a list of 5 words that are associated with the term 'Biology'. Then compare the word lists from the different groups and identify the most frequent ones. Try to define chemistry as a science on the basis of the frequent words.

Then, according to the principle of linguistic and pictorial representativeness, a visual support is offered to present the learners with a Word cloud with the key concept

"Biology" (Figure 3). The students note which words in their lists are also contained in the Word Cloud produced by the teacher. This task is aimed at updating the students' vocabulary as well as their previous knowledge.

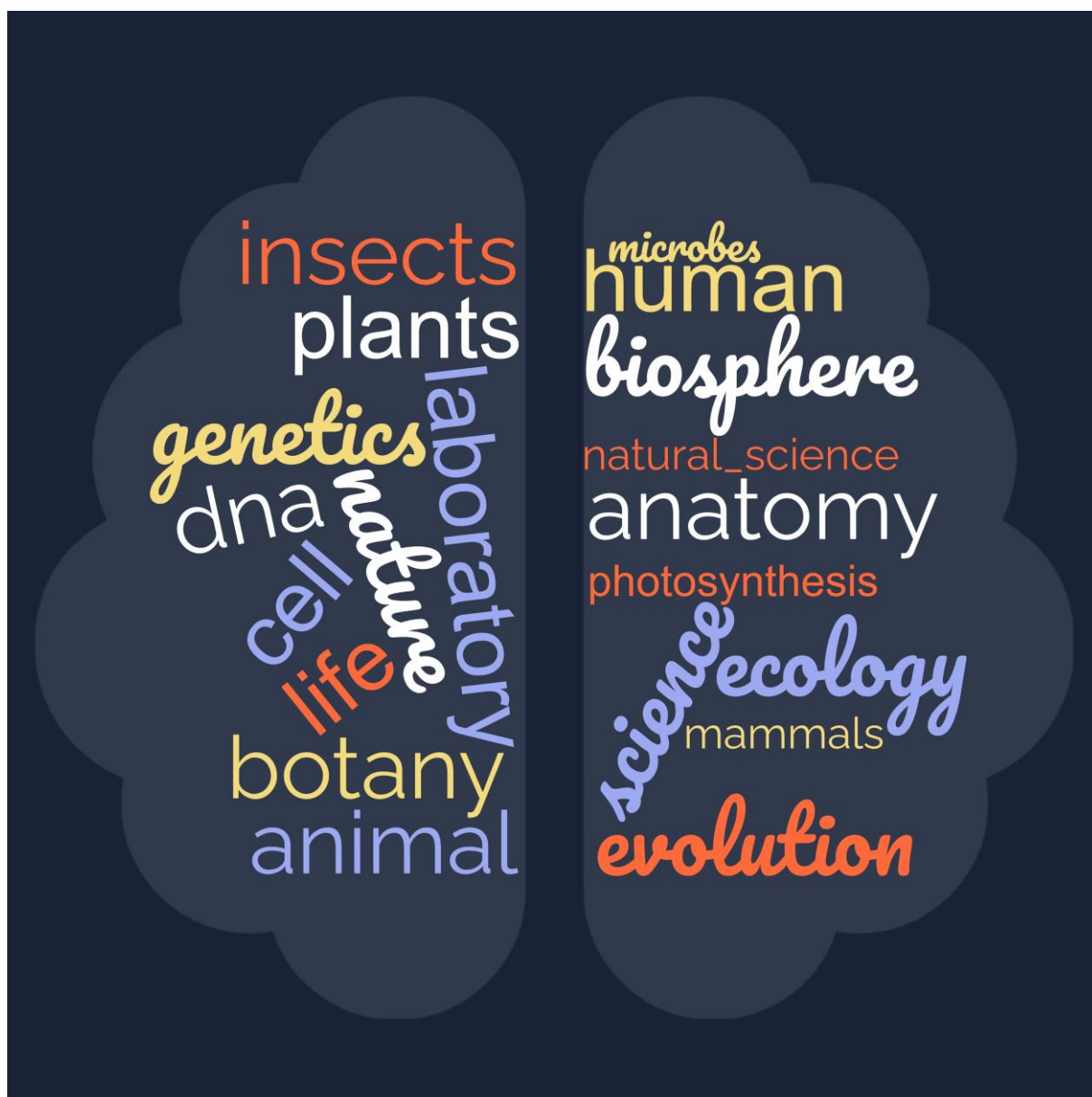


Figure 3. – Word Cloud

In the text phase, the system of exercises was focused on the operation of new lexical units and reproductive activities.

The textual exercise of highlighting key words in the text, according to the principle of conscientiousness, allows students to identify the most important concepts for them in the process of reading:

Exercise 2

Underline key words and phrases while reading.

The reproductive exercises aimed at consolidating the thematic vocabulary are both text-based and involve the use of the studied vocabulary in a new context (Exercises 3 and 4 respectively). Exercise 4 used authentic titles of scientific and popular articles taken from the Internet, which contained the required vocabulary units for training.

Exercise 3

Fill in the blanks without using the text.

1. Fruits and vegetables contain powerful agents called _____ that can help us fight many _____, including one of the biggest killers of all: cancer.
2. Cancer is one of the _____ causes of death for humans: it kills millions each year.
3. Some promising candidates for cancer prevention are substances called _____.
4. Lucky for us, these antioxidants can be found in some of the food we're eating: _____.
5. Tomatoes, for instance, contain certain antioxidants (called _____) that can help fight or _____ cancer and other diseases.
6. We recently made such a _____ (GM) tomato with increased antioxidant levels.
7. Finally, we exposed isolated breast _____ to each extract (some of extract of GM tomatoes and some to that of traditional tomatoes) in test tubes ("in vitro") to compare their cancer fighting _____.
8. Lastly, we ground up whole tomatoes of both types and analyzed their antioxidant content with two methods called _____ and mass _____ to identify which compounds might be helpful for fighting cancer cells.
9. We obtained these results both with the _____ microscopy as well as the flow cytometry method.
10. Our GM tomato has even more of these _____ antioxidants and could be useful for cancer _____, whether as a whole fruit or as an extract or food supplement.

Exercise 4

Fill in the blanks in the headings with the words given below.

Decline	Generate	Affects
Rescue	Sniff out	Spread

1. Ants can _____ cancer
2. How the ancient viral DNA in our genome _____ disease and development
3. How long will wildfire smoke last, and where will it _____?
4. Population _____ will change the world for the better
5. Plankton _____ a cloudy shield over the Antarctic
6. Plants call in hornets to _____ their seeds
(<https://www.scientificamerican.com/>)

According to the principle of problem-based learning, the following exercise requires analysis of the context and develops semantic and lexical guesswork:

Exercise 5

Find English equivalents for the suggested words in the text: *ткани, рак поджелудочной железы, противораковый, теплица, лазерный луч.*

The mind-map task provides for a creative approach to its execution and builds the students' productive skills. Before completing the task, the rules of mind-map compilation should be explained to the students and the purpose of its further application should be indicated. The mind-map also serves as a visual support for retelling, summarising subject, and language material on the studied topic, etc.

Exercise 6

Present your ideas as an intelligent map, using information from the text. Use a template.

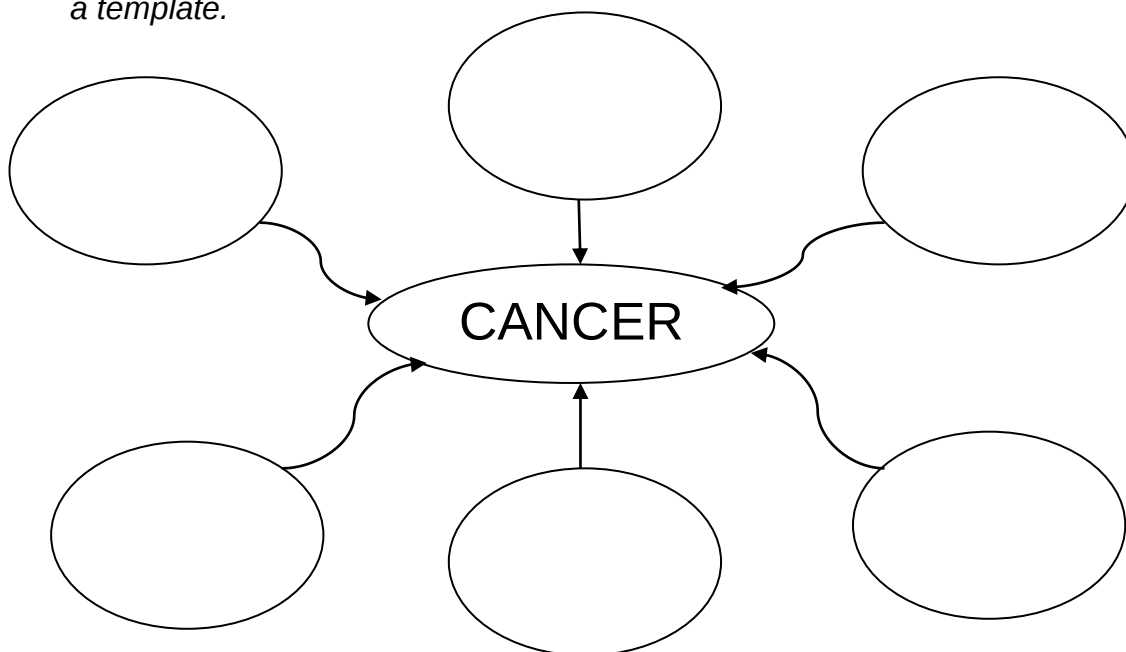


Figure 4 – Mind map template

The following tasks are designed to apply foreign language skills to the content of the study material, while simultaneously fostering an understanding of the subject matter and the development of professional communication skills in a foreign language:

Exercise 7

Answer the questions using words from the text.

1. What is the role of antioxidants, and how do they help against cancer?
2. Can you identify foods that are rich in antioxidants?
3. Could you explain the impact of tomato extract on cancer cells?

Exercise 8

Three-minute essay. Answer the question "How can you prevent cancer?" and write a short essay (50-100 words).

According to the methodological recommendations, the students' content and language work should be constantly monitored and supervised by the teacher, which is reflected in the explanation of the technique of performing a task (for instance, compiling a mind map).

The final, post-textual stage, according to the given methodological recommendations, is aimed at summarizing the lesson and reflecting on it: evaluating the performance of the exercises and sharing the results of the mind maps.

To practically assess the methodological development based on the text "How can GM tomatoes help fight cancer?" and the accompanying set of exercises, group of biology students of first-year was selected. The choice of the text and the student group was based on the text's subject matter, its level of complexity, and the students' readiness. The group comprised 12 students, all of whom were performing well academically. Each student in the group displayed a genuine interest in foreign language learning, and they were attentive and highly motivated. The students were provided with an explanation of the CLIL methodology's core principles, as well as the specific aims and objectives of the experiment.

A positive reception from the students, who were genuinely intrigued by this novel approach to lessons, was evident. The students attentively focused on the foreign language instruction provided during the CLIL session. It was observed that, initially, the students were not entirely self-assured and occasionally faced challenges in

comprehending the teacher's speech. In some instances, the teacher needed to rephrase or elaborate on sentences to aid comprehension. However, as the session progressed, the learners adapted, increasingly relying on their own linguistic judgment, and making more effort to decipher the sentence's meaning within the broader context.

After completing the practice exercises, the average score of the group was calculated. Each completed exercise was graded on the following scale:

- Exercise 1 – from 0 to 5 points;
- Exercise 2 – from 0 to 5 points;
- Exercise 3 – from 0 to 10 points;
- Exercise 4 – from 0 to 6 points;
- Exercise 5 – from 0 to 5 points;
- Exercise 6 – from 0 to 5 points;
- Exercise 7 – from 0 to 5 points;
- Exercise 8 – from 0 to 5 points.

Out of 46 points the average score of the group was 40.9 and only one learner completed all of the exercises. The mind map was assessed as follows: the students were asked to voice their own ideas based on a basic Biology concept. The evaluation criteria were the number of key words chosen for the basic concept (one word – one point). The required number of words is five. Interestingly, most of the students successfully completed the task and matched five concepts with the key word. The students liked this exercise the most.

Consequently, by the conclusion of the lesson, the students demonstrated their capacity to effectively employ the vocabulary related to "Biology and life" in practical contexts. They were proficient in explaining and rectifying errors, using the vocabulary in spoken form, comprehending content, retrieving essential information from a text, and articulating theoretical concepts both in writing and through oral expression, all while utilizing the language skills they had acquired.

To summarise, the CLIL methodology is quite successful in non-linguistic faculties. In order to finally convince ourselves of the feasibility and applicability of the methodology, questionnaires were distributed to the learners asking them to write down what they liked best and why. A significant proportion of the learners expressed that they found foreign language instruction and the choice of exercises to be the most engaging and productive aspects of the lesson. Furthermore, many students

highlighted the mind map exercise as the most captivating activity in the questionnaire.

THE QUESTIONNAIRE

What did you enjoy the most?

- 1) Teaching in a foreign language
- 2) Text selection
- 3) Choice of exercises
- 4) Your choice: _____

Conclusion on chapter 2

Therefore, we have conducted a comprehensive assessment and analysis of the existing classifications of CLIL models as proposed by researchers. Our findings indicate that the Soft CLIL, often referred to as the language-driven model, is the most suitable for introducing non-linguistic students to CLIL at the initial education stage. Furthermore, we have outlined a series of steps involved in working with the CLIL methodology, which encompass the selection and analysis of materials, the identification of the appropriate CLIL methodology for implementation, the organization of materials into various activities through planning, and the practical application of the CLIL methodology in foreign language classes.

Additionally, we have identified a set of pedagogical conditions necessary for the effective use of the CLIL methodology. We have also established methodological guidelines for teacher training and the integration of CLIL methodology into the teaching process. According to the principles of this methodology, to introduce CLIL elements into foreign language classes for non-linguistic students, we have compiled a list of exercises suitable for the initial stages of training. These exercises include activities such as highlighting key words, seeking analogies for terms in the provided text, filling in gaps, creating relationship diagrams, engaging in creative tasks, and other related exercises.

To put the methodological recommendations for CLIL implementation into practice in foreign language classes, we have developed a specific set of exercises based on text materials appropriate for students at the initial level. To validate our methodological development, a group of first-year students from the Faculty of Biology was selected for a trial. After summarizing the results of the lesson, it became evident that the CLIL methodology can be successfully implemented in non-

linguistic faculties, provided that the recommended principles and guidelines highlighted by us are followed.

CONCLUSION

The primary objective of this research was to establish evidence-based methodological recommendations for incorporating CLIL (Content and Language Integrated Learning) into the educational process for non-linguistic students at the outset of their academic journey.

Upon examining the role of CLIL methodology within the context of a competency-based approach, we have determined that its core objective is to cultivate cognitive or academic language competence in learners. This competence is directed towards enhancing the development of critical thinking skills within the specific field of study, improving foreign language proficiency, and enabling the acquisition and application of subject-specific vocabulary and terminology. The CLIL methodology also entails fostering qualities such as resilience, self-directed learning, mental adaptability, and active engagement. Additionally, CLIL enables educational institutions to move beyond the conventional communicative scenarios found at the school level, particularly in General English classes, and transition towards situations that mirror future professional interactions for students.

The salient characteristics of the CLIL methodology encompass the seamless integration of content and language, the cultivation of intercultural communication skills, the promotion of a global perspective, its applicability across various age groups and educational levels, and its emphasis on the development of linguistic, social, cultural, academic, and other competencies that facilitate knowledge acquisition in both the discipline and the foreign language itself.

Through our analysis of the specific characteristics of the CLIL methodology, we have identified key psychological and pedagogical principles that should serve as the foundation for organizing CLIL instruction. These principles encompass: the principle of conscientiousness at any stage of learning, the principle of consistency, the principle of reliance on personal experience and background knowledge of the profile subject, the principle of predominance of group types of work, the principle of linguistic and other object-image visualization, the principle of authenticity, the principle of problem-based learning, the principle of project activity, the principle of

correlation between the studied topics in the academic discipline and the foreign language.

In order to determine the position and role of the CLIL methodology within the educational process, we conducted a comparative analysis of CLIL in contrast to other teaching methods. This analysis revealed the primary distinctions between CLIL and similar methodologies. Notably, we found that the application of the CLIL methodology is vital for achieving a harmonious integration of subject content and foreign language acquisition.

After evaluating various CLIL models, we have concluded that the Soft CLIL model is particularly recommended for the initial stages of learning. This model allows for a partial immersion in the foreign language and is considered one of the most effective approaches for non-linguistic students to acquire a foreign language.

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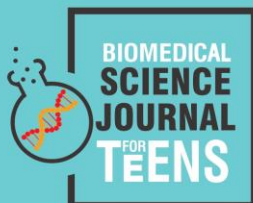
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How can GM tomatoes help fight cancer?

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Abstract

Did your parents ever tell you that eating your fruit and veggies is good for you? Well, they're right! Fruits and vegetables contain powerful agents called *antioxidants* that can help us fight many diseases, including one of the biggest killers of all: cancer. With *genetic engineering* techniques, we created a new tomato that is even healthier than its traditional counterparts. In this study, we not only show

that it contains more compounds that are beneficial to our health, but also that it has higher cancer-fighting powers than traditional tomatoes. We believe that our new tomato can aid in cancer prevention, either by simply eating it or by turning it into food supplements or cancer prevention medicine.

Introduction

Cancer is one of the leading causes of death for humans: it kills millions each year. There are many different kinds of cancers, but in all of them the body's cells begin to divide without stopping and spread into surrounding tissues. This often causes significant damage or even death.

Scientists are working hard on finding or developing substances that help fight or prevent cancer. Some promising candidates for cancer prevention are substances called antioxidants. These compounds fight cancer either by stopping cancer cells from growing or by stimulating our *immune system* (the system that fights diseases in our body).

Lucky for us, these antioxidants can be found in some of the food we're eating: fruit and vegetables (Figure 1). So what your parents have been saying about them is true after all! Studies have shown that eating them can reduce the risk of various diseases, including many cancers (such as breast, lung, pancreatic or colon cancer).

Tomatoes, for instance, contain certain antioxidants (called *flavonoids*) that can help fight or prevent cancer and other diseases. Wouldn't it be great if they had even more healing



Figure 1:
Many fruit and vegetables contain powerful compounds called antioxidants that help our bodies fight diseases and even cancer.

powers? Many scientists (including us!) think so and have tried to increase their amount of flavonoids through either traditional plant breeding or genetic engineering techniques.

We recently made such a *genetically modified* (GM) tomato with increased antioxidant levels. Now we wanted to know if this tomato (or its extract) indeed has more cancer-fighting power. To do so, we tested its cancer fighting activity in our lab, and also compared the nature and amount of antioxidants in our GM tomato to that of regular tomatoes.

Methods

First, we grew GM tomatoes and traditional tomatoes plants from seeds under the same conditions in a greenhouse. Later we picked the tomatoes and immediately froze them for use in our experiments. We then turned them into extracts that contained all their flavonoids. Finally, we exposed isolated breast cancer cells (Figure 2) to each extract (some of extract of GM tomatoes and some to that of traditional tomatoes) in test tubes ("in vitro") to compare their cancer-fighting abilities.



Figure 2:
Flasks with breast cancer cells.

We used three types of special equipment/technology to analyze the impact of each extract on cancer cells:

- 1) **Fluorescence microscopy:** cancer cells are stained with special colors that make them light up ("fluoresce") under a special kind of light under the microscope. That allows us to distinguish between live and dead cells.
- 2) **Flow cytometry analysis:** this technique helps us to detect a certain cell type with the help of a laser beam. The samples light up differently depending on what kind of cells there are.
- 3) **Gene expression analysis:** we isolated *RNA* as a measure of gene activity in cancer cells to understand better how our extract kills cancer cells.

Lastly, we ground up whole tomatoes of both types and analyzed their antioxidant content with two methods called *chromatography* and *mass spectrometry* (see glossary for more info) to identify which compounds might be helpful for fighting cancer cells.

Results

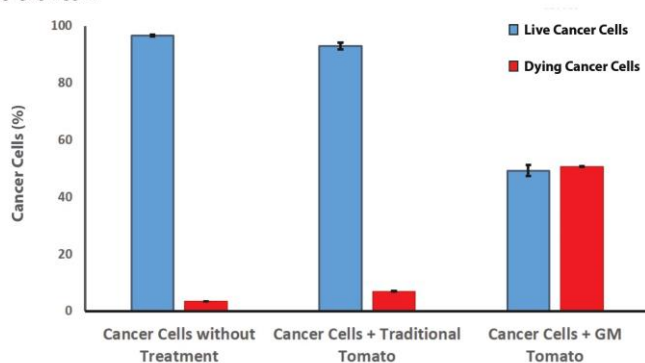
Our GM tomatoes contained 37%-50% more *phenolic compounds* (a group that also contains flavonoids) than the traditional tomatoes.

When exposed to breast cancer cells in test tubes, the GM tomato extract killed more cancer cells than the extract of

traditional tomatoes (Figure 3). We obtained these results both with the fluorescent microscopy as well as the flow cytometry method. The later one showed that extract of GM tomatoes killed up to half the cancer cells in our test tubes.

Which tomato extract had the highest cancer fighting power?

Figure 3:
Death of breast cancer cells when exposed to traditional or GM tomato extract. The first bar is the control, so it shows the normal rates of cell death for cancer cells that are not treated with any tomato extract.



Discussion

Tomatoes are great for our health because they naturally contain special compounds (antioxidants) that help fight diseases, including many cancers. Our GM tomato has even more of these beneficial antioxidants, and could be useful for cancer prevention, whether as a whole fruit or as an extract or food supplement. In fact, our lab experiments showed that the extract of our GM tomatoes killed more cancer cells than traditional tomatoes. We were even able to identify various compounds of our tomato extract that might be key players in cancer defense (for instance, Naringenin and Kaempferol).

Our gene expression analysis showed that the GM tomato extract had a different effect on the gene activity of cancer cells than the traditional tomato extract. The genes affected seem to involve the production of DNA and RNA in the cancer cells, which are crucial for their survival and multiplication.

Our research is a promising step in understanding the health benefits of certain food components. We need more research like ours to identify more of these compounds and what gives these compounds their cancer- and disease-fighting powers.

Conclusion

Scientists and doctors have believed for thousands of years that certain foods are beneficial for our health. Now, with genetic analysis, we can prove that is true, and even show what exactly is happening when beneficial compounds from our food come in contact with harmful cells in our body. Fruits and vegetables especially are high in beneficial compounds

called antioxidants that can help fight cancer and other diseases. So next time you hear "Eat your veggies," don't just roll your eyes or ignore this advice. If you follow it, you'll stay healthier and happier in the long run. And now you can even quote current research like this one to explain what's going on!

Glossary of Key Terms

Antioxidants – chemical compounds that delay some types of cell damage. They can be found in many foods, including fruits and vegetables.

Chromatography – a laboratory method of separating a mixture of different compounds (in our case, the antioxidants in our tomato extracts). The mixture is dissolved in a fluid called the mobile phase, which carries it through a structure holding another material called the stationary phase. The various constituents of the mixture travel at different speeds, causing them to separate.

Flavonoids – a group of chemical compounds in plants with many functions, including given certain plant parts like flower petals or fruits color. ("Flavus" means "yellow" in Latin). They act like antioxidants when consumed by humans.

Genetic engineering – the process of altering the DNA of genes.

Genetically modified (GM) plant – plant in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination. In our case, we modified tomatoes genetically to produce higher levels of antioxidants.

Immune system – a body's defense system against pathogens and other intruders. It consists of a network of cells, tissues, and organs that work together to protect the body.

In vitro – Latin for "in glass." It describes experiments done in test tubes (like our experiment of exposing our tomato extract to breast cancer cells). The opposite would be "in vivo" which are medical tests done in living organisms.

Mass spectrometry – an analytical technique that measure the mass of substances. We can then compare the mass with a database of masses of known substances to identify what we're looking at (in our case: antioxidants in tomatoes).

Phenolic compounds – a group of chemical compounds in plants that have a certain structure. Flavonoids also belong into this group.

RNA – short for RiboNucleic Acid, a nucleic acid present in all living cells. Its main role is to act as a messenger carrying instructions from DNA for controlling the synthesis of proteins.