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CONTENT AND LANGUAGE INTEGRATED LEARNING APPROACH IN MATHEMATICS

Аннотация. Статья посвящена изучению особенностей подхода CLIL и его различий от обычных уроков иностранного языка при изучении математики на английском языке. Были изучены преимущества и недостатки данного подхода. Цель исследования заключается в изучении подхода CLIL и его особенностей на занятиях в Институте математики и механики имени Н.И. Лобачевского. Результатом исследования был анализ урока в ИМиМ. Была доказана эффективность применения CLIL при изучении математики на английском языке. Статья может быть полезна тем, кто связан с системой образования, ищет новые методы обучения и преподавания различных предметов.

Ключевые слова: CLIL-подход, математика, английский, иностранный язык, занятия, обучение, знания, навыки.

Abstract. The article is devoted to the study of the peculiarities of the CLIL approach and its differences from ordinary foreign language lessons in the study of mathematics in English. The advantages and disadvantages of this approach were studied. The aim of the research is to study the CLIL approach and its peculiarities in the

classes of N.I. Lobachevsky Institute of Mathematics and Mechanics (IMM). The result of the research was an analysis of a lesson at IMM. The effectiveness of CLIL application in the study of mathematics in English has been proved. This article may be useful for those who are involved in the education system and are searching for new methods of teaching and learning of different subjects.

Key words: CLIL approach, study, foreign language, English, lessons, learning, knowledge, skills.

Currently, the educational system actively uses Content and Language Integrated Learning to teach various subjects. The relevance of this approach is that it is very widely and successfully used not only in foreign countries, but also in Russia. In our country CLIL is used in general education schools with a profound study of foreign languages, as well as in non-language colleges and universities, where students study major subjects during the subject "Foreign language" [1]. CLIL describes a progressive approach to teaching and learning in which subjects are taught and studied using a foreign language [2].

Students are exposed to a wider range of languages while simultaneously acquiring knowledge and skills in various areas of the curriculum. Knowledge of the language becomes the way to learn the content, the language is integrated into the overall curriculum, learning is enhanced by increased motivation and the study of textualized natural language [3]. CLIL is used to learn mathematics as an aspect of a career in a non-native language in order to be competitive not only at home, but also abroad. CLIL is also used for a deeper understanding of mathematics, to improve the level of foreign language skills and to develop communicative skills. The aim of the research is to study the CLIL approach and its features in classes at N.I. Lobachevsky Institute of Mathematics and Mechanics.

The acronym CLIL was invented in Europe in the early nineties to describe any dual focused type of provision in which a foreign language is used for the teaching and learning of a non-language subject [4]. In CLIL, a language becomes the medium instead of the end in itself.

The successful CLIL lesson must incorporate elements from the following four principles:

- **Content.** Progression in knowledge, skills and understanding associated with specific elements of a defined curriculum.

- **Communication.** Using a language to learn while learning to use a language.

- **Cognition.** Development of thinking skills that link the formation of concepts (abstract and concrete), understanding and language.

- **Culture.** Exposure to additional perspectives and common understanding.

A lesson from the CLIL is based on a four-step framework.

- Processing the Text. The best texts are those with illustrations to allow students to visualize what they are reading.

- Identification and Organization of Knowledge. Diagrams are used to facilitate learning and creating activities with an emphasis on language development and knowledge of basic content.

- Language Identification. It is anticipated that learners will be able to reproduce the bulk of the text in their own words.

- Tasks for students. A variety of tasks need to be provided, considering the learning objective and learner styles and preferences. Receptive skills activities include reading/listening and doing [3].

A CLIL lesson is neither a language lesson nor a subject lesson translated into a foreign language nevertheless. CLIL includes many aspects of language teaching methodology.

The CLIL methodology is based, similar and integrates many aspects of the ELT: CLIL and Situational Learning, CLIL and Language Acquisition, CLIL and the Natural Approach, CLIL and Motivation, CLIL and Current ELT Practice. Language is learned with greater success when the learner has the opportunity to learn about the subject at the same time. In many respects, the CLIL approach resembles a modern ELT concept of integrated competency lessons, but includes language exploration, is provided by a teacher familiar with the CLIL methodology and is based on material directly related to a content-based subject [3].

CLIL offers learners a richer and more naturalistic environment that enhances language acquisition and learning, and thus leads to a better mastery of learners of all abilities. CLIL learners process the spoken word in a foreign language in order to receive new information, while integrating new knowledge into an existing body of knowledge [4].

The benefits of the CLIL approach are numerous: it develops learner confidence, improves academic cognitive processes and communication skills, and promotes intercultural understanding and community values. Despite many advantages, CLIL has disadvantages. For example, the development of substantive materials, time-consuming and labor-intensive preparation for lessons, and few qualified personnel who train teachers in this approach [2].

Since the aim of the study is to apply CLIL in learning mathematics through English, one of the foreign language lessons in the group.

At the beginning of the lesson, the lecturer asked several questions to discuss a new topic. The students shared their thoughts and ideas in English. Then they practised reading new words and proceeded to read a geometry text. Work with the text included illustrative material (pictures of segments and points on the plane) to help the students better absorb the information, as well as structural "markers" in the texts so they could navigate the content. Then they wrote transcriptions and definitions of mathematical terms, translated sentences, found keywords, gave Russian and English equivalents of certain expressions from the text, related the mathematical terms and their corresponding definitions, inserted the missing words, and answered questions after the text. The students also retold the text they had read, prepared for a dialogue with their conversation partner, and abstracted an unfamiliar geometry text.

The students included people who had a good command of a foreign language and who had never studied it. Lack of language proficiency can be a serious obstacle to comprehension and learning. The students who do not understand a foreign language worked more actively with the material to overcome the language barrier. Despite varying levels of knowledge, each student achieved good results.

During the analysis of the watched lesson we noticed a decrease in anxiety, a good knowledge of all four skills - listening, speaking, reading and writing, which increase the language acquisition. Many students became more motivated to learn Maths and English, to increase their proficiency and to learn new ones. Thanks to CLIL the students acquired a wider and more diverse vocabulary, developed communication skills, practiced the application of theoretical material, and developed the ability to work in a team and express themselves. The students stepped out of their comfort zone, learnt more effectively, got used to unfamiliar situations, and learnt to think critically.

In the study of the CLIL approach features and its use in practice during the study of mathematics with the help of English were considered. The results of the analyzed lesson has shown that CLIL promotes students' motivation to study subjects, increases their foreign language proficiency, expands their vocabulary, develops critical thinking, and builds communicative skills. The interdisciplinary instruction provides the conditions in which effective learning happens, because students learn more when they use language skills to explore, write and talk about what they are learning. The skills listed above are reflected in the student's future professional sphere.

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