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THINKING SKILLS IN CONTENT AND LANGUAGE INTEGRATED LEARNING

Abstract

Educational approach known as Content and Language Integrated Learning (CLIL) has become one of the most popular approaches in foreign language teaching, especially in countries with developed educational systems. One of its main aims is to help learners develop thinking skills through their simultaneous studying of the foreign language and the content of a particular subject. Since CLIL promotes the development of cognitive skills, many researchers and psychologists proposed a variety of techniques and activities which could be used for this purpose. Some of these techniques shall be discussed in this paper, along with the ways of applying them at different levels of education.

Key words: CLIL, education, thinking skills, techniques

Introduction

Content and Language Integrated Learning (CLIL) is an educational approach that has become very popular over the last decades. The term was coined in 1994 by David Marsh and he defines CLIL as a dual-focused educational approach in which an additional/foreign language is used for the learning and teaching of both content and language (Mehisto, Marsh & Frigols, 2008). CLIL is also important in terms of its strikingly powerful motivating role in encouraging people to learn additional languages, which was one of the main reasons why the European Union Commission promoted the idea of using CLIL at all levels of education.

There are various ways of implementing CLIL in language learning, all of them contributing to the acquisition of specific vocabulary, as well as to developing the four language skills (speaking, reading, writing and listening). At the core of all CLIL activities are four building blocks, usually referred to as 4 Cs: *Content, Communication, Cognition, and Culture* (Coyle, 2008). This paper is focused on cognition, i.e., on the development of learners' thinking skills, especially in terms of teaching English language within the CLIL approach.

Theoretical background

The development of cognitive skills plays a vital role in education and it has therefore been given much attention by numerous researchers. As explained by Eric Jensen (2005), in order to be able to transfer the knowledge to learners and to help them develop cognitive skills, one must gain an understanding of thinking processes. In other words, educators should be aware of how brain works in different environments and in different emotional states. Jensen further believes that cognition is built from six components, including sensory and motor systems, auditory and language systems, attention and executive functions, social and emotional systems, memory systems, and behavioural and reward systems. All the aforementioned systems cooperate during the development of cognitive skills in educational process.

Moreover, the studies Jensen relied on show that the children included in the programs dealing with the development of cognitive skills, one of them being CLIL, may improve their language fluency, their IQ, as well as their social and emotional intelligence. On the other hand, James E. Zull (2006) promotes the idea that in order to help learners develop their thinking skills, educators should not only transfer their knowledge to learners, but they should also provide them with new situations and experiences, which would motivate learners to *generate their own ideas* and theories. By challenging learners in this way, educators help them include the additional sensory data in order *to learn from their own experience*, rather than learning from what teachers present to them without practical application.

Critical thinking developed in this manner includes mental processes such as *selection, comparison, categorization, judgment, as well as focusing attention* (Cottrell, 2005). In other words, if learners want to dig deeper below the surface of a subject, they are expected to be highly skillful in *recognizing, evaluating, reading between the lines, drawing conclusions, and expressing opinions.*

What teachers need to take into consideration throughout the entire teaching/learning process are learners' individual differences and their different ways of learning, since not all students learn in the same way and at the same pace. As stated by Cottrell (2005), personal or emotional/affective reasons could also affect learners' abilities of learning and they could be a barrier in the learning process. Due to this fact some students could find it difficult to use thinking skills in new contexts and abstract problem-solving and academic tasks. Their educators should therefore be aware of this issue and adapt the activities used for developing thinking skills to all their students equally by triggering the knowledge students already possess, which can be related to Vygotsky's concept of Zone of Proximal Development (ZPD).

There are certain thinking skills which are particularly significant for the learners' cognitive development. According to Danah Henriksen (2017) they include *perceiving, patterning, abstracting, modeling, and synthesizing.* For the successful development of such skills Dana Hanesová (2014) presented several techniques and strategies which could be used in teaching. All of them address the Bloom's taxonomy, cognitive objectives belonging to two types of thinking skills: higher order thinking skills (HOTS)[1] and lower order thinking skills (LOTS)[2]. The ultimate goal of Bloom's taxonomy is to help learners achieve the progress from LOTS to HOTS. This progress is fundamental in the development of learners' cognitive skills. Each of those skills belongs to a particular level of thinking in the taxonomy. Table 1. gives the examples of different student activities in which the taxonomy could be applied at different levels of education.

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[1] remembering, understanding and applying
[2] analyzing, evaluating and creating

Table 1.
Activities related to development of thinking skills

LOTS	
REMEMBER recognize, name, list, identify, define, choose	– make a list of events/characteristics – list all the … (e.g., verbs in passive voice) in the text – write down the facts
UNDERSTAND Compare, classify, cause and effect, exemplify, summarize	– retell the story in your own words – explain the difference between … and … – predict what will happen after the experiment is conducted – summarize the process/story/event
APPLY Plan, draw conclusion, carry out, implement, interpret	– construct a model of … – develop a set of instructions about … – design a market strategy for your product – make a plan to carry out a research/an experiment
HOTS	
ANALYZE Compare, investigate, examine, contrast, differentiate, distinguish	– do research about the topic to support your point of view – make a family tree showing relationships – watch documentary movie and write a review – choose the work of art and make a review about it describing its color, form, etc.
EVALUATE Appraise, argue, defend, select, evaluate	– conduct a debate about … – What changes would you recommend for …? – discuss the results obtained in the survey
CREATE Design, manage, formulate, construct, produce, build, develop	– create a product and plan a marketing campaign for it – write a recipe for your own dish – construct the model of DNA and RNA – construct a wind turbine

There is a variety of techniques and strategies relying on Bloom's taxonomy which are applicable in teaching within CLIL. Those techniques and strategies could be used for different purposes such as stimulating learners' creative thinking skills in generating problem-solving ideas, for teaching vocabulary, etc. Some of them are more suitable for group work.

Thinking/cognitive skills developing techniques which could be particularly helpful in teaching vocabulary are those using graphic organizers as tools for *helping learners organize their ideas*. Such techniques are significant for scaffolding input and they help learners *notice, observe, compare and contrast* the most important terms and concepts related to the topic. Most of them could be used as visual aids helping learners notice the most important terms and concepts related to a particular topic as well as express their own ideas. Some of those graphic organizers include tag clouds which can be generated online by using a certain program where the size or color of font shows the most important terms and concepts. The pictures generated online are mostly used by educators to present learners with the most prominent terms and concepts related to the topic.

Mind maps*, on the other hand, could help learners *develop ideas* in their own way, using pictures or symbols that help them understand the topic easier. Starting from the main idea, they could write down the terms and concepts which would *help them understand or explain the topic* easier, along with the vocabulary related to it.

Besides scaffolding input, activating prior knowledge plays an important role in the development of cognitive skills in CLIL. The technique which is particularly useful in this aspect is *brainstorming*. It enables learners to retrieve their knowledge of the subject content by remembering and putting together the terms, concepts, and vocabulary related to a particular topic.

Since encouraging learners and teaching them how to solve problems on their own is very important in CLIL, using techniques such as Lotus blossom, or SCAMMPERR, could be extremely helpful in developing thinking skills. After learners are presented with a particular problem by the instructor, one of these techniques for problem solving may be applied. The first one positions the

problem in the center of a so-called *matrix* visually surrounded with the steps for problem solving. The steps are proposed by the learners who use them *to expand on the main idea* of the problem. The name of the technique originates from the resemblance to the lotus flower blossoming since the learners' ideas unfold and develop in the same manner.

The second technique also includes the steps which should be followed in order for learners to generate and share new ideas in problem-solving. Beginning with *Substituting*, learners should then *Combine, Adapt, Magnify/Minimize, Modify, Put to another use, Eliminate, Rearrange, and Reverse*, hence the name SCAMMPERR (Hanesová, 2014).

Besides the techniques allowing learners to work individually, there are some which are more suitable for group work. They motivate learners to cooperate and thus observe problems from different points of view, which is frequent in CLIL practices - for *developing critical thinking*. After learners are given the topic or a problem to solve, their different ways of learning and observing should help them find a solution together, without the help of their instructor. A nice example is a technique called *De Bono's 6 Thinking Hats* (Hanesová, 2014). It is a technique which is mostly used for brainstorming and exploring problems and solutions from different points of view. Therefore, it is quite popular and applicable in a group work.

Another technique significant for the development of cooperation among learners, as well as for their understanding of the meaning of their responsibilities is known as project-based work. It could increase learners' *creativity and autonomy*, and also *foster their critical thinking*. The educator's task is to monitor the process and to encourage learners to use the foreign language among them. In this way, some of the most important aims of CLIL could be achieved – learners learn and use the additional language while engaging their critical thinking to complete the tasks given by the educator.

In primary education, the emphasis is on communication and active listening, while fluency is emphasized over accuracy, with the exception of pronunciation. It is crucial for students to be in an environment which could boost their self-confidence and thus contribute to the development of their thinking skills, since *critical*

thinking is fostered with learners' autonomy, authenticity, scaffolding and meaningful learning (Sepesiova, 2015).

As students in primary education learn easily and acquire language unconsciously, the importance of a play is emphasized at this level. As reported by Henriksen (2017), not only that it intrinsically motivates learners, but it also enables them to be flexible and *to improvise* while playing. Moreover, the play helps children build an *understanding of the world through exploration and discovery* and therefore it can be implemented in different subjects at the primary level of education. Such students do not have the same level of understanding of abstract phenomena as students at higher levels of education. Nevertheless, it is possible to use various cognitively challenging activities even at this level of education which would foster their thinking skills, as well as language acquisition, but still not be too demanding for their cognitive level. In this way, learners should be prepared for their secondary education in which the successful implementation of CLIL would depend on the extent to which CLIL was implemented at the primary level.

Students at the secondary level use their thinking skills in different ways from students at the primary level since they are more aware of abstract phenomena. There is a great variety of activities and teaching practices which could be used for fostering students' thinking skills at the secondary level of education, and some of these practices include different forms of dialogues and discussions while dealing with authentic and real-world problems, also known as *problem-based learning* (Lapuz & Fulgencio, 2020). In those situations, learners should be able to draw conclusions, express their opinion, reflect on issues, etc., while using an additional language at the same time. Furthermore, learners develop their cultural awareness (as another important aspect of CLIL) by being involved in activities related to different topics from their socio-cultural environment. Playing is not used as frequently as with younger learners, but there are still various games which might motivate high school learners by increasing the competitiveness among them, which is desirable to a certain extent. What is considerably significant for students, especially at higher levels of CLIL education, is creating attitudes and understanding, since they are the factors that trigger learners to engage their

thinking skills and the additional language properly. A successful transition from secondary education to a university level could be made if high school students have already developed critical thinking, because, at tertiary level of education it is expected from them to think critically (Zanden, Denessen, Cillessen, & Meijer, 2020).

Jesús Ángel Gonzalez and Javier Barbero (2013) claimed that not many experiences related to developing thinking skills were documented in higher education. Since learners at this level are already more autonomous and they are able to create their own understanding, they should be encouraged to build correlations between areas of knowledge, as well as between old and new information through different activities proposed by their instructors. Therefore, minimal instruction is needed for them. In CLIL environment, learners are challenged in such a direction so that the knowledge they already possess can be triggered and, at the same time, an additional language applied in new situations. Learners are challenged to explore issues independently, but not to a great extent, because too demanding tasks might demotivate and discourage them. Obviously, CLIL plays an important role since it increases learners' motivation and "enables learners to perform to the level of their linguistic and academic competence" (Vilkancienė, 2011, p. 115).

CLIL and cognition

As already mentioned, cognition, i.e., development of thinking skills, is an important foundation pillar in CLIL. In the following lines some of the most useful activities used in that direction will be presented. It is worth mentioning that even though they might be used at more than one level of education, some of them are more applicable at a certain level than at the others.

The first technique useful at all levels of CLIL education is *patterning*. The process of patterning is related to making patterns in order to remember the structure of certain phenomena or the steps of some processes. Since *thinking in patterns*, according to Henriksen (2017), is one of the ways of thinking, along with *thinking in words* and *thinking in pictures*, some learners find it easier to remember concepts if they are presented to them in

patterns. For example, if learners find it difficult to understand the structure of an iambic pentameter in a poem written in the foreign language, the CLIL teacher invites learners to clap to the beat of the iambic pentameter in order to feel and recognize the pattern.

Another example could be related to the use of a musical composition broken down into segments, each of those segments corresponding to different parts of a pattern. When combined, they should make the composition complete, and if the composition is disrupted, it should be a sign for learners that there is a mistake in the way they created the pattern. For example, a life cycle of a butterfly could be presented in this way in a CLIL Biology class to elementary school students, while students in high schools could learn about the process of perception in psychology in this way. A similar activity used at tertiary level of education could, subsequently, include the process of *consolidation* as another important thinking skill.

The next technique relates to the concept of *modeling* and its application in the CLIL classroom. Learners are sometimes not able to understand the essence or the purpose of a particular thing or the process if they do not perceive it visually. Model-based instruction could give learners an insight into the way things were created and it can help them make sense of what they see. Therefore, "it is essential to build a model as a plan in order to represent something and understand the idea in tactile or real world terms, before it comes to an actuality" (Henriksen, 2017, p. 53). Such a technique helps learners combine their visual thinking with models (flat or 3D) through their *imagination, observation, understanding* and *the engagement in the process*. The models can be presented by the teachers, or the students could be given the task to make the models themselves and explain the steps of making them in their foreign language.

For example, showing learners the model of a water cycle in CLIL Biology class or asking them to make one on their own could be used with elementary school students. They could be asked to explain each step of the process using appropriate vocabulary and grammar in their foreign language. On the other hand, students at higher levels of education could use more complex models for creating and explaining.

Application of modeling technique is very common in teaching natural sciences as there are numerous abstract phenomena that could be easier understood through modeling. Some of these include modeling biological systems, building or mechanical structures, etc. By organizing new ideas into models and structures students develop their *high order thinking skills (HOTS)* which enable better *understanding* of processes.

Another technique which is used in CLIL and which can provoke learners' cognitive development is related to *kinesthetic thinking*. In order for something to be fully understood and analyzed, one should experience it using all of their senses. Learners can analyze something by looking at it, touching it, listening to different sounds it can make, by smelling it, or even by tasting it in order to understand its essence. They approach things from different sides. It is possible to engage younger learners' senses through various games, which involve a lot of physical movement. Encouraging learners to observe things surrounding them and thus make their own conclusions based on the observations is quite significant in the development of learners' cognitive skills. After observing something or being involved in a certain process and gaining an understanding of it, learners should be able to describe their observations using a foreign language. However, as students make progress in their learning, they are becoming more and more interested in activities that are *challenging their cognition* rather than in activities involving a lot of physical movement. In this respect, learners' ability to make comparisons between things that belong to a similar category using the tool of *analogy* can be very useful. For example, in CLIL Chemistry classes learners could compare different chemical elements based on their state, color, smell and other characteristics. They could also describe the chemical reaction after observing or conducting an experiment using appropriate grammar and vocabulary, and compare it afterwards to another reaction they are able to describe.

Even though there are many more techniques which could be used for developing learners' cognitive skills, the last one to be discussed in this paper is *effective questioning*. This technique is useful in determining students' understanding of basic facts related to specific content and in encouraging learners to apply facts using

their critical skills. Accordingly, effective questioning increases learners' interest in the topic and encourages them to 'think outside the box' as well as to independently explore the content matter. The questions should always be adapted to the learners' level of education and knowledge. In that sense, Sari Rose and John Litcher (1998) proposed some strategies for effective questioning. They suggest that students should be given enough time to think about the answers after questions are phrased clearly to them. Bearing in mind that not all learners are at the same cognitive level, various questions adapted to all learners should be asked, while it is desirable to use higher level questions with older students. However, if a student still finds it difficult to understand the question, the educator can rephrase it or even redirect to somebody else. Nevertheless, the educator can always ask additional questions and thus elicit students' responses.

Conclusions and Recommendations

Among various approaches in English language teaching, CLIL stands out as an approach in which the focus is not only on developing learners' communication skills or their interest in content matter and cultural issues, but it also fosters the development of learners' cognitive skills.

There are generally many teachniques useful for challenging learners' cognitive skills and most of them can be used in CLIL. Out of plethora of these techniques, some of the most significant (*Lotus blossom, SCAMMPERR, modeling,* or *effective questioning*) were discussed in the paper. Such techninques could help educators encourage learners to solve problems using their critical thinking in order to develop their cognition because language and content are always most successfully acquired when students are challenged cognitively.

Finally, it could be concluded that CLIL is a versatile approach applicable at all levels of education. Implementation of such an approach in Bosnia and Herzegovina schools would definitely bring significant changes in the current educational system. CLIL could ultimately improve the devastating results of PISA research from 2018. Those results showed that more than a half of 15 year-old participants from Bosnia and Herzegovina did

not attain the minimum level of functional literacy in mathematics, reading, and science. Therefore, it is suggested that the implementation of CLIL, as one of the main approaches in educational reform worldwide, should be considered in Bosnia and Herzgovina as well.

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VJEŠTINE RAZMIŠLJANJA U INTEGRISANOJ NASTAVI JEZIKA I STRUKE

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Sažetak

Obrazovni pristup poznat kao integracija jezika i struke (CLIL) postao je jedan od najpopularnijih pristupa u podučavanju stranog jezika, naročito u zemljama sa razvijenim obrazovnim sistemima. Jedan od njegovih osnovnih ciljeva jeste da učenicima pomogne da razviju svoje sposobnosti razmišljanja istovremenim učenjem stranog jezika i sadržaja određenog predmeta. S obzirom na to da CLIL promoviše razvoj kognitivnih sposobnosti, mnogi istraživači i psiholozi predložili su različite tehnike i aktivnosti koje bi se mogle iskoristiti u ovu svrhu. U ovom radu će se govoriti o nekim od tih tehnika, skupa sa načinima njihove primjene na različitim nivoima obrazovanja.

Ključne riječi: CLIL, obrazovanje, sposobnosti razmišljanja, tehnike.

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مهارات التفكير في التعلم المتكامل للغة والمهنة

الملخص

أصبح النهج التعليمي المعروف باسم التعلم المتكامل للغة والمهنة (CLIL) أحد أكثر الأساليب شيوعًا في تدريس اللغة الأجنبية، خاصة في البلدان ذات أنظمة التعليم المتقدمة. يتمثل أحد أهدافها الرئيسية في مساعدة الطلاب على تطوير مهارات التفكير لديهم أثناء تعلم لغة أجنبية ومحتوى مادة معينة. ونظرًا لأن التعلم المتكامل للغة والمهنة CLIL تعزز تنمية القدرات المعرفية، فقد اقترح العديد من الباحثين وعلماء النفس تقنيات وأنشطة مختلفة يمكن استخدامها لهذا الغرض. سيتناول هذا البحث بعض هذه التقنيات، مع طرق تطبيقها على مستويات مختلفة من التعليم.

الكلمات الأساسية: التعلم المتكامل للغة والمهنة – CLIL ، تعليم، مهارات تفكير، تقنيات.