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Ako vnímajú učitelia svoje hodiny biológie s využitím CLIL?

How do Teachers Perceive their Biology Lessons with the Application of CLIL?

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Abstract

This paper focuses on biology teachers' opinions about CLIL in the Czech Republic. The main aim of the study was to determine how teachers perceive their biology lessons with the application of CLIL at upper secondary schools (ISCED 3). The research of the paper consists of an analysis of the results of the online questionnaire. Within our research, we identified the reasons which lead biology teachers to the application of CLIL as well as their opinions about how CLIL is accepted by the students. At the same time, we focused on the advantages and disadvantages of CLIL in biology lessons. According to Czech biology teachers, the attitude of students towards CLIL is positive. The biggest advantage of CLIL is that biology lessons are more interesting, diverse, and interactive. Our research has also revealed that Czech teachers perceive biology lessons in CLIL to be time-consuming to prepare.

Keywords: Biology teaching. CLIL. Biology teacher.

Introduction

In recent years, we have observed an increase in innovative methods and strategies in science and biology education. The main purpose is to raise students' motivation, develop their critical thinking, and enhance their practical skills. It is not only about laboratory or outdoor skills that require manipulation with specific instruments or equipment. However, modern teaching focuses primarily on the knowledge and practical use of a foreign language in biology lessons as well. CLIL (Content and Language Integrated Learning) is one of the innovative approaches used worldwide and belongs to the significant curricular trends of current European education¹. CLIL, as a progressive teaching approach, includes teaching a specific subject with

¹ <https://www.english-efl.com/wp-content/uploads/pdf/CLIL-EN.pdf>

the application of a foreign language, which serves not only as a communication instrument but also helps to convey the content of a specific subject. Through this connection, it is possible to teach biology effectively and efficiently while practicing and strengthening communication in English (Marsh, 2002). The current state educational curriculum of the Czech Republic² supports the importance and role of cross-curricular relationships, which are also fulfilled through the CLIL approach.

The contribution of the CLIL approach lies not only in the achievement of language and content objectives but mainly in discovering new approaches and introducing activating methods that encourage students to be active in acquiring new knowledge in a natural environment. The innovativeness of activating methods lies in the experience and the desire to discover something new (Mehisto et al., 2008). Moreover, CLIL strongly supports student-centred teaching and respects the psychological development of the individual (Lojová, 2010).

The aim of the study was to explore biology teachers' opinions about CLIL at upper secondary schools (ISCED 3A) in the Czech Republic. With the help of an online questionnaire, we determined the main reasons why teachers apply CLIL in biology lessons, found out how they describe and evaluate their own CLIL lessons, how CLIL is accepted by their students, and how they verify the effectiveness of CLIL. We assume that the application of CLIL in biology lessons will be influenced by the opinions of the teachers; therefore, it is very important for us to examine these parameters.

1 Content and Language Integrated Learning

The term CLIL, which is an acronym for Content and Language Integrated Learning, was first used by David Marsh at Jyväskylä University in Finland (Marsh et al., 2001). CLIL is an approach to teaching the content of non-language subjects through the medium of a foreign language. During teaching, both the language and the content are equally important (Marsh, 2002). The language serves as an instrument for teaching content, whereas the content becomes a source for language teaching (Coyle et al., 2010). This type of integrated learning sets two basic goals – content and language, which are often complemented by a third goal that defines what skills and strategies will be developed and how (Šmídová et al., 2012). According to Dalton-Puffer (2007), the term CLIL refers to educational contexts in which a language other than the mother tongue is used as the language of instruction. Furthermore, Wolff (2012, p. 106) characterizes CLIL as a change agent with respect to education: “...CLIL cannot simply be called a current trend in

² <https://www.edu.cz/rvp-ramcove-vzdelavaci-programy/>

language and/or content learning but must be seen as a more general concept through which we are able to bring about real change into language education and education in general.”

CLIL is classified as a bilingual methodology (Mehisto et al., 2008). However, in the bilingual method, the prerequisite is a sufficient language level of the students, and the goal is not to acquire new knowledge of a foreign language but primarily to acquire knowledge of a non-language subject (Kazelleová & Váňová, 2010). During the CLIL lesson, the use of the mother tongue is accepted and plays a relevant role. If we teach in CLIL, it is necessary for the students to master professional terminology in both their mother tongue and the foreign language (Marsh, 2002).

CLIL is usually applied in two main forms - hard CLIL and soft CLIL (Mehisto et al., 2008). The inclusion of thematic content into foreign language teaching is typical for soft CLIL. In other words, the teacher includes the given topic of a non-linguistic subject in the teaching of English. In this case, however, the emphasis is on the linguistic goal. This form of soft CLIL is implemented by foreign language teachers (Bentley, 2010). The second form is hard CLIL, which represents teaching in which a part or all of the curriculum of one or more specific subjects is taught in a language other than the mother tongue. Hard CLIL is subordinate to the educational content and is primarily implemented by teachers of non-linguistic subjects (Šmídová et al., 2012).

CLIL, as an innovative approach, offers a number of advantages. According to Bentley (2010) and Harrop (2012), we introduce several reasons why it is beneficial for students to apply CLIL:

- increases students’ linguistic proficiency in various contexts,
- develops cognitive and communication skills,
- improves students’ motivation and self-confidence,
- encourages a learner-centred atmosphere in the classroom,
- creates a natural environment and supports learning from authentic materials,
- leads to greater intercultural awareness.

1.1 CLIL teacher and his/her preparation for teaching

A teacher who excels in a specific subject and a foreign language simultaneously is very precious. He or she has to feel confident enough in the foreign language, especially in the cognitive academic diversity and the specific requirements in order to control the language of the subject and to express a range of pedagogical strategies in the classroom (Ball et al., 2015). According to Pavesi et al. (2001), there are several types of teachers who can be effectively involved in CLIL:

- teachers qualified in both the content subject and the foreign language,

- classroom teachers using an additional language, to a greater or lesser extent, as the medium of instruction,
- foreign language teachers instructing learners on non-language subject content,
- a content subject teacher and a foreign language teacher working as a team,
- exchange teachers supported by foreign ministries of education, educational authorities, or European programmes.

Preparation for CLIL lessons is very important, especially in the stage of introducing CLIL methodology into teaching. Coyle (2006) identifies four areas that a teacher should focus on when planning CLIL lessons. These areas are called the Four Competencies of CLIL (4Cs) and represent: Content (subject curriculum), Communication (the language of learning), Cognition (the development of the student's higher-order thinking and metacognition), and Culture (the global citizenship agenda). These areas form a framework that determines how knowledge, skills, and understanding of content will be mediated, what language structures will be used, what cognitive processes will be developed, and what aspects of cultural awareness students will be exposed to (Šmídová et al., 2012).

Choosing suitable teaching materials for a CLIL lesson is one of the most important tasks for the teacher. Teaching materials should be relevant to the topic (and to the curriculum of the non-language subject) and appropriately challenging linguistically (Gondová, 2013). It is also recommended to use as many different visual and multimedia aids, dictionaries, magazines, foreign language books, etc., as possible, which can contribute to a better understanding for the students and facilitate learning through a foreign language (Hlaváčová et al., 2011).

Teaching in CLIL has a wide range of realizations. For example, it can be achieved through instructions or short activities in a foreign language that are integrated into the specific subject, or even the entire teaching unit can be conducted in a foreign language. The mother tongue may also be integrated, and transitioning between the foreign and mother language is a natural part of teaching in CLIL (Marsh, 2002). Students may be more motivated when their mother tongue is incorporated into the CLIL classroom language, especially for clarifying difficult language sections or contents (Floimayr, 2010).

The success of a CLIL lesson may be influenced by both the teacher's and students' language proficiency. Without self-confidence and adequate fluency in a foreign language, CLIL teachers cannot effectively teach their subject, which may contribute to a decline in the subject curriculum (Ball et al., 2015). Wilhermer (2010) claims that in almost all CLIL situations, it depends on the teachers' own initiative and motivation to achieve a level of general English competence sufficient for teaching the lesson in the target language.

1.2 CLIL from teachers' perspective

The research conducted by Moate (2011) showed that Finnish teachers perceive CLIL as stressful and frustrating at the beginning. Moreover, they feel insecure, and most of them agreed that they were not able to incorporate humour into their lessons compared to traditional lessons. The reason for these negative feelings is their insufficient knowledge of the language in which CLIL is realized. Nevertheless, three of the six teachers admitted that after a few years they had gained confidence in their communication skills and had accepted that their English was not perfect but satisfactory enough for CLIL (Moate, 2011). Teachers from Lithuania are also critical about their linguistic competences. However, they appreciate CLIL as an opportunity to develop both their linguistic competences and enhance professionalism in the content area (Vilkancienė & Rozgienė, 2017).

Another issue indicated by the teachers is the absence of standards, guidance, and administrative support in CLIL (McDougald, 2015; Vilkancienė & Rozgienė, 2017). For example, many Colombian teachers expressed that CLIL requires new teaching materials. In other words, they had to adapt materials to make them suitable for their learners. Furthermore, 92% of the teachers in McDougald's study (2015) agreed that CLIL requires a lot of time for lesson planning and teaching. According to Hlaváčová et al. (2011), the teachers are also expected to be able to collaborate with colleagues, especially in lesson planning. Cooperation and teamwork are vital components for the successful implementation of CLIL (McDougald, 2015).

Particularly interesting results were obtained by Infante et al. (2008) through interviews with Italian teachers. Many of them agreed that their understanding of CLIL had changed during implementation. The more experienced teachers evaluated teaching in CLIL as a very positive experience, while the less experienced viewed it as only positive. The teachers consider CLIL very beneficial as it develops students' motivation and cognitive skills (Infante et al., 2008). Furthermore, CLIL supports student-centred teaching, which means that the teacher's monologue is replaced by interaction among students (Grandinetti et al., 2013). After a certain time, students start thinking in a foreign language instead of translating (Lojová, 2010). Last but not least, some of the teachers admitted that they applied teaching methods and forms from CLIL lessons into their regular teaching (Infante et al., 2008; Moate, 2011).

2 Aims of the research and research questions

In our study, we investigate how teachers perceive their biology lessons with the application of CLIL at upper secondary schools (ISCED 3) in the Czech Republic. The results will also help us identify the areas in which

teachers feel shortcomings or fears that are limiting them from applying CLIL. Educators can focus on these areas later on during further education courses or in the preparation of students at the faculty of education.

We pursued the following research questions:

For what reasons do teachers apply CLIL in biology lessons?

How do they describe and evaluate teaching with the application of CLIL?

What do teachers say about students' acceptance of CLIL?

How do they verify the effectiveness of CLIL?

3 Methodology

The research was carried out through a self-designed online questionnaire in Google Forms. The main topics of our questionnaire were the reasons that led biology teachers to apply CLIL, their experience with CLIL including advantages and disadvantages, teachers' opinions about how CLIL is accepted by their students, and the ways of verifying the effectiveness of CLIL in biology lessons. The questionnaire is composed of closed items that contain multiple-choice questions where one or, in some cases, more options could be selected. Only one question of the questionnaire is open-ended where the teachers had space to express their own opinions about CLIL. The process of collecting data has been divided into two stages. The questionnaire was sent to the teachers twice in a row with a three-month delay.

Research sample consisted of biology teachers at upper secondary schools. The teachers were contacted via email addresses. The questionnaire was completed by 108 biology teachers from the Czech Republic, 34 of whom apply CLIL in biology. Only the responses of the teachers who applied CLIL were used for the analysis. The subjects taught together with biology were also investigated in our study (see tab. 1). Among the Czech teachers, the most frequent combination was with chemistry (15). The option "others", which was chosen by 9 teachers, includes subjects such as ecology, breeding and cultivation, biochemistry, or health education.

Table 1: The subjects taught by Czech teachers together with biology

	Czech Republic
	total number
Chemistry	15
Physics	3
Geography	4
Foreign languages	2
Mathematics	2
Physical education	5
Others	9

The majority of Czech teachers (16) applied CLIL in biology for three years. The most frequently used language during teaching in CLIL was English (30).

Collected data were evaluated by descriptive statistics in MS Excel due to a low number of respondents, and they are presented in the table and graphs. The data obtained from the open-ended question were evaluated by classifying teachers' statements into particular categories in order to support our findings.

4 Results

4.1 The reasons for applying CLIL in biology

Fig. 1 illustrates particular reasons why teachers apply CLIL in biology lessons. It can be seen that the most important reason in the Czech Republic was that a foreign language in connection with biology is important for students' further education. This finding can be confirmed by the following statement from a teacher: "The use of a foreign language in teaching biology is very beneficial because many quality resources are not available in the Czech language. Students will be compelled to use foreign language resources to write essays at university in the future. I assign seminar papers to my students, where they have to use foreign resources as well, for example, books and scientific articles. However, some students' knowledge of English is worse, so it is more difficult for them to be oriented in biological terms." Moreover, Czech teachers said that they applied CLIL because a foreign language in connection with biology is important in science. They also said they thought that CLIL enriches biology lessons more. The teachers could select more than one option (a total of 137 responses).

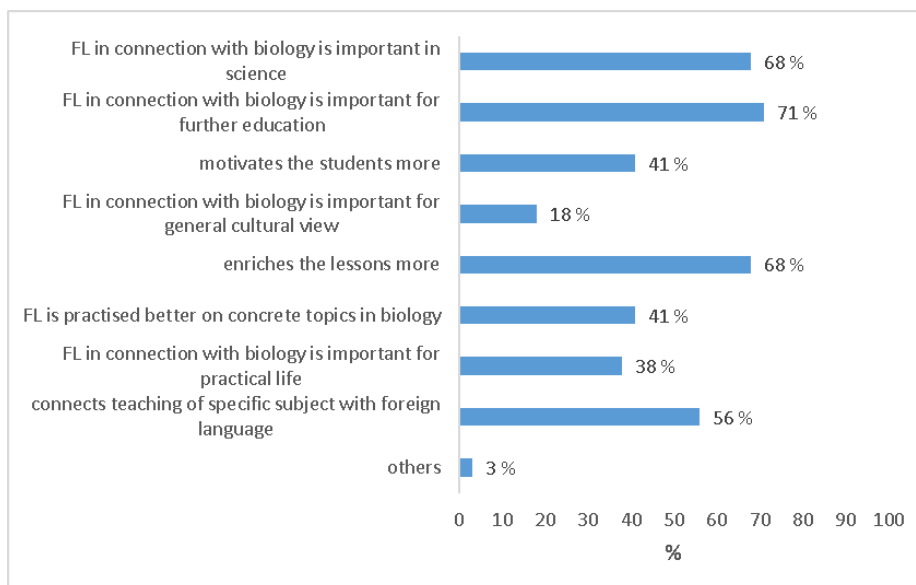


Fig. 1: The reasons for the application of CLIL (FL – foreign language)

4.2 Teaching with CLIL

Concrete advantages of CLIL in biology lessons are illustrated in Fig. 2. It can be seen that the majority of Czech teachers agreed that the biggest advantage of CLIL was that biology lessons are more interesting, diverse, and interactive. In addition, more than one half of the teachers said that CLIL increased students' motivation and self-confidence. These findings can be confirmed by the following statements from two teachers: "It will definitely make the lessons more interesting. Students will appreciate the change, and the benefits of CLIL are unquestionable." and "CLIL develops students' personalities in many ways." The teachers could select more than one option (a total of 69 responses).

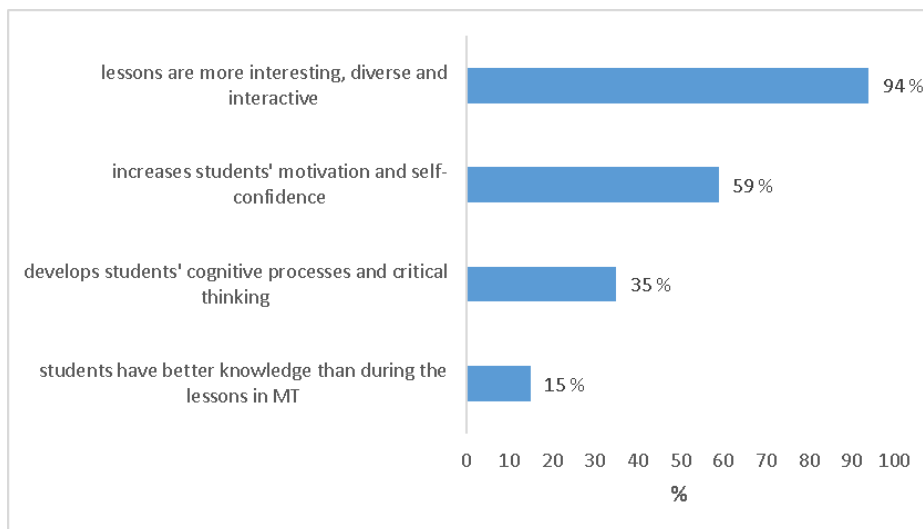


Fig. 2: Advantages of CLIL in biology (MT - mother tongue)

Concrete disadvantages of CLIL in biology lessons are illustrated in Fig. 3. It can be seen that the majority of the teachers agreed that the biggest disadvantage of CLIL was that lessons require much time for preparation. Moreover, Czech teachers said that CLIL required much time during the lessons. A minority of biology teachers admitted that their knowledge of CLIL language was insufficient. These findings can be confirmed by the following statements from two teachers: "...regarding the quantum of biology curriculum there is little time for CLIL." and "For me personally, the limiting factor is insufficient knowledge of CLIL language. I would otherwise support teaching in CLIL (lots of biological documents in foreign languages, etc.)." The teachers could select more than one option (a total of 81 responses).

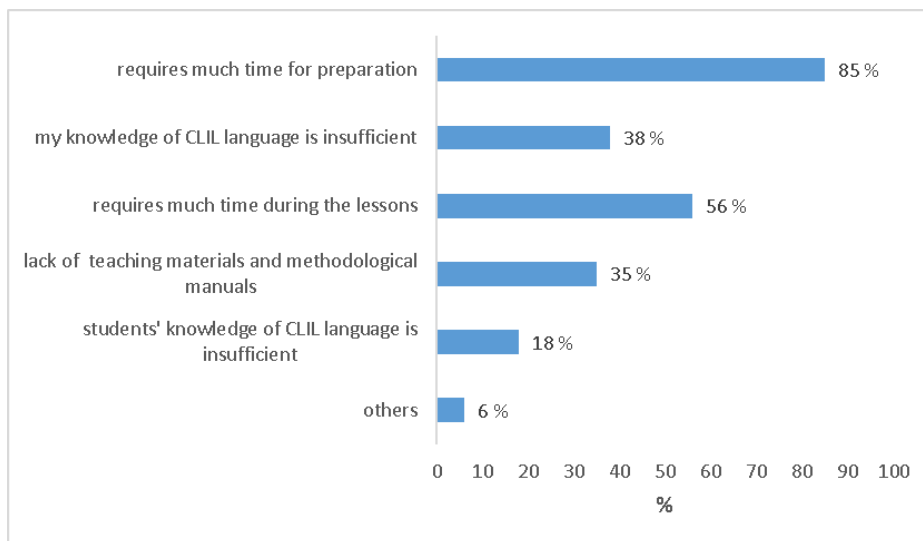


Fig. 3: Disadvantages of CLIL in biology

Fig. 4 illustrates teachers' preferences concerning the two aspects of CLIL - content and language. It can be seen that more than one half of the Czech teachers said they placed emphasis on content and language equally, which means they are completely identified with CLIL philosophy. However, almost one half of the teachers admitted they placed greater emphasis on content while teaching biology in CLIL. None of the teachers placed greater emphasis on language.

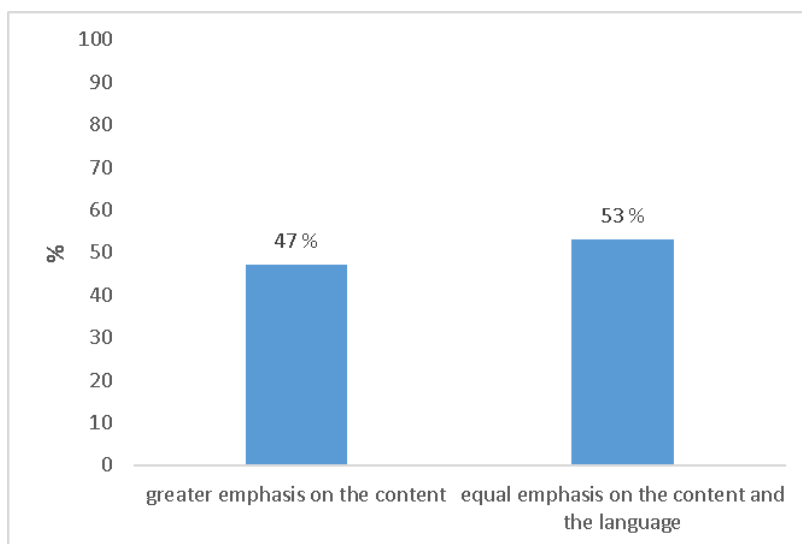


Fig. 4: Content and language preference while teaching biology in CLIL

The most frequent sections of CLIL lesson taught in a foreign language are illustrated in Fig. 5. We can see that more than one half of the teachers agreed they taught only instructions and concrete activities in the CLIL language. This finding can be confirmed by the following statement from a teacher: “I use CLIL to enrich my lessons. We usually revise in this way rather than introduce a new topic.” On the other hand, a minority of Czech teachers said they taught the whole biology lesson in the CLIL language. The option “others” includes responses such as worksheets in English, descriptions of pictures, working with professional texts, or videos, etc.

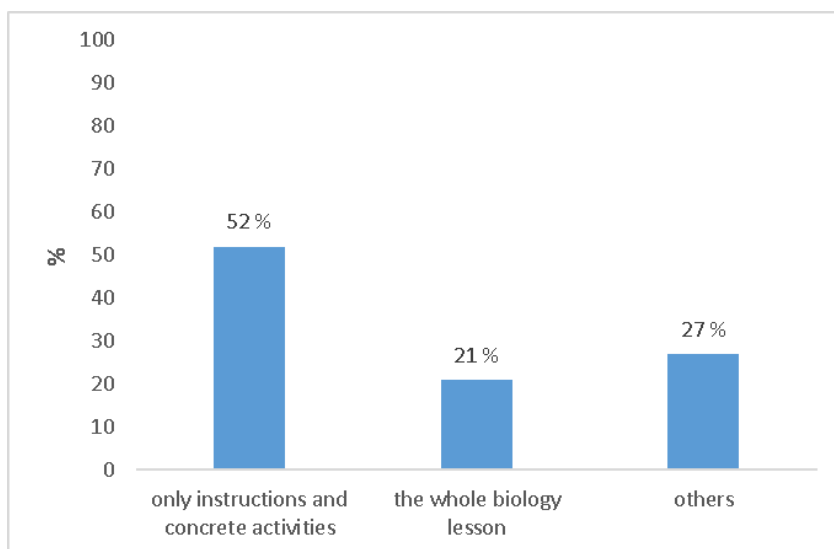


Fig. 5: Sections of CLIL lesson taught in a foreign language

Fig. 6 illustrates the level of understandability of CLIL biology lesson. It can be seen that more than one half of the Czech teachers agreed that biology lesson in CLIL was as understandable as biology lesson without the application of CLIL. However, a minority of the teachers said that biology lesson in CLIL was less understandable compared to a lesson without CLIL.

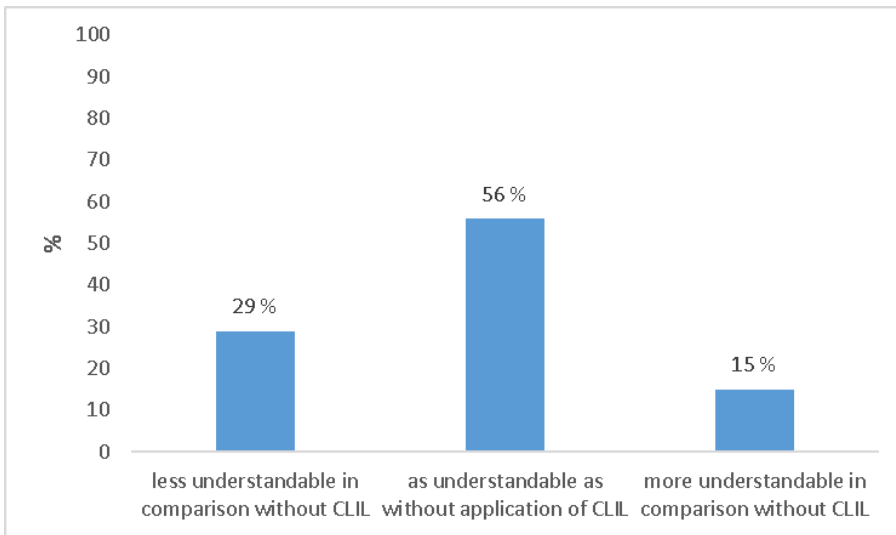


Fig. 6: Understandability of CLIL biology lesson

Concrete activities where CLIL is helpful in biology lesson are illustrated in Fig. 7. We can see that more than one half of the Czech teachers said that CLIL helped their students especially during the reading of professional articles in journals. This finding can be confirmed by the following statement from a teacher: “CLIL helps students to be well orientated in professional terminology (similarity between English and Latin).” The teachers could select more than one option (a total of 58 responses).

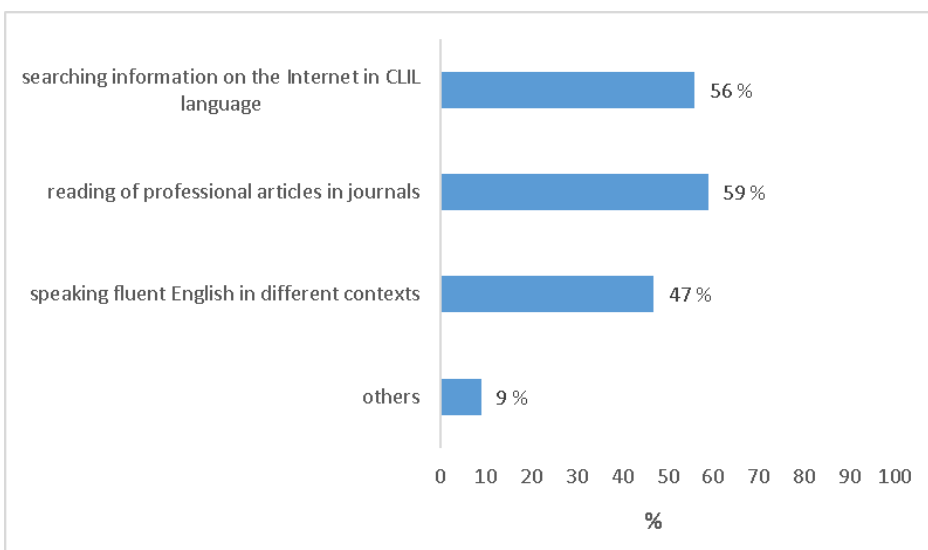


Fig. 7: Concrete activities where CLIL is helpful

Fig. 8 illustrates specific knowledge acquired by students during effective CLIL lesson. The majority of Czech teachers agreed that their students practised already acquired knowledge from biology. Moreover, more than one half of the teachers admitted that their students acquired new knowledge from biology not only in their mother tongue but also in the CLIL language. The teachers could select more than one option (a total of 92 responses).

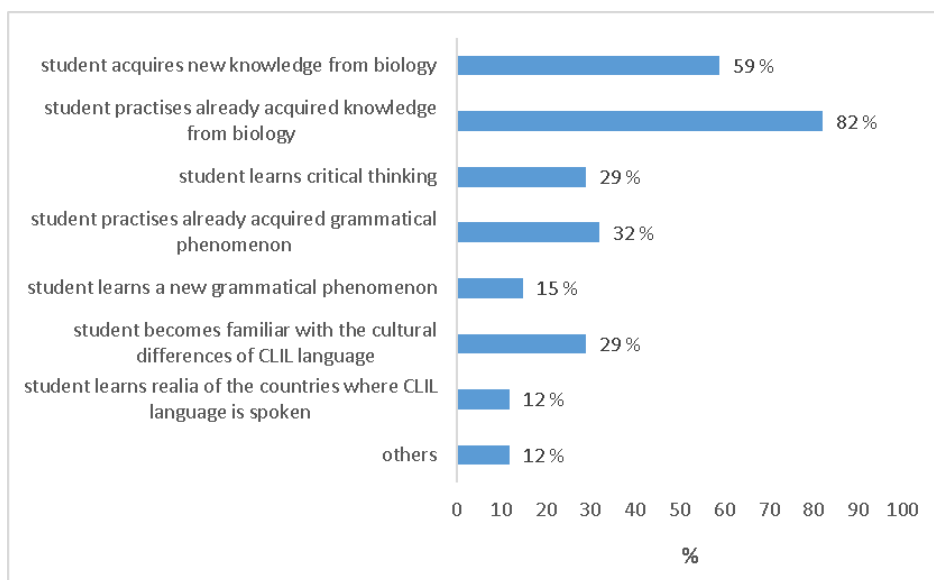


Fig. 8: Specific knowledge acquired during effective CLIL lesson

4.3 Students' acceptance of CLIL perceived by their teachers

Another issue CLIL teachers seem to agree on is the attitudes of their students towards CLIL. According to the Czech teachers, the attitudes of students were positive or rather positive. Only a minority of the teachers said that the attitudes of students were rather negative.

It is also noteworthy to mention how CLIL is accepted according to the students' gender. The majority of Czech biology teachers agreed there was no difference in acceptance of CLIL between girls and boys. Only a minority of the teachers said that CLIL was better accepted by boys.

The acceptance of CLIL by students who are not so interested in biology is illustrated in Fig. 9. It can be seen that more than one half of the teachers from the Czech Republic said CLIL was especially well-accepted by students who are normally not interested in biology. Only a minority of Czech teachers said that CLIL was not well-accepted by students who are not interested in biology.

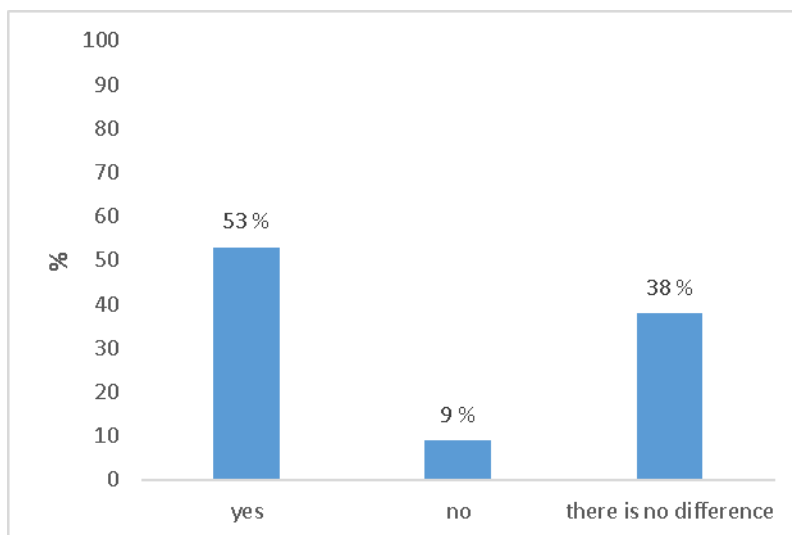


Fig. 9: Better acceptance of CLIL by students who are normally not interested in biology

4.4 Verifying the effectiveness of CLIL

Fig. 10 illustrates the ways of verifying the effectiveness of CLIL in biology lesson. We can see that almost one half of the Czech teachers agreed they verified the effectiveness of CLIL with oral examination or test focusing on biological knowledge in the mother tongue. Furthermore, the teachers also said they verified the effectiveness of CLIL with oral examination or test focusing on biological knowledge in the CLIL language. The option “others”, which was chosen by a minority of the teachers, includes responses such as discussion in a foreign language, crosswords, gap-filling exercises, or presentation of students’ projects. The teachers could select more than one option (a total of 70 responses).

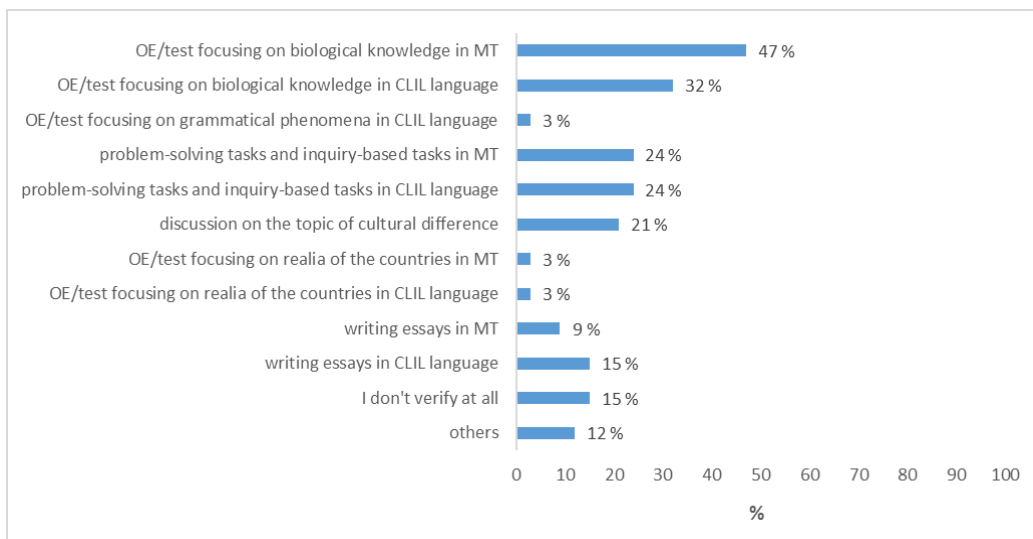


Fig. 10: The ways of verifying the effectiveness of CLIL (OE – oral examination, MT - mother tongue)

5 Discussion

The aim of this study was to determine how Czech teachers perceive their biology lessons with the application of CLIL at upper secondary schools (ISCED 3).

One focus of our study was to discover the particular reasons why teachers apply CLIL in biology lessons. The results suggest that the most important reason why Czech teachers apply CLIL in biology is that a foreign language in connection with biology is important for students' further education. Another relevant reason is that a foreign language in connection with biology is important in science. These opinions are in accordance with the general advantages of CLIL for students (for example, in publications by Klímová, 2012; Šmídová, 2012). Approaching teachers' opinions about CLIL indicated several aspects worth taking into account, for instance, advantages and disadvantages of CLIL.

When exploring the advantages of CLIL, our results suggest that the main advantage of CLIL, according to Czech teachers, is that biology lessons are more interesting, diverse, and interactive. Moreover, the teachers stated that CLIL increased students' motivation and self-confidence. Research in Finland has also shown that teachers prefer tasks that involve variety and diversity because such tasks are more likely to facilitate students' interest in learning and provide meaningful reasons for engaging in an activity (Bovellan, 2014). Gondová (2013) confirms that CLIL is motivating because it gives students the opportunity to use language in meaningful situations. Furthermore,

she also claims that CLIL supports the development of students' cognitive skills, teaching them to think and solve problems in several languages, thus contributing to the development of students' autonomy (Gondová, 2013).

An interesting finding about CLIL teachers' views on language was revealed by Banegas (2012). He pointed out that CLIL teachers felt they failed to achieve the language-in-use aim since all their activities were content-oriented and did not provide vocabulary or grammar practice. This finding seems to indicate that CLIL teachers consider language to be primary to content and prefer vocabulary and grammar practice to content-oriented activities. Our results showed that more than one half of the Czech teachers said they placed equal emphasis on content and language, which means they realise the equivalence of these two main goals.

On the other hand, the majority of Czech teachers agreed that the biggest disadvantage of CLIL is that biology lessons require much time for preparation. Moreover, they admitted that CLIL also required much time during the lessons. These results are in accordance with research conducted in Colombia (McDougald, 2015). Case studies carried out by Cross and Gearson (2012) also found that teachers need to be well-prepared, flexible, and have a high level of proficiency in the CLIL language.

Gondová (2013) highlights that collaboration between teachers, especially subject teachers and foreign language teachers, might be time-consuming because subject teachers are usually not qualified English teachers. Without teacher training for language teaching, it may be difficult for subject teachers to assume the role of a language teacher in CLIL. The feeling of missing CLIL aims and disorientation may demotivate CLIL teachers. Therefore, it would be important to develop a specific CLIL curriculum or at least specify the aims for teaching in English in the secondary school curriculum (Bovellan, 2014).

The majority of Finnish teachers also confirmed that preparing CLIL materials is demanding and time-consuming. It must also be borne in mind that CLIL materials have to be simple enough for students to understand them but also to contain new elements in an appropriate ratio for efficient learning to take place (Bovellan, 2014). According to Floimayr (2010), another problem is that teachers often have to prepare most of the teaching materials on their own, which makes CLIL a time-consuming approach. Based on her study, she revealed that biology textbooks still require significant development in CLIL materials. She pointed out that the materials used by teachers contained little language support and the lack of communicative and interactive activities.

The recognition of weaknesses and obstacles limiting the application of CLIL in teaching practice, as presented in our study, may contribute to identifying the current situation in Czech upper secondary schools. The results of our research are applicable for teachers' educators in both pre-graduate and lifelong education. Educators can focus on problematic areas while planning and preparing course content for teaching to strengthen the CLIL competences of teachers.

The results of our research are limited due to the small number of respondents and therefore cannot be generalised. The sample of biology teachers was drawn from convenience sampling. Since CLIL is not very widespread, we assume that only teachers interested in innovative teaching methods participated in our research. Moreover, the fact that the questionnaire was addressed only to biology teachers at upper secondary schools might have influenced the number of respondents. If we had chosen a wider range of secondary schools, it would have provided a more complex view.

Conclusion

On the basis of our research, it can be concluded that the most significant reason why Czech teachers apply CLIL in biology was that foreign language in connection with biology is important for students' further education (71%).

The majority of Czech teachers agreed that the biggest advantage of CLIL was that biology lessons are more interesting, diverse, and interactive. However, they also confirmed that the biggest disadvantage of CLIL was that biology lessons require much time for preparation.

According to Czech teachers, their students have a positive attitude towards CLIL. They also agreed that there was no difference in the acceptance of CLIL between girls and boys. Furthermore, 53% of Czech teachers said that CLIL was especially well-accepted by students who are normally not interested in biology.

Our results also show that Czech teachers primarily verify the effectiveness of CLIL through oral examination or test focusing on biological knowledge in the mother tongue.

In conclusion, the results of this study contribute to research on CLIL as they show how Czech teachers perceive their biology lessons with the application of CLIL at upper secondary schools. We believe it is very important for biology teachers to focus on teaching in CLIL because it largely supports student-centred teaching. Through activating methods, students develop not only lower cognitive skills but also higher cognitive skills that enable them to solve problems independently. Our results also indicate shortcomings that might limit teachers from applying CLIL. For these reasons, we recommend that courses developing teachers' CLIL competencies should be included in their preparatory education at faculties or in lifelong learning programmes.

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