

CLIL (Content and Language Integrated Learning) for Pre-service Teachers of Science: Scaffolding in Lesson Planning

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Abstract

In this paper the author introduces the conception of teaching CLIL (Content and Language Integrated Learning) in a specialised English course for student teachers at the Faculty of Science Masaryk University. She deals with the methodological aspects of the approach which are transferrable beyond CLIL and beneficial to future teachers of any subject. Specifically, she discusses scaffolding, i.e., the supporting strategies guiding a pupil through increasingly more challenging tasks. In the last part of the presentation, the author summarises the main points and comments from a survey which imply that students mainly struggle with structuring their lessons and the choice of suitable activities for their teaching.

Key words: CLIL; scaffolding; teacher training

Abstrakt

V tomto článku autorka představuje koncepci výuky metody CLIL (Content and Language Integrated Learning) ve specializovaném kurzu anglického jazyka pro studenty učitelství na Přírodovědecké fakultě Masarykovy university. Zabývá se didaktickými aspekty metody, které jsou přenositelné mimo výuku CLIL a přínosné pro budoucí učitele všech předmětů, konkrétně tzv. scaffoldingem, tedy podpurným strategiím, které vedou žáka k zvládnutí stále náročnějších úkolů. Na závěr shrnuje hlavní náměty a komentáře studentů z dotazníkové zpětné vazby, ze které vyplývá, že studenti se při přípravě svého mikroyučování nejvíce potýkají právě se strukturováním hodiny a volbou vhodných aktivit.

Klíčová slova: CLIL; scaffolding; vzdělávání učitelů

Introduction

This paper introduces a course of English for student teachers of science, its focus, and goals as well as the findings that emerged in feedback from students after the course implementation. In particular, the paper focuses on CLIL methodology that students apply in their microteaching and the lessons that they learn in the process.

The course, designed to meet the specific needs of student teachers, was first run in 2019 in response to common complaints that future teachers of science do not get sufficient opportunities to discuss various issues related to teaching and put their theoretical knowledge of teaching methodology into practice. The language department at the faculty of science decided to offer an optional course open to student teachers of all fields of study (unlike the regular language courses at the faculty which are field-specific, e.g., English for Geographers, English for Physicists, etc.) that would deal with questions relevant to teachers but at the same time prepare the students for their compulsory language exam. The goals are therefore multiple—the syllabus is designed to cover all basic language skills (speaking, listening, reading, and writing) while teaching several methodological and pedagogical concepts. This paper describes the principles of CLIL studied in the course and the methodological tasks students are assigned, their benefits and pitfalls.

The principles of CLIL

The acronym CLIL stands for Content and Language Integrated Learning, i.e., a methodology that combines learning of a subject, e.g., science, arts, history, or another social science with learning a foreign language.

The “4Cs” that are often quoted as the main principles of CLIL stand for *content* (i.e., the subject matter), *communication* (in a foreign language), *cognition* (the focus on higher order thinking skills) and lastly a combined concept of *culture*, *community*, and *citizenship* (Coyle, Hood & Marsh, 2010). Translated into real terms, in a CLIL classroom students learn new subject matter through a foreign language. The teacher therefore needs to pay attention to both aspects of their lesson—the language, and the content. Ideally, this means that the teacher should be trained for CLIL teaching as subject teachers may not be sensitive to the language they need to include and prepare. Or, alternatively, CLIL is taught in a subject and language teacher tandem.

CLIL is essentially based on the philosophy of constructivism: it relies on starting from what the students already know, building on it by means of manipulating and processing the new material to make sense of it. The innovative teaching combination of a subject and language has undoubtedly many benefits, among them the fact that the added challenge can boost learners' motivation and reinforce the acquisition of the new knowledge. Also, a traditional language lesson which follows a textbook may revolve around topics that learners might find too bland, inauthentic, and unstimulating whereas a CLIL lesson uses actual subject matter to stimulate a genuine, meaningful communication and thus enhance the process of learning both the new material and a foreign language (Dale & Tanner, 2012).

What it means for CLIL teacher training is that attention needs to be paid to the extra challenge of the foreign language since subject teachers may not be ready to take specific language into consideration when planning their lessons. It is therefore useful to demonstrate the way language is used in successful CLIL lessons to sensitise future teachers to it and help them incorporate the language element into their lesson planning and teaching.

Scaffolding in CLIL

The term “scaffolding” in its common sense refers to a temporary structure used when constructing or repairing a building. Scaffolding is put up to make work possible or easier—once the work has been completed, the structure is removed. Scaffolding is used in teaching in a metaphorical sense to refer to any strategy used to provide assistance and support that might be needed in various stages of learning. That extra help or support is built and afterwards gradually reduced or removed to encourage learner's autonomy.

There are different classifications of scaffolding, the types commonly distinguished are e.g., *strategic* scaffolding, which encourages students to consider different way of dealing with problems; *metacognitive*, which helps learners critically reflect on their learning; *conceptual*, which guides learners to understanding basic concepts, or *procedural*, which allows them use various tools to accomplish the goal (Hogan, 1997). Scaffolding in science classes can take many forms, among them e.g., coaching students, modelling different problem-solving approaches, or promoting independent work. Excellent teachers would probably combine several of these strategies to keep their students motivated (Holliday, 2000).

All in all, scaffolding strategies are used to increase the likelihood of successful learning, specifically autonomous learning. This approach has roots in the teaching of Vygotsky and his concept of “the zone of proximal development” (Vygotsky, 1978) which suggests that it is the teacher who initiates each new step in learning building on what the learner currently knows and designs tasks in such a way that the learner is soon able to complete them on his/her own. Appropriate scaffolding facilitates learning to make sure the learner does not face an intellectual challenge too high for them.

A part of scaffolding is undoubtedly teacher-student rapport and the way the teacher approaches their students. Their aim is to make sure the students improve and gain confidence in the process learning. Their failure is seen as a failure in the teacher’s preparation and syllabus / lesson design (Williams, Mercer & Ryan, 2015). However, it is understandable that different students will require different types and amounts of support while dealing with their assignments (Holliday, 2001) and so catering for the needs of students in large classes is challenging even for experienced teachers.

In our course, the students are asked to prepare a CLIL session (or a series of tasks) on a subject within their field of study or a cross-curricular science subject. Based on their previous study of CLIL methodology they themselves define the criteria that their lessons should fulfil and based on these criteria they later give detailed feedback to their peers. Some of the criteria as specified in one of the courses were e.g., clear lesson objectives, well-structured lesson, interactive tasks, examples, etc.

As our student teachers typically do not specialise in languages, they might request advice as to what language scaffolding is appropriate or needed to make it possible for everyone, even students of other subjects, to follow and participate in their lesson. Below we give examples of how our student teachers approached the task.

Scaffolding in students’ lessons

The first example is taken from a student’s lesson on colours (physics). The aim of the lesson was to teach about colours and why we see them. In the first slide presented here (Diagram 1) there are illustrated examples of properties of objects (*opaque, translucent, transparent*) serving as vocabulary support. There is also a demonstration of how light can be *absorbed, reflected* or *transmitted*. In the following slide of the presentation (Diagram 2) there is a task—this time, the students are asked to apply the new information

and say what happens in case of a leaf and a bottle. It is noteworthy that the visual with the useful vocabulary stays on the margin of the slide to provide extra help, should it be needed. This can be considered as language and conceptual scaffolding.

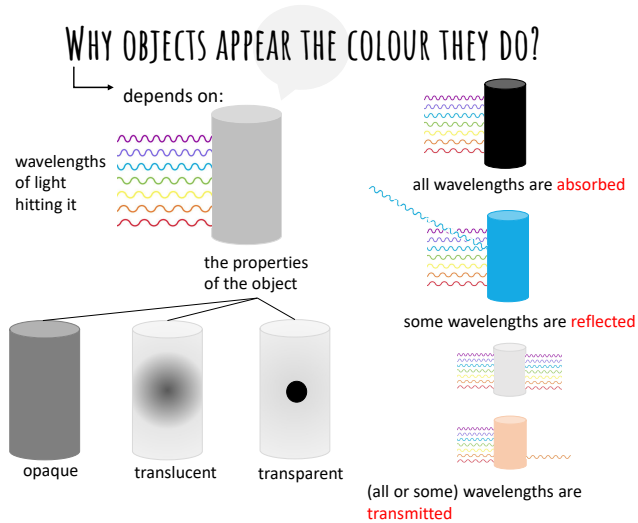


Diagram 1 (K. Rozehnalová)

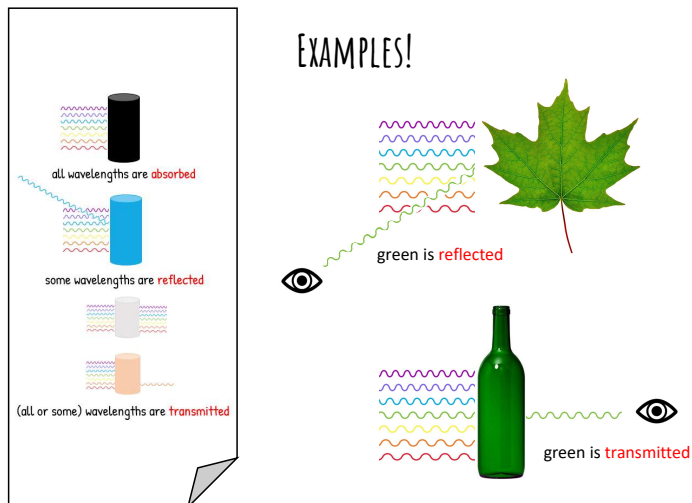


Diagram 2 (K. Rozehnalová)

This task was highly appreciated by the participating student teacher peers as an example of “good practice” not only for its accomplished graphic design but also for the explanation of the process which is effective thanks to the combination of the visual, conceptual and language scaffolding.

In terms of the language content of this specific lesson, the student teacher who was in charge of it stated in her list of prerequisites that the students should be on approx. B1 level of English and thus it is safe to assume they will be familiar with passive voice needed to formulate sentences such as “Light is reflected...”. It is not very common to devote much time of a CLIL lesson to grammar, however, if necessary, this grammar phenomenon could be elaborated on if the students struggle with it and the inability to formulate correct sentences in the passive voice hinders communication.

The second example of successful scaffolding in a CLIL lesson is from a lesson on nutrition. In this case, the student decided to introduce the topic by a brief presentation on the main components of nutrition (Diagram 3). Next, she divides the class into three groups—carbohydrates, lipids and proteins (Diagram 4) and asks them to work on two questions: *Why do you think we need this nutrient? And What are the sources of this nutrient?*

Activity	Timing	Materials	Procedure	Interaction/seating
Topic introduction	3 min	PowerPoint presentation	Lecture Discussion about amount of intake of individual nutrients	Whole class

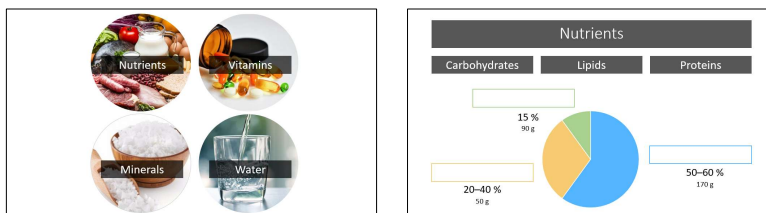


Diagram 3 (L. Kozielová)

Activity	Timing	Materials	Procedure	Interaction/ seating
Nutrients - discussion	5 min	Pen and paper	Discussion in groups: Why do we need nutrients and what are their sources?	Groups

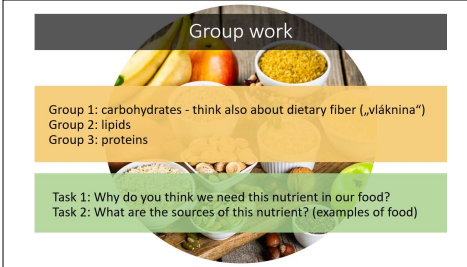


Diagram 4 (L. Kozielová)

Students collaborate on answering the questions, they are encouraged to try and brainstorm the answers, but they are also allowed to use the Internet to verify their ideas. In the final stage of the lesson students are asked to work in small groups or pairs to design a meal plan for a specific person / target group. They need to consider all the information learnt throughout the lesson, including the terminology. They present their results and get feedback from the teacher regarding the content and usage of the new terminology (e.g., expressions such as carbohydrates, proteins, etc.).

The fact that this lesson was seen as effective has to do with the fact that it included both conceptual and procedural scaffolding—students were encouraged to use different methods when completing the task in their groups, such as discussions, internet search, consultation with a teacher. The lesson plan was designed in such a way that it guided the students from the simpler, directed, and controlled activities to the more complex and autonomous ones where they use higher order thinking skills.

In the examples described above the students demonstrated their understanding of CLIL principles and scaffolding. As demonstrated below, the final feedback on the course proves that CLIL makes them think about their lesson planning more thoroughly and use some of the strategies inherent to CLIL:

- *Now I feel that CLIL is something I could really teach, I have never thought about it before and without this subject I would probably not.*

- *I think CLIL could be a good way to engage the students and use another language in my own subject matter.*
- *I have discovered CLIL and I have found it exciting, I sincerely believe that in the future in my practice as a future teacher I will carry it out. I consider that it has been very beneficial to practice simulating a CLIL session because CLIL can help teachers think about their subject matter differently.*

Conclusion

The course CLIL for pre-service teachers of science has shown us that CLIL methodology can be beneficial to student teachers when it comes to lesson planning and scaffolding their activities. Although scaffolding is an organic part of any teaching, the special attention that was paid to this teaching strategy will hopefully be useful to student teachers either in their CLIL or regular science sessions. Hopefully, the issue of developing future science teachers' lesson planning strategies will attract more attention of researchers and teacher trainers in the future.

Acknowledgement

The author would like to thank her students Bc. Kateřina Rozehnalová and Bc. Lucie Kozielová for sharing their presentations and allowing the author to use them for the purposes of the article.

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