Introduction

The aims of bilingual education

The National Curriculum states only the basic guidelines for bilingual education, most probably because the bilingual project takes place in a limited number of schools and classes. Out of the 12 grammar schools and two vocational schools in the bilingual project*, seven offer classes in English: one in Belgrade, three in the province of Vojvodina, one in central Serbia, and two in south-eastern Serbia[1], while there are 14 elementary schools in the project – 11 of which offer classes in English (Pasuljević Shimwell, 2018). The project offers an increased opportunity for language learning, allowing for 30% (and up to 50%) of teaching in particular natural sciences to be in English. The aims are stated as:

- the development of the system of dual language teaching;
- the development of plurilingualism in the system of education;
- the modernisation of education; horizontal and vertical connection of subjects in the curriculum; closer collaboration within schools but also with international bilingual schools;
- the increase in the linguistic competence of both learners and teachers (Education Gazette, no.12/2018).

* Bilingual project/ CLIL instruction/ CLIL project – in the textbook, these terms will be used as synonyms

The recommended approach for the project is Content and Language Integrated Learning (CLIL), even though to some extent the requirements call for the application of English-Mediated Instruction (EMI). Learners are expected to cover the same content as the learners in 'regular' classes, but do so both in Serbian and English, within the same period of time, and with the same number of classes. Additionally, learners are not in any particular way assessed when they finish their secondary education, and, unlike French and German-mediated

[1] From the rest of secondary schools in the project, four offer French, two offer Russian, two German and one Italian. The CLIL project is offered in Russian, French and German in each of the rest of elementary schools.

projects, learners do not have their graduation diploma recognised as a dual-language program diploma.

The fact that the National curriculum does not provide any more specific guidelines as to how these objectives are to be accomplished frees schools and teachers to organise the instruction on their own. While the increasing autonomy in this respect is a move towards greater teacher participation in curriculum design, the lack of the framework and continuous assessment of the project places an additional strain on subject teachers. Finally, the training and continuous support for teachers – in terms of their own language proficiency development and methodological professional development have been lacking.

With the latest changes to the National Curriculum introduced in 2018/2019, content teaching might play a more prominent role when teaching is organised around outcomes. Many of the strategies applied in active learning classrooms and CLIL teaching are suitable for the outcome-based education where demonstrated competencies are the main objectives. In addition, project learning, now a new addition to the curriculum, can be easily expanded from the CLIL basis.

CLIL in English language teaching has had a somewhat established place for the last two decades or so, there is a lot of research, as well as manuals and additional literature. Still, this support is mostly for English language teachers who teach social and hard science topics in their English language classes and want to include cross-curricular connections. However, CLIL in sciences will have to be adapted for the current context and the bilingual project, learner profiles, and curriculum requirements.

This is not to say that only Serbia finds the bilingual project challenging. Other countries in Europe have been struggling with the implementation of CLIL as well, with the scope of the project and success rate ranging from quite modest to full-fledged. What has been troubling teachers in Serbia has been detected in other CLIL projects across Europe: language requirements and competencies for both learners and teachers, availability (and lack thereof) and adaptability of material, unstructured teacher training, challenges of assessment (Karabassova, 2018; Pérez, Cañado, 2016).

English as the medium of instruction (EMI) is used for academic subjects such as science, mathematics, geography, etc. in countries where the first language (L1) of the majority of the population is not English. As opposed to CLIL which has a clear objective of improving both content and language, EMI does not (necessarily) have that objective (Dearden, n.d.).

Teacher competencies for CLIL

The European Framework for CLIL Teacher Education (Marsh et al., 2011) states that there is a certain set of competencies that is important for CLIL teachers, based on the personal reflection and commitment to development. Teachers should show the understanding of the core features of CLIL, contextualising CLIL with respect to the school and national curriculum. An important competence for CLIL teachers is the awareness of content and language in the form of:

- the knowledge of the interdependence of language and cognitive development to facilitate both content and language learning;
- the ability to identify the appropriate content to be taught and obstacles to content learning;
- the usage of strategies to support language learning in content classes;
- the application of strategies for fostering critical thinking in learners about content and language;
- the application of strategies for fostering in learners the habit of linking new learning with their personal experience.

The European Framework states that teachers should understand methodology and assessment of CLIL: use formative and summative assessment strategies to support content, language and learning skills development and introduce the concepts of self-assessment and peer-assessment to support learners in taking greater responsibility for their learning. Finally, teachers should be competent in managing learning resources and environments (for example, to design and use cognitively and linguistically appropriate learning materials, help learners build cross-curricular links), classroom management (for example, to use

appropriate language for classroom interaction, cater for learners with a wide range of needs).

Each of the competencies and their elements are important and they are explored in more detail in the following chapters.

When it comes to pedagogical concerns, the European Framework for CLIL Teacher Education lists these:

Awareness-raising of personal established teaching practice
When teachers join the CLIL project, they have to reassess and reconsider their teaching practices. This would be a good time for them to think about personal teaching philosophy, what they see as the goal of their teaching and what they want to see as the most immediate outcomes for their learners. Even though the National curriculum and the conditions within schools to a high degree dictate what can be done in the classroom, it is important for CLIL teachers to define the main features of their teaching. In addition to that, they should share their beliefs with learners, because this will be another way to make teaching transparent, showing learners that they are an important factor in instruction.

Socio-constructivist theories and content/ language teaching
The collaborative nature of learning is important for CLIL. Vygotsky (1978) was a proponent of socio-constructionism, as he believed that it was impossible to separate learning from its social context. He believed that social interactions dictated how cognitive functions were developed; so learning could not be the assimilation and accommodation of new knowledge by learners, something that happened 'inside' them, without any influence from the environment. The important principle is that the process of learning integrates learners into a 'knowledge community'.Teachers should try to provide the learning opportunities where learners collaborate and jointly work on tasks so that peer-teaching is used more.

Another important principle in socio-constructivist theory is that learning takes place when tasks are on a level a bit beyond the learner's actual level of development, when they are in the zone of proximal development (ZPD). The theory foregrounds group work and peer-feedback, and this will be discussed in more detail later.

Autonomy, authenticity and agency

The National Curriculum and the Education Strategy 2020 both stress the importance of learners becoming independent, self-regulated and responsible for their own learning. CLIL provides a lot of room for learners to work on their own learning, developing their autonomy, and becoming active participants in the teaching and learning processes – in order to claim agency. The introduction of project-based learning and CLIL classes help teachers show to their learners the relevance of what they learn in one subject in relation to other subjects and everyday life. Approaches such as CLIL require from learners to develop skills other than purely academic, such as communication, individual research, collaboration.

Critical and creative thinking

While all teaching should insist on critical thinking from learners, CLIL in particular can combine different input sources, cooperative learning and critical thinking. Different ways in which new terminology in a foreign language can be covered, different approaches to organising learning in a foreign language to get maximum results require being creative about one's teaching.

Language learning/ acquisition theories and knowledge about language learning

It is important for CLIL teachers to be at least familiar with language learning theories because these can help them predict language proficiency and abilities of their learners so that they more easily balance content and language. This is especially important for CLIL in elementary schools, as it is illustrated in the next point.

Language awareness

Language and content are equally important for CLIL classes, but in the bilingual project content might take precedence. Teachers should be aware of different aspects of language, different ways in which learners acquire knowledge, and what they can expect from their learners on particular levels. Combining their knowledge about theories of learning in general and language in particular will help teachers organise their instruction more efficiently. For example, for elementary school teachers, knowing in what sequence particular language elements are usually acquired might help with assessment and expectations (whether 5th-graders are linguistically proficient enough to report on a phenomenon using the past tense, or describe their thinking process, using required adverbs, etc.). Further, teachers should be able to predict what amount

of drills and mechanical memory activities can be done before learners move to problem-solving tasks, or how to order the activities and when to expect independent work from learners.

Content awareness and knowledge about content learning and content-subject specific awareness

It goes without saying that subject teachers are competent professionals in their field. Each subject will have its own specificities when it comes to teaching the content, the particular order of topics, expected competencies and skills that teachers are well aware of. In CLIL, in addition to the content, teachers need to consider the terminology that might be new and problematic in learners' mother tongue as well. Also, it is important how to present the content multimodally, how to include the support for learning both the subject matter and language. In this respect, CLIL planning has additional steps and the balance between content and language should always be factored in.

Awareness of language user profiles, identities, and affective factors

Knowing what possible profiles, affinities, and preferred learning styles learners might have is valuable information to incorporate in instruction. Learners of different ages will have certain shared characteristics, but they will also show quite individual features. The understanding of what affective factors (shyness, stage fright, different insecurities) might influence their engagement and production will help teachers in their instruction.

Integration of personal established practice and new approaches

Just like with 'regular' teaching, being prepared to try out new strategies and methodologies refreshes one's practices and breaks the routine of teaching. When teachers establish their own teaching philosophy, it is easy to confidently include new practices. The same goes for CLIL; therefore, throughout the textbook teachers are asked to think about their present practices and reflect on where to make changes, adaptations, and already existing instruction elements to emphasise.

 TASK

Before starting in earnest, try and test yourself. Make a list of things that are similar between your CLIL class and your 'regular' class. Then, make a list of things that are different. If you have not started teaching, try to predict differences/ similarities, or rely on your pedagogical practice in school.

Similarities	
They both…	
Differences	
In CLIL… but in regular...	In regular… but in CLIL

The more details you're able to add, the more clearly you will see the key elements in both.

Background to CLIL

The impact of globalisation was increasingly felt in Europe during the period of rapid integration from 1990 to 2007. The increase in contact and collaboration highlighted the need for better language and communication educational outcomes. However, the hours allocated for language teaching were often insufficient to produce satisfactory outcomes, where learners would be ready to use a foreign language for everyday and academic purposes. There was an interest in looking at how some language teaching could be done while learners were doing other subjects, thus providing more exposure to the language overall. It was realised that there was a need for better linguistic and communicative competence, more relevant methodologies, and higher levels of authenticity that would increase learner motivation. The solution was seen in increasing the use of language outside of just foreign language classes, and CLIL was introduced as a suitable tool for providing more space for actual language usage.

CLIL is a teaching and learning approach with a double focus where the native language and an additional language are used for developing both content mastery and language acquisition (Maljers et al., 2010). In itself, CLIL is not a new form of language education, nor is it a new form of subject education. However, it is an innovative fusion of both: an educational approach in which various language-supportive methodologies are used to lead to a dual-focused form of instruction: focused on both language and content. The twofold aim calls for the development of a special approach to teaching in that the non-language subject is not taught *in* a foreign language but *with* and *through* a foreign language. The important difference between a CLIL class and a language class or a subject class is that communication about the content is in focus. In a CLIL classroom the foreign language is not the main goal but the means of communication which learners use in authentic situations. Such language usage is both pragmatic and functional (Surmont et al., 2014).

When it comes to classroom procedures, they can be various in terms of the languages used. Sometimes one language might be used for outlining and

Translanguaging is a recent theory that states that in order to communicate, all users of language select and use different language features from all languages they know, as if it was a unified linguistic repertoire.

summarising the main points, and the other for the other lesson functions. Sometimes the two different languages may be used for specific types of activities: some learners may use a textbook in their mother tongue when doing homework in order to build confidence and check comprehension while others will work on the material in a foreign language; some learners may ask for explanations from the teacher in a foreign language, while others will ask in their mother tongue and be answered in a foreign language. Beginner CLIL learners may use their native language to speak to the teacher when doing problem-solving, but the CLIL teacher will answer questions and support learners in a foreign language. Still, the systematic switch between languages or even translanguaging is based on a planned development of content, language and cognition, and these actions should not be random. Whatever language is used at a particular point during the lesson should be purposeful and strategic.

There are two main versions of CLIL, the hard and soft one, but the application of CLIL variants is not uniform: the local context and needs of the learners will dictate how CLIL is applied. Hard CLIL is sometimes seen as half-immersion, where roughly 50% of the curriculum is done in a foreign language. On the other hand, in soft CLIL some curricular topics are taught in a foreign language in a language subject class. There is a middle ground between these two, a modular CLIL, in which teachers choose from their subject syllabus certain areas that will be taught in a foreign language. While in hard and modular CLIL the subject matter has a dominant place, in soft CLIL language and linguistic aims are primary. There is quite a variety between European countries that run bilingual projects because the characteristics of different education systems influence different solutions. Still, even though there is no prescriptive model, there are certain pedagogical principles that should be followed.

In terms of pedagogical approaches, the bilingual program is dependent on the social interaction between learners and teachers. Learning is scaffolded (that is, supported) by someone more ‘expert’ – that might be the teacher, other learners or even resources. When learners are able to accommodate a cognitive challenge, that is, when they are ready to deal with new knowledge, they are also ready to start interacting with ‘expert’ others, teachers and/or peers, to develop their individual thinking. Understanding the concept of the zone of proximal development (Vygotsky, 1978) is essential for a successful bilingual lesson. Becoming competent in new material is always challenging but learners will start to see that new knowledge is potentially within reach when they know

they will get appropriate support, scaffolding, and guidance. This will give them confidence to try out things on their own and start to work independently on their skills and competencies.

As content might be presented in a foreign language, teachers should understand how to strike a balance between new language and new content. From a language-learning developmental perspective, it has been shown that learners usually know more than they can express, and they can almost never use the same resources in CLIL as they do in the classes in their mother tongue. The gap is quite obvious for CLIL as learners have little to fall on language-wise while they are going through new material.

CLIL teachers have to consider how to actively involve learners to enable them to think through and articulate their own learning, so that content learning becomes effective learning. Learners need to be made aware of their own learning through the development of metacognitive skills such as 'learning to learn'. CLIL classrooms are usually interactive and typified by group work, inquiry learning, and problem-solving. They usually require learners to cooperate with each other in order to make use of each other's areas of strength and compensate for weaknesses. Therefore, learners need to learn how to operate collaboratively and work effectively in groups.

The benefits for learners are that code-switching between languages and translanguaging lead to a dynamic form of bilingualism in the classroom. It has been reported that 'learners in a CLIL environment have a more positive attitude towards (language) learning' (Breeze et al., 2014: 57). This does not mean that only those learners 'gifted for languages' prosper as improvement has been recorded for all learners.

Second language acquisition research provides a lot of support for CLIL implementation as it shows that CLIL

> (1) creates conditions for naturalistic language learning; (2) provides a purpose for language use in the classroom; (3) has a positive effect on language learning by putting the emphasis on meaning rather than form; and (4) drastically increases the amount of exposure to the target language (Dalton-Puffer, 2007; Dalton-Puffer & Smit, 2007) (Naves, 2009: 25).

It should be noted that CLIL does not only improve language proficiency – if the instruction is correctly implemented, the benefits for learners go further than that. Learners become better prepared for internationalisation and build their intercultural communication and soft skills because CLIL relies on group work and cooperation and requires active involvement of learners in all stages of instruction. Also, learners develop critical thinking skills because inquiry teaching and inductive learning (and other diverse methods of classroom practice) are supported through CLIL. Learners communicate meaningfully about the content; as a result, the overall motivation should increase (Breeze et al., 2014).

The complexity of language and content integration puts before teachers, even in a well-developed program, certain challenges. One frequent issue is the lack of linguistic competence in English of either learners or teachers, or sometimes both. When CLIL is a general approach used and not just an education stream for specific learners, there might be those who are not motivated to learn a foreign language. Other concerns fall into the realm of the organisation of teaching. Sometimes the choice of subjects to be studied in English is arbitrary, and in the soft version of CLIL the amount of material in English within the subject might also be arbitrary. Since CLIL should be tailor-made to fit particular learners, there is usually a lack of materials for specific needs or teaching contexts. Additionally, there is a need for teacher training that is more focused on CLIL itself, rather than exclusively on language proficiency or content. Still, all these issues need not be seen as problems, and might be turned into learning points (Garciá-López & Bruton, 2013).

Integrating content and language

What constitutes content in a CLIL context?

Depending on a context, content can range from the elements taken directly from the statutory National curriculum in both native and foreign languages to the inclusion of the topical issues drawn together from different aspects of the curriculum (for example, the Olympic Games, global warming, ecosystems…), making it cross-curricular, or even interdisciplinary. The basic content usually starts with the defined knowledge and skills within the curriculum or thematic plan. It might include how to apply these through creative thinking, problem solving, and cognitive challenges. Content will provide a knowledge base which is continually growing and changing; therefore, learners need to know how to use it throughout life: how to think, to reason, to make informed choices and to respond creatively to challenges and opportunities.

Language-driven CLIL

- Content is used to learn the foreign language (L2).
  Language learning is priority.
  Content learning is incidental.
  Language objectives are determined by L2 course goals or curriculum.
  Learners are evaluated on content which should be integrated.
  Learners are evaluated on language skills/ proficiency.

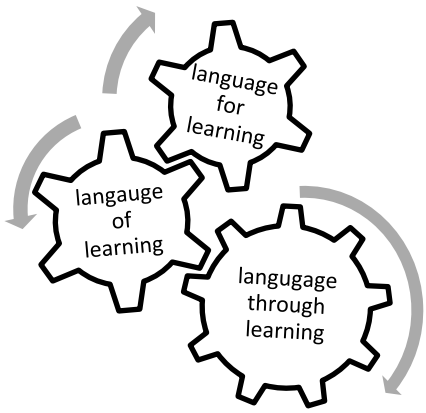
Content-driven CLIL

- Content is taught in L2.
  Content learning is priority.
  Language learning is secondary.
  Content objectives are determined by course goals or curriculum.
  Teachers must select language objectives.
  Learners are evaluated on content mastery.

CLIL can be organised along the continuum from very language-driven to very content-driven. For Serbian schools, the CLIL project is in many aspects content-driven, even though it is expected that learners should be evaluated on both content and language proficiency.

When content and language have to be integrated in one lesson, the aims to be achieved have to be stated firstly: not only on a lesson-to-lesson basis, but for a whole study cycle and for a whole academic year, and, especially as the percentage of the content in a foreign language can vary in different grades and different subjects. Therefore, teachers need to identify and justify the means by which the integration of content and language will be achieved. This is probably different for different schools and different teachers, as individual learning and teaching contexts are also different.

Teaching a particular content in a foreign language considerably increases the need for repetition, rephrasing and checking of understanding. When teaching in one's mother tongue teachers do not spend as much time on rephrasing, and the checking for understanding is usually done for content. There is a lot of content in CLIL classes, so teachers might have high teacher-talking time at the expense of the learners' output. Since particular content is already required by the National curriculum, teachers should think about the process in which to provide enough of both linguistic and content scaffolding, and give enough room for the learners' output.



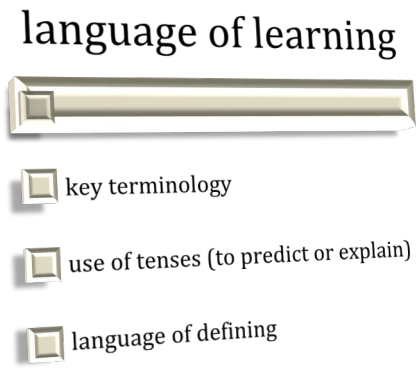
Subject teachers need to take into consideration a number of questions about the language demands of the unit they are teaching. It might be useful to identify *content-obligatory language*, which is essential for content learning: the vocabulary, grammatical structures and functions learners need in order to study specific curricular subjects (e.g. for chemistry: matter, mass, physical state…). Also, understanding *content-compatible language* helps teachers to strategically sequence their language and content objectives (Snow, Met & Genesee, 1989: 205), because it is the less formal, more everyday language that learners need for studying curricular subjects (e.g. for chemistry: measure, mix, reaction…). Teachers need to make clear links between content objectives and language objectives so that learners understand the different role a foreign language takes in a CLIL subject. The 'Language Triptych' (Coyle, 2000) might help with this as it enables teachers to analyse language needs in different language contexts and differentiate between

types of language demand (Coyle et al., 2010). The triptych conceptualises language learning from three perspectives: language of learning, language for learning and language through learning.

'Three languages' in CLIL

Learners use language in different ways to achieve different purposes in CLIL. They need to learn particular terminology to master the subject content. In order to do that, learners need to be able to functionally use language – to ask questions, to be able to add information when asked, to ask for clarification themselves, etc. While learning the content and using the language, learners should master both. Teachers can prepare for the exploration of a foreign language by paying more attention to the lessons in their mother tongue. They could note what subject-related terms they use, if there are any fixed phrases and expressions, to what purposes language is used (Coyle et al., 2010). By raising their awareness about language use in their mother tongue (L1), it might be easier for teachers to organise language and content in CLIL.

With language of learning teachers provide terminology and structures that enable learners to understand the subject matter. For example, if the topic is solutions, the language of learning consists of the key vocabulary and phrases related to solvents: *homogenous mixtures*, *saturation*, *saturated*, *unsaturated*, *to dissolve*, etc. When learners need to define and talk about these concepts, they need to embed the terminology into 'defining' language. They will also need time and some practice to start using the new vocabulary. Learners need to develop a repertoire of language functions which relate to the content, such as describing, evaluating, drawing



conclusions, as these are essential for tasks to be carried out effectively. If learners have to explain their ideas and provide support and justification (Dale & Tanner 2012), they will develop better understanding.

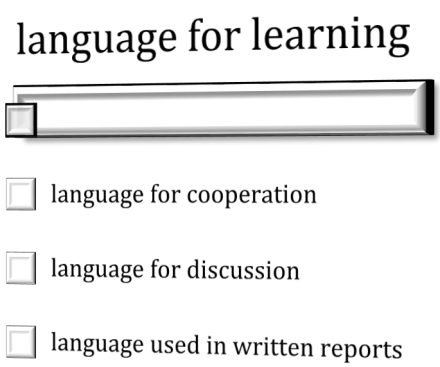
We say 'zero'	for the number	0	the number zero
We say 'zero'	for temperature	-5°C	five degrees below zero
We say 'oh'	after a decimal point	5.03	five point oh three
We say 'nought'	before a decimal point	0.05	nought point oh five

Teachers can analyse the material and check what cognitive skills are required to understand it (e.g. if learners are expected to understand and explain, or they will have to analyse material as well). Also, they can check what tenses are used, whether there are complex constructions in addition to new terminology. Based on such input, teachers might decide what is crucial for the introductory lesson and what can be dealt with later.

Certain activities require more content-obligatory language than others. Teachers need to be aware of the type of language needed for each activity and pre-teach some vocabulary if necessary. For example, learners are familiar with the concept of the number zero, probably also with the terms 'oh' and 'null', but might not have used 'nought', and then, probably need some guidance on how these three terms are used.

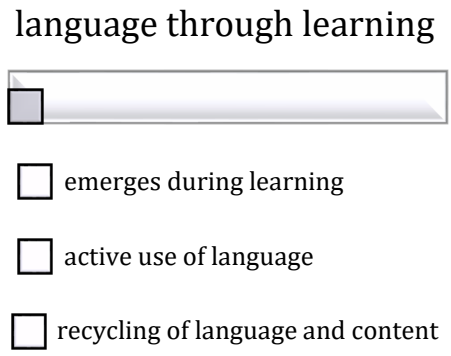
Further, teachers need to teach and support *language for learning*: the kind of language needed to operate in an English language environment. It is the language learners need during lessons to effectively carry out the planned activities. Teacher should provide learners with strategies so that they can use language effectively (Coyle et al. 2010). Teachers need to understand that, in addition to providing key terminology, they should think about the language learners need to talk about new material, to express learning, to communicate, to follow instructions or to give instructions to their peers. They need to support the learner in developing skills such as those required for pair work and cooperative group work: asking questions, debating, chatting, rephrasing, adding, clarifying, enquiring, thinking, memorising. If learners do not

understand and do not use language which enables them to learn and support each other, there will be no learning.



The formal, academic language in learners' mother tongue does not come easily, so it will demand some work in English too. For example, a chemistry task for 7th-graders states that they should do research and find information on solutions used in households. Then, in pairs or groups they need to present the results in the form of a poster or PowerPoint presentation. In order to do that, learners need to have the language firstly to understand the subject matter and then to cooperate with others. They will have to work successfully in groups, carry out their research, organise information and then present it either in the written form or orally without referring to their notes.

Finally, teachers need to provide *language through learning* since effective learning cannot take place without the active involvement of language and thinking. Learners need to report on what they learned and to articulate their understanding, and this is where deeper learning takes place. They need language to advance their thinking processes while they are acquiring knowledge and at the same time learning language. In effect, for learners, understanding physics or chemistry in their own right is like understanding a different language in itself (Lee, 2006). Doing all that in English is a formidable task that requires strategic planning and support.



While working in groups, for example, learners might decide to express some ideas for which keywords have not been introduced. Therefore, they need to be able to effectively search for the terms (for which they need dictionary skills).

In this way spontaneous learning takes place, so teachers need to decide how they are going to recycle language and capitalise on unplanned learning.

In order to address these concerns, CLIL teachers need to continuously ask the following questions when preparing lessons, as these questions help as a planning tool for all subsequent stages (Coyle, Hood, Marsh, 2010).

- What are the 'talk demands' of the tasks? What does the task entail linguistically?
- What language should learners know in order to be able to complete an activity? For example, are learners going to discuss theory, or follow a formula, or try to give their justifications for task solutions? What different language knowledge do these different tasks require? Will they ask a lot of questions, will they work in pairs/ groups and need to jointly solve a task?
- Do learners need to negotiate with their peers how to do a task?
- If you ask learners to discuss or debate, do they have the necessary linguistic support to enable them to do this? If not, what kind of scaffolding will help them?
- Are 'talk demands' at an appropriate level for learners' age and cognitive level of ability?
- Is the language for the subject content available for foreign language learners of their level?
- What are your criteria for *important* and *meaningful* in a specific content area (a specific subject)?

In that way, the content-language balance will always be a focal element in the planning process.

Practical tips

The younger the learners, the more essential the manner in which instructions are given. Consider these guidelines:

- Grade language according to the age of the learners and their proficiency.
- Remain consistent: use language learners will recognise as 'instruction'.
- Do not 'overload' learners, use only language that is necessary.
- Break instructions down into smaller steps to optimise understanding.
- Use clear and slow delivery.
- Check instructions repeatedly throughout the process/ activity (for example, use Yes/No questions rather than 'Do you understand?' questions).
- Whenever that is possible, use demonstrations and provide examples.
- Use gestures or mime when that is possible.
- Involve learners through elicitation, ask for their own experience and examples.
- Script instructions in advance if you are not used to giving them in English.
- Challenge the learners gradually by adding 'new' language as time goes on.

4Cs Framework in CLIL

Coyle et al. (2010) define CLIL as having 4 elements: communication, cognition, content and culture. The framework allows for the elements to be integrated in different measures, showing great flexibility in how the elements influence each other in different contexts and are inseparably connected. The 4Cs framework is a holistic representation of learning that happens through different dimension: the development of knowledge, interaction in a foreign language, and the development of intercultural competence. Content is developed during communication among learners, within one context, and

should help the development of intercultural awareness in learners. These four elements should be present in all CLIL lessons, and depending on the subject, they will be more or less challenging to include.

Cognition
With its particular organisation of instruction, CLIL favours learner-centred learning, where active learning and inquiry-based learning are encouraged, and through which thinking skills, reasoning, creative and critical thinking are developed. Learners are expected to face the cognitive challenges, through their active involvement, self-regulated learning, and autonomy. Formative assessment, self- and peer-assessment are used to help learners become independent and responsible learners.

Communication
The CLIL approach allows learners to use language skills with particular subject content, to solve problems or understand ideas. Language is not used for language's sake, but in order to communicate their understanding with others and to actively work on tasks. During a lesson, learners use and produce subject language, both orally and in writing and make use of content-obligatory and content-compatible language.

Content
Content in CLIL has already been discussed: different curricular subjects, cross-curricular topics and language are types of content. Whatever form of CLIL (soft or hard, language- or content-driven), content should be analysed for language demands and purposefully worked on in class.

Culture
This element might be challenging to include in different subjects, simply because of the nature of different subjects. While in history, geography and philosophy it might be easier to work on and with culture and intercultural learning, this might not be readily available for mathematics of physics. Even if teachers do not feel culture as central for CLIL, learners should develop the feeling that they are members of a learning community, and that they will communicate with the members of that community – both within their own culture and with other cultures. Real-life problems and project-based learning might be some of the ways in which culture can become more prominent in the CLIL classroom.

TASK 1

1. What do you see as the benefits and drawbacks of teaching sciences in English?
2. Are there ways in which teachers of your school can collaborate across the curriculum? Are these collaborations long-term or short-term (do you plan them to last the whole year, or are they done only when there is a suitable topic in different subjects)?
3. If you were to make an analogy for bilingual education, what would it be? *Bilingual education is like … because* ...
4. Find definitions for these terms. You might look online or use a monolingual dictionary:

BICS	HOTS
CALP	(partial) immersion
chunk	inquiry approach
cloze test	learning outcomes
code switching	LOTS
competence	pyramid discussion
completion activities	visual organisers
first language (L1) transfer	wait time
functional language	word bank

The importance of academic language

Academic language in one's mother tongue is not something that comes naturally to learners. Mastery in academic language 'is the most reliable foundation for success in school, for success in subject learning and success in society at large after graduating from school' (Beacco et al., 2016: 22). If

learners develop it, they will be able to function effectively in school, across all subjects.

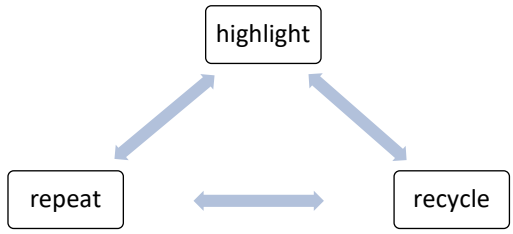
However, the specific forms of and competence in academic language that are required are often under-defined, not described or explained explicitly to learners. When learners need to use a foreign academic language, the process becomes additionally challenging.

Learners who attend CLIL classes come in with already somewhat developed language proficiency, and are often fluent speakers of English. The research has shown that CLIL teachers believe learners, especially those in secondary school, possess such a high level of linguistic competence that they need not address language aspects in their classes. While that might be the case when it comes to grammar competence, the target language forms, uses and development of critical literacy should be explained. Academic language, not only in English but in their mother tongue, is probably something learners still need to practice further. The genre and terminology which are different for each subject need to be explained and appropriately practiced.

Different genres – reports, instructions, explanations, persuasion, argumentation – are present in different subjects. Just as learners would need to argue and explain different philosophical ideas in philosophy, they would need to give and follow instructions in chemistry, or recount historical events in history. They will need to develop these different genres accordingly – on top of mastering the content of different subjects.

Another possible challenge in terms of academic language is the input of information. If learners read a text or listen to a talk that is information-heavy and abstract, without any visual support or graphic organiser, they might not be able to keep up. The reverse situation might also be problematic – that learners need to be able to follow and understand a graph without much additional explanation. Also, finding key points, understanding long complex problems, distinguishing between facts and opinions, could all be an obstacle to understanding (Dale & Tanner, 2012: 43). This is the reason why CLIL instruction needs to balance content and language, and provide enough support for both language and new material.

In order for learners to understand content areas and develop subject-specific critical thinking skills, teachers should highlight, repeat and recycle key academic language in a visually suitable framework (Ball, 2018).



This can be done through allowing learners to use their own words to describe terminology, repeating a learner's answer in academic language (revoicing), echoing a learner's answer in class (repetition), and prompting the student to justify or lengthen their answer (elaboration) (McNeil, 2011).

Subject teachers need not be language experts but should point out the important language aspects to learners (for example, the usage of linking devices when writing up a report of an experiment). Suggesting what language, terminology or structures to use when answering a task makes the relationship between content and language visible and provides scaffolding for learners.

 TASK 2

When teachers present new material, they usually do it through several stages in this sequence:

1. Establishing pre-knowledge (brushing up on what learners already know)
2. Introducing the concepts (presenting the material)
3. Working on the main conceptual content (practicing the material)
4. Concluding work on the main conceptual content with pre-assessment (summing up)

5. Doing proper assessment or a synthesis with other subjects/ concepts (assessing what learners learned)

Over the period of the work with one particular conceptual sequence, the most time is spent on the third point. Just like with any other subject done in the mother tongue, understanding the concept and being skilful in working with it takes the most time.

In what order would the following statements be placed along the continuum (from the introduction of the topic to the point where learners show mastery)?

a) Other white blood cells digest any cells that the antibodies adhere to
b) Everyone gets ill sometimes
c) $C_6H_{12}O_6$ $2C_3H_6O_3$ + 2ATP
   Glucose lactic acid + energy
   As opposed to aerobic, anaerobic respiration refers to the oxidation of molecules in the absence of oxygen to produce energy

From input to intake

Input is any and all written or spoken language that learners encounter (a teacher's lecture, video or reading material, etc.) that may be used to construct linguistic knowledge. When the information is comprehensible and meaningful, input turns into intake: a comprehended input that influences the development of learners' linguistic system.

In order to turn input into intake, a learner has to be able to notice information in input. What is noticed depends on the mediating factors such as prior knowledge and skill, what the task demands, frequency of that particular language element, and whether it is seen as relevant. However, for true learning, noticing activities alone are insufficient if they are not coupled with follow-up awareness activities that include tasks through which learners discover rules.

In CLIL classes, just like in regular classes, teachers introduce material in various ways. They might bring in visuals or real objects to brainstorm already existing knowledge, or start with a presentation which introduces the language and concepts, or open with a set of questions. To facilitate intake, teachers should think of the language-content input and consider different viewpoints, including:

- The clarity of the 'message': is it expressed in an accessible way?
- The clarity of the thread of thinking: is this apparent? Do learners need to infer new information, do they need to integrate it?
- The mix of styles for presentation: does it have visuals, tables, diagrams, graphics as well as texts which can be heard or read, including bulleted and continuous text?
- The level of grammatical/ syntactic complexity: are the phrases and sentences too complicated and/or is the use of grammar more complex than it is needed? Will language stand in the way of the content?
- The level of general vocabulary: are there complex words which are not necessary?
- The level of subject-specific specialist vocabulary: is there the right amount of new vocabulary?

When there is the integration of language and content, tasks for learners are multi-layered. Therefore, some of these questions will be important for CLIL instruction:

- Do the tasks allow learners to show they have understood the concepts?
- Are the task output formats appropriate for showing understanding (e.g. are they visual, tabular, do they demand simple language?)
- Do the produced outputs allow the learners to revisit the learning or explain it to someone else, that is, do the outputs allow for metacognition? (are learners required to describe or be aware of their thought process?)
- Are the language requirements for completing the task appropriate, or do they represent a barrier to learners in their expression of understanding (e.g. is the syntax/grammar needed too demanding? Do the learners know the task vocabulary as well as the content vocabulary?)
- Are the tasks collaborative (e.g. do they involve discussion? Do the learners have the language needed for this discussion?)

Practical tip

For CLIL in elementary school, it is important to use ‘classroom English’ as a first step towards proper academic language. You can find more on that in the section *CLIL in elementary school*.

Scaffolding in bilingual science classes

Vygotsky's theory of a child's development (1978) is important for the CLIL context, as it is for the whole learning process. Vygotsky believes that the process of learning does not happen in isolation, but in interaction between a learner and their environment: learning is a social activity and a learner is a social agent. Since learning should not be a solitary activity, there should be someone in the process who will help the learner, someone who is a bit more competent, to provide a structure for learning, or scaffolding. Scaffolding is a form of an assistance that enables a learner to solve a problem, do a task, or achieve a goal that would otherwise be beyond their possibilities. This usually comes from a teacher but a more skillful or competent peer will also be able to provide the support.

Learners in the classroom interact with the peers and the teacher and go through the learning process as a series of problem-solving activities. The teachers and more knowing peers help a lot in the whole learning process. For those problems where a learner cannot reach a solution on their own but needs a little bit of help, scaffolding provides this 'push'. In such a way, tasks are not simplified, but the demands on the learners are (Cole, 2000).

For the classroom this means that instruction should provide opportunities for development. Scaffolding ensures that the learner develops firstly through collaboration with others. From this basis of knowledge and confidence, the learner should gain an individual control over the task in the end. Additionally, teachers focus on what learners can achieve, and how to use the existing potential for more complex tasks, rather than 'on a demonstrated level of achievement' (Cole, 2000: 319).

There are different ways in which the teacher can provide support for the learner: it can be in the form of task organisation, classroom/ group organisation, language input, use of different types and modes of material, etc. Even when a CLIL teacher uses lecturing as an input strategy, scaffolding can come in the form of different multi-modal material, question strategies, tasks, and gestures to communicate the content to learners. As a rule, teachers start with what learners know and then provide scaffolding that might come in different formats (for example, saying 'you know this from everyday life as…

but in science, it is called…'). The same happens when the learner is doing an experiment, and the teacher is asking additional, guiding questions, so that the learner can confidently finish it.

The peer-support can be introduced through cooperative strategies (see more in the section on *Cooperative learning*), specific tasks for different learner pairs and groups, peer-teaching and peer-assessment.

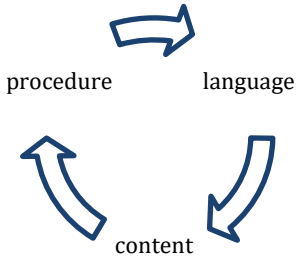
Learners need to have opportunities to use subject-specific terminology not just for content learning but also in meaning-making activities (Lin, 2016). Repeating subject-specific words and phrases will provide language support but will not be enough for CLIL learners. Learners should have a chance to relate new terminology to the one they know, and to understand that general English that they already know might be used to mediate the new concepts, learning academic, subject-specific terminology that way. This does not discredit the use of L1 in the CLIL classroom. Quite the contrary – given that the bilingual project is content-driven, code-switching might help clarify the important concepts – especially for younger learners. For example, in their classroom talk, teachers can use L1 explanations and L2 vocabulary, or learners might prepare for the task in L1 but then perform it in L2.

In addition to the teacher, peer and language support, CLIL learners should get conceptual and procedural support: providing the understanding of what the important tenets are and what specific competences need to be developed in a particular subject. Learners need to be engaged in activities where they would work on concepts in English. Conceptual content, or declarative content, requires learners to be able to talk about it; language is there as a vehicle for their learning, not the main goal. The procedural demands of a task, what cognitive skills are employed to master the content, also places certain demands on learner language. If teachers want learners just to understand the key words or a process, language will be rather straightforward. However, if learners need to make inferences and employ higher cognitive skills, language will be more demanding.

For example, learners might be asked to read this:

> *Scientists understood why forces acted the way they did when objects touched. The idea that confused them was forces that acted at a distance without the objects touching – for example, gravitational force, electric force, and magnetic force. To help*

them explain what was happening, scientists used the idea of "field". They imagined that there was an area around the object, and anything that entered would feel a force. We say, for example, that the Moon has a gravitational field around it, and if you get close to the Moon, it will pull you down to its surface (adapted from *physics 4 kids* website*)*.



If learners are asked to answer this question: *What is a 'field'?* they can easily find the answer in the text: 'an area around the object'. However, if the question is: *Do electric and magnetic force interact?*, the answer might not be readily available in the text: a learner needs higher-order cognitive skills to solve it. Consequently, the learner needs language with which to discuss these concepts that support the thinking process and the explanation. Without proper language learners cannot '*language* about content' or form understanding about the content. They should be able to express their thought-processes and justify their solutions while using appropriate terms and following required procedures. Since 'academic language is no one's mother tongue' (Passeron, 1977) teachers should always be careful that they counterweigh heavy content demand with lighter language demand, and vice versa.

Practical tip

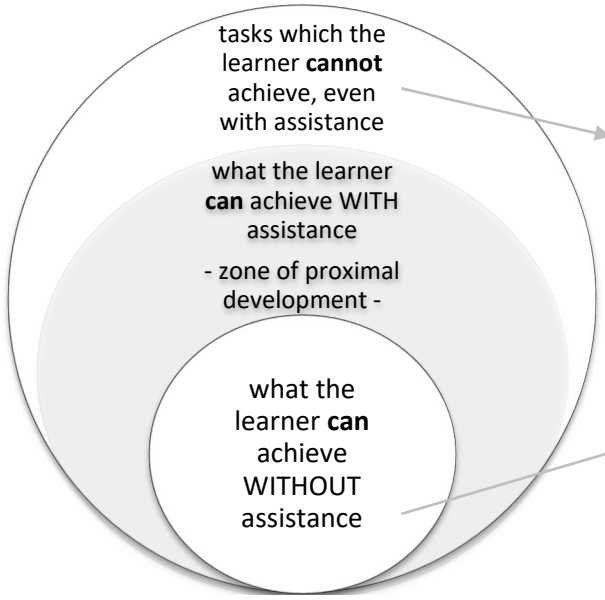
In order to maximise the use of language and content, scaffolding can include:

- Create interest
- Break down tasks into smaller chunks
- Provide before-, during- and after-task support
- Demonstrate tasks
- Use word banks, glossaries, writing frames,
- Use model texts for language production activities,
- Provide constructive, full feedback (Bentley, 2010: 69).

When organising an instructional unit, teachers need to keep in mind the accompanying tasks and texts and how they organise them. It is important to sequence the units so that they are manageable but at the same time each more challenging than the previous one, with the gradual progression. Learning should be guided so that it helps learners develop beyond their current level – beyond what is called the zone of proximal development (ZPD).

As Figure 1 indicates, the grey 'area' of the ZPD shows that with additional guidance a learner can do more, develop more than their level would suggest when they do tasks individually and without any help. The ZPD is the distance between the actual developmental level (which is seen in individual work) and the level of potential development, which is seen when there is some teacher guidance or collaboration with other learners (Crain, 2015).

In CLIL classes, structuring the learning will be of particular importance as language and content have to be in balance. A good analogy for a CLIL lesson is a mixing desk of language, content and procedures, where language and content need to balance out (Ball et al. 2016). The teacher decides what will be the most prominent at what point. The content (concepts) is usually given, and language is what will make learners understand the concepts. Whenever new language takes more weight, the content should be smaller in volume, and vice versa: when language is not difficult, or has already been acquired, the content should include complex concepts and ideas.



If asked to perform on this level independently, before they are ready, learners will feel anxiety.

If asked to continuously work on this level, even when they are ready for the next one, learners will feel boredom.

Figure 1 Zone of proximal development

When it comes to procedures, this may be anything from 'listen and copy' to 'find out what these terms mean, first in your L1 then find L2 counterparts'. If procedures are just focused on remembering and learning by heart, not much of language or concepts will be learned. If, however, the procedure is such that it demands from learners to read or listen to something, write down things, then discuss them, the procedure equally includes language and concepts. By being aware of these demands, the teacher can take into consideration what will be demanding for learners and provide the needed support (Ball et al., 2016).

As a form of instruction organisation, group work is very useful and can in many ways increase the engagement of learners, provide peer-coaching as well as peer-assessment, and an increase in autonomy and self-regulated learning (more on group work roles in the *Cooperative learning* section). If groups are organised in such a way that a more proficient learner guides others, then this creates a peer-teaching situation and scaffolds learning. However, other types of group work might be equally beneficial, as learners jointly work on a problem, potentially having different roles in a group.

Practical ideas on scaffolding

☆ Teachers can organise a revision session, or test preparation by creating two types of cards for groups of 5-6 learners. One type of cards will be with the content material – questions about the material, definitions, equations, problems, etc. These cards are to be stacked up and placed face-down on the desk. The other type of cards are 'nomination' cards. Simply write 'ask the first person on the right', 'ask the second person on the right', 'ask the first person on the left', 'ask the second person on the left', 'ask whoever you want' on the cards and have several of each. A learner will first draw the nomination card and then the content card. Depending on the content, you can impose a time limit for each question. Learners need to check on each other and note down if there are things they still do not understand.

The cards can be in both the native and the English languages or could indicate that the next person needs to restate what was said in English in the native language. This will depend on what you want to practice and to what purpose.

☆ It is important for the CLIL teacher to go through a list of questions before starting each lesson if scaffolding is to be done appropriately. Conceptual problems, theories, formulas, main ideas would probably be the first concern. However, at the same time, the teacher needs to think about what language will be used at every point in the lesson. Will it be the native or the English language, and then what type of genre will be used – discussion, report, presentation… The teacher should think about what general English they can refer to when introducing new ideas and what particular formulations learners might require to discuss tasks. Checklists and templates with these items might be useful for lesson planning.

☆ As a form of scaffolding, learners might be provided with lists of phrases to use. The younger the learners, the more important this support is. While it might be expected from high school students to possess a high linguistic proficiency, more specific, academic language might present certain challenges to them. If teachers prepare the lists beforehand, or practice them with learners beforehand, they might be more comfortable using the language and be better prepared to participate in a lesson.

In addition to terminology, learners can get these prompts for pair and group work when they ask for clarification:

- I missed what you said – what do you want us to do?
- I don't follow – can you repeat?
- Did I get this correctly: we need to…?
- What do you think?
- Do you have the same answer?
- I think you're right.
- I've got a different result from you.
- I don't think that's the correct solution.

Learners can be provided with the list of the verbs and adverbs to describe changes (sharply, rapidly decrease, steadily rise/ increase, fluctuate, level, expand, shrink…).

When learners are asked to make hypotheses and inferences, the cues that they can use might be:

- ★ It seems that …
- ★ It's unlikely that …
- ★ This points to …
- ★ It is difficult to be certain about/ when …
- ★ It is the result of ….
- ★ It might be a consequence of ….

Being able to concisely and orderly organise the material helps learners show their knowledge and competence. For those purposes they can use the language which organises information (*Let's begin with, Now we move on, My next point is...*, *Firstly, Secondly, Thirdly, To sum up, Not only/ but also…*)

☆ In order to ease the input, the teacher can provide learners with the key words from a new lesson before the lecture. The teacher then proceeds to give information in sizable chunks, while learners listen and individually try to order the key words as they are presented. The teacher then stops and gives the learners time to recreate the text (in pairs or in groups), to add to the key words what they have heard in the lecture (adapted from Deller & Price, 2015).

☆ The teacher might provide scaffolding by dividing the presentation of the new material into several stages. Firstly, just based on the title, the learners are asked to predict the key terms they think will be important for the lesson. These will probably be terms in general English, so the teacher will provide more subject-specific terminology, which the learners can translate into their L1. After that, the learners might be given a 'script' of a lecture/ video/ podcast without the key words. The learners then need to listen and try to fill in the gaps (adapted from Deller & Price, 2015).