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# Chapter 10

## Explicit Plurilingualism in Co-taught CLIL Instruction: Rethinking L1 Use

Iris Milán Maillo and Elisabet Pladevall-Ballester

**Abstract** Language studies framed within sociocultural perspectives have claimed that the use of the first language (L1) in foreign language (FL) instruction settings can facilitate FL learning. This study inquired into the functions of L1 use in the oral production of Catalan/Spanish bilingual primary school learners ( $n=20$ ) and teachers ( $n=2$ ) of co-taught Content and Language Integrated Learning (CLIL) science sessions. Eight complete lessons that were taught by means of both the L1 (Spanish/Catalan) and the FL (English) were audio recorded and transcribed. The identified functions were quantified and classified into different interactional strategies so as to know which ones were mostly used by which participants. The direction of interaction between addressees and addressers was also analyzed to investigate if the lessons were teacher or student centered. The main findings indicated that this specific co-teaching model did not fulfill the objectives of CLIL approaches but L1 use was shown to be a beneficial tool serving the purpose of coping with CLIL linguistic and cognitive demands. Finally, pedagogical implications are discussed with regard to CLIL and collaborative teaching methodology.

**Keywords:** L1 use, foreign language learning, CLIL, co-teaching, sociocultural theory, interactional strategies.

### 10.1 Introduction

The use of the native language within foreign language instruction contexts is often discouraged. Although the L1 is a resource that both teachers and students utilize, it is not an overt and evident practice, but a rather cautious one mainly due to traditional models of language learning neglecting its use. The predominant view encompassing foreign language learning has developed a series of recommendations and policies *inviting* to teach only by means of the language that has to be learnt, arguing that the presence of other languages during instruction can interfere with the FL learning process (Jones 2010; Littlewood and Yu 2011; Pavón and

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Ramos 2018). The aim behind monolingual approaches to language teaching is to provide students with large amounts of comprehensible input trying to simulate linguistic immersion and maximise FL use.

Studies framed within sociocultural theories (Alegría de la Colina and García Mayo 2009; Antón and DiCamilla 1998; Jones 2010; Swain and Lapkin 2013; Vanderheijden 2010) have shown that the prohibition of L1 use might have a negative effect on students' cognitive learning. In addition, the prohibition of L1 use might entail loss of confidence, affect students' achievement and trouble the establishment of interpersonal relationships (Jones 2010). In the same vein, these studies attribute an important role to L1 use when promoting FL learning (Méndez and Pavón 2012; Pavón and Ramos 2018) since it is one of the major tools that may encourage and scaffold FL communication.

From a sociocultural perspective, language is considered a mediating cognitive tool that regulates thinking and fosters the building of knowledge (Lantolf and Thorne 2007). This view of language is tightly connected with the objectives of the CLIL approach, where language use ideally mediates cognitive processes and aids its learning. Instruction settings that are provided thanks to the application of this approach are perfectly aligned with sociocultural claims. Hence, the presence of the L1 in CLIL contexts could play a role in helping FL learners to cope with the cognitive effort invested in their learning process.

To date, there is a small number of studies examining the functions of the L1 in co-taught CLIL contexts (Méndez and Pavón 2012; Pavón and Ramos 2018). Understanding the different uses of the L1 that are indeed present in the input in FL settings is necessary to discover if FL learners can actually benefit from plurilingual input, and, as an ultimate goal, if they are able to develop a series of strategies through their L1 that could help in facilitating FL development. Therefore, this study analyses the different functions fulfilled by L1 use both by teachers and students in a plurilingual co-taught CLIL context in order to understand the impact of the L1 during FL learning.

The present study is organised into six sections. Section 1 presents sociocultural perspectives on L1 use, CLIL approaches to FL teaching, L1 use studies in non-CLIL and CLIL contexts, and the use of L1 interactional strategies. Research questions are addressed in Section 2 and the methodology of the study is described in Section 3. The results are presented in Section 4 and discussed in Section 5. The main conclusions and the pedagogical implications of the results are presented in Section 6.

### ***10.1.1 Sociocultural Perspectives on L1 Use***

Within the framework of the sociocultural theory, studies consider language as a primary psychological means of mediation and regulation of both mental processes and social interaction (Lantolf and Thorne 2007; Vygotsky 1978). Language

regulates and mediates the relationships that are established between the individual (biological, interpsychological and behavioural) and the material world (cultural activities, perceptions and intrapsychological relations). Consequently, language is no longer perceived as a simple communication tool, but rather as a key element that is linked to psychological processes that derive its “functions from social activities” (Swain and Lapkin 2000, p. 254). Language plays the role of being “a resource for participation” (Zuengler and Miller 2006, p. 37) and a useful device for creating collaborative activities. Thus, language learning takes place in settings where language use is involved, so language learning is both a cognitive and a social process (Swain 2000). Following these assumptions, one could argue that the L1 can act as a useful cognitive tool in mediating FL learning and responding to specific communicative needs when coping with linguistic and cognitive demands. In other words, the L1 can be useful in mediating the expression and the construction of both knowledge and content in FL instructional settings. This construction of knowledge would originate from the dialogue among the collective on the social plane.

It is especially in cognitively demanding activities when learners co-construct meaning, spontaneously externalise their thoughts, and interact with their peers by means of the L1, since it is the language that students share at the same level of competence. This kind of interaction that is framed within Vygotsky’s dialogic model (Swain and Lapkin 2013)<sup>1</sup> is labelled as private speech, and it allows learners to overcome the linguistic difficulties they might encounter when doing a task.<sup>2</sup> L1 private speech serves the purpose of developing three important functions when learning a FL: metacognitive and cognitive functions (monitoring the task and its goal), social functions (sharing understanding of the task) and affective functions (externalising thoughts and feelings). In sharing competence and serving these functions, the L1 allows learners to discuss and perform the tasks at higher levels. Sociocultural perspectives agree on the fact that the L1 provides the learner with cognitive support when students are not able to make progress in a given task by using the FL (Castellotti 2001). The use of the L1 allows FL learners to “establish a shared understanding of the task, to set task goals, and to comment on their L2 use (metatalk)” (Alegría de la Colina and García Mayo 2009, p. 327). Together with these functions, the L1 also helps the students to make progress within their zone of proximal development (from now on ZPD). As described in Vygotsky’s 1978 study, the ZPD is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). This concept reinforces the idea of

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<sup>1</sup> This refers to collaborative dialogue and the notion that individuals derive knowledge from social interaction. It is by the interaction of two or more individuals that language learning and knowledge development can (co-)occur while collaborative dialogue is taking place.

<sup>2</sup> This does not mean that the FL or a mixture of both the L1 and the FL cannot be used in private speech. It is likely that learners use a mixture of both languages during their learning process, especially as the proficiency level increases.

deriving knowledge and scaffolding from communicative tasks, both enhancing co-construction of meaning and promoting natural language use, social interaction and collaborative dialogue. Thus, CLIL contexts alongside their communicative purposes and the social interaction that is derived from them perfectly embody and prompt learners' development within their ZPD. Following these assumptions, the presence of the L1 would act as a facilitator element when coping with cognitive, psychological, linguistic and socio-affective difficulties in FL settings.

### ***10.1.2 CLIL and Co-teaching***

Similar to the conception of language within sociocultural frameworks, CLIL settings were also designed to mediate (language) learning through language use and to reinforce learners' cognitive capacities when processing language. The essence of this approach is to teach certain subjects of the curriculum through the use of a foreign language, which means that both content and target language are assumed to be learnt at the same time (Coyle, Hood and Marsh 2010; Dalton-Puffer 2011; Lyster 2007). This model satisfies the emphasis given by the European Commission on trying to soften the lines of the existing communication gap among the member states of the European Union in the name of inclusiveness, diversity and participation. In relation to this political agenda, new educational policies have started to be applied in order to fulfil the demands posed by the European Commission's multinational research project of creating a bilingual and multilingual Europe (Commission of the European Communities 2006).

Nevertheless, the emergence of CLIL can also be seen as a response and a possible solution for the previous foreign language learning models, since its aim is to provide relevant input beyond the layer of pure language instruction and to overcome learners' low levels of proficiency (Muñoz 2007). In embracing the dual focus of integrating content and language rather than only focusing on language itself, CLIL instruction has positively attributed the same importance to content and language, both being learnt hand in hand (Lyster 2007). Learners, in being engaged with the content matter, presumably create more positive attitudes towards language use and learning, which might help them to develop linguistic competence and effective communication (Lasagabaster 2008).

When it comes to CLIL implementation, a wide variety of teaching modalities emerge, from those in which the L1 and the FL are used to different extents (fostering plurilingualism) to totally monolingual foreign language CLIL classes. Plurilingual CLIL practices, which are crucial for this study, consist of two or more languages coexisting in CLIL lessons. The L1 is present together with the FL when teaching and discussing the content of the subject matter. In these kinds of contexts, the L1 is available for the students in classroom settings and constitutes an important tool favouring learning development (Méndez and Pavón 2012; Pavón and Ramos 2018). The co-existence of the L1 and the FL within the same instructional context might give rise to a situation in which both languages do not

need to be used separately depending on the situation, but rather can be present in the same one, creating a plurilingual environment. This context might be handled by collaborative teaching, that is to say, by two different teachers giving instruction at the same time (Méndez and Pavón 2012). Collaborative teaching can also be applied in different ways. For instance, one teacher can be in charge of content, whereas the other one can be in charge of language instruction. Another possibility within collaborative teaching is to assign to each teacher a language of instruction. One of them would be delivering the lesson by means of the L1, whereas the other one would be doing so by means of the FL.

This teaching modality would be able to fulfil, at least theoretically, the gaps highlighted both by sociocultural perspectives and research on CLIL contexts. Concerning sociocultural theories, co-taught CLIL instruction would be able to cope with learners' linguistic and cognitive demands, for the L1 would be available and embodying the role of knowledge mediation. In line with this, but more strictly related to CLIL contexts, collaborative teaching reinforces the idea of integration. Besides, it is clear that a "development of both language and thinking skills is needed for content and language to be acquired in communication" (Basterrechea and García Mayo 2013, cited in Devos 2016, p. 14), for CLIL lessons require higher levels of both linguistic and cognitive processing due to its cooperative nature. Hence, by applying this co-teaching model, teachers' provision of language and thinking skills is reinforced by the presence of the L1. With respect to students, the dialogic activity that might be prompted by CLIL pedagogy (e.g. cooperative learning activities, group-work) may be more easily tackled because of the availability of the L1. The use of the L1 in co-taught CLIL lessons might allow students to link knowledge and communication (Devos 2016). Therefore, the L1 would act as a strategy with the objective of fulfilling both language and content gaps.

Referring to instruction and direction of interaction, two different processes might take place. On the one hand, the direction of interaction would be from individual to individual/collective (students). In this case, content and language would be integrated and embodied by the teacher (as an individual) and mediated through language towards the student(s). On the other hand, both teachers as a collective would integrate content and language (and also between them) and thus, the interaction would be from the collective to the individual/collective of students. The fact that each of them mediates integration by means of a different language system would not disturb or prevent interaction from taking place, but it would probably prompt different inputs on the teachers' part and different outcomes derived from the learners' learning process. Studies on L1 use in co-taught plurilingual CLIL settings are scarce but those framed in CLIL and English as a Foreign Language (EFL) contexts are more and more frequent. Some of the most relevant ones, particularly in relation to our local context, will be reviewed in the next section.

### ***10.1.3 Previous Research on L1 Use in CLIL and Non-CLIL Contexts***

A number of studies both in CLIL and non-CLIL contexts have examined L1 use as a mediating tool in FL learning and use. In a non-CLIL context, Antón and DiCamilla (1998) examined the nature of learners' collaborative talk and strategies when dealing with writing tasks. Learners worked effectively towards problem resolution and constructed a shared perspective on the task through their L1, "a powerful tool of semiotic mediation between learners (at the interpsychological level) and within individuals (at the intrapsychological level)" (Antón and DiCamilla 1998, p. 234). Results showed that the collaborative dialogue carried in the learners' L1 fostered comprehensible input in the FL and prompted acquisition. Along these lines, the study seemed to validate the argument that the L1 has to be established as an important psycholinguistic and cognitive tool that mediates and enhances FL social interaction and learning. In similar ways, other studies (García Mayo and Lázaro-Ibarrola 2015; Lázaro-Ibarrola and Azpilicueta Martínez 2015) have shown that the L1 in EFL contexts has been a powerful tool for resolving communication breakdowns. Authors such as Vanderheijden (2010) explored the properties of L1 use in non-CLIL classroom settings, and concluded that the native language was a facilitating tool for both language learning and noticing. The author discussed predictable learners' L1 use in three different situations (i.e. information gap, narration jigsaw and cloze texts tasks) and the different functions that the L1 might have as well. In the study, learners used their L1 for controlling and managing the task. Furthermore, the L1 helped learners to process the information that was given in the second language (L2).

Similarly, Alegría de la Colina and García Mayo (2009) reported that students resorted to their L1 to self-correct, ask for help and manage or discuss the tasks they had to complete in the L2. Basically, L1 use was a resource that provided cognitive support and served the purpose of developing learners' understanding and facilitating L2 input processing. Tognini and Oliver (2012) also highlighted the importance of L1 functions in foreign language learning settings. In the study, both researchers discovered that L1 use had positive social and cognitive functions deriving from peer interaction. The study also proposed that L1 use fulfilled different functions that allowed learners to move the task along, focus attention on the task, create interpersonal interaction and develop learners' identity. Nonetheless, the study also pointed out the need to balance L1 and L2 use to benefit learning. The situations in which the L2 was used were very much restricted due to both the presence of the L1 and the L2 low proficiency on the learners' part.

With regard to CLIL contexts, Lázaro-Ibarrola and García Mayo (2012) evaluated the role carried out by the L1 in CLIL settings in order to characterise CLIL discourse features (e.g. discourse markers and repair sequences) and morphosyntactic development when learners narrated a story. The study suggests that L1 use was crucial when learners asked for help during narrative production. In addition, children were allowed to make use of the L1 whenever they recognised a gap be-

tween what they wanted to say and what they were able to express (ZPD). By using the L1, learners were able to mediate their knowledge through collaborative dialogue. Results suggested that learners were not able to cope with linguistic difficulties in English. Learners did not use English for expressing discourse markers or when paraphrasing sentences/words, a characteristic that supposedly would differentiate CLIL learners from regular EFL learners.

Other studies have compared oral production tasks in non-CLIL vs. CLIL contexts and have explored if type of instruction has any effects on L1 use. Gené Gil et al. (2012) examined L1 and FL functions of both teachers and students in a CLIL setting as compared to an EFL setting. The study was conducted by means of questionnaires, oral interviews and classroom observation. The authors observed that there were more instances of code-switching and L1 use in CLIL instruction with respect to EFL lessons, which might be attributable to the difficulties posed by the content subject. The fact that teachers did not restrict students' L1 use might have also been an important factor. Findings also highlight that the L1 did not compete with the FL and that it was used as a support and reinforcement tool that benefitted the students' learning.

Pladevall-Ballester and Vraciu (2017) examined L1 use in oral narratives in CLIL and EFL contexts. The study examined the way in which learners utilized their L1 as a resource when coping with the linguistic and cognitive demands of a narrative oral task. Results indicated that CLIL learners made use of L1 interactional strategies, being metatalk and private speech the most recurrent ones. In addition, the L1 was acknowledged to be fulfilling the functions of self-regulation and scaffolding of FL production, although the scaffolding function decreased as proficiency level increased. Nevertheless, the L1 was analysed as a compensatory strategy for FL learners, regardless of the instructional setting. Similarly, García Mayo and Hidalgo (2017) conducted a longitudinal study exploring L1 use in mainstream foreign language lessons and CLIL. They used a two-way communicative task in which the students had to complete a poster with the information provided by their partner, fostering interaction on students' part. Results showed that students relied minimally on their L1 during the experiment and that students switched to their L1 to facilitate task completion, providing further evidence of the fact that the L1 can act as a scaffolding tool.

Martínez-Adrián (2018) compared L1 use in interactional strategies of two CLIL and non-CLIL groups (grades 4 and 6) of primary school children. The interactional strategies under study were appeals for assistance, clarification requests and metacomments. As for non-CLIL learners, the use of the L1 was found to be more frequent in metacomments strategies, whereas 4<sup>th</sup> grade CLIL learners preferred to use appeals and 6<sup>th</sup> grade CLIL learners preferred clarification requests. Nonetheless, results suggest that for both groups the L1 was mainly used when organising and monitoring the activity. Martínez-Adrián, Gallardo del Puerto, and Basterrechea (2017) inquired into primary school learners' (grades 5 and 6) self-reported opinions about their use of communication strategies by means of questionnaires. Analyses showed that L2-based strategies were generally favoured in both CLIL groups. However, L1-based strategies were also significantly used in



grade 6. As a whole, results suggest that resorting to the L1 did not interfere with their target language learning. Arratibel-Irazusta and Martínez-Adrián (2018) examined L1/L2 (Spanish and Basque, respectively) use in two groups of secondary school CLIL learners in an oral narration task conducted in the L3. Results showed that 2<sup>nd</sup> and 4<sup>th</sup> grade students showed similar amount of L1/L2 use in interactional strategies, borrowings, code-switching and discourse markers. Discourse markers was the most used strategy among groups, which shows that the use of the L1 was framed within the unplanned discourse and served the purpose of facilitating the flow of speech. Finally, Pavón and Ramos (2018) investigated L1 strategies used by primary school learners in a co-taught CLIL setting. Results showed that a wide variety of L1 strategies was used with the main objectives of clarifying meaning, supporting general understanding of ideas, concepts and vocabulary. The L1 was also frequently used to initiate and maintain interaction, thus facilitating the correct use of the FL during challenging situations.

Previous research has established the need to further explore L1 use as a communicative and interactional strategy in FL learning situations. The types of L1 interactional strategies used in this study are justified and described in section below.

#### ***10.1.4 L1 Interactional Strategies***

It is generally acknowledged that learning strategies play a crucial role in FL acquisition. In agreement with the assumption that language is a mediating tool, FL learning strategies can be defined as “a learner’s socially mediated plan or action to meet a goal, which is related directly or indirectly to L2 learning” (Oxford and Schramm 2008, p. 48). In other words, there is an underlying process of mediation from the social to the individual when using learning strategies, which again points towards the importance of learners’ social interaction for processing L2 knowledge in foreign language instruction (and specifically in CLIL contexts because of their communicative purposes). By the same token, this definition also reinforces Vygotsky’s sociocultural and cognitive theory on collaborative dialogue. The dialogic processes that take place when interpersonal relationships are established enable learning processes to be mediated through the use of strategies. These strategies are thought to allow learners to integrate learning better. Importantly, it needs to be pointed out that dialogic views of language applied to instructional settings give rise to the idea that “different educational purposes require different ways of talking in the classroom” (Moate 2011, p. 22). Hence, different types of strategies will be needed so as to accomplish different objectives (i.e. understand the concepts of the lesson, ask questions about the language system that is to be learnt, and so on).

When trying to communicate in a FL, learners resort to a type of strategy referred to as compensatory strategies, which are used by the speakers with the objective of communicating their intended meaning after detecting the difficulties

and problems posed by the communicative situation (Hüttner and Rieder-Bünemann 2010). Within compensatory strategies, L1 interactional strategies emerge as “intentional switches into languages other than the target language” (Cenoz 2003, p. 3). Thus, the development, effectiveness and internalization of these strategies mainly depend on the social interaction and the collaborative dialogue that is carried by both teachers and learners through their L1. L1 use is then a compensatory strategy that responds to specific linguistic, cognitive, emotional and communicative needs that have to be resolved in order to cope with CLIL demands, both on the learners and the teachers’ part. More elaboration on this topic will be presented in the discussion section.

For the purpose of the study, seven types of L1 interactional strategies following and adapting the classifications of strategies by O’Malley and Chamot (1990), Oxford and Schramm (2008), functions by Alegría de la Colina and García Mayo (2009), and talk-types by Moate (2011) are set out. The classification used for the present paper together with examples found in the data of the present study are presented below.

**Metacognitive strategies** are those that relate to clarifications on meaning, content and objectives, cooperative and assertive interaction with peers aimed at increasing knowledge and exploratory talk (i.e. asking questions committed to building understanding), as illustrated in (1):

- (1) Algú té alguna idea del que pot passar? [teacher asking whole class]  
*Does anyone have any ideas on what might happen?*

**Metatalk strategies** concern comments, questions and feedback about the language system. Metatalk can be considered a mix of focus-on-form and focus-on-meaning approaches, since one of the objectives of this type of strategy is to foster a correct language use and learning regarding language features and meaning:

- (2) *Find* és buscar? [student asking the teacher]  
*Find is look for?*

**Task-related strategies** entail instruction of task procedures, clarification of specific task-based instruction, comments on task procedures and the organisation of the task. This kind of strategy is always framed in the here-and-now context of the classroom environment. It tends to be formulaic, repetitive, and it is based on “maintaining the focus and pace of [the] activity” (Moate 2011, p. 23).

- (3) Escolteu queden dos minuts! [teacher addressing whole class]  
*Listen, there are two minutes left!*

**Pedagogical strategies** include translation and a type of talk focused on bridging between everyday understanding and expert conceptualization (leading to decisive higher cognitive basis responses). In this type of dialogue, the expert mediates the learning process of the learner by joining the construction of knowledge

that flows out from the conversation of both interlocutors. This dialogic space allows learners and experts to elaborate on their explorations until they find a satisfactory answer. Hence, both participants actively co-construct knowledge.

- (4) *What's a paraula clau, what's a keyword?* [teacher asking students]  
*What's a keyword, what's a keyword?*

**Social/affective strategies** involve motivation, control over affective factors (either individual or shared among the learners of a specific social group), off-topic and non-assessed talk between peers, fillers, hesitations and comments about classroom procedures that are not directly related to knowledge building, as (5) shows:

- (5) *Qué chungo.* [student-student]  
*How tough (colloquial: what a bummer)*

**Organisational strategies** refer to practical management of classroom procedures (clarifications, commands, questions). Similar to task-related strategies, this kind of strategy also tends to be based in the here-and-now of the classroom environment, as shown in (6):

- (6) *Fem dos grups que facin la mateixa?* [teacher-teacher]  
*Shall we make two groups that might do the same?*

**Self-regulation strategies** include planning, monitoring progress, reflecting on performance, setting goals, self-evaluating and restructuring the methods. This type of strategy can identify questions in two directions. The first question would be addressed to the self (e.g. 'what do I know about the topic?', 'how did I perform?', 'what is the goal?'). Then, the second question (that can be formulated either in the form of a question or a declarative sentence), which would be a second reflection of the topic under exploration, would allow the learner to participate in the learning process in an active way co-constructing the knowledge with other peers and teachers:

- (7) *Abans no he escoltat* [student addressing the teacher]  
*I was not listening before.*

## 10.2 Research Questions

Given the scarcity of research on L1 use in co-taught CLIL instruction settings, this study seeks to contribute to that gap by examining and describing L1 use patterns in the oral production of primary school learners and teachers of co-taught CLIL science sessions. By analysing the nature and the different types and pur-

poses of L1 use, some implications for FL learning will be drawn, for it will be possible to explore if the L1 is a beneficial tool serving the purpose of coping with CLIL linguistic and cognitive demands. Thus, the research questions that this study seeks to answer are the following:

1. What L1 interactional strategies are more frequently used by which participants?
2. What is the direction of participants' L1 interaction?

### 10.3 Method

#### 10.3.1 Participants

The study was conducted in a local primary Catalan/Spanish bilingual school situated in a newly created neighbourhood in a town near Barcelona. The school started to function during the academic year 2006-2007, but it was not until 2011 that it had a more clearly outlined project together with its new facilities. The institution offers schooling for two educational stages, namely infant school and primary education. The demographic composition of the school is diverse but most of the students are from Spanish/Catalan origins. Many of the students are familiar with the English language, since most of them have attended private English classes and some of them have had babysitters that interact with them in English.

The school started to develop a *Pla Integrat de Llengües Estrangeres* (PILE) in 2012 that promoted a plurilingual environment in different subjects taught in the school. It also prompted the implementation of a co-taught CLIL course on science. The main aim of the plan was twofold. On the one hand, it was designed to offer the possibility of making use of a foreign language in a functional and significant way. On the other hand, the design followed the objective of teaching science by means of a language that is different from the native one. After completing the PILE, the school started to participate in the *Grup d'Experimentació per al Plurilingüisme* (GEP) project. Despite the development and the methodology of the PILE and the GEP were different, the tenets underlying both programmes were very much the same. Since 2012, the school has developed and encouraged plurilingual environments in instructional settings.

The participants of the study were 20 6<sup>th</sup> grade students, aged 11-12, and two female teachers co-teaching CLIL science lessons. The students received between 40-45 minutes of CLIL science instruction per week in addition to two EFL hours per week. Both teachers taught the lessons simultaneously, that is, they coexisted in the same space and at the same time. However, both teachers had different language pre-defined roles, which fostered a plurilingual context. One of the teachers delivered the lessons in Catalan, whereas the other one taught the lessons in Eng-

lish. There were no restrictions concerning the amount of L1 use. The teacher who mediated learning by means of the L1 was the teacher who normally taught regular science lessons at that school. The teacher who delivered the lessons through English was normally in charge of teaching regular EFL lessons. She was supposed to lead the science class (i.e. she was supposed to be the “main teacher”), had received previous training on CLIL, and held a C1 in English language. Both teachers had the same training background and were equally capable of delivering science lessons. However, given their teaching trajectory inside the school, it is clear that the teacher who taught regular science lessons was more likely to contribute to the content part than the teacher who taught regular EFL lessons, and the latter could contribute more to the language part.<sup>3</sup> Although none of the teachers had received previous training on co-teaching, both of them complemented each other. As the language teacher was in charge of the classroom, the content teacher intervened either to contribute with specific or highly elaborated content explanations using the L1 or to translate some of the explanations provided by the language teacher. On these occasions, the language teacher took advantage of the situation to provide FL linguistic translations or annotations.

Both learners and teachers were informants of the study. Students worked in the same groups in each of the lessons, so they were always involved in group-work activities. The main objective of the CLIL science lessons was to develop a scientific experiment linked to the subject curriculum. Every group of students had to design an experiment related to a given topic (e.g. the effect of ultraviolet rays on different materials). First, they had to write a short text introducing the topic (e.g. what ultraviolet rays are and the impact they can have), then they had to design an experiment together with their hypotheses and finally they had to test their hypotheses by carrying out their experiment.

### ***10.3.2 Procedure***

The study was based on the oral production data collected during classroom observation. To collect data for this study, eight complete lessons were audio recorded, resulting in 330.19 minutes of recorded data. Narrative summaries derived from field notes were produced for each lesson. Lessons were also transcribed and coded.

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<sup>3</sup> When referencing their activity and interaction in the classroom setting, both teachers will be differentiated following this assumption, i.e., “content teacher” (abbrev. CT) will be the label for the one who normally teaches regular science lessons and speaks in Catalan, and “language teacher” (abbrev. LT) will be the label for the one who teaches regular EFL lessons and speaks in English.

### 10.3.3 Coding and Data Analysis

The content of each transcription was further classified in line with the research questions requirements. The data were classified according to L1 interactional strategies for quantitative analysis and qualitative description of lesson extracts.

L1 interactional strategies were divided into seven categories in line with sociocultural perspectives depending on the function they were fulfilling, namely, metacognitive, metatalk, task-related, pedagogical, social/affective, organisational, and self-regulation. Direction of interaction was also taken into account within this classification. The types of interaction that were considered in this study were the following: content teacher-whole class (CT-WC), language teacher-whole class (LT-WC), teacher-teacher (T-T), content teacher-student/s (CT-Ss), language teacher-student/s (LT-Ss), student-student (Ss-Ss) and student-teacher (Ss-T).

## 10.4 Results

As regards the first research question, all types of L1 interactional strategies were observed in the data, although metacognitive and social/affective strategies are the ones that prevailed in the majority of the participants that used the L1. The seven types of strategies that were investigated (i.e. metacognitive, metatalk, task-related, pedagogical, social/affective, organisational and self-regulation functions) taking into account the direction of interaction when using the strategies are presented in Table 1 and examples of strategies are provided below. Every example provided in this paper is framed within the context of group work activity explained in section 10.3.1.

**Table 10.1** Total number of interactional strategies per participants

Strategies	Metacognitive	Metatalk	Task-related	Pedagogical	Social/Affective	Organisational	Self-regulation
CT-WC	204	3	117	88	153	111	11
LT-WC	2	1	0	21	4	8	0
T-T	32	10	4	14	76	20	1
CT-Ss	111	5	62	53	89	32	1
LT-Ss	11	9	0	64	14	0	0
Ss-Ss	278	35	11	71	231	46	44
Ss-CT	176	0	36	2	100	7	12
Ss-LT	325	57	59	83	303	47	74

As Table 1 shows, the four strategies that are mostly used in CT-WC interaction are the metacognitive (8), social/affective (9) and task-related (10) ones followed by the organisational one (11). The strategies that were least used by this participant were metatalk (12) and self-regulation (13):

- (8) com que deuen faltar, faltaven connectors, per això a l'hora de dir-ho no s'entenia gaire bé, semblava que (ell) digués, veiem si obrim els ulls, si no els obrim no veiem

*because some connectors were missing, some connectors were missing, that's why it was not so clear, it looked as if it said, let's see if we open our eyes, if we don't open them we can't see*

- (9) us ajudarem la (language teacher's name) i jo  
*the language teacher and myself will help you out*
- (10) cada taula pensarà el seu disseny i la seva història  
*each table will think of their own design and their story*
- (11) mirarem de # de... # dissenyar un experiment de manera que ho puguem comprovar això  
*we'll try to design an experiment so that you can test this*
- (12) com li diem quan la llum rebota?  
*How do we say it when light bounces off?*
- (13) jo ja no sé com explicar-ho...  
*I don't really know how to explain this...*

In the case of the language teacher, the two strategies that are mostly used when interacting with the whole class are the pedagogical (14) and the organisational ones (15). The strategies that were less prominent were metatalk (16) and metacognitive (117). Interestingly, no instances of task-related and self-regulation strategies are found:

- (14) incoming light, yes, que ve # it could be in catalan # la llum que VE, la llum que ENTRA  
*incoming light, yes, which is coming, in Catalan it could be the light that's coming, the light that's coming in.*
- (15) guardem i continuarem demà  
*let's pack and we'll go on tomorrow*
- (16) how do you say rebota?  
*how do you say bounce off?*
- (17) because what I did # is translating what you said # but she is right # it's not # el que JO penso  
*because what I did is translating what you said but she is right, it's not what I think.*

Regarding teacher-student(s) interaction, the strategies that were most widely used on the content teacher's part were metacognitive (18) and social/affective (19) strategies. The less widely used strategies were self-regulation (20) and metatalk (21). As for the language teacher, pedagogical (22) and social/affective (23) were the most widely used strategies. Interestingly, no instances of organisational strategies, task-related and self-regulation strategies are found:

- (18) CT-S: perquè una lupa pot cremar objectes, no?  
*because a magnifying glass might burn objects right?*
- (19) CT-S: i llavors m... dius, bueno  
*and then you mm...say, oh well.*
- (20) CT-S: clar que té sentit

- of course it makes sense*
- (21) CT-S: no heu posat *off*, heu posat *on*  
*you didn't write off, you wrote on*
- (22) LT-S: but do you say lupa in Catalan? o you say... llanterna?  
*but do you say magnifying glass in Catalan? or you say...torch?*
- (23) LT-S: look look! # molt bé!  
*look look! Well done!*

As for teacher-teacher interaction, it is mostly managed in terms of social/affective (24) and metacognitive strategies (25). This indicates that they normally addressed each other for off-topic talk and for cooperative interaction (i.e. define and talk about the content of the task/lesson). Scarce instances of task-related (26) and self-regulation (27) strategies were found in the data. Thus, issues about task procedures and instructions were not discussed between them:

- (24) CT-LT: no, oi? estic una mica empanada...  
*that's not it right? I'm a bit absent (colloquial: empty-headed)*
- (25) CT-LT: és que es salten la retina  
*the thing is that they skip the retina*
- (26) CT-LT: això és posterior  
*this comes after that*
- LT-CT: ok after they finish # ok
- CT: no és la feina que...  
*isn't that the task that...?*
- LT: I am just asking # ok that's fine
- (27) CT-LT: alumini és steel? *és que no ho sé...*<sup>4</sup>  
*steel is steel? The thing is I don't really know...*

For student-student interaction, metacognitive (28), social/affective (29) and pedagogical strategies (30) were the most widespread strategies. The strategy that was used the least was task-related (31). Although the difference between metacognitive and social/affective strategies is not very large (see Table 1) it is interesting that students used to employ their L1 primarily to increase their knowledge and cooperate with their peers during the tasks. In line with that, students also used their L1 to bridge the gap between everyday understanding and expert conceptualisation among themselves. However, they did not usually use their L1 to discuss about task procedures:

- (28) S-S: home, evidentment que la travessa, perquè mira...  
*come on, it's clear that it goes through, look*

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<sup>4</sup> The part of the sentence that is emphasised in italics has been analysed as self-regulation. The first part of the sentence is included in order to understand the situation better, otherwise “és que no ho sé” could be interpreted as part of a metacognitive strategy. It is argued here that this sentence belongs to self-regulation, because the content teacher intervention is not fully focused on clarifying the meaning of the word “steel”. Rather, it is more focused on self-reflecting on her lack of knowledge in relation to a given word.



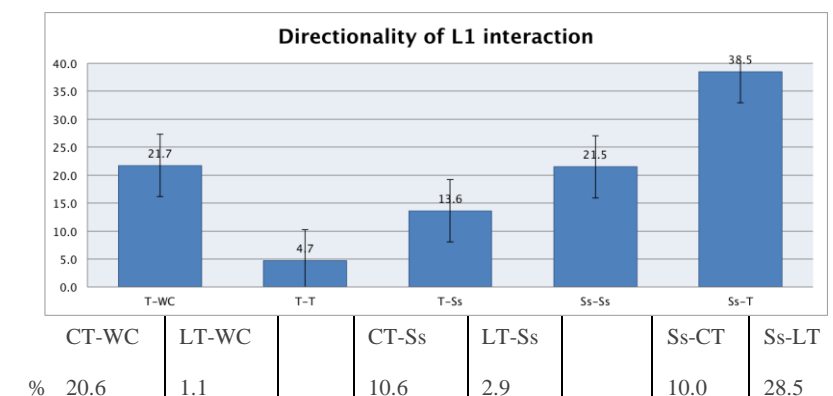
- S-S: sí, reflecta  
*yes, it reflects*
- (29) S-S: m'he equivocat oi, llegint? que he llegit malament tio  
*I made a mistake while reading didn't I? I did it wrong man*
- (30) S-S: ultraviolet rays may burn some materials # que...els rajos ultraviolet # calenten # alguns materials  
*ultraviolet rays may burn some materials, that ultraviolet rays heat some materials*
- S-S: que cremen  
*they burn them*
- (31) S-S: ja però és que... # així directament?  
*yes but...just like that?*

When it comes to student(s)-teacher interaction, students mainly used metacognitive (32) and social/affective (33) strategies when addressing both the content and the language teacher. Nevertheless, the strategy following these two is different depending on the addressed teacher. Whenever students interact with the content teacher, L1 discourse focuses on task-related (34) issues, whereas the interaction with the language teacher is more pedagogically centred. Pedagogical (35) and organisational (36) strategies were not widely used when addressing the content teacher. It is also worth pointing out that students do not use metatalk strategies when interacting with the content teacher. Metacognitive (37), social/affective (38) and pedagogical strategies (39) were used when addressing the language teacher, and less widely used was the organisational (40) strategy:

- (32) S-CT: i es poden cremar els líquids?  
*and can we burn liquid?*
- (33) S-CT: no, és una ferida  
*no, it's an injury*
- (34) S-CT: apuntar-los i fer una exposició sobre l'experiment  
*(you need to) note them down and do an oral presentation about the experiment.*
- (35) CT-S: estareu molta estona esperant-vos a veure si travessa?  
*are you going to wait long to see if it goes through?*
- S-CT: no!  
S-CT: o sigui, si travessa és directament!  
*so, if it goes through it will do so right away!*
- (36) S-CT: però això ho farem o no? o és com...  
*but are we going to do that or not? Or is it...?*
- (37) S-LT: el que rebota, el que refracteix  
*The one that bounces off, the one that refracts*
- (38) S-LT: que no paren de parlar de l'amic invisible  
*they are always speaking about secret Santa...*
- (39) S-LT: *find* és buscar?  
*find is look for?*
- (40) S-LT: estem, és, estem parlant de quin dia podem quedar per...

*we are, is, we are talking about what day we could meet to...*

As regards the second research question, total percentages regarding the direction of L1 interaction are shown in Figure 1. Percentages were calculated out of the counts presented for interactional strategies.



**Fig. 10.1** Total percentage of L1 interaction concerning direction

The majority of L1 interaction occurs when students address teachers, and specifically, the language teacher.<sup>5</sup> Teacher-whole class is the second classification that predominates. As expected, the content teacher leads this category, since the language teacher mainly communicates with students by using the FL. The category that follows is interaction between students, representing less than a quarter of the total interaction. These results will be discussed in the next section.

## 10.5 Discussion

This study has examined the functions of L1 use in the oral production of CLIL science primary school learners and teachers. Concerning the first research question, the use of L1 interactional strategies is varied among participants and seems to indicate the functions and roles that each participant had in the classroom. The

<sup>5</sup> Students used to interact with the language teacher much more than with the content teacher. Then, as students addressed teachers in their L1 almost by default, the percentage of students-language teacher interaction is much higher than with the content teacher. Hence, it is not the case that the students made an effort for addressing the content teacher in the FL (which might have been a fair interpretation derived from the data presented in Figure 1).

fact that both teachers used different strategies in a mutually exclusive way indicates that their roles were very well defined. This separation of roles is also exemplified in the cases in which teachers used the same strategies when addressing the whole class or a group of students (i.e. the content teacher did not use metatalk and self-regulation in either case). Thus, it seems that teachers had separate roles not only in terms of language, but also in terms of class management.

As for teacher-whole class interaction, the content teacher was the one who led the lesson in terms of clarifying the objectives and the contents of the lesson, increasing students' knowledge of the subject as well as making sure that the established procedures were straightforward. The content teacher did not normally use the L1 to deal with language issues or monitor students' progress, but rather she focused on content delivery and instruction clarification. As she was only concerned with content and not with language, both her role and her figure did not adjust to the objectives of the CLIL approach, since CLIL ideally fosters content and language learning to the same extent. As for the language teacher, pedagogical and organisational strategies were the most prominent ones. The way in which the language teacher used the L1 is in line with the extracts presented in Pavón and Ramos (2018), where teachers avoided using students' L1, but when using it, they mainly did it for pedagogical purposes. The language teacher addressed students whenever she felt that there was some misunderstanding or language problem going on. When dialogues between her and students occurred, she adopted the role of the expert, mediating the learning process of the students and prompting co-construction of knowledge. In addition, she would translate the concepts that were not understood into the L1 and clarify classroom organisational procedures. Likewise, she also interacted with the whole group in order to develop students' knowledge at a higher cognitive basis and comment on organisational procedures.

The use of these strategies is partly in line with findings from Qian (2009), who reported that teachers used their L1 to mainly develop metacognitive, metatalk and social strategies so as to provide necessary scaffolding and optimal conditions to promote FL learning. In this study, however, none of the teachers widely used metatalk strategies when addressing students. As teachers' use of the L1 was not focused on reflecting on the language system, the potential of the L1 in helping in the FL learning process was diminished. Task-related and self-regulation strategies were not used at all (both in LT-WC and LT-Ss interaction) and organisational strategies were only used in whole-class interaction situations. It appears that the language teacher did not fulfil the functions of dealing with task-related and organisational issues because it was the content teacher that mainly embodied them. It is worth noticing that the language teacher never used the L1 to monitor the progress of the students or reflect on students' performance. Consequently, the potentiality of using the L1 for regulating and mediating learning remained ignored. In contrast, the content teacher did use the L1 for this purpose, but only on few occasions. At least, as far as the L1 is concerned, it seems that the language teacher did not play an important role with regard to classroom management and organisational procedures.

In relation to teacher-teacher interaction, the fact that teachers barely interacted

between them to talk about task management reinforces the division of the roles that were established and indicates that classroom and task management mainly involved and pertained to the content teacher. The division and the collaborative teaching model that has been presented seem not to really adjust to the CLIL approach and principles, for the model does not incorporate real integration. This might be attributable to the fact that the two teachers did not have many opportunities outside the classroom to discuss and model the collaborative situation. Moreover, none of the teachers had received previous training on collaborative teaching and hence they were almost forced to rely on their intuition. These arguments coincide with those of Méndez and Pavón (2012), who observed that teachers participating in collaborative teaching programmes did not have proper guidelines for effective co-teaching, which is detrimental to the successful management of plurilingual instruction.

Regarding students, communication among them was mainly based on cooperative interaction, but also on non-assessed talk. This situation poses L1 use into two opposite extremes, since –in broad terms– the L1 either served the purpose of clarifying the meaning or the content of a given task or talking about topics that were not of primary interest regarding the lessons. Thus, on these occasions the L1 functioned merely as a communicative tool through which students could interact with their peers without restrictions. As they could interact by using the L1 as much as they wanted, there seemed to be no need to try and produce FL output to communicate, which had also been observed by in Tognini and Oliver's (2012) study. However, it was seen that students used their L1 for pedagogical purposes too, which developed learners' understanding and facilitated FL input processing (Cummins 2007; Littlewood and Yu 2011; Martínez-Adrián 2018; Pavón and Ramos 2018, Tognini and Oliver 2012). Whenever students used metacognitive and pedagogical strategies they were building on their knowledge through dialogic activity mediated by their L1. Therefore, the L1 fulfilled an important cognitive and social strategic role, for learners were capable of regulating their learning through strategies during peer interaction. Similar results are shown in Martínez-Adrián (2018), where the greater amount of L1 use of grade 4 CLIL learners occurred during appeals for assistance (equivalent to our metacognitive strategy). However, it is important to highlight that task-related strategies were not widely used among the students of this study, which is not in line with the results in Martínez-Adrián (2018). This suggests that students did not discuss about task procedures, which is rare given the collaborative nature of the classroom setting. This might be explained by the fact that the CT-WC interaction was highly centred on task-related issues. As a result, it is possible that students did not feel the need to communicate among them with regard to task procedures.

As for student-teacher interaction, an alignment between some of the strategies used by the teachers (when addressing students) and the students (when addressing teachers) was found. As has already been mentioned, teachers seem to have very well defined separate roles. It might be that in line with these roles, students addressed teachers in different ways too. Regardless of the fact that students used metacognitive and social/affective strategies with both teachers, it is worth noting

that they addressed the content teacher for task-related issues, whereas they addressed the language teacher for pedagogical reasons, coinciding with the strategies that teachers used with students in whole class/group situations. The fact that students used pedagogical strategies mainly when talking with the language teacher means that learners were able to identify that the role of the expert was embodied by the language teacher and not by the content one. They addressed the language teacher in pedagogical terms so as to co-construct knowledge with the help of the expert. Besides, students did not ask the content teacher about language issues. This goes very much in line with the role and the functions that the content teacher embodied, both in whole class and group interaction. Yet, students did not address her for pedagogical and organisational purposes but addressed the language teacher for these purposes. This might be connected with the fact that students used to address the language teacher more frequently than the content teacher. In addition, this may also be related to the results with respect to social/affective strategies, for the interaction of the students when addressing the language teacher was highly framed within social/affective strategies. This might have had an impact when dealing with pedagogical strategies and metacognitive strategies as well. It seems that students addressed the language teacher whenever they felt they had a doubt because they felt more comfortable when interacting with her than when interacting with the content teacher. Moreover, it can also be related to the fact that they perceived the language teacher as the expert who participated the most in conversations around construction of knowledge. Although students did address the content teacher for metacognitive issues, the number of instances with regard to the language teacher was always shown to be higher.

The second research question was linked to the direction of interaction among participants. The analysis of classroom interaction revealed that the direction of interaction was mainly from students to teachers. This finding was not expected at all due to the given learning context, since CLIL settings should ideally promote peer interaction. This fact reveals great insights on the CLIL model that was implemented in this science course. As the interaction among students only represented a small part out of the total, it has been concluded that these science lessons were not framed within a truly communicative pedagogy. Some of the necessary elements that are claimed to reinforce communicative procedures, such as the availability of the L1 and the application of CLIL approaches were present in the classroom. However, as the interaction was predominantly teacher centred, the outcome was not the desired one, since “exclusive whole-class discussions and teacher-centered interactions –frequently reported in immersion programs– have been identified as methods for modern language teaching that fail to produce desired results” (Devos 2016, p. 12). The fact that the interaction was teacher-centred was analysed as a consequence of a lack of regulation of teachers’ responsibilities. A number of appropriate guidelines for managing effective co-teaching and L1 use should be provided to teachers in order to create meaningful communicative situations. This might also include L1 explicit instruction on appropriate language use so as to encourage the learners to take active control over their learning.

Besides, the expertise of the students and the difficulty posed by the subject might have also played a role (Gené Gil et al. 2012) in diminishing peer interaction. Students were not familiarised with experimental procedures, so it is possible that they felt the need to address the teachers in a recurrent manner. This argument can be associated with the prominence attached to teacher-whole class interaction, for teachers might have also felt the need to constantly give instructions and clarify the objectives in the classroom setting. However, this issue can also be related to the fact that collaborative functions and management procedures were not well established or regulated. This might prompt a sense of unbalance in regard to classroom procedures on the teacher's part. That is to say, it is possible that the teachers felt that something had not been clarified or explained thoroughly enough, leading to repeated interventions. This also correlates with the high percentages of content teacher's interventions addressed to the whole-class. The content teacher regularly intervened addressing the whole group of students in order to translate what the language teacher said, just in case students did not understand the message because of language difficulties. Nonetheless, the fact that the interaction among students just represented the 21.5% out of the total was found to be intriguing, for students had absolute freedom to use their L1 and always worked in teams. However, the arguments suggested above might provide an explanation, considering that teachers almost completely remained the centre of classroom interaction. Students could not interact among themselves more than they actually did, which led to an undesired outcome, for the main tenets of CLIL pedagogy were not fully developed. The fact that student-student interaction was that low in relation to the total complicated the integration and mitigated the effectiveness of L1 interactional strategies. As collaborative dialogue did not predominate, their learning process might have also been affected, as strategies and learning mediation mainly depend on peer and social interaction. The final section will close the chapter with a number of concluding remarks.

## 10.6 Conclusions

The data presented in this paper has shown that the L1 acted as a compensatory strategy that coped with CLIL demands and was beneficial both for learners and teachers. Thus, this study enlarges the literature that provides evidence for the L1 being a beneficial tool in FL settings (Alley 2005; Antón and DiCamilla 1998; Aratibel-Irazusta and Martínez-Adrián 2018; García Mayo and Hidalgo 2017; Martínez-Adrián 2018; Martínez-Adrián, Gallardo del Puerto, and Basterrechea 2017; Pavón and Ramos 2018; Pladevall-Ballester and Vraciu 2017; Storch and Aldosari 2010; Swain and Lapkin 2000; Tognini and Oliver 2012). Although the idea that the L1 might be a damaging source of crosslinguistic influence when learning a foreign language is discarded in this study, L1 use did not always fulfil a cognitive strategic role. Yet, the native language will always be present for the foreign language speaker, and it will be used if the speaker feels the need to do so. Therefore,

the potential benefits that a regularised use of the L1 might bring to foreign language instruction cannot be ignored. L1 use has to be focused and employed to the learners' advantage so as to maximise the avoidance of using the L1 within unplanned discourse situations (Arratibel-Irazusta and Martínez-Adrián 2018; Gené Gil et al. 2012). When restrictions are not applied on its use, the L1 does not fully develop its cognitive and scaffolding role within the classroom context. The cognitive support provided by the L1 is essential in the process of deriving meaningful FL learning (Alegría de la Colina and García Mayo 2009). Taking this into account, a proper regulation of teacher's responsibilities and a balance regarding the amount of L1 use is needed so as to create the optimal conditions to foster FL learning and maximise the potential functions the L1 can have during CLIL instruction (Pavón and Ramos 2018). Maximising FL comprehensible input and learning opportunities alongside relying on L1 mediating functions and collaborative dialogue is necessary as well (Tognini and Oliver 2012). If restrictions and regulations on language use were applied, the use of the L1 would probably be more centred on and related to learning and maintaining FL discourse during collaborative dialogue. This would be beneficial both for CLIL methodology and for CLIL learners, who would develop content and language learning on a higher cognitive basis (at least within communicative and cooperative situations).

Besides, a regularisation of functions and a balance of teachers' responsibilities are needed in order to effectively integrate collaborative teaching practices within the model, diminish the predominance of centred teaching and give more room for student-student interaction. This, which also fits CLIL communicative purposes better, would stimulate interactive group-work and peer scaffolding, which would produce more opportunities for cognitive and learning development. As for collaborative teaching, effective and explicit guidelines need to be given to the teachers, for the integration of content and language might be more easily handled during the lessons. Interaction cannot be absolutely taken by teachers addressing whole-class situations, as these situations pose difficulties to real communicative environments.

In any case, it is clear that the primary objective is to truly apply a balanced content and language pedagogy, both concerning its methodology and its practice (Devos 2016) so as to be able to establish a balanced collaborative teaching model. The potential offered by the L1 needs to be exploited so as to reveal more insights with regard to foreign language learning processes. In order to do so, planning the use of the L1 in foreign language settings is mandatory if strategic fostering of foreign language use is to be promoted.

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