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CLIL teachers' views on cognitive development in primary education

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ABSTRACT Content and language integrated learning (CLIL) has been implemented in Spain for more than two decades, and the number of schools that have joined CLIL initiatives has progressively grown in an attempt to increase students' proficiency in English; all of these developments are indicative of the importance of foreign language learning (FLL) in this country. The aim of this paper is to analyse the promotion of cognitive skills by teachers in the subjects of science and social science in primary education in the Spanish Region of Murcia. A mixed methodology combining techniques for collecting both quantitative and qualitative data was implemented. The results show a tendency to lapse into low-order thinking skills, which can hinder the development of demanding cognitive skills and creative learning processes in CLIL lessons. Some factors might affect these teaching practices, such as the type of teaching staff position or the experience that teachers have gained over time. The article concludes with some suggestions for further research.

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Introduction

Content and language integrated learning (CLIL) is a teaching approach in which teachers use a language other than their students' mother tongue to promote additional language learning and content acquisition in a non-linguistic area (NLA).

Unlike conventional foreign language teaching methodologies, CLIL promotes a more complex process of teaching because of its heterogeneous and multifaceted nature, involving the integration of some basic principles that can make teaching practice more effective (Cenoz et al., 2014). As Coyle (2007) states, the CLIL methodology is based on the four Cs: content, communication, cognition and culture. To ensure meaningful teaching, these four principles should be intertwined and should not be seen as isolated components. Furthermore, it seems reasonable to deepen the analysis of this pedagogical approach by taking into account more components that influence it to a greater or lesser extent. If we zoom out from this original theoretical framework and look at the wide range of variables involved, a clearer picture of different teaching scenarios emerges. Under these premises, Van de Craen et al. (2007) examined other variables on which it seemed convenient to focus, for example, conducting comparative analysis of the roles of the first and second language or motivational aspects that can positively influence this approach. Other relevant factors have been analysed within the framework of this innovative approach, for example, curriculum development, training methodologies, educational resources and teaching scenarios (Morton, 2016; Barrios and Milla Lara, 2020; Vázquez et al., 2020). To meet the challenge of successful, quality CLIL, it is up to educators at different levels and in different institutional contexts to examine these factors in detail and to transform these principles and processes into reality (Dalton-Puffer, 2007). For this reason, there is the challenge of designing practical and pedagogical frameworks that help teachers integrate these factors in accordance with the basic principles mentioned above. In this sense, an effective and systematic way to promote thinking skills in class is through the application of Anderson and Krathwohl's (2001) functional taxonomy of the cognitive process dimension, an updated version of Bloom's taxonomy, a model that is considered beneficial in the analysis of cognitive categories in context (Wewer, 2014; Vázquez and Ellison, 2018). The cognitive process dimension has six categories that include different cognitive processes ranging from the simplest to the most complex: remembering, understanding, applying, analysing, evaluating, and creating. This cognitive taxonomy provides a comprehensive continuum of students' cognitive mental operations that can potentially be performed in the classroom (Bentley, 2010; Hillyard, 2011; Pinner, 2013). The three lowest categories of this taxonomy relate to lower-order thinking skills (LOTS), while the other three categories relate to higher-order thinking skills (HOTS). They are usually represented as a pyramid, with the creative cognitive processes at the top and the recall processes at the bottom. According to this organized hierarchy, students' analytical skills are derived from the mastery of LOTS, which allows a greater understanding of the subject matter being taught and the practical application of knowledge and skills in real-life situations. Therefore, this hierarchy represents a functional and rational framework for teachers to cultivate students' specific mental processes, for relating those ways to overall content learning objectives and for assessing students' learning outcomes (Coyle et al., 2010; Meyer, 2010). Given its relevance, CLIL teachers usually resort to this taxonomy so that they can design teaching units that map out a secure path that focuses on the integration of cognitive processes, language objectives and content objectives in each academic subject. This integration becomes a truly multidimensional phenomenon that requires careful lesson planning that includes challenging tasks that develop students' problem-solving and decision-making skills (Nikula et al., 2016). To support the development of these skills, teachers play a decisive role in providing students with enough opportunities and effective resources to interpret content and meet cognitive demands in the L2 (Dale and Tanner, 2012; Marsh et al., 2012). To enable teachers to meet such demands, Anderson and Krathwohl's taxonomy includes subcategories, also called cognitive processes, with which educators can systematize teaching processes more precisely and introduce thought-provoking proposals into CLIL lessons that progressively improve students' cognitive and linguistic performance (Mehisto, 2012). However, applying these subcategories to the more concrete level of teaching practice remains an ambitious objective not only for teachers, but also for scholars, curriculum designers and educational researchers.

The literature provides evidence of how CLIL teachers in Europe and Spain have made a change in the educational approach adopted in an attempt to increase student participation and improve students' language and cognitive skills (Ruiz de Zarobe and Lasagabaster, 2010; Escobar Urmeneta, 2013; Wegner, 2012; Skinnari and Bovellan, 2016; Otto and San Isidro, 2019). However, most of the time when teachers design CLIL lessons, students' reasoning skills are not fully developed and the emphasis is mainly placed on checking their understanding of the content acquired (Lorenzo et al., 2011). Similarly, in the monolingual Spanish Region of Murcia, where CLIL programmes have been running since 2009, Lova et al. (2012) highlighted primary teachers' satisfaction with the CLIL methodology in the same context, primarily based on the development of observation and experimentation rather than on more complex knowledge-processing methodologies. In this line, Alcaraz-Mármol (2018) pointed out that, in relation to CLIL teachers' views on lesson planning, controlled activities were carried out more frequently than other types of activities in this Spanish region. More recently, Valverde Caravaca (2019) analysed how primary school teachers used questions to cover all cognitive categories in the classroom, as a result of which more than half of the questions raised in CLIL lessons required recall of conceptual knowledge. All of this research in this area primarily focuses on the early stages of teaching thinking skills, and it does not explore in depth the teaching of HOTS by CLIL teachers at this stage of education or the professional factors that may influence this situation.

Method

The main objective of this study is to provide insights into CLIL teachers' beliefs regarding how they promote the cognitive process dimension in the subjects of science and social science in primary education in the Region of Murcia.

With respect to the main objective, the following four research questions are posed:

RQ1. How often do CLIL teachers promote the six cognitive categories in science and social science in primary education through meaningful communicative tasks?

RQ2. How often do CLIL teachers promote HOTS in science and social science in primary education through meaningful communicative tasks? In particular,

- How often do CLIL teachers design meaningful communicative tasks that promote analytical skills, such as differentiating and deconstructing, in science and social science lessons?
- How often do CLIL teachers plan meaningful communicative tasks that foster evaluation skills, such as checking and critiquing, in science and social science lessons?

- How often do CLIL teachers design meaningful communicative tasks that promote creative skills, such as generating, planning and producing, in science and social science lessons?

RQ3. What resources do CLIL teachers mainly use to promote the six cognitive categories in science and social science lessons?

RQ4. How often do CLIL teachers use the L1 to promote cognitive development in science and social science lessons?

To answer these questions, science and social science teachers were consulted using an integrated quantitative and qualitative methodology to study the subject in question more effectively and to compensate for the shortcomings inherent in the individual use of each approach. The teacher responses in both dimensions can provide an opportunity for educational administrations to introduce modifications and improvements that meet the needs of CLIL educators (Campillo et al., 2019). In addition, this research may reflect some similarities in comparison with other CLIL educational contexts, where one or more NLAs are taught through an L2, which may favour contrasting studies between different learning contexts under this new paradigm.

Sample. The participants who completed the questionnaire consisted of 129 primary school teachers from the Region of Murcia, 12 of whom participated in the discussion forum. The average profile of the participant was that of a state school teacher who teaches science and has a B2 level of English, according to the Common European Framework of Reference for Languages: Learning, Teaching, Evaluation (CEFR). Most participants had 10 years of experience as teachers and 3 years in CLIL education programmes. In addition, 99 teachers worked in state schools and 30 in private schools, while 20 teachers had a university degree in bilingual education. Regarding the discussion forum, five educators worked in state schools and seven in private schools (Table 1). Their teaching experience ranged from 7 to 20 years, while their experience in CLIL programmes ranged from 2 to 5 years. In terms of their L2 proficiency, eight participants presented level B2, three presented level C1 and one presented level C2. None of them had a bilingual degree in primary education; thus, their practice in this field was carried out after completing their university studies. Three discussion subgroups were structured to encourage discussion and an exchange of views on current CLIL practices in primary schools. The discussion group recordings were transcribed and analysed using a series of categories and covering the information and beliefs presented by CLIL teachers on cognitive and language dimensions. Open-ended questions allowed the participants to discuss and share opinions on the topic more spontaneously and eloquently.

Instruments. The instruments used for data collection consisted of a semi-structured questionnaire and a discussion forum, which have been widely applied in social science research. As Bruton (2011) argues, a semi-structured questionnaire is defined as an effective instrument for helping to conduct research in CLIL contexts. Its validity and reliability are two essential criteria for determining the degree of credibility of research. While reliability focuses on replicability, validity is based on accuracy and the ability to generalize results. Furthermore, the application of the questionnaire facilitates the systematic transfer of data and the possibility of including control mechanisms through different types of filter questions that limit the effect of the working conditions developed by the respondents. This instrument was prepared ad hoc, and regarding its validation, several revisions were needed to take into account the technical comments of a group of expert professors from the University of Murcia and those of a group of CLIL teachers. The instrument included several blocks of questions that allowed the range of topics to be extended to various aspects related both to the professional profile of the teachers and to the implementation of CLIL in this context. In particular, the questionnaire included the following questions related to the six cognitive categories: (i) remembering, (ii) understanding, (iii) applying, (iv) analysing, (v) evaluating and (vi) creating. In addition, the questionnaire included a section asking the participants to rate how often they used the L1 to promote these cognitive categories and how often they promoted the following higher-order cognitive processes: (i) deconstructing, (ii) differentiating, (iii) checking, (iv) critiquing, (v) generating, (vi) planning and (vii) producing. With regard to the resources used, the respondents were also asked to rate how often they used the following resources: (i) a smartboard, (ii) slide decks, (iii) flashcards, (iv) a digital textbook, (v) websites, (vi) a printed textbook and (vii) software. The second instrument in this study consisted of six questions on how CLIL teachers carry out their cognitive-based teaching practice and what reviewable aspects they believe need to be addressed in this approach. The more open-ended nature of the discussion forum allowed teachers to more freely provide their opinions on their CLIL practice while complementing those expressed in the questionnaire. The following questions were asked to establish the discussion forum: (a) What are the results of this paradigm in terms of cognition? (b) What professional training is necessary under this approach? (c) Do you think the exchange of best practices and methodological and educational resources among CLIL teachers is particularly useful? (d) Should CLIL teachers be better coordinated? (e) What cognitive activities and evaluation tools are most commonly used in CLIL teaching? and (f) What significant improvements are needed to optimize this approach?

Table 1 Description of the CLIL teachers in the qualitative phase of the research.

	Gender	Experience in teaching CLIL	Teaching experience	Proficiency level in English	School where they work
Teacher 1	Female	5 years	12 years	B2	State
Teacher 2	Female	4 years	15 years	C1	State
Teacher 3	Female	5 years	20 years	B2	State
Teacher 4	Female	2 years	7 years	C1	State
Teacher 5	Male	5 years	13 years	C2	State
Teacher 6	Female	5 years	20 years	B2	Private
Teacher 7	Female	4 years	20 years	B2	Private
Teacher 8	Female	3 years	8 years	B2	Private
Teacher 9	Female	5 years	16 years	C1	Private
Teacher 10	Male	4 years	12 years	B2	Private
Teacher 11	Female	3 years	17 years	B2	Private
Teacher 12	Female	5 years	14 years	B2	Private

Table 2 Frequency of use of CLIL activities in science and social science lessons.

	AV	SD	Mann- Whitney *U*	*Z*	*p*	Kruskal-Wallis *H*	df	*p*
Remembering	4.18	0.90	1374	−0.58	>0.56	14.58	4	<0.006*
Understanding	4.44	0.68	1290	−1.22	>0.22	3.63	3	>0.304
Applying	4.27	0.72	1259	−0.80	>0.42	2.74	3	>0.433
Analysing	3.97	0.79	1379	−0.64	>0.52	2.68	3	>0.444
Evaluating	4.20	0.76	1466	−0.11	>0.90	2.30	3	>0.513
Creating	3.75	1.04	1359	−0.59	>0.51	8.10	3	<0.044*

*$p < 0.05$.

Procedures and data analysis. The opinions expressed by the participants in the first instrument were received telematically after informing the respondents of the aim of this study and the instructions for completing the questionnaire. The steps in the data collection process with the first instrument were as follows: All teachers' questionnaires were classified into different subgroups based on some variables, such as gender, the L2 proficiency level, whether or not the teacher holds a bilingual degree in primary education, the number of years of experience, the type of school, experience in bilingual programmes and CLIL training. The data from each subgroup were analysed, and the frequencies of responses were calculated using a Likert scale. The frequencies of all elements were then calculated and the percentages presented in tables for better representation and further analysis. Furthermore, non-parametric tests were used because our data were not normally distributed. These tests helped obtain statistically significant differences among the respondents and more relevant results and conclusions. SPSS version 23 was used for the analysis. The degree of reliability of this instrument was calculated before data analysis. It was tested using Cronbach's alpha and positive results were obtained that prove its high level of reliability ($\alpha = 0.94$).

Regarding the second instrument, the discussion forum, data were collected in three private meetings with CLIL teachers lasting ~45 min each. The data collected are presented in the cross-reference tables provided in the next section. The total score for each indicator was obtained by aggregating the data that were estimated for each indicator.

Results

This section presents the results of the analysis of the views expressed by CLIL teachers regarding the development of cognitive performance, which defines the implementation of CLIL in primary schools in the Region of Murcia.

In particular, based on the answers provided in the questionnaire, learning activities for understanding are the activities that are the most frequently applied in bilingual classrooms because 93% of CLIL teachers say they are carried out very often. On the other hand, creation activities are the least frequently used in science and social science, with one-third of teachers saying they are seldom used.

Non-parametric tests for two or more independent samples do not indicate significant relationships between the series of variables 'CLIL activities' and the independent variables 'gender' ($U = 1428$; $p > 0.05$), 'experience in bilingual programmes' ($H = 3.51$; $p > 0.05$), 'level of English' ($H = 0.22$; $p > 0.05$), 'possession of a bilingual degree' ($U = 1032$; $p > 0.05$) or 'type of school where they work' ($U = 1374$; $p > 0.05$). However, significant differences were found in relation to the number of hours of CLIL training ($H = 11.60$, $p < 0.05$) and the planning of activation activities, showing that better trained CLIL teachers carry out these activities more often than those with less training. In addition, significant differences were found between their professional profile and the implementation of creation activities ($H = 8.1$; $p < 0.05$), indicating that permanent teachers in both private and state schools carry out creation activities significantly more often than temporary teachers (Table 2).

Additionally, the teachers in the discussion forums agreed on the effectiveness of the approach in promoting lower-order cognitive skills.

> For the area that we are teaching, what interests us is that children get the idea and the contents (Teacher 8).
>
> The understanding part is already very, very, very much learnt. Because we've uploaded a lot of stuff. They have a lot of resources. […] The level is high (Teacher 11).
>
> They are no longer afraid to listen to a language other than their own because, at the beginning, it was more difficult. We used to talk all the time in English, I don't know if you ever… they used to say, "We don't understand you", but now, they never imagine telling you "I don't understand you" because they don't speak English. […] But, bilinguals, they've gotten over that. They know it's another language we use to teach (Bilingual teacher 8).
>
> But when it comes to expressing themselves, they are not able to express certain contents…" (Bilingual teacher 12).

The primary teachers indicated that the frequency of tasks that promoted HOTS in CLIL lessons varied from moderate to high (see Table 3).

Based on the analysis of the replies to the questionnaire and regarding the variable 'deconstructing', there are statistically significant differences between teachers working in state schools and those working in private schools ($U = 1043$; $p < 0.05$), since the former encourage this cognitive process more often than the latter. Similar significant differences are obtained in relation to the variables 'differentiating' ($U = 1067$; $p < 0.05$), 'checking' ($U = 1128$; $p < 0.05$) and 'planning' ($U = 1102$; $p < 0.05$).

Regarding the dependent variable 'producing', once the Kruskal–Wallis H and Mann–Whitney U tests were applied, we identified statistically significant differences in the teaching position of the participants ($H = 9.74$; $p < 0.05$) and the type of school where they work ($U = 960$; $p < 0.05$), since permanent teachers in state schools encourage this higher-order cognitive process more frequently than the rest of the subgroups studied. For the dependent variable 'critiquing', we also found statistically significant differences in relation to the variables 'experience in CLIL programmes' ($H = 14.03$; $p < 0.05$) and 'the type of school where they work' ($U = 918$; $p < 0.05$), since teachers in state schools and those with more experience in teaching under the CLIL approach are those who most frequently encourage quality peer critique in their teaching practice.

Based on the views expressed in the discussion forum, more efforts should also be made to promote high-order thinking skills

Table 3 Frequency of use of higher-order cognitive processes in science and social science lessons.

	AV	SD	Mann- Whitney *U*	*Z*	*p*	Kruskal-Wallis *H*	df	*p*
Deconstructing	3.93	1.05	1043	−2.67	<0.009*	7.83	3	>0.050
Differentiating	3.61	1.01	1067	−2.55	<0.011*	3.63	3	>0.304
Checking	4.06	1.08	1128	−2.11	<0.034*	2.68	3	>0.444
Critiquing	3.75	1.03	918	−3.60	<0.000*	14.03	3	<0.006*
Generating	3.86	0.94	1220	−1.58	>0.113	3.50	3	<0.320
Planning	3.57	0.98	1102	−2.22	<0.026*	3.87	3	>0.276
Producing	3.91	0.99	960	−3.13	<0.002*	9.74	3	<0.021*

*$p < 0.05$.

Table 4 Frequency of use of the L1 to promote cognitive development under the CLIL approach.

	AV	SD	Mann- Whitney *U*	*Z*	*p*	Kruskal-Wallis *H*	df	*p*
Remembering	2.19	1.34	788	−1.74	<0.080	9.55	3	>0.049*
Understanding	2.53	1.26	758	−1.91	<0.056	10.72	3	>0.030*
Applying	2.40	1.29	660	−1.67	<0.094	9.66	3	>0.046*
Analysing	2.46	1.29	660	−2.59	<0.009*	13.76	3	<0.008*
Evaluating	2.50	1.27	792	−1.97	>0.048*	14.58	3	<0.006*
Creating	2.29	1.43	715	−2.24	>0.025*	16.14	3	>0.003*

*$p < 0.05$.

Table 5 Resources used to promote cognitive development in science and social science lessons.

	AV	SD	Mann- Whitney *U*	*Z*	*p*	Kruskal- Wallis *H*	df	*p*
Smartboard	4.55	0.98	915	−1.52	<0.129	7.03	3	>0.318
Slide decks	4.17	0.97	803	−2.03	<0.042*	5.95	3	>0.428
Flashcards	4.09	1.06	1035	−0.383	<0.702	5.24	3	>0.513
Digital textbooks	4.04	1.18	1077	−0.091	<0.928	17.11	3	<0.009*
Websites	3.97	1.07	899	−1.32	>0.187	10.70	3	<0.098
Print textbooks	3.82	1.09	972	−0.802	>0.423	15.17	3	>0.019*
Science software	3.42	1.26	682	−2.75	<0.006*	3.40	3	<0.756

*$p < 0.05$.

to meet the challenges of this content-based paradigm. In particular, the teachers stress the need for effective planning and analysis of new content.

> I believe that in primary we are at a level where everything should be much more experiential, building new meanings, rather than simply memorizing vocabulary (Teacher 5).

> In some units, children are going to study vocabulary, and we all know that vocabulary learned by heart is quickly forgotten (Teacher 9).

> They memorize the phrase in the book, but for me, that's not learning, right? (Teacher 12).

Regarding the use of the L1 in CLIL lessons, most respondents reported that they used their mother tongue from time to time to promote cognitive skills in these programmes (Table 4).

Non-parametric tests revealed that teachers in private schools used the L1 more often than teachers in state schools to promote analysis, evaluation and creative skills ($U = 918$; $p < 0.05$). In addition, teachers with a bilingual education degree used their mother tongue more often than teachers without a degree for the same purpose ($H = 7.12$; $p < 0.05$). In addition, teachers with less CLIL training used the L1 more often than those with more training to promote cognitive skills.

The participants in the discussion forums also stressed the use of the L1 to give clearer instructions when students have to perform more complex tasks that require the development of HOTS, for example, in projects or end-of-unit tasks.

> In science, at higher levels, I sometimes find it necessary to use the L1 to explain certain tasks or projects where they have to speak more freely in English, and perhaps, they find them more difficult and do not understand them (Teacher 10).

> Yeah, I use it for that purpose too (Teacher 11).

Apart from this communicative tool, the primary teachers quite often use a wide variety of resources in CLIL lessons to encourage cognitive development (Table 5).

The Mann–Whitney *U* and Kruskal–Wallis non-parametric tests indicated that primary school teachers who had a bilingual education degree used slide decks and software more often than teachers who did not ($U = 803$; $p < 0.05$). In addition, teachers with less experience in these programmes used printed and digital textbooks less often than most experienced teachers ($H = 15.17$; $p < 0.05$). In general, the teachers who participated in the qualitative study highlighted the efforts made to provide students with a large number of resources, and therefore, they demanded more

resources and training in the CLIL methodology, especially in how to integrate HOTS into science and social science.

> That, we have been uploading resources to the blog, spending hours and hours surfing, looking for resources on the web, so that the kids and parents can select and organize information, check the uploaded content and so we have been doing that, and it has been very good, but very time consuming (teacher 10).

> When you teach at the higher levels of primary education and the content is more complex, you have to teach the whole class in English and, this also requires many resources and the ability of teachers to promote complex learning in science (Teacher 7).

> It depends on the teacher's motivation in this subject (Teacher 9).

Discussion and conclusions

The aim of this study is to investigate how CLIL helps to reinforce cognitive development in primary education in EFL contexts such as Spanish. The first conclusion is that, although these programmes are intended to provide students with effective cognitive and language skills, teachers' views on the cognitive dimension revealed some shortcomings in their teaching practice, for example, the fact that they do not provide enough opportunities for more active modes of learning, especially given the extensive demands that this approach entails. In particular, the results of this research indicate that CLIL teachers promote the use of English through a variety of cognitive processes, although most of them are quite undemanding (Banegas, 2014). Although the greatest potential of CLIL lies in its integrated dimension, the development of higher-order thinking skills is less established, resulting in more activities that encourage LOTS. Based on the data gathered during this study, although the central tendency in the distribution of responses is quite similar and most values indicate a high frequency of CLIL tasks, with values of ~4, there are differences based on the type of task to be carried out in the classroom. The frequency of tasks promoting LOTS is higher than that of tasks promoting HOTS, demonstrating that teachers focus more on activating prior knowledge than on developing problem-solving skills (Table 2). Some scholars suggest the use of cognitive discourse functions (CDFs) to bridge the gap in understanding how thinking skills can be effectively addressed under this approach (Dalton-Puffer, 2013; Morton, 2020). Future studies should analyse teachers' pedagogical skills for implementing these CDFs through meaningful tasks that encourage students' mental processes at all educational levels.

Another idea that emerged from this study is the use of the L1 mainly for explanatory and scaffolding purposes in CLIL lessons. In general, the use of the L1 seems to be common practice (Lasagabaster, 2013), although there are significant differences among the respondents in regard to contextual and professional factors, i.e., the school where they work and the training received at university. Therefore, more systematic consideration should be given to how primary teachers use the L1 in CLIL lessons.

The results of the study also revealed the use of a wide variety of resources that helped the teachers address the cognitive challenges of teaching content and developing thinking skills in the classroom (Ball et al., 2015). However, due to the differences found among the participants in regard to their use and application, more research is needed on how different resources can be used effectively in CLIL contexts to maximize cognitive skills.

Furthermore, based on the results of our research, one of the factors that influences cognitive development in class is the type of teacher, i.e., whether permanent or temporary, who carries out activities geared towards such development. There are statistically significant differences among the study participants, since permanent teachers in state schools encourage production processes significantly more than temporary teachers (Table 3). Some studies agree that the number of permanent CLIL teachers in schools may affect the outcomes of these programmes (Doiz and Lasagabaster, 2017; Ellison, 2018). In this sense, the benefits associated with permanent teaching positions often include increased opportunities for professional development, greater relationships with students over time, and more regular and structured schedules that allow teachers to modify CLIL lesson plans, develop more resources during preparation periods, collaborate with colleagues. For all these reasons, CLIL teachers working as permanent staff members may have more opportunities than temporary teachers to carry out creative activities in the classroom, as such activities require more time and energy. Another factor influencing the improvement of HOTS is the teaching experience in CLIL programmes.

In addition, experience in these programmes seems to be another important factor contributing to the development of sophisticated reasoning. The results of this study show that more experienced teachers are more willing than their less experienced colleagues to enhance review processes in these NLAs. Since teachers must be able to assess their students' progress and provide feedback that makes them think about their learning processes, it seems obvious that these cognitive skills will be better taught by experienced teachers because over the years they have gained the capacity to further improve student performance (Kini and Podolsky, 2016).

In conclusion, given the high stakes, it is extremely important to invest in action plans that sustain an experienced and trained teaching workforce that knows when and how to develop thinking skills. This conclusion is also supported by the teachers who participated in this study. To that end, it is of utmost importance to strengthen teacher training under this approach because without such training, it will not be possible to develop an effective educational programme. In this regard, targeted training grants, along with incentives to improve salaries and working conditions, could ensure that all students have access to a strong cadre of teachers willing to improve their learning and cognitive skills.

Furthermore, successful implementation of any CLIL programme requires the collaboration of all members of the educational community, not only students and teachers but also native-speaking assistants, school administrators and support staff (Genesee and Hamayan, 2016). If CLIL is to be effective, it must trigger more integrated and professionally inclusive policies, with a clearer focus on the role of other staff in supporting CLIL teachers within these programmes. The participants in this research stressed the need for strong cooperation among colleagues to share resources and experience gained through their CLIL practice, with regularly planned sessions for this purpose. Addressing these limitations is crucial to the future of CLIL, as doing so will lead to a reinforcement of teachers' key competencies to promote cognition in the classroom. However, these findings need to be complemented by further research with long-term follow-up and advanced statistical analysis.

Data availability

The datasets generated during the current study are not publicly available because the identities of some participants are visible,

undermining privacy protection, but they are available from the corresponding author upon reasonable request.

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Competing interests

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