

EXPLORING CLIL CONTRIBUTION TOWARDS THE ACQUISITION OF CROSS-CURRICULAR COMPETENCES: A COMPARATIVE STUDY ON DIGITAL COMPETENCE DEVELOPMENT IN CLIL

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Abstract: *This large-scale study compares the digital skills of CLIL and non-CLIL secondary students by means of two separate tests assessing 'communicative digital competence' (CLIL group, n=2,152, and non-CLIL group, n=18,093) and 'informational digital competence' (CLIL group, n=2,581, and non-CLIL group, n=17,553). The findings indicated that CLIL students showed significantly better digital skills than non-CLIL learners, particularly regarding communicative digital competence. This may suggest CLIL students are more familiar with the use of ICT, and that the communicative skills acquired by means of CLIL methodology based on communication, participation and interaction were transferred to digital environments. These outcomes reveal a new CLIL by-product as well as added value in a highly underexplored area in CLIL research: its effectiveness in the acquisition of key competences (in this case, digital competence), which are the major goals of compulsory education.*

Keywords: *CLIL, ICT, digital competence, cross-curricular competences, secondary education.*

1. INTRODUCTION

In the last two decades, the implementation of school subjects taught through a second language, commonly named CLIL (Content and Language Integrated Learning), has become ever more popular, since these programmes have been considered to be both 'a lever for change and success in language learning' (Pérez Cañado and Ráez Padilla, 2015:1), and 'an innovative form of education' (Cenoz, Genesee and Gorter, 2014:16). However, second language acquisition in CLIL environments has given rise to far more studies than any other educational aspect (Sierra, Gallardo del Puerto and Ruiz de Zarobe, 2011; Lasagabaster and López Beloqui, 2015). As Sierra *et al.* (2011) point out, the picture of CLIL cannot be complete unless other educational issues, and not only language learning, are properly addressed. In fact, CLIL should not be perceived as being a method for learning second languages, but, rather, an educational approach, and consequently, how successful CLIL is, depends on its effectiveness not only for attaining proficiency in a second language, but also for acquiring educational objectives, key competences and content knowledge.

To bridge this gap, this paper is devoted to exploring the potential of CLIL for the development of one of the eight key competences for education: digital competence. Acquisition of the eight key competences for lifelong learning is the ultimate goal of compulsory education. Additionally, digital competence has been chosen in this study among these because it is considered to be 'an essential foundation for learning' (European Commission, 2006), and 'a transversal key competence which enables acquiring other key competences' (Eshet-Alkalai, 2012:1), including the key competence of communication in foreign languages, the acquisition of which is one of the main rationale for the implementation of CLIL programmes.

2. LITERATURE REVIEW

2.1. CLIL and development of key competences

Research on CLIL has mainly focused on language learning outcomes (Sierra *et al.* 2011), to the detriment of other important educational issues, such as developing the mother tongue (Nieto Moreno de Diezmas, 2017, 2018), assimilating contents and acquiring the key competences.

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While the growing body of studies focused on learning a second language reflects a positive perception of CLIL regarding the development of the target language (Admiraal, Westhoff and de Bot, 2006; Alonso, Grisaleña and Campo, 2008; Lagasabaster, 2008; Lorenzo, 2010; San Isidro, 2010; Dalton-Puffer, 2011; Navés, 2011; Pérez Cañado, 2011; Ruiz de Zarobe, 2011; and Nieto Moreno de Diezmas, 2016a, among others), studies on the assimilation of content are not so conclusive. Whereas some authors confirm satisfactory acquisition of content (Housen, 2002; Bergroth, 2006; Van de Craen, Lochtman, Ceuleers, Mondt and Allain, 2007; Badertscher and Bieri, 2009; Grisaleña, Campo and Alonso, 2009; Madrid, 2011), the findings in other studies, are not so clear-cut (Washburn, 1997; Seikkula-Leino, 2007; Fernández-Sanjurjo, Fernández-Costales and Arias Blanco, 2017), and as a result, this area would need further scrutiny. Despite the scarcity of studies on the acquisition of cross-curricular competences, CLIL seems to be conducive towards the development of these, at least in secondary education. CLIL students enrolled in the 2nd year of compulsory secondary education showed significantly higher skills than their peers when their competences for learning to learn (Nieto Moreno de Diezmas, 2016b) and their emotional competence (Nieto Moreno de Diezmas, 2012) were assessed. Regarding learning to learn, CLIL students significantly outperformed non-CLIL students in the use of meta-cognitive strategies, as well as learning and self-regulation strategies. This fact was explained as a result of CLIL methodology “which places more emphasis on the construction of learning” and “provides students with learning strategies which may compensate for the difficulty of assimilating and processing new concepts by means of a foreign language” (Nieto Moreno de Diezmas, 2016b:30). As for emotional competence, CLIL students showed significantly higher skills in emotional awareness, emotion regulation and social awareness, including personal relationships and problem-solving. These findings were explained by two main reasons (Nieto Moreno de Diezmas, 2012): first, some of the indicators used for the evaluation of emotional competence were connected to language skills, which could have been transferred to the emotional field. Secondly, CLIL methodology based on participation and collaboration could have been a key factor behind these positive outcomes in emotional competence, thus detecting another added value of CLIL.

Therefore, in spite of the dearth of empirical studies, researchers claim CLIL is more helpful for integrating key competences than mainstream education (Ball, 2014), since “CLIL is cross-curricular in nature. It teaches some cross-cutting competences explicitly” (Clegg, 2014:84), and it is considered that CLIL methodology is intrinsically connected to the principles of competence-based learning (Mittendorfer, 2014).

However, even if the findings of the aforementioned studies and the opinion of researchers show a positive view regarding the prospective of CLIL for the acquisition of cross-curricular skills, further evidence would be needed to confirm how beneficial CLIL is to developing all the key competences established by the Recommendation of 18th of December 2006 of the European Parliament and the Council on Key Competences for lifelong learning. In this document, eight key competences were selected as being essential basic acquisitions for all citizens, and these are included, in one way or another in the educational regulations of most European countries as a part of their curriculum. The Spanish educational law in particular considers the key competences to be reference points in the teaching-learning process and the ultimate goal for compulsory education to attain. This means all students, whether they are enrolled in mainstream education or in bilingual or CLIL programmes, should acquire these eight key competences: communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, cultural awareness and expression, social and civic competences, and sense of initiative and entrepreneurship. In this regard, it should be noted that ‘competences cannot be related to one specific subject, but they involve different aspects of learning skills and strategies and are interdependent and transversal’ (Bentley, 2014:100), and therefore, all school subjects have to make a contribution to their development.

2.2. Digital competence and CLIL

Studies on new technologies and CLIL that have been carried out so far have mostly focused on three main lines of research; firstly, the impact of ICT on language learning and on content learning in CLIL settings; secondly, the methodology for implementing ICT in CLIL; and thirdly, the description of particular experiences by means of projects, applications, or online games and activities. However, so far there has been no research on analyzing how CLIL may help digital competence be learnt, which as yet remains uncharted territory.

The first line of research mentioned explores the benefits ICT provides in terms of language and content acquisition. In their 2014 report, Scott and Beadle (2014) acknowledged how effective digital technologies, and CALL (computer assisted language learning) were in language learning, particularly for pronunciation (Saz, Rodríguez, Lleida, Rodríguez and Vaquero, 2011), reading skills, motivation (Dourda, Bratitsis, Griva and Papadopoulou, 2013), vocabulary retention (Baturay, Yıldırım and Daloğlu, 2009), and for focusing on form in writing tasks (Alwi, Adams and Newton, 2012). Further evidence on the beneficial effects of ICT was shown by Dourda *et al.* (2013) who researched how CLIL students used a digital detective game to learn geography and English. After the experience, the 11-12-year old students had improved their knowledge of geography by 30%, and their reading skills, vocabulary and motivation were also enhanced. In turn, Wojtowicz, Stansfield, Connolly and Hainey (2011) surveyed CLIL teachers about the results of using digital games in their classes, and they gained positive feedback

on this kind of innovation. However, further evidence and more specific studies would be needed to establish whether it can be concluded that implementing ICT in CLIL settings and improved learning results go hand in hand.

Regarding the second line of research mentioned above, i.e., formulation of methodological principles for implementing ICT in CLIL environments, Fernández Fontecha (2012) created the Content and Language Processing Sequence (CLPS) that provides methodological guidelines for introducing new technologies into the CLIL classroom, and Gimeno, Seiz, de Siquera, and Martínez (2010) reflected on the pedagogical implications for integrating ICT into CLIL effectively.

Finally, the third line of research, aims at disseminating particular experiences implementing new technologies in CLIL settings for all educational levels. For example, Durán and Cruz (2013) showed how to use stories and ICT in CLIL to enhance learning by means of JClic and Atenex, and Fernández Yubero and Pareja Moreno (2009) reported experiences of implementing ICT in CLIL in social and natural sciences. In the same vein, Rodríguez, Blázquez, López, Castro, San Cristobal y Martín (2014) described the use of Hot Potatoes, Scratch, and What2Learn in physics and chemistry, whereas Fernández Fontecha (2014) showed an example of a CLIL quest on climate change. In turn, Vlachos (2009) explained the implementation and results of webquests in the CLIL classroom, Gaballo (2010) reflected on the use of digital resources in bilingual subjects, and finally, Gimeno *et al.* (2010) designed and implemented online platforms as InGenio, in CLIL learning environments. Along the same lines, eTwinning projects (which are based on digital communication) have been successfully implemented in CLIL for students of all ages: in early childhood education (Nieto Moreno de Diezmas and Ortiz Calero, 2017), primary (Prentza, 2013) and secondary school education, with CLIL providing fertile ground for enhancing communication and developing ICT skills (Gillera, 2012).

Although the aforementioned studies focus on what effect ICT has on the learning process in CLIL settings, without providing information about how CLIL affects development of digital competences, the amount and variety of the experiences reported may suggest that ICT are particularly used and integrated in CLIL environments.

3. RESEARCH QUESTIONS AND HYPOTHESIS

The following research questions are posed in this study:

1. Are CLIL learners better than non-CLIL learners at digital skills?
2. Are there differences in achievement of both dimensions of digital competence: communicative and informational competence depending on the type of instruction received CLIL/ non-CLIL?
3. Do specific learning standards of digital competence benefit especially depending on the type of instruction received CLIL/non-CLIL?

The main hypothesis of the study is that CLIL may have a positive effect on the acquisition of digital skills, and particularly on communicative digital competences, since CLIL is based on communication and interaction and these skills could be transferred to digital environments. Three main additional arguments support this hypothesis. Firstly, due to the special cognitive effort CLIL students have to make to learn new content through a new language, they become more efficient learners (Dalton-Puffer, 2008; Halbach, 2009), so that they could apply their improved learning skills to the acquisition of cross-curricular competences, and among them to the development of digital competence. Secondly, whilst conveying meaning in this way, CLIL teachers have to make extra effort and use more varied teaching resources and “this inevitably leads to a widening of their teaching repertoires, and to a heightening of their methodological awareness” (Ball, 2014:77), and, as a result, CLIL may foster the use of more enriching methodologies that are more conducive to the acquisition of transferable cross-curricular competences (Ball, 2014; Clegg, 2014; Mittendorfer, 2014). And thirdly, the aforementioned wide variety of digital experiences in CLIL settings suggests digital technologies are deeply integrated in CLIL environments, which may specifically enhance the development of digital skills.

4. METHOD

4.1. Participants and context

The participants in this study were two different groups of 2nd year students in compulsory secondary education (henceforth, 2CSE), aged 13-14, from the census of the Autonomous Community of Castilla-La Mancha, a monolingual region located in central Spain, where Spanish is the only official language. The Spanish educational system is decentralized, which means that the legislative powers for the development of educational regulations lie

with the Autonomous Communities, including designing specific programmes, such as CLIL. In order to improve traditional poor results in foreign languages, in 2005, a CLIL programme called 'European Sections' was launched in Castilla-La Mancha which was to be implemented in primary and secondary schools.

Data were collected whilst making a diagnostic assessment of the educational system of this Spanish region and for the purpose of this study, two comparative groups were considered: the CLIL group, made up of secondary school students enrolled in the European Sections, and the non-CLIL group composed of mainstream students. Two tests were taken in two consecutive years. The first year, the census of CLIL ($n=18,093$) and non-CLIL ($n=2,152$) students enrolled in 2CSE in Castilla-la Mancha took a test evaluating communicative digital competence, and the following year, the students in 2CSE in Castilla-la Mancha divided into CLIL ($n= 2,581$) and non-CLIL students ($n =17,553$) were tested regarding their informational digital competence. The tests were not taken by the same students, but by two different, consecutive generations of CLIL and non-CLIL students enrolled in 2CSE, and the sample of this study came from 240 secondary schools.

CLIL students were enrolled in European Sections for at least two years (1CSE and 2CSE) and in addition to the subject of English (EFL), common to CLIL and non-CLIL programmes, they received at least 50% of at least two content subjects in English (L2). The CLIL subjects varied from one school to the other given that they are implemented depending on the availability of teachers accredited with a B2 level of the CEFR. Despite that, the most popular subjects were: natural science, social science and mathematics. CLIL and non-CLIL students followed the same general educational programme, with the same mandatory and optional subjects. Apart from the possibility of choosing the subject 'technology workshop' (a practical and vocational subject, which included the basics of computer operations), the acquisition of digital competence (as it happens with all the key competences) had to be promoted in all subjects, both CLIL and non-CLIL. Additionally, in general terms, CLIL and non-CLIL schools were treated equally regarding provision from the administration of digital resources for teachers and students.

On the other hand, the regulation explicitly forbids schools to make student access to European Sections conditional on any academic or linguistic grounds, so that the admission criteria in these programmes have to respect the general admission rules applicable to all schools (proximity to family home, number of siblings already enrolled at the school, low family income...). In fact, the European Sections programme aims to provide bilingual education at primary and secondary schools according to the principles of inclusion and equality, and access is voluntary and non-selective (Nieto Moreno de Diezmas and Ruiz Cordero, 2018).

4.2. Instruments

The European Recommendation of 18 December of 2006 defined two core dimensions of digital competence: the informational digital competence and the communicative digital competence. The informational competence consists in the acquisition of the necessary skills to retrieve, assess, store, produce, present and exchange information by using digital devices and applications, while communicative competence includes the use of new technologies to communicate and participate in online collaborative networks.

Both dimensions of the digital competence described by the European Commission (2006), i.e. 'communicative competence' and 'informational competence' were considered and evaluated by means of two separate tests entitled 'Surf with Art' and 'Action!' conducted over two consecutive years and administered around the end of every school year.

The tests focused on the ability of students to use and integrate their knowledge, skills and attitudes to solve real-life problems. Since, 'competence' implies 'performance', and in order to perform a 'competence needs a situation (as authentic as possible)' (Ball, 2014:78), the tests provided a scenario, i.e., an authentic situation to encourage the students to mobilize their skills in a realistic context (Di Pietro, 1987). For the test 'Surf with Art', this scenario was a blog, through which students had to communicate and make decisions in order to organize a collaborative art project. The students had to fulfill a series of tasks connected to this situation, such as surfing the net, choosing a famous painting, making comments, and sending e-mails. The scenario of the second test, 'Action!' was a project about the film director Pedro Almodóvar, born in Castilla-La Mancha. The series of tasks students had to carry out included: searching the net for information and pictures of Pedro Almodóvar, creating a poster, processing and presenting information, managing, creating and compressing folders, and creating a backup copy among others.

Every task was connected to a learning standard and to a set of assessment criteria. For assessing communicative competence, six learning standards were considered, and fourteen, for evaluating informational competence. Scoring for tasks fulfilled was as follows: one point was awarded for simple tasks, and two or three points for those requiring more operations. In Table 1 there are two examples of the connections of learning standards, tasks and assessment criteria.

Table 1. Example of connections among learning standards, tasks and assessment criteria.

Learning standard	Task	Assessment criteria
Use the Internet as a source of information	Find a picture of Pedro Almodóvar, download it in your folder and then paste it in table 'B'	2 points: a) she finds the information + b) Downloads it in the folder+ c) Pastes it in table 'B' 1 point: a) + b) or c) 0 points: none of them
Print a document	Print the document in landscape orientation	2 points: a) She prints the document +b) the document is printed in landscape orientation. 1 point: a) 0 points: the document is not printed.

In total, overall evaluation of digital competence consisted of four 1-point, thirteen 2-point and three 3-point tasks (Table 2).

Table 2. Learning standards and score.

Communicate and participate in collaborative networks		Search, collect and process digital information			
Standard	Score	Standard	Score	Standard	Score
Respect the rules of participation in virtual networks	2	Compress folders	1	Manage folders and files	2
Handle network communication tools	2	Copy a file to share	2	Print a document	2
Use the Internet as a source of information	2	Create folders	2	Work on a network	2
Send e-mails	3	Create a back-up copy	1	Search for information in databases	1
Understand the risks of sharing personal data	3	Create a list of favourites	2	Select information critically	1
Manage files and folders	2	Edit with word processor	2	Use the Internet as a source of information	2
		Edit and use spreadsheets	3	Draw and edit images	2

4.3. Procedure and data analysis

Both tests were conducted in the computer labs in schools. The computers were equipped with a word processor, image editor, printer connections, web browser and Internet. All information in the tests was written in the mother tongue of the students, i.e. Spanish. Students were given 60 minutes to complete each test.

The Statistical Package for Social Science, SPSS was used to analyze data. Cronbach's alpha for the test 'Surf with Art' was 0.693, and for the test 'Action!' was 0.770, which means that the internal consistency and reliability of both tests were high. The distribution was normal (Kolmogorov-Smirnov Test), and in order to make comparisons with independent samples and determine if differences between CLIL and non-CLIL students were significant, t-tests were run.

5. RESULTS

5.1. Overall results in digital competence

CLIL students significantly outperformed their peers in both dimensions of digital competence: communicative competence and informational competence. The overall results also showed significant differences in the development of digital competence shown by CLIL secondary students, since $p=0.000$.

Table 3. Results of the dimensions for digital competence and overall results.

Dimension	Group	Mean	Sig. (2- tailed)
Communicative competence	CLIL	6.528	0.000
	NON-CLIL	5.992	
Informational competence	CLIL	6.48	0.000
	NON-CLIL	6.032	
Mean	CLIL	6.504	0.000
	NON-CLIL	6.012	

5.2. Learning standards for dimension 1: communicative competence.

CLIL students recorded significantly higher scores in all the learning standards of communicative competence, as shown in Table 4.

Table 4. Results of the learning standards for the dimension ‘communicative competence’.

Standard	Group	Mean	Std. Deviat.	Std. Error	Sig.
				Mean	(2-tailed)
Respect the rules of participation in virtual networks	CLIL	1.33	0.793	0.017	0.000
	NON- CLIL	1.22	0.821	0.006	
Handle network communication tools	CLIL	1.6	0.664	0.014	0.000
	NON- CLIL	1.47	0.746	0.006	
Use the Internet as a source of information	CLIL	1.12	0.826	0.018	0.000
	NON- CLIL	1.03	0.848	0.006	
Send e-mails	CLIL	1.63	0.627	0.013	0.000
	NON- CLIL	1.58	0.684	0.005	
Understand the risks of sharing personal data	CLIL	1.98	1,061	0.023	0.000
	NON- CLIL	1.69	1,162	0.009	
Manage files and folders	CLIL	1.48	0.73	0.016	0.000
	NON- CLIL	1.40	0.776	0.006	

5.3. Learning standards for dimension 2: informational competence

Table 5 shows secondary school CLIL students significantly outperformed their peers in all standards except for three: no significant differences were detected in ‘compress folders’ and ‘create a backup copy’, and the non-CLIL students scored significantly higher than their CLIL counterparts for one standard: ‘edit and use spreadsheets’.

Table 5. Results of the learning standards for the dimension ‘informational competence’.

Standard	Group	Mean	Std. Deviation.	Std. Error Mean	Sig. (2-tailed)
Compress folders	CLIL	0.32	0.538	0.011	0.247
	NON- CLIL	0.33	0.549	0.004	
Copy a file to share	CLIL	1.43	0.833	0.016	0.000
	NON- CLIL	1.29	0.875	0.007	
Create folders	CLIL	1.89	0.38	0.007	0.000
	NON- CLIL	1.82	0.489	0.004	
Create a backup copy	CLIL	0.68	0.606	0.012	0.088
	NON- CLIL	0.66	0.644	0.005	
Create a list of favourites	CLIL	1.06	0.865	0.017	0.000
	NON- CLIL	0.95	0.866	0.007	
Edit with word processor	CLIL	1.5	0.689	0.014	0.000
	NON- CLIL	1.38	0.743	0.006	

Standard	Group	Mean	Std. Deviation.	Std. Error Mean	Sig. (2-tailed)
Edit and use spreadsheets	CLIL	0.15	0.46	0.009	0.000
	NON- CLIL	0.23	0.631	0.005	
Manage folders and files	CLIL	1.84	0.47	0.009	0.000
	NON- CLIL	1.73	0.586	0.004	
Print a document	CLIL	1.34	0.887	0.017	0.000
	NON- CLIL	1.25	0.887	0.007	
Work on a network	CLIL	1.7	0.587	0.012	0.000
	NON- CLIL	1.64	0.615	0.005	
Search for information in databases	CLIL	0.69	0.462	0.010	0.000
	NON- CLIL	0.59	0.492	0.004	
Select information critically	CLIL	0.76	0.645	0.013	0.000
	NON- CLIL	0.69	0.681	0.005	
Use the internet as a source of information	CLIL	1.55	0.642	0.013	0.000
	NON- CLIL	1.44	0.693	0.005	
Draw and edit images	CLIL	1.29	0.849	0.017	0.000
	NON- CLIL	1.08	0.886	0.007	

6. DISCUSSION

6.1. Research question 1: Are CLIL learners better than non-CLIL learners at digital skills?

The main hypothesis of this study, i.e. that CLIL methodology may have a positive influence on development of digital skills, has been largely confirmed, given that CLIL students achieved a significantly higher average in digital competence and scored significantly higher in 17 out of the 20 learning standards assessed.

These outcomes suggest that the CLIL programme was more productive for learning digital competence, probably because, as Fernández Fontecha (2012:320) indicates “CLIL may indirectly help create favourable conditions for ICT integration”. Additionally, and according to Gimeno Sanz (2009:80), the focus of CLIL methodology on participation is essential to foster enriching implementation of new technologies, since “technology in education is better exploited when an environment favouring student participation is developed”.

These findings are also in keeping with the conclusions researchers such as Ball (2014), Clegg (2014) and Mittendorfer (2014) came to. They claim that CLIL provides a methodological framework which is optimal for developing cross-curricular competences. In addition to this, previous studies that showed CLIL secondary school students were significantly ahead in achieving emotional competence (Nieto Moreno de Diezmas, 2012) and the competence of learning to learn (Nieto Moreno de Diezmas, 2016b) seem to support this finding.

CLIL seems to integrate new technologies in the classroom routines more systematically, as shown by researchers such as Stohler (2006), who cited the use of ICT as being one of the compensatory strategies teachers make use of so as to make up for the additional difficulty students have in understanding subject matter in a L2. This integration of new technologies in CLIL seems to have acted as a catalyst, the outcome of which is CLIL students showing improved digital skills when compared to their peers enrolled in traditional programmes.

Nevertheless, more research is needed to be able to establish a categorical connection between CLIL and increased digital competence, since factors, such as the extramural exposure to ICT of CLIL and non-CLIL students were not controlled in this study and could have affected the results, and therefore, it is not guaranteed that the differences were due solely to the type of instruction CLIL/non-CLIL.

6.2. Research question 2: Are there significant differences between CLIL and non-CLIL students in achieving both dimensions for digital competence?

CLIL students scored significantly higher in both dimensions of digital competence, although, while CLIL students got their better results in communicative competence, the non-CLIL students showed their higher scores in informational competence. These outcomes seem to indicate that CLIL students are comparatively more specialized in using ICT for digital communication, probably due to the potential CLIL has to provide more communicative, cooperative and participative learning environments.

Furthermore, the acquisition of communicative skills promoted by CLIL may have been transferred and applied to digital contexts. Therefore, the incidental improved acquisition of digital skills in CLIL settings can be included among the so-called CLIL by-products (Reilly and Medrano, 2009) and considered to be an example of the 'added value' of CLIL (Marsh, 2002:11) beyond its potential to enhance second language learning.

6.3. Research question 3: Do specific learning standards of digital competence benefit especially depending on the type of instruction received CLIL/non-CLIL?

The impact of the CLIL programme was more noticeable on achievement of the learning standards connected to communicative digital competence, since the CLIL group scored significantly higher in all of them: 'respect the rules of participation in virtual networks', 'handle network communication tools', 'send e-mails', and 'understand the risks of sharing personal data information'.

Moreover, how CLIL contributed to developing the standards connected to informational competence is also remarkable. CLIL students showed better computer skills for basic operations (creating, copying, and managing folders and files) and in some more advanced operations (sharing files, creating a favourites list and working on a network). This may suggest that ICTs are more integrated in the CLIL daily routines, and are a part of CLIL methodology, since CLIL students also showed better command in processing and presenting information. Furthermore, they appeared to be more familiar with the use of ICTs for searching for information, in light of their performance in using the Internet to retrieve information and images, and in searching for information in databases. Special note must be taken regarding the ability CLIL students demonstrated for critically selecting digital information, given that this is a higher order thinking skill and CLIL is claimed to specifically enhance critical thinking, as well as lower and higher order skills (Coyle, Hood and Marsh, 2010). Again, a typical benefit of CLIL, i.e., improved higher order thinking skills, could have been transferred to different contexts, in this case, to digital environments.

However, in more sophisticated computer operations such as 'compress folders', and 'create a backup copy', no significant differences were found between CLIL and non-CLIL students, and the CLIL group even scored significantly lower than their mainstream peers when editing and using spreadsheets, making it patent that CLIL pupils lag behind in mastering this digital application which, incidentally, is more connected to mathematical competence. This finding may be indicative of the weakness of mathematical competence in CLIL students and would merit further scrutiny.

7. CONCLUSIONS

CLIL secondary school students (aged 13-14) showed better results when evaluating their digital skills when compared to their mainstream peers. The CLIL group scored significantly higher in both dimensions for digital competence: communicative competence and informational competence, and in 17 out of the 20 learning standards evaluated. CLIL seems to be particularly effective for promoting communicational digital skills, and although it also positively affected informational digital competence, its impact was more limited in the most complex computer operations.

The main conclusions that can be drawn from these findings are outlined below. Firstly, new technologies seem to be more integrated in the CLIL classroom than in mainstream education, since they are used to promote understanding of concepts conveyed through a foreign language, to boost the construction of knowledge, and to provide opportunities to develop online collaborative work and student-centered activities. Secondly, CLIL methodology seems to provide a more productive space for learning digital skills than traditional teaching, because CLIL is a more student-centered approach that encourages participatory, communicative and collaborative learning in the classroom, which in turn, helps ICT be implemented successfully in the teaching-learning process. Thirdly, CLIL methodology seems to be conducive to learning linguistic and cognitive skills and these seem to have been transferred to different contexts, such as digital environments, so that the educational model CLIL provides is a catalyst for improving educational environments, and has a multiplier effect, since CLIL focuses on the development of 21st century skills and not on the rote learning so typical in traditional approaches.

Nonetheless, this article has to be understood as an attempt to open a new field of research: the investigation of the acquisition of key competences in CLIL settings, and it explores the level of development of digital competence in CLIL and non-CLIL students, but a number of limitations have to be highlighted. To determine whether CLIL was genuinely responsible for improved digital competence, it would have been necessary to take into account more variables, such as the socio-economic and cultural background of students and the consequent extramural exposure to ICT. In addition, to obtain categorical results, it would have been useful to conduct a pre-test prior to the access of students to the CLIL programme to ascertain whether there were already differences between both groups and study their evolution. Additionally, to gain a more in-depth understanding of how CLIL can promote

the acquisition of digital skills, it would be necessary to work with more reduced data in terms of quantity, since the present study worked with data from 240 schools and about 40,000 students, and this represents an obstacle to identify particular practices and methodologies. Therefore, the impression of the positive contribution of CLIL in developing digital skills established by means of the present study would need to be complemented with a combination of quantitative and qualitative research methods and it would be interesting to conduct classroom observation, interviews and questionnaires addressed to ascertain teachers', students' and families' perceptions about the particularities of the teaching and learning processes in CLIL and non-CLIL and their implications for the development of digital skills.

In this framework, this study represents a step forward in determining the positive impact CLIL seems to have on developing cross-curricular skills and key competences, but further research is needed in this line to provide more solid ground for this assertion.

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