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The use of digital resources and materials In and outside the bilingual classroom

El uso de los recursos y materiales digitales dentro y fuera del aula bilingüe

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Abstract

Research on the integration of digital resources and materials in CLIL contexts is still scant. This article presents the results of a study carried out in eight schools in the province of Seville. Questionnaires and interviews were used to collect the data regarding CLIL teachers' and learners' opinions on the intergration of digital resources and materials in the classroom. The aims of this study are: 1) To analyse teachers' and learners' perceptions on the integration of digital resources and materials in the CLIL classroom; 2) To analyse how the educational stage affects teachers' and learners' perceptions on this use; 3) To analyse the type of digital resources and materials in English that learners use outside the classroom. The following analyses have been carried out: Categorical Principal Components Analysis; Mann-Whitney U test; qualitative content analysis; finally, Pearson correlation coefficients were calculated. Results show that there are discrepancies between teachers' and learners' perceptions regarding the use of digital resources and materials in the classroom; and that these perceptions are affected by the educational stage. This study concludes that the type of resources and materials that learners use outside the classroom is determined by those used in the classroom. However, at home, they are used differently, which is indicative of the need to adapt classroom practices to learners' own independent uses.

Resumen

La investigación sobre la integración de recursos y materiales digitales en contextos AICLE es todavía escasa. Este trabajo presenta los resultados obtenidos en ocho centros de la provincia de Sevilla, donde se han recogido las opiniones de alumnado y profesorado AICLE a través de cuestionarios y entrevistas. Los objetivos del estudio son: 1) Analizar las opiniones de los participantes sobre la integración de los recursos y materiales digitales en el aula; 2) Analizar cómo afecta la etapa educativa a las opiniones de ambos grupos; 3) Analizar el tipo de recursos y materiales digitales en lengua inglesa que utiliza el alumnado fuera del aula. Se han llevado a cabo los siguientes análisis: análisis de componentes principales categóricos; prueba no



paramétrica U de Mann-Whitney; análisis de contenido; y se ha calculado el coeficiente de correlación de Pearson. Los resultados muestran discrepancias en las percepciones de profesorado y alumnado con respecto al uso de los recursos y materiales digitales en el aula; y que estas percepciones se ven afectadas por la etapa educativa. Este estudio concluye que el tipo de recursos que utiliza el alumnado fuera del aula está condicionado por el uso que se hace de ellos dentro de la misma. Sin embargo, en casa se utilizan de manera diferente, lo que revela la necesidad de adaptar las prácticas de aula a los usos autónomos del alumnado.

Keywords / Palabras clave

Content and Language Integrated Learning, bilingual education, instructional materials, mixed method research, primary education, secondary education, informal learning, digital communication.

Aprendizaje Integrado de Contenidos y Lengua Extranjera, enseñanza bilingüe, material didáctico, metodología mixta, educación primaria, educación secundaria, aprendizaje informal, comunicación digital.

1. Introduction

Both CLIL (Content and Language Integrated Learning) and current methodologies in TEFL (Teaching English as a Foreign Language) fall under the umbrella category of the communicative approach. The communicative shift in language teaching began to take shape in the 1970s when theoretical configurations of linguistic competence (Chomsky, 1965) gave way to more encompassing notions of linguistic proficiency in terms of communicative competence (Hymes, 1972). As part of this new approach, new methodologies and programmes based on communicative principles started to emerge. These included content-based instruction, task-based language teaching, language immersion, bilingual and multilingual programmes, and CLIL (Dalton-Puffer 2011, 2014; Ruiz-de-Zarobe, Sierra, & Gallardo, 2011).

Coyle, Hood, & Marsh (2010) defined CLIL as “an educational approach in which various language-supportive methodologies are used which lead to a dual-focused form of instruction where attention is given both to the language and the content” (p. 3). Due to this dual focus through which both linguistic and non-linguistic contents are integrated into the teaching-learning process, CLIL shares some of the principles of communicative language teaching. Indeed, in Coyle’s 4Cs model, communication is, together with content, culture, and cognition, a central aspect of CLIL, as language is used not only as a means of instruction but as a tool to communicate and build knowledge on non-linguistic content. In this process, knowledge is also built around non-linguistic content (Coyle, 2002). Communication in CLIL implies engaging in tasks that meet the following criteria:

- 1) Tasks must be real: that is, they must replicate what we do with language outside the classroom.
- 2) Tasks must be purposeful: that is, language use must have a purpose or function.

At the same time, tasks that are truly communicative have three features in common (Larsen-Freeman & Anderson 2000):

- 1) Information gap: this occurs when one of the interlocutors knows something the other interlocutor does not, and therefore, contributes to filling an information gap.
- 2) Choice: this refers to the interlocutors’ freedom to decide what to say and how to say it.
- 3) Feedback: this implies that feedback from the interlocutor is required in order to know whether communication has happened.

When one or more of these requirements are not met, communication is not taking place.

In this scenario, the very conceptualisation of communication and communicative competence (the ultimate aim of language teaching and learning -Council of Europe, 2001) makes the CLIL classroom a suitable place for the use of ICTs, as these communicative situations and tasks may be easily reproduced and successfully performed through the use of digital media. Furthermore, digital resources and materials allow for a greater variety of contexts and interlocutors, which are needed so that real and purposeful communication may take place in the classroom.



1.1. Digital resources and materials in CLIL

The use of adequate resources and materials is key to successful teaching and learning: considered in a broad sense (Tomlinson, 1998), they are the mediators between learners and the reality that is the object of study (Manrique & Gallego, 2013). In the case of CLIL, it is through these resources and materials that students gain access to both language and content.

The very characteristics of CLIL described above suggest a methodological preference for the use of digital resources and materials over analogue ones. This is further reinforced by the fact that CLIL's emergence in the 1990s (Pérez-Cañado, 2012; Fernández-Sanjurjo, Fernández-Costales, & Arias, 2017) coincided with the proliferation and popularisation of digital tools and media in education and elsewhere (Henderson & Romeo, 2015). Indeed, the theoretical bases of CLIL rely on, either implicitly or explicitly, on an understanding of the teaching-learning process as mediated by, or even happening in, the digital world (Coyle, 1999; Cummins, 1998). However, the real inclusion of digital resources and materials as an integral part of a whole CLIL pedagogy that fosters learner autonomy, knowledge building, interpersonal communication and collaborative work in the classroom is still far from being realised. The literature also indicates that there is a shortage of CLIL materials capable of linking theory and practice (Fernández-Fontecha, 2012). Table 1 provides a tentative classification of digital resources and materials commonly used in CLIL.

Type	Authentic / Teaching-oriented	Examples used in CLIL
Hardware (physical devices)	Both	PCs, laptops, tablets, mobile phones, interactive whiteboards, scanners, cameras, etc.
Software (programmes for creating, running, managing and editing content)	Both	Browsers, office suits, media players, multimedia software, editors, etc.
Files (created, run, managed and edited by software)	Both	Books, music, films, podcasts, etc.
1.0 content websites and applications	Both	Of newspapers, institutions, companies, and products; search engines; online reference material (databases, dictionaries...); games; virtual environments; etc.
2.0 content websites and applications	Both	Blogs, wikis, message boards, listing sites, video sharing sites, etc.
Social media	Both	Virtual communities, social networks, etc.
Communication services	Both	E-mailing, videoconferencing, instant messaging, etc.
Online learning environments	Teaching-oriented	Virtual Learning Environments (VLEs), webquests, online lesson plans, digital textbooks, educational apps, etc.

While it is widely acknowledged that the use of these resources and materials per se does not necessarily entail a methodological shift, their potential for transforming educational paradigms is usually recognised (Fernández-Fontecha, 2006, 2012). Thus, in order for this transformation to take place, digital resources and materials must be seen and used, not in an instrumental way (i.e. as tools), but rather as pathways for building knowledge, or loci for experiencing learning (Lesmes, Rodríguez, & Naranjo, 2010; Merchant, Burnett, & Parry, 2017).

At the same time, it has been argued that, because education is, above all, a communicative process (Martín-Barbero, 2006), it must be necessarily affected by the new ways in which we communicate through digital technologies. These changes refer especially to the development of new ways of thinking, analysing, feeling and communicating that are also central to changes produced at the epistemological level (Lesmes, Rodríguez, & Naranjo, 2010). This idea is also supported by Wong,



Chai, & Aw (2017), for whom the new forms of communication imply the need for a new learning paradigm. The development of these epistemological structures finds an appropriate environment in the integration of CLIL and digital resources and materials (Maggi, Cherubim, & García-Pascual, 2014) through the use of, for example, interactive (as opposed to passive) devices such as the interactive whiteboard, which allows for new ways of interacting with information; 2.0 content websites such as blogs and wikis, where knowledge is built collaboratively; synchronous and asynchronous forms of computer and mobile-mediated communication, through which interpersonal communication across time and space is made possible; and virtual environments such as virtual reality experiences and webquests, which promote learner autonomy.

While there is ample research on the use of digital resources and materials in regular TEFL courses in Secondary Education (Banegas, 2017; Fernández-Fontecha, 2006; Izquierdo, De-la-Cruz-Villegas, Aquino-Zúñiga, Sandoval-Caraveo, & García-Martínez, 2017; Marsh, 2010; Wong, Chai, & Aw, 2017), research focused on CLIL at primary level is scant. This is mainly due to the fact that CLIL is a fairly recent methodology. Early research on CLIL concerned itself with conceptualisations and characterisations of the methodology (Coyle, 2008; Coyle, Hood & Marsh, 2010; Dalton-Puffer, 2011; Pérez-Cañado, 2012). This was followed by research focused on measuring learners' foreign language proficiency levels (Admiraal, Westhoff, & De Bot, 2006; Lasagabaster, 2008; Dalton-Puffer, 2011), as well as their mastery of specific communicative subcompetences, skills or systems (Lasagabaster, 2007; Nieto, 2016), and how these are affected by other variables such as contextual factors, individual learner characteristics or motivation (Lasagabaster, 2011; Fernández & Canga, 2014; Doiz & Lasagabaster, 2014; Sylvén & Thomson, 2015). It is only recently that attention has been drawn to CLIL resources and materials, with several studies providing descriptions of materials that can be used in CLIL classrooms, frameworks and guidelines for material design and evaluation, and specific examples of CLIL activities (Banegas, 2017; Ball, Kelly, & Clegg, 2015; Coyle, Hood, & Marsh, 2010; Fernández-Fontecha, 2012; Mehisto, 2012; Meyer, 2010; Moore & Lorenzo, 2007, 2015; Morton, 2013; Smit, 2007). All of these are indicative of a lack of CLIL materials. However, there are no studies on the real use and integration of digital resources and materials in CLIL classrooms, teachers' and learners' perceptions of this, and their use outside the school setting.

These are the aspects addressed in this study, which seeks to answer the following research questions:

RQ1. How do teachers and students perceive the use of digital resources and materials in the CLIL classroom?

RQ2. How does the educational stage (Primary and Secondary Education) affect teachers' and learners' perceptions of the use of these resources and materials?

RQ3. What kind of digital resources and materials in English do CLIL learners use outside of school?

2. Methods

This article draws on data and findings from a larger research project, "The effects of Content and Language Integrated Learning in monolingual communities: A large-scale evaluation." The present study was carried out in eight different schools (both urban and rural) in the province of Seville (Spain). The participants were the teachers and learners involved in CLIL programmes in these schools; these included foreign language (FL) teachers, non-linguistic area (NLA) teachers, language assistants, and students. A mixed methods approach was used, more specifically, a convergent parallel design (Creswell, 2014). Four data-collection techniques were used: (1) direct observation, in order to obtain information about the actual use of digital resources and materials in the classroom; (2) semi-structured interviews to explore teachers' and learners' opinions on the use of digital resources and materials and contrast the information collected by means of other techniques; (3) a general questionnaire in different versions for teachers and students, designed and validated in Spanish and English; and (4) an extramural exposition questionnaire to determine learners' use of digital resources and materials outside the school setting. Both the general questionnaire and the interviews include opinion questions to explore the respondents' thoughts and



outlook on the CLIL resources and materials used in the classroom. The combination of all these techniques ensured that information was collected in an objective and uniform way. The quantitative analysis was based on the answers to the general questionnaire by 137 students and 38 teachers. The qualitative part of the study was based on the observation of 14 classes, and interviews with a total of 70 students and 24 teachers.

3. Analyses and results

The internal consistency of teachers' and students' questionnaires was determined by calculating Cronbach's alpha coefficient. In the questionnaire administered to teachers, this coefficient was 0.919 and, in the questionnaire applied to the student, it was 0.886. A Categorical Principal Components Analysis (CAPTCA) (rotation method: Varimax with Kaiser normalisation) was used to assess construct validity. This analysis also allowed us to reduce the information gathered from the questionnaires and to distinguish between teachers' and learners' perspectives. Finally, in order to contrast the differences between teachers' and learners' opinions both at a primary and secondary level, a Mann-Whitney U test was applied.

A content analysis was performed on data collected from direct classroom observation and teachers' and students' interviews. A cross matrix was created from the analysis of the differences between FL and NLA teachers, both in Primary and Secondary Education. This qualitative analysis made it possible to contrast and interpret the quantitative data from the questionnaires. Finally, Pearson correlation coefficients were calculated to establish correlations among the different digital resources and materials that students used outside the classroom, again both at a primary and secondary level.

3.1. Perceptions of the use of digital resources and materials

Regarding the first research question, a CAPTCA analysis allowed us to reduce the information collected in the questionnaires and distinguish, for both teachers and students, two principal components that can explain the variability in respondents' answers. CAPTCA is similar to principal component analysis (sometimes considered a factor extraction method in factor analysis) when data are measured using ordinal or interval scales. As Table 2 shows, component 1 in the teachers' questionnaire (items 7, 8, 9, 10 and 11, which correspond to multimedia software; online reference materials; blogs, wikis and webquests; interactive whiteboards; and computer-mediated communication, respectively) and component 2 in the learners' questionnaire (items 7, 8, 9 and 10) are almost identical. These components allowed us to identify those items that were explicitly related to the use of digital resources and materials and recognised as such by respondents. In the case of teachers, item 4 (collaboratively made bilingual teaching materials) did not fit this pattern, as it was associated with factorial weights in both components; this may be due to the fact that they assigned more importance to the collaborative element than to the type of materials that were generated; on the other hand, students clearly associated this item with the use of digital resources and materials in the classroom.

	Teachers		Students	
	1	2	1	2
1) Authentic materials for bilingual teaching are used	0.323	0.780	0.626	-0.053
2) Authentic materials for bilingual teaching are adapted	0.729	0.152	0.629	-0.100
3) Bilingual teaching materials are interesting and innovative	-0.007	0.896	0.722	0.155
4) Bilingual teachers work in collaboration to prepare and deliver the bilingual teaching materials in class	0.545	0.532	0.745	0.038
5) The bilingual teaching materials used follow communicative principles	-0.175	0.694	0.571	0.467



6) Attention to diversity is always taken into account when bilingual teaching materials are being designed	0.007	0.846	0.616	0.273
7) Multimedia software is used in class	0.369	-0.174	0.274	0.767
8) Online reference materials are used in class	0.430	0.035	0.213	0.777
9) Blogs, wikis, and webquest are used in class	0.848	0.083	-0.014	0.718
10) Interactive whiteboards are used in class	0.850	-0.109	-0.051	0.425
11) Computer-mediated communication is used in class (e.g., e-Twinning)	0.618	0.098	0.372	0.154

Figure 1 shows the spatial arrangement of these components: items associated with digital resources and materials on the one hand, and the rest of the items on the other. Component 1, located on the horizontal axis and with a wider range of scores, had somewhat higher saturation levels (variance explained =28.25%) for items referring to digital resources (see lower quadrants). On the contrary, the rest of the items are located in the upper quadrants, with lower saturation levels (variance explained =27.04%). These data show a clear distinction between digital materials and resources and other types of materials.

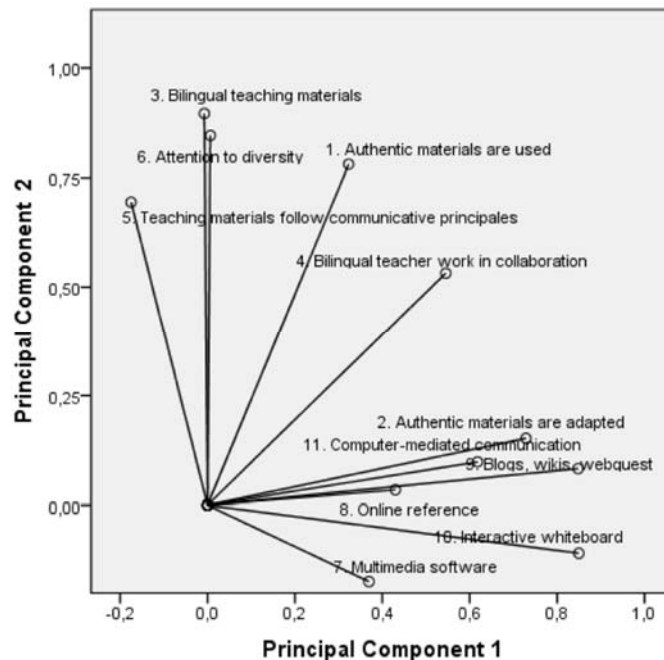


Figure 1. Component loadings plot (Teachers).

Figure 2 shows the spatial arrangement of the main components obtained from the CAPTCA based on learners' responses. In this case, the spatial arrangement is an inversion of that shown in Figure 1. Thus, the highest saturation levels are located in the upper quadrants, corresponding to items that do not explicitly refer to digital resources and materials (explained variance =25.73%), whereas the lowest saturation levels appear in the lower quadrants (explained variance =20.40%). These correspond to items explicitly related to digital resources and materials. It is interesting to note that, as opposed to teachers, learners associated item 11 (computer-mediated communication) with items not expressly related to digital resources and materials.

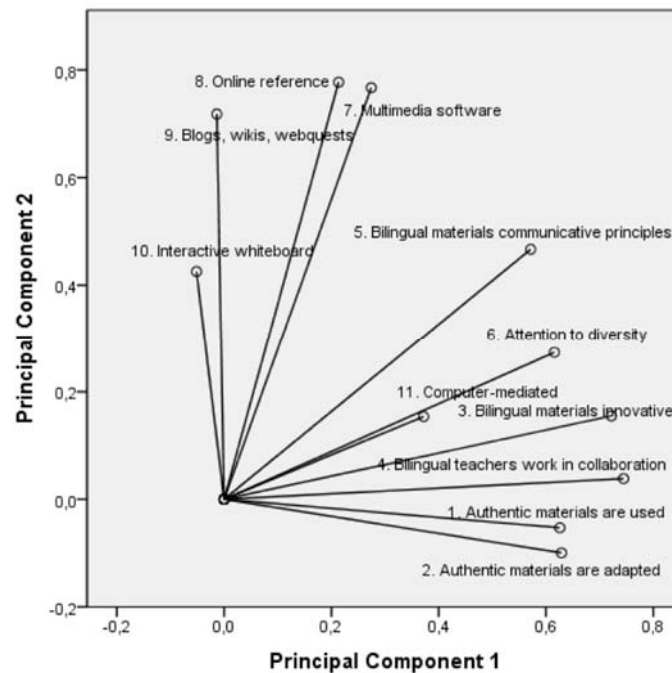


Figure 2. Component loadings plot (Learners).

These data indicate that, generally, both teachers and students identify and classify digital resources and materials in a similar way. However, differences are found in their interpretation of their frequency of use in the classroom, with teachers perceiving a higher frequency of use than learners. These differences seem to be due to respondents' different knowledge of and experience in the use of digital resources and materials, which distinguishes between teachers and learners, and between ICT-trained and non-ICT trained teachers.

3.2. The effect of the educational stage on teachers' and learners' perceptions

With respect to the two educational stages under study, the data indicate that teachers' and learners' perceptions of the use of digital resources and materials differ at both primary and secondary level. In Primary Education, teachers' means are generally higher (above 3) than those of students (below 3), except for item 1 (authentic materials), for which teachers' mean is below 3, and item 11 (computer-mediated communication), for which teachers' mean is below 3 and students' mean below 2. As Table 3 shows, if we consider only the items explicitly related to digital resources and materials, items 7, 8 and 10 (multimedia software; online reference materials; and interactive whiteboards, respectively) obtain similar percentages, with higher values for teachers (100%, 100% and 94.2% respectively) and lower values for learners (86.9%, 73.6% and 82.4% respectively). Both groups agree that the resources and materials in item 9 (blogs, wikis, and webquests) are used less in the classroom (88.2% for teachers and 66.2% for learners). Similarly, these data show that item 11 (computer-mediated communication) is rarely used (35.2% for teachers and 16.2% for students). In Secondary Education, there is a higher degree of concurrence between teachers' and learners' responses. The means for most items exceed 3, except for items 9 and 11. In the case of learners, mean values are, in general, above 3, with the exception of items 2, 3 and 11. Again, Table 3 shows the percentage of use of digital resources and materials only: item 8 (online reference materials) is the most widely used resource (95.3% for teachers and 88.4% for learners), followed by item 10 (interactive whiteboards), which, according to 90.4% of teachers and 88.4% of students are used in class. Again, as in Primary Education, respondents report less use of resources and materials in item 9, but in this case, the percentage for teachers is even lower than that of learners (71.4% and



88.4% respectively). Finally, agreements between teachers' and students' perceptions are found when considering item 7 (61.9% for teachers and 66.7% for students) and item 11 (47.6% of teachers and 52.3% of students).

Table 3. Percentage of use of digital resources and materials

		Primary Education		Secondary Education	
		Teachers	Learners	Teachers	Learners
7) Multimedia software is used in class	Strongly disagree/ Disagree		13.3	38.1	33.3
	Agree/ Strongly agree	100	86.9	61.9	66.7
8) Online reference materials are used in class	Strongly disagree/ Disagree.		26.5	4.8	11.6
	Agree/ Strongly agree	100	73.6	95.3	88.4
9) Blogs, wikis, and webquests are used in class	Strongly disagree/ Disagree	11.8	33.8	28.6	11.5
	Agree/ Strongly agree	88.2	66.2	71.4	88.4
10) Interactive whiteboards are used in class	Strongly disagree/ Disagree	5.9	17.7	9.5	11.6
	Agree/ Strongly agree	94.2	82.4	90.4	88.4
11) Computer-mediated communication is used in class (e.g., e-Twinning)	Strongly disagree/ Disagree	64.4	83.2	52.3	47.8
	Agree/ Strongly agree	35.3	16.2	47.6	52.3

The most notable differences between results in Primary and Secondary Education were found when analysing learners' opinions. Table 4 shows the results of the Mann-Whitney U test. It reveals statistically significant differences in the opinions of primary and secondary learners: secondary students report significantly more frequent use of digital resources and materials in English outside the school setting than primary learners. The only exception is item 2 (adapted authentic materials), where no statistically significant differences were found between primary and secondary students; this is probably due to differences in interpretation of the item, as learners may not have a clear picture of what adapted materials may be.

Table 4. Mean, standard deviation and differences between primary and secondary students

	Year 6 in P.E. / Year 4 in S.E.	Mean	Standard deviation	Sig.
1) Authentic materials for bilingual teaching are used	PE	2.49	1.015	0.001
	SE	3.14	0.809	
2) Authentic materials for bilingual teaching are adapted	PE	2.81	0.868	0.841
	SE	2.84	0.980	
3) Bilingual teaching materials are interesting and innovative	PE	2.62	0.962	0.020
	SE	2.96	0.695	
4) Bilingual teachers work in collaboration to prepare and deliver the bilingual teaching materials in class	PE	2.54	1.177	0.001
	SE	3.20	0.719	
5) The bilingual teaching materials used follow communicative principles	PE	2.59	1.096	0.002
	SE	3.07	0.649	
6) Attention to diversity is always taken into account when bilingual teaching materials are being designed	PE	2.22	1.063	0.001
	SE	2.88	0.738	
7) Multimedia software is used in class	PE	3.29	0.734	0.011



	SE	3.59	0.626	
8) Online reference materials are used in class	PE	2.93	0.869	0.001
	SE	3.43	0.696	
9) Blogs wikis and webquests are used in class	PE	2.81	1.055	0.004
	SE	3.28	0.784	
10) Interactive whiteboards are used in class	PE	3.79	0.505	0.009
	SE	3.48	0.851	
11) Computer-mediated communication is used in class (e.g. e-Twinning)	PE	1.44	0.870	0.001
	SE	2.52	1.093	

Now, regarding the opinions of teachers at both educational levels, no statistically significant differences were shown in the data, except for items 2 and 3 (adapted authentic materials and innovative bilingual materials). Likewise, the opinions of FL and NLA teachers were also not significantly different in terms of their perception on the use of resources and materials, with the exception of item 7 (multimedia software), which was most used by FL teachers.

In spite of the differences between teachers and learners, there were some similarities in respondents' answers if we take into account only the digital resources and materials: most respondents agreed that items 8 and 10 (online reference materials and interactive whiteboards) are more frequently used than items 9 and 11 (blogs, wikis and webquests, and computer-mediated communication). The information provided by the quantitative data was supported by the information provided by the qualitative data obtained through classroom observation and interviews. Table 5 summarizes these qualitative data. The information obtained in the interviews showed that both authentic and adapted materials are used in CLIL. Books are mainly used for FL classes and some NLA ones. In general, teachers stated that there are not enough resources available for CLIL delivery. Some schools do use online resources, both at primary and secondary levels. Students in Primary Education indicated that they do not use blogs, wikis or webquests, although teachers stated that they are used in the classroom. In Secondary Education, both teachers and students agreed on some use of blogs, wikis, and webquests. Finally, the interactive whiteboard is used, but most respondents coincided that these are mainly used as projectors.

Tabla 5. Cross matrix from class observation and semi-structured interviews				
	Primary Education		Secondary Education	
	Students	Teachers	Students	Teachers
Authentic materials	-	They use both authentic and adapted materials	All kinds of materials are used	
Adapted or hand-made materials	Non-linguistic-area worksheets and notebook			
Books	In the foreign language class	In the foreign language class	In the foreign language class Non-linguistic-area books if they find any	
Online reference materials	Only 1 school	Some schools	All of them use online reference materials	
Blogs	-	Some schools	Some of them have blogs; others use websites or wikis	
Interactive whiteboard	2 schools, but mainly as a projector	Mainly as a projector	All of them use interactive whiteboards but mainly as a projector	



3.3. Learners' out-of-school use of digital resources and materials in English

In relation to the last research question, the questionnaires on extramural exposition provided information on the number of hours learners spend on English language activities outside of school and the digital resources they use. At the primary level, video games and songs are the most widely used. Primary school students also do other activities such as watching TV shows and films, reading books and magazines, but they devote fewer hours to these. In Secondary Education, listening to songs is the activity done by most respondents. Other activities to which they devote an important amount of time are the Internet and videogames. Finally, they spend fewer hours watching TV shows, reading books and magazines, and watching films.

There are positive and statistically significant correlations between these resources and materials. Table 6 (<https://figshare.com/s/4cc23be1ec9a1bb5f917>) illustrates the correlations between the different types of resources and materials that primary learners use in English outside of school. Interestingly, there is a positive and statistically significant correlation between internet use and a variety of activities (reading books, watching films and listening to songs). These correlations may indicate that when students access the Internet, they do so mainly to read digital books, watch films and listen to music online.

Table 7 shows the correlations between the resources and materials used by Secondary Education students outside school (<https://figshare.com/s/4cc23be1ec9a1bb5f917>). As in Primary Education, there are positive and statistically significant correlations between internet use and other activities. In this case, their use of the Internet seems to be closely related to listening to songs, playing videogames, reading magazines and reading books.

All this is indicative that, even if the type of resources and materials that learners use outside the school is determined by those used in the classroom, new forms of access to the FL, and therefore, new ways of learning are developing through learners' independent uses at home. These uses afford them opportunities for non-segmented and non-graded access to the FL, which differs greatly from the kind of exposure that they receive in the classroom.

4. Discussion and conclusions

This article provides a detailed analysis of the use of digital resources and materials in the CLIL classroom as well as of learners' own independent uses outside the school setting, filling a gap in the burgeoning field of CLIL studies and of digital media in language education. As a main contribution, this study brings to the fore the need to adapt classroom practices to learners' out-of-school use and experience of digital resources and materials. Concerning the first research question regarding teachers' and learners' perceptions on the use of digital resources and materials, both teachers and students grouped these in a similar way: items related to digital resources and materials on the one hand and the rest of the items on the other.

However, results regarding their use in the classroom varied, with teachers acknowledging a much higher use of digital resources and materials than students. There are discrepancies between what teachers and students perceived as high or low use of digital resources and materials in the classroom. This may be due to the fact that they have different knowledge of and experience in the use of these resources and materials. Furthermore, in the case of teachers, lack of training may also account for these discrepancies. When undertrained teachers make use of these resources and materials, they tend to focus on the medium, and not so much on the contents to be delivered, as the medium takes up too much of their time and energy. Therefore, teachers' perceptions of their use might be affected by these psychological factors. This is in accord with what previous research says about undertrained teachers using digital technologies (Scrivener, 2011).

From all this, it may be concluded that respondents' identification of the types of resources and materials is not an issue at stake here, but rather the interpretation that each group makes of their frequency of use. In this regard, the main contribution of this study to the field is that respondents' varying interpretations are determined mostly by their experience of these resources and materials,



which tends to discriminate between teachers and learners on the one hand, and between ICT-trained and non-ICT-trained teachers on the other. Moreover, it seems that novice teachers' experience and use of this kind of resources and materials is closer to that of learners, probably due to more similar patterns of independent access outside of school and, possibly, training. Further research on the contextual determinants of teachers' and learners' experience would be needed to shed light on their perception of the frequency of use of digital resources and materials in the classroom.

In relation to the second research question, when the sample is differentiated according to the educational stage, the data indicated that respondents' opinions differ regarding the use of digital resources and materials. The most notable differences were found in the learners' responses. This may be due to variations in the implementation of the CLIL approach, depending on the learners' needs at each educational stage.

Another variable that may have an effect on this is teacher profile and training; factors also indicated in the literature (Izquierdo & al., 2017). However, common shortcomings in the use of these resources and materials in the two stages have also been identified. Results show that digital sources and materials more likely to, or specifically designed to, foster collaborative knowledge building, interpersonal communication and learner autonomy (2.0 content websites such as blogs and wikis; social media such as virtual communities; communication services, such as e-mailing and instant messaging; and online learning environments, such as virtual learning environments and webquests) are the least used by teachers, both at primary and secondary level.

Furthermore, even if they make use of devices that could enhance these aspects (for example, the interactive whiteboard), in the classroom these serve the function of analogue devices (i.e., projectors). This is in accord with previous findings regarding traditional uses of digital resources and materials (Fernández-Fontecha, 2006; Izquierdo & al., 2017). As the teachers themselves indicated in the interviews, this may be because there are not enough digital materials available for bilingual teaching, a result that also supports previous findings, as mentioned above. However, as this study shows, it may not only be a question of lacking specific materials for CLIL but of the difficulties entailed in acknowledging and adequately utilising the opportunities that digital resources offer to set up spaces for interaction and process thinking. Further research into teachers' knowledge of and experience in the use of these resources may provide an insight into these difficulties.

Finally, concerning the last research question, the results of the analyses conducted on the type of resources and materials in English that students use outside of school revealed that songs and videogames are the most widely used in both stages. The most important finding of this analysis was the existence of significant correlations between the activities. These correlations show that, at both levels, learners use the Internet to access reading materials and to listen to songs; primary learners also use it for watching films, while secondary learners use it for playing videogames.

These results indicate that students at both levels have an ongoing interest in using digital resources and materials in English outside of school. Furthermore, these uses replicate those that take place in the classroom, which demonstrates that these resources and materials are helpful in promoting and connecting both formal and informal learning experiences, giving rise to what is known as "seamless learning" (Wong, Chai, & Aw, 2017). This means that what is learned in the classroom does not stay there, but rather is recontextualised continuously and enriched by new uses in real communicative interactions in a variety of contexts and with a variety of interlocutors.

However, the full potential of these processes of recontextualisation is still far from being realised. Whereas the digital resources and materials used in and outside the classroom are the same, the activities in which learners engage in the classroom are passive (reception of knowledge) and offer segmented, graded and decontextualised access to the FL. This contrasts with the kind of activities in which learners engage outside the school setting, where activities are and afford them access to the FL in a non-segmented and non-graded, more communicative and contextualised way. The main conclusion to be drawn from this is that, in order to adequately exploit the teaching and communicative potential of digital resources and materials for CLIL, these should be used in ways that resemble more closely the ways learners interact with information and access the FL outside of



school. These ways are also more communicatively and socially relevant and have a greater potential to foster collaborative knowledge building, interpersonal communication, and learner autonomy. It is necessary to incorporate these aspects in order to help bridge the distance between formal and informal access to knowledge and to truly integrate digital resources and materials in the classroom in accordance with CLIL principles.

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