Teacher-developed materials for CLIL: frameworks, sources, and activities

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Abstract

The integration of curricular content and language learning, usually known as CLIL (Content and Language Integrated Learning) has brought about new possibilities to the learning of an L2, in this case English, by building bridges with the school curriculum. While the CLIL literature is rich in positive experiences, there are also reports about the lack of context-responsive CLIL materials in the market. The purpose of this viewpoint article is to argue that instead of employing commercially produced coursebooks only, teachers can become materials developers for CLIL in secondary education. A review of the literature on CLIL materials development is offered with the aim of providing teachers with frameworks for developing or adapting their own materials to suit the needs of their local contexts. The frameworks, sources of input, and activities described and discussed draw on sociocultural theory and cognitivism. Through CLIL materials development, teachers can revisit and reflect on their own teaching principles and pedagogical approaches which guide learning and teaching. It is hoped that both pre-service and in-service teacher courses allocate more training opportunities for developing materials based on a framework which establishes a powerful link between theory and practice in CLIL education.

Keywords: CLIL; materials development; teacher-made materials; teacher development; secondary education

Introduction

The integration of curricular content and language learning is usually linked to Content Language Integrated Learning (CLIL). European in origin (Dalton-Puffer & Nikula, 2014), CLIL is generally defined as a "dual-focused, learning and teaching approach in which a non-language subject is taught through a foreign language, with the dual focus being on acquiring subject knowledge and competences as well as skills and competences in the foreign language" (Ioannou Georgiu, 2012, p. 495).

Underpinned by sociocultural theory, interactionism and cognitivism (Dallinger, Jonkmann, Hollm, & Fiege, 2016), CLIL is spreading at a fast pace and its implementation causes celebration and concerns about its reach and practice (Ball, Kelly, & Clegg, 2015; Morton, 2016). In a critical analysis of CLIL, Cenoz, Genesse and Gorter (2014) highlight the international interest in the integration of curricular content and language. CLIL implementation can be extensively found in Europe (Fortanet-Gomez, 2013; Ruiz de Zarobe, 2013; Ruiz de Zarobe & Cenoz, 2015), and to a lesser extent in Africa (Gustaffson, 2011), Asia (Brown, 2015; Lang, 2012; Lin, 2015; Yang, 2015), Australia (Turner, 2013), Latin America (Banegas, 2013; Mariño, 2014; McDougald, 2015), and North America (Chamot & Genovese, 2009). While the CLIL literature is rich in positive experiences (Doiz, Lasagabaster and Sierra, 2014, Llinares and Pastrana, 2013), there are authors who argue that one drawback is the lack of context-responsive CLIL materials in the market (Maley, 2011; Mehisto, 2008; Meyer, 2010; Moore & Lorenzo, 2015; Morton, 2013). To address this, many teachers develop their own materials. Moore and Lorenzo (2007) believe that teachers may have three possibilities when developing their own CLIL materials: (1) produce their own materials from scratch, (2) employ authentic sources without any modifications, and (3) adapt authentic materials according to their teaching aims.

This article suggests that teacher-developed CLIL materials for secondary education can be excellent resources to meet such a demand for materials because teachers, as

Bosompem (2014) concludes, can make them suitable for their learners and needs in context. Materials produced in collaboration between subject and language teachers is a personal and professional investment opportunity to reflect on teaching and learning processes which integrate learner involvement, motivation, and cognitive development (Ball et al., 2015).

This article reviews the literature on CLIL materials for secondary education with the aim of providing teachers with frameworks of reference and pedagogical tools to adapt and produce CLIL materials. I discuss materials based on the belief that they need to be envisaged as part of a pedagogic approach, in this case, CLIL, which takes materials as tools to scaffold learning (Foley, 1994).

CLIL Materials in the Market

CLIL teachers may resort to authentic materials or commercially-produced coursebooks. For example, teachers of English may opt for a Science textbook written for English L1 British secondary learners, to teach in Brazil or Singapore. Smit (2007) remarks that the drawback of this type of authentic material is lack of contextualisation as most examples may be American/British-based and, therefore, not connected to the learners' curriculum. In fact, no authentic materials produced elsewhere and with a different target audience will ever bear correspondence with teachers' local school curriculum. Furthermore, Ball et al. (2015, p. 174) indicate that such materials have "no consideration of language support."

Conversely, commercially-produced textbooks for the international market are far from satisfactory. In a study of four series advertised as CLIL-oriented, Banegas (2014a, p. 345) found "(1) little correlation between featured subject specific content and school curricula in L1, (2) oversimplification of contents and (3) dominance of reading skills development and lower-order thinking tasks'. The author adds that CLIL is 'incorporated as a brand name but there seems to be little evidence of genuine innovation or development in CLIL-related coursebooks."

In this landscape, teachers can assume a more active role by developing their own context-responsive materials individually or as a team. In so doing, materials development

does not become a burden but another powerful opportunity for collaborative professional development. CLIL, as any approach, needs that teachers engage in training opportunities in order to understand the underlying principles of CLIL. Although this contribution does not deal with the rationale and features behind CLIL, it provides teachers with a guide to explore and develop contextualised CLIL and content-rich materials (see McGrath, 2013).

Teacher-Developed CLIL Materials

CLIL materials, defined here as sources of comprehensible input and activities which teachers employ in order to offer meaningful learning opportunities, are mediating tools. Such materials respond to a general theoretical framework which integrates, as mentioned above, sociocultural theory, cognitivism, and interactionism. The sections below discuss frameworks, sources, and activities which scaffold language and content learning.

Frameworks

According to McDonough, Shaw and Masuhara (2013) all teaching and learning materials need to be developed within a framework which considers the context (learners and setting), goals, and the syllabus. Thus, materials, whether they are for CLIL or any other approach, need to be part of a pedagogical approach which is principled and context-responsive (López-Barrios and Villanueva de Debat, 2014; Tomlinson, 2013). Because any language pedagogical approach must respond to context, materials should start by relating their structuring topics to the learners' lives thus encouraging the elicitation of learners' prior knowledge. However, materials per se do not guarantee learning if they are not the synthesis of informed decisions and good teaching practices. To this effect, it is discussed different organising framework and principles which teachers can consider guides for materials as mediating tools.

One framework to scaffold language and content learning is Mohan's (1986) seminal framework (Table 1).

Activity (also applied to a sequence of materials)			
1 Description	Specific practical knowledge	General theoretical knowledge	4 Concepts and classification
2 Sequence			5 Principles
3 Choice			6 Evaluation

Table 1. Mohan's (1986) framework for knowledge structures.

According to this framework, a CLIL lesson should start by taking learners from specific practical knowledge in order to activate their prior knowledge and lower-order thinking skills such as remembering. From that basis, the lesson can move to general theoretical knowledge with the aim of promoting higher-order thinking skills such as evaluating or creating. Linguistic demands will follow the same evolution of cognitive demands, and therefore CLIL materials will mediate and scaffold this sequence not only in terms of language input and output but also in terms of cognitive development. The didactic sequence below explains Table 1.

The following sequence is based on a lesson developed for a group of fifteen-year-old secondary school learners in Argentina. The subject was Social Studies and the lesson learning objectives were to describe types of climate. The aim was to introduce climate differences across the world together with the language needed to describe and compare climate graphs. To this effect, the learners first completed sentences about their town (E.g. "In Esquel, winters are usually cold and dry"). They read aloud their sentences and compared their ideas. To activate subject-specific terminology, they were asked to work in groups and complete Table 2:

Element of weather/climate	Measure instrument

Table 2. Measuring elements of the weather/climate.

This graphic organiser was completed with information taken from a coursebook targeted at UK secondary school learners. Next, the learners were asked to think about how the seasons change according to perceived changes in the atmosphere. They were given a list of conditions (E.g., Temperatures may reach 22°C; There are prevailing cold winds from the south) which they sequenced from January to December. After that and following the "choice" stage, they were provided with a climate graph of their town together with a climate graph from another different place (e.g. Buenos Aires and Helsinki) and they had to determine whether statements were true or false (e.g. The average winter minimum temperature in Helsinki is lower than in Buenos Aires). Depending on their language level, they were asked to correct and/or justify each statement.

Once the learners had become aware of specific practical knowledge, they were provided with a map of world climate zones and a classification of climates briefly described. The descriptions had been modified by reducing the length of the sentences or breaking down complex sentences into simple sentences. Their task was to match climate graphs to each climate type. They were encouraged to find similarities and differences between places with a similar climate type but located in different hemispheres. Once they looked at the different climate types and sample climate graphs, they were asked to identify what principles and reasons gave rise to the different climate types. To scaffold this activity, they were provided with a list of reasons and principles which they had to rank. Then, they had to complete the following sentence: "We understand that the main reason/principle for climate differences is … because…" Last, they collaboratively wrote a text which described the climate in a region of their country and inserted an updated climate graph taken online.

Following a cognitivist paradigm, McDonough, Shaw, and Masuhara (2013) suggest that materials should be developed in such a way that learners are presented with a sequence that evolves in complexity and scope to promote language and, above all, cognitive development. Similarly, several authors (Banegas, 2014b; Coyle, 2007; Coyle, Hood, & Marsh, 2010; Evans, Hartshorn, & Anderson, 2010; Llinares, Morton, & Whittaker, 2012; Marsh, 2008; Mehisto, 2012; Meyer, 2010) agree that activities should move from lower-order to higher-order thinking skills and that materials should also scaffold new language and

content based on familiar language and content. The following framework is based on this view.
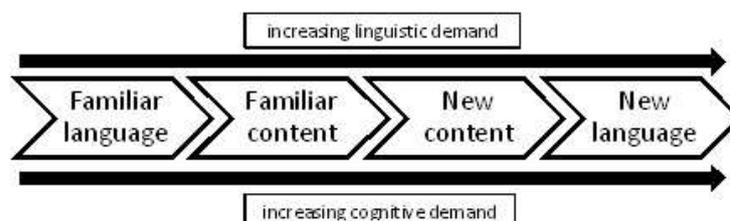

Figure 1. CLIL lesson framework.

Similarly to Mohan's framework, the CLIL lesson framework responds to concerns around cognitive development together with the desired balance between the content and language components of the CLIL classroom. In relation to teacher-developed materials, it organises sources and activities so that lessons become an engaging and coherent proposal for learning.

The following example of the CLIL lesson framework is based on a lesson for a group of Argentinian secondary school learners whose level of English was, according to CEFR standards, A2/B1. The aim of the lesson was to introduce the Battle of the River Plate during WWII together with complex passive voice structures. For this group of learners the familiar language was simple past, narrative time markers, and subject-specific vocabulary, and the familiar content was WWII from a European perspective. They had covered these latter contents in the History class delivered in their L1 (Spanish).

The learners were first asked to work in groups and summarise one important event during WWII in one sentence beginning "During WWII, …". Second, they were given a series of statements to be sequenced chronologically. Learners watched a section of a documentary (in English, with English subtitles) to check the sequence of events. For each statement, the teacher asked them questions for elaboration. So far the lesson was focused on familiar language and content together with lower-thinking skills such as remembering, identifying, and understanding.

Third, the teacher showed them a map of the route of Admiral Graf Spee's cruise and the learners had to guess the lesson topic. At this stage, they were asked to listen to an audio about the Battle of the River Plate. Previously, the teacher had summarised the contents of a Wikipedia entry on this topic and asked a colleague to read the summary aloud. The text contained instances of passive voice. The learners had to listen to the recording and answer content-related comprehension questions (e.g. What made the Graf Spee enter the River Plate estuary?). After checking the questions orally, they were provided with the script, which contained highlighted instances of passive voice. They were asked to identify other instances. Based on these examples, they were asked language-noticing questions such as "How are these structures formed?"or "When do we use them"? Through such questions the teacher aided the learners with moving from new content to new language. These questions promoted language awareness and learners' ability to produce rules by themselves. Finally, the learners had to read a gapped text where they had to insert passive voice phrases. The text, longer and with more complex sentences inserted by the teacher for clarification purposes, provided them with more information and opinions on the battle. In groups, they had to assess the political impact of the battle between Argentina and Uruguay and their relationship with the Allies, particularly Britain. This last activity promoted higher-order thinking skills by asking learners to evaluate the political landscape in South America during WWII.

In this sequence, the materials employed by the teacher were authentic texts, maps, and videos, and the activities were based on questions which moved from remembering to understanding to evaluating. Following Ball et al. (2015), the lesson showed cohesion between the text and the task for it provided them with content and language to produce an evaluative response. In addition, the learners were actively involved as it was them who had to assess the political angle of the Battle of the River Plate in the international scene. Third, the materials had been adjusted so that concepts, procedures and language were combined in such a way that the lesson featured an organic sequence. Last, both input and output were scaffolded by guiding learners with useful phrases and key facts. The lesson, in turn, promoted interaction through group discussion.

The following sections focus on the sources and activities teachers can resort to and develop to enact the frameworks outlined in this section.

Sources

One of the features usually found in CLIL materials development is authenticity as discussed in Gilmore (2007). Authentic materials are those which have not been produced to teach modern foreign languages. In the frameworks above, the teachers used authentic materials such as climate graphs, maps, documentary extracts, UK secondary education coursebooks, and Wikipedia entries. For example, the following activity is based on an authentic line graph:
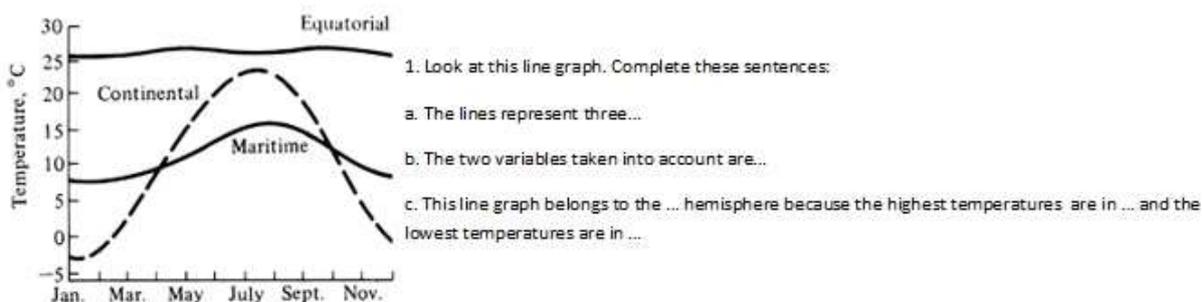

Figure 2. Line-graph based activity.

McGrath (2002) offers criteria for the selection of authentic texts since the use of them is not unproblematic. He suggests: relevance, intrinsic interest of topic, cultural appropriateness, linguistic and cognitive demands, logistical considerations (length, legibility, and audibility), quality, and exploitability. In a similar vein, Coyle et al. (2010, p. 93; also Gottheim, 2010) mention that texts need to be considered on the basis of: focus and clarity of the message, mix of textual styles, level of subject-specific and general vocabulary, level of grammatical complexity, and clarity of the thread of thinking.

Conversely, authentic texts, according to Moore and Lorenzo (2007) may be adapted through simplification, elaboration, and discursification. The authors explain that those teachers who resort to simplification produce a shorter text composed of fewer and shorter sentences than the original. For instance, in the sequence on climate types, the teacher simplified a text by shortening the sentences without shortening the text (Crossley, Allen &

McNamara, 2012). As for elaboration, this process includes the lengthening of texts by inserting examples, paraphrases, the use of the pronoun 'we', noun repetition, and lack of ellipsis. For example, for the Battle of the River Plate text, the teacher inserted sentences which clarified or illustrated the input and showed instances of passive voice structures. Last, discursification involves transforming the nature of a text, for example, producing a bullet-point list from a narrative text. Teacher may include visuals, rhetorical questions, parenthetical information, and focus on attitudes and evaluation.

Aural texts can also be modified through teacher intervention. For example, it has been observed that teacher talk can include summarising, paraphrasing, translating, synonyms, gestures and body language, and board drawings among others (de Graaff, Koopman, Anikina, & Westhoff, 2007; Dafouz Milne & Llinares García, 2008). De Graaff et al. (2007) observe that teachers tend to select attractive authentic materials which are then scaffolded by active use of body language and visual aids.

In conclusion, strategies to modify written and oral input are similar. This similarity shows that materials are scaffolding tools which can be further scaffolded by teachers as they interactively employ them in the classroom with their learners. What is important to maintain is that whatever the strategy, teachers should strive for ensuring that content and language authenticity are preserved as it may be one of the driving forces in learner motivation in CLIL classrooms. They can achieve this by selecting texts which require little modification in terms of coherence and cohesion.

Activities

While the studies above suggest strategies, overarching practical frameworks should provide teachers with ways of adapting authentic sources and developing activities based on those sources of input. Following CLIL, such activities need to ensure that learners engage with knowledge construction and meaning making. In addition, the language and cognitive skills involved in those sources and activities should help them share the meanings and ideas they

wish to convey. Thus, it may be agreed that the theoretical basis for activity development is a combination of socioconstructivism, cognitivism, and interactionism.

Casal Madinabeitia (2007) recommends that, as shown in the didactic sequences above, initial activities may ask learners to remember and understand information before the inclusion of higher cognitive skills. In this regard, while Casal Madinabeitia is concerned with the learning of content, Vázquez (2007) suggests the use of worksheets to support language. These may include L1-L2 vocabulary lists, figures for labelling, boxes with useful expressions and grammatical structures to reactivate and resituate language contextually speaking, or specific tips about how to study content while paying attention to language, i.e., a balance between meaning and form. It is hoped that through such support meaning making and learning is strengthened since the motivation of CLIL lies in the opportunity that learners have to talk about contents which promote higher-order thinking skills (Banegas, 2013).

Furthermore, activities can be scaffolded through illustrations, graphic organisers (Bentley, 2010), awareness of text features (Reiss, 2005) and ICT/online resources. For example, in a lesson about temperature and climates, secondary school learners from Argentina were asked to read a short text extracted from a Geography coursebook and complete this graphic organiser (Figure 3):
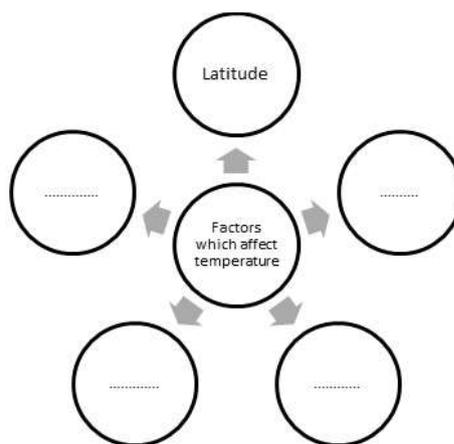

Figure 3. Graphic organiser.

Then they were provided with another modified text taken from a website. One sentence had been deleted from the first paragraph and key words had been highlighted. The text was followed by language-awareness questions (Figure 4).

The presence of **cloud cover** has a definite effect on air temperature. During the daytime, cloud cover tends to block the transmission of sunlight to the Earth's surface. Less **solar radiation** leads to reduced **heat** generation and lower surface air temperatures. This process explains why daytime temperatures are cooler along the equator and hotter at the subtropical deserts. At the equator, cumulus and cumulonimbus (thunderstorm) clouds develop almost daily reducing the amount of incoming solar radiation absorbed at the Earth's surface. In the subtropical deserts, skies are usually clear, maximizing the flow of solar radiation through the **atmosphere** to the **surface**.

At night, the presence of clouds is associated with less dramatic **nighttime cooling**. Nighttime cooling is the result of heat energy in the lower atmosphere being converted into outgoing **longwave radiation**. In a clear atmosphere, most of this emission leaves the Earth and only a small amount of this outgoing energy is reemitted as counter-radiation to partially offset radiative cooling at the Earth's surface and lower atmosphere. The presence of clouds greatly enhances the greenhouse process. When cloud cover is extensive and thick, most of the outgoing longwave is redirected back to the surface where it again creates heat energy. Therefore, cloudy nights tend to be warmer than cloudless nights.

a. Look at the words in bold, what do we say in Spanish?
b. What words/phrases does the author use to talk about (a) cloud cover (b) absence of clouds?
c. Re-read the first paragraph, what does "this process" refer to?
d. What do these words describe? "incoming, outgoing, flow"
e. What do these comparatives describe? "cooler, hotter, warmer"

Figure 4. Text-based activity.

As regards ICT, Fernández Rivero, García de la Morena and del Pozo (2009) illustrate the use of PowerPoint presentations and interactive material found in institutional websites which sometimes provide educational activities (for examples see Notes). In addition, Maggi, Cherubin, and García Pascual (2014) shows how Web 2.0 tools such as videoconferencing applications and an interactive whiteboard can enhance collaborative learning through a democratic and digital environment. The authors highlight that learners' attention to form and content are motivated by their efforts to express meaning clearly in an engaging and collaborative manner.

With reference to sources of input and follow-up activities in teachers' worksheets, Coyle et al. (2010) suggest that lessons should start by using visuals, real objects, brainstorming prior knowledge. The authors remind teachers that CLIL materials move from

familiar language and content to new content and language, in that order. What they suggest is that, in the case of texts, teachers can explore bullet-point texts, tables and diagrams and more visuals within the texts they select. As for a progression in terms of text-related activities, teachers need to create activities which go from recognising words to sentences to texts. Finally, Coyle et al. (2010) recommend learning scaffolding through activities which include vocabulary headers to add examples to, sentence starters, spidergrams, and substitution tables among other possibilities. Teachers are also encouraged to adapt texts by using synonyms, cognates, reducing complex and long sentences, and keeping the core aspects of the language of and for learning.

As regards activities and thinking skills, text completion, sequencing, diagram completion, text marking, labelling, segmenting, table construction, student-generated questions, and writing summaries are all activities which cut across Bloom's taxonomy. Teachers can exploit them if arranged from lower-order to higher-order demands so as to increase the depth of interaction between students and subject matter in their attempts to strengthen meaning making through such interaction. More recently, Dale and Tanner (2012) offer a compilation of almost 100 activities to cover level proficiency, thinking skills, and are organised around prior knowledge activation, language skills, and assessment.

Conclusions

Teachers who wish to explore CLIL with their learners may realise that using commercially-produced coursebooks may pose a challenge because the content side of CLIL should respond to the learners' school curriculum and the global market cannot cater for specific requirements. It follows that teachers can see this shortcoming as a possibility to engage in developing their own materials to meet the needs and demands of all the actors involved in the teaching and learning processes. By assuming greater responsibility in such processes, teachers become agents of change and empowerment (Kaufman & McDonald, 1995).

To this effect, teachers may opt for a set of principles which they can modify according to their own experience and background. Once teachers have agreed on a set of

principles and features, they can first collect and select sources of input which match their learners' cognitive and language level but maintaining a level of challenge. These sources will respond, above all, to the curricular content selected and what language can be taught through that content and sources. Teachers can then develop a sequence of activities which offer variety, relevance, and cognitive engagement.

The studies and experiences included in this contribution suggest that there exist several roads to discover and that teachers' explorations need to be guided by an awareness of the context around them. Drawing on and integrative framework guided by sociocultural theory, interactionism and cognitivism, teachers can reach informed decisions discussed not only with colleagues but also learners. Although it may be a demanding task, developing materials may be seen as another opportunity for in-service teacher development which has direct impact on teachers' practices. It is hoped that both pre-service and in-service teacher courses allocate more learning opportunities for materials development following a framework which establishes a powerful link between theory and practice in CLIL.

Notes

1. CLIL didactic sequences and materials:
http://www.juntadeandalucia.es/educacion/webportal/web/aicle/secuencias-aicle
2. CLIL activities, blogs, and wikis: http://www.isabelperez.com/clil/clicl_m_6.htm

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