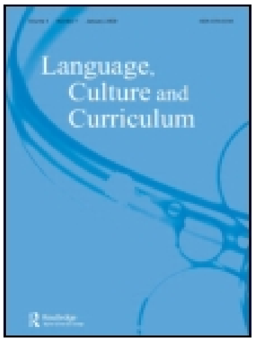

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Conceptualising the potential role of L1 in CLIL

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Content and language integrated learning (CLIL) is a rapidly growing area of both research and practice in all parts of the world, especially in Europe and Asia. As a young discipline, CLIL has a good potential of distinguishing itself from monolingual L2 immersion education models by becoming more flexible and balanced about the role of L1 in CLIL lessons. Although recent years have witnessed increasing research on the potential role of L1 in foreign language teaching [e.g. Littlewood, W., & Yu, B. 2009. First language and target language in the foreign language classroom. *Language Teacher*, *42*, 1–14], monolingual immersion ideologies are still dominant in many contexts in the world (especially in Southeast Asia) because of a whole host of ideologies. The beliefs affecting medium of instruction policies and practice have their roots in the traditional tenets (e.g. the maximum input hypothesis) in the discipline of second language acquisition (SLA). Although these tenets are increasingly being countered by recent research in multilingualism [see May, S. (Ed.). (2014). *The multilingual turn: Implications for SLA, TESOL and bilingual education*. New York: Routledge, for a critique of these tenets], SLA still has an influence on pedagogies in both immersion and CLIL programmes. In this paper, I shall first critically review these deep-rooted monolingual tenets. Then, I shall discuss how we can conceptualise the potential role of L1 in CLIL and by extension in content-based instruction (CBI), as both CLIL and immersion programmes are considered to be key approaches to CBI. I shall conclude with suggestions for future research in CLIL.

Keywords: bilingual classroom strategies; classroom code-switching; L1 use in L2 classrooms; curriculum genres

CLIL – a European rebranding of immersion? Or potentially a distinctive approach?

After comparing and contrasting various instances of content and language integrated learning (CLIL) programme models with other content-based instruction (CBI) programme models (including immersion models), Cenoz, Genesee, and Gorter (2014) arrive at the following conclusion:

> CLIL has undergone important developments during the past 20 years and has become a well-recognized and useful construct for promoting L2/foreign language teaching. Now that CLIL is well established, it no longer has to struggle for recognition and support. Efforts to insist that it is unique are potentially harmful to its future evolution for several reasons. (p. 258)

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While the above observation is largely true, as a young discipline, CLIL does hold good potential to distinguish itself from traditional L2 immersion models by becoming more flexible and balanced about the potential role of L1 in CLIL lessons. For instance, Gonzalez and Barbero (2013) report that evidence for the potential benefits of a moderate use of L1 in learners' language development can be found in a number of CLIL studies (e.g. Alegría de la Colina & García Mayo, 2009; Antón & DiCamilla, 1998; Storch & Aldosari, 2010; Storch & Wigglesworth, 2003). In a similar vein, Ardeo (2013) reports that CLIL tolerates more use of L1 and code-switching strategies. However, it must be pointed out that these studies are still in the minority and the established CLIL literature (e.g. Coyle, Hood, & Marsh, 2010; Dalton-Puffer & Smit, 2013) has still not much to say about the potential role of L1 in CLIL.

In the following sections, I shall first analyse the ideologies underlying monolingual immersion approaches to bilingual education and CBI. Then, I shall review key studies and related approaches which represent a more balanced stance towards the potential role of L1 in CLIL curriculum design and pedagogies. Then, I shall propose future research directions which will enrich the conceptualisation of the potential role of L1 in CLIL. This conceptualisation, I argue, will contribute to distinguishing CLIL in the future as a more comprehensive and balanced approach to CBI and bilingual education than traditional monolingual immersion approaches.

Problematising the ideologies underlying monolingual immersion approaches

Despite a growing body of recent empirical research on the potential role of systematic and functional use of L1 in foreign language teaching (FLT) (e.g. Littlewood & Yu, 2009) and in CBI programmes including immersion and CLIL programmes (e.g. Cenoz, 2009; Cummins, 2007; Laupenmühlen, 2012; Turnbull & Dailey-O'Cain, 2009), monolingual immersion ideologies are still dominant in many contexts in the world, especially in government and official policies in Asia. For instance, L2 English is/has been used as a medium of instruction (MOI) in many Asian schooling systems including Hong Kong, Brunei, Singapore (although it can be argued that a Singaporean variety of English has become the L1 of many Singaporeans), Malaysia (where English has an interestingly chequered history as an MOI for mathematics and science in primary schools), and until recently, the Philippines (where mother tongue-based multilingual education [MTB-MLE] was introduced only recently; see Tupas & Martin, in press).

The deep-rootedness of monolingual immersion approaches seems to be due to a whole host of factors including the following:

(i) the pedagogical ideology of teaching the target language (L2) through the target language only (or: multilingualism through parallel monolingualisms);
(ii) the stereotyping of L1 use in the classroom as equivalent to the extensive use of L1 in grammar translation or concurrent content translation approaches;
(iii) the one-sided application of the 'maximum input hypothesis';
(iv) the reported advantages of the separation strategy in some early bilingual education studies in the USA.

In what follows, I shall delineate these ideologies and pedagogical discourses and discuss why they are persistent and how they can hamper a more comprehensive and balanced approach to conceptualising and researching the potential role of L1 in CBI and bilingual education.

(i) The pedagogical ideology of teaching the target language (L2) through the target language only (or: multilingualism through parallel monolingualisms)

One of the pedagogical straitjackets often imposed by much official discourse is that of 'bilingualism through parallel monolingualisms': that is, to use only the target language as the MOI in the classroom with the hope that students will become bilingual through monolingual immersion classes, denigrating and completely excluding the L1 resources of the students from the L2 classroom.

This kind of pedagogical straitjacket is often persistently enforced by official policy discourses, representing a top-down approach attempting to dictate and legislate language use of local classroom participants. For instance, in the context of French immersion in Canada, McMillan and Turnbull (2009) report:

> … a core principle of Canadian French immersion is that learning is best achieved when teachers and students use French exclusively. While the exclusive use of the target language has been accepted as best practice [in French immersion] since its inception in 1965, first language use has long been a topic of much debate and controversy in many teaching and learning contexts beyond French immersion. Current thinking leans towards acceptance of judicious and theoretically principled L1 use … However, the results of this debate have generally been ignored by French immersion policy makers throughout Canada. (p. 15)

Similarly in Hong Kong, the official discourses legislate that only English (L2) should be used in the English-medium content classrooms. Such official discourses have hampered the conceptualisation, research and exploration of innovative pedagogical methods to enhance students' bilingual and multilingual development. As pointed out by Lemke (2002):

> It is not at all obvious that if they were not politically prevented from doing so, 'languages' would not mix and dissolve into one another, but we understand almost nothing of such processes … Could it be that all our current pedagogical methods in fact make multilingual development more difficult than it need be, simply because we bow to dominant political and ideological pressures to keep 'languages' pure and separate? (p. 85)

However, why are immersion ideologies so persistent and difficult to change? As Mahboob (2011) puts it:

> One of the most consistent findings in the … literature is that both students and teachers find … proficiency in the students' vernacular a positive and useful resource. If this finding is indeed valid, then one might ask: why is it that ELT [English language teaching] teacher education programs and teacher educators do not train the teachers in judicious and pedagogically appropriate uses of local languages in the classrooms? Why is it that the administrators do not sanction or approve of the use of local languages in classrooms (and sometimes the whole school)? And, why is it that teachers feel ashamed and guilty of using local languages as part of their lessons? (p. 1)

Mahboob points out that the persistence of negative attitudes is related to the stereotyping of L1 use as equivalent to the use of the traditional grammar-translation method. And we shall discuss this in the following section.

(ii) The stereotyping of L1 use in the classroom as equivalent to the extensive use of L1 in the traditional grammar translation approach

The origin of the negative attitudes towards L1 use, according to Mahboob (2011), is related to the history of FLT – the 'grammar translation approach' in the history of FLT. This approach gave a primary position to a (dominant) local language and used it extensively in building knowledge of and about the target language (L2). The grammar-translation approach was used to teach not only English but also a range of other foreign languages and in some cases 'dead languages' (e.g. Latin). Mahboob (2011), via a historical analysis of the succession of modern FLT approaches, delineates the source of negative attitudes towards L1 use as an artefact of the contexts of FLT approaches, not the result of systematic research:

> The teaching approaches that developed in the 20th century can be seen as a succession of methods that reacted to the (perceived) shortcomings of the one preceding them [see Table 1]. So, for example, the Direct Approach emphasized oral communication skills, which was not a focus of the grammar translation method. The Direct Approach, like the other major approaches to language teaching in the 20th century was developed in English speaking countries (predominantly in the UK and the USA). The teachers trained for teaching English (and the teacher trainers/researchers) in these contexts mostly spoke English as a mother tongue; furthermore, the ESL student population in these countries came from a number of different language backgrounds. Given these contextual factors, the role of local languages was not really considered as a factor in the development of pedagogical material or training of teachers. (p. 1)

Mahboob (2011) further points out that as an increasing number of international teacher trainees went to study in the West, they were trained in the methodologies developed for the 'mother tongue' English teachers and so they were not trained in how to use local languages in teaching English. In contrast, they were often explicitly trained to avoid using the students' familiar languages. When they came home they were valued as 'foreign' trained experts and this further spread the belief that the use of local languages needs to be discouraged in English as a foreign language (EFL) and other English-based education. All these have led to a negative attitude towards the use of students' familiar languages in the classroom.

While Mahboob (2011) was talking about the source of negative attitudes towards L1 use in English language teaching (ELT) contexts, his insights are relevant to unpacking the paradox of the persistence of negative official attitudes towards the use of local or familiar languages to scaffold students' learning of L2. Added to this negative association with the grammar-translation method is the one-sided application of the 'maximum input hypothesis' from second language acquisition (SLA) studies, which we shall discuss in the next section.

Table 1. Major teaching approaches and the role given to local languages.

Teaching approach	Context of development	Use of local language
Grammar translation	EFL (also used for other languages)	Dominant (local used extensively)
Direct approach	Europe and USA	No use of students' vernaculars
Audio-lingualism	USA (then spread)	No use of students' vernaculars
Cognitive approach	USA	Limited use of students' vernaculars
Affective-humanistic approaches	USA	Varied, but limited use of students' vernaculars
Natural approach	USA	Use of vernaculars discouraged
Communicative approach	USA and UK (then spread)	Use of vernaculars discouraged

Source: Mahboob (2011).

(iii) The one-sided application of the '*maximum input hypothesis*'

The monolingual principle underlying the immersion pedagogical discourse is closely related to the 'maximum input hypothesis' from SLA studies (Krashen, 1982), which argues for providing the maximum amount of L2 input to L2 learners to facilitate SLA. An over-application of this hypothesis tends to turn it into a dogma. However, the maximum input hypothesis needs to be considered in conjunction with the 'comprehensive input hypothesis' (Krashen, 1982). The input that is made maximum is useful only when that input is also made comprehensible. The potential role of L1 in helping to make the L2 input comprehensible should not be neglected and we should not throw the baby out with the bath water just for fear of using too much L1 (e.g. the fear invoked by equating the use of L1 with the grammar-translation method). It is true that if L1 is overused to the extent that the entire lesson is full of L1 without any L2 input then it is disastrous. However, much of the administrative and official discourse banning the use of L1 seems to be an over-application of the 'maximum input hypothesis'. Having interacted with some well-meaning education officials in Hong Kong, I have gradually begun to understand their worries: privately they know that some systematic and judicious use of L1 is needed to help students, especially at the beginning and intermediate levels, to understand the L2 content. However, they are worried that once the rule of using only L2 is broken, then there will be some 'irresponsible' teachers or schools overusing L1 to the detriment of students' learning. While sympathising with their worries and admitting that such a scenario can happen, it is, however, in the long run, not to the benefit of students if we ban the use of L1 across the board just because some 'irresponsible' or 'unprofessional' teachers or schools might misuse or over-use L1. The better, long-term, solution is to conduct systematic research and conceptualisation of the possible roles of L1 in bilingual education programmes so as to yield findings that will inform teacher-education programmes to ensure the spread of professionalism and the judicious and well-planned use of L1 in CLIL and CBI classrooms.

(iv) The reported advantages of the separation strategy in some early bilingual education studies in the USA

Another possible source of negative attitudes towards the use of L1 in CBI has perhaps come from an early study by Legarreta (1979) on six Spanish–English bilingual classes of kindergarten children in the USA. Swain (1986) quoted Legarreta's findings that the children in the bilingual class using the 'separation approach' (i.e. one language is used in the morning and the other language is used in the afternoon) made more gains in oral comprehension of English and in communicative skills in general in both English and Spanish than the children in the other five classes using the 'mixing approach' (Swain, 1986, p. 3). Another study quoted by Swain (1986) is that of Wong-Fillmore (1980), who reported children alternatively being attentive and inattentive as the teacher switched between languages in their lessons. That is, students not motivated in learning the second language (L2) tuned out when the L2 was being spoken by the teacher and they tuned in to the teacher again only when L1 was being spoken by the teacher. Quoting these two studies, Swain (1986) argued in favour of the separation approach. However, nearly three decades have passed, and Swain, Kirkpatrick, and Cummins (2011) have written a handbook titled: 'How to have a guilt-free life using Cantonese in the English class', which provides guidelines on how to use local languages 'guilt free' in an English language class. Among other things, and most important of all for our discussion here, Swain et al. (2011) state that using the L1 or the familiar language resources of the students helps make the content comprehensible for it allows teachers/students to (a) build from the known, (b) provide translations for difficult grammar and vocabulary, and (c) use cross-linguistic comparisons. They also provide concrete examples to illustrate how this can be done effectively in the classroom. It is apparent now with hindsight that there can be ways of planning the strategic use of L1 such that the two scenarios reported in the two early studies (Legarreta, 1979; Wong-Fillmore, 1980) should not be generalised to all other contexts or serve as conclusive evidence for ruling out other possible judicious and well-planned ways of using L1 to build on students' existing knowledge and to make content comprehensible, especially when the students are not kindergarten or young children but are cognitively more mature, secondary or tertiary students who have developed some L1 literacy already.

Research gaps in the literature on the use of L1 in bilingual classes

In Lin (2013a), I point out that the traditional sceptical attitudes towards L1 use in bilingual classes have made breakthroughs in the research on and conceptualisation of the potential role of L1 use difficult. I hypothesise that these difficulties have arisen in part from the general ideological environment (e.g. the immersion ideologies discussed above) that have implicitly pushed many researchers towards a 'normalizing mission' (Rampton, Roberts, Leung, & Harris, 2002, p. 375) in their studies. As a result, the findings of the bulk of the existing research literature on L1 use seem to be variations on similar themes without providing new research questions or new research approaches to achieve new insights beyond what is already known in the literature. For instance, a study on L1 use usually concludes by providing a list of functions of L1 use, arguing for the local rationality or good sense of L1 use. The diverse functions of L1 use reported in the literature can be summarised as follows:

(1) *Ideational functions – functions related to unpacking the field for the student*: Providing basic-L2-proficiency students with access to the L2-mediated curriculum/content by using the students' L1 (or familiar, local language) to translate or annotate (e.g. key L2 terms), explain, elaborate, or exemplify L2 academic content (e.g. drawing on students' familiar everyday experiences as examples to explain a science concept in the L2 textbook/curriculum). This is very important in unpacking the field-specific meanings of academic content (e.g. field-specific academic vocabulary) for the students.
(2) *Textual functions*: Highlighting (signalling) topic shifts, marking out boundaries or transitions between different stages in the lesson, different activity types or different focuses (e.g. focusing on providing technical definitions of terms vs. exemplifications of the terms drawing on students' everyday life experience).
(3) *Interpersonal functions*: Signalling and negotiating shifts in frames and footings, role-relationships and identities, change in social distance/closeness (e.g. negotiating for in-group solidarity), and appealing to shared cultural values or institutional norms.

It must be pointed out that these functions are also inter-related and that at any moment of any single utterance or instance of L1 use, there can be multiple functions being negotiated. While the above framework of three major types of functions can help researchers to understand and analyse the diverse range of functions found in the literature under a few key principles that are inspired by Halliday's three meta-functions of language (ideational, interpersonal, and textual meta-functions; see Halliday, 1994), the research literature is still marked by some important gaps, which will be outlined below.

(i) Lack of focus on both the spoken use and written use of L1 in the curriculum

A large part of the research literature on the use of L1 focuses on analysis of classroom code-switching studies (for a summary of major studies in the past three decades, see Lin, 2013a). The tradition of focusing on the spoken instances of classroom code-switching in the literature has thus predisposed the study of L1 use in spoken form only. However, to have a comprehensive understanding of the use of L1 in bilingual classes, it is important to focus not only on the spoken use of L1, but also on the written use of L1, and most importantly, on the coordinated and integrated use of *both* the spoken and written use of L1 in bilingual programmes. This brings us to the next point about the systematic and planned use of L1.

(ii) Lack of focus on the planned use of L1 in the curriculum

Again, a substantial part of the research literature focuses on analysing the teacher's unplanned, spontaneous spoken use of L1 in the classroom. This choice of focus is also related to the usual methodology favoured in the literature: the use of micro sociolinguistic analytical tools to analyse the naturally occurring spontaneous interactions in the classroom. This methodology parallels the sociolinguistic analysis of naturally occurring interactions in everyday life, and the body of literature on L1 use in the classroom can be said to be an extension of (and applying the methodology of) the former set of research studies to classroom interaction studies. However, the research of L1 use in the classroom can be further enriched by education and curriculum design perspectives, which emphasise not only analysing the local rationality or good sense of naturally occurring interactions (e.g. the spontaneous use of L1 for certain functions in the classroom), but also how the patterns of L1 use (including both spoken and written L1 use) in the curriculum can be systematically changed or adapted to further enhance the educational and curricular goals of the programme. The latter perspectives that are characteristic of educational design intervention studies are largely absent in the existing body of research on L1 use in bilingual classrooms. This brings us further to the consideration of the next point.

(iii) Lack of focus on analysis of instances of L1 in relation to its position in the curriculum genre

The large part of the body of research on L1 use in the classroom does not analyse the instances of L1 use in relation to the positioning of the L1 use in the different stages of the 'curriculum genre' (Christie, 1993; Rose & Martin, 2012). If the classroom speech event is analysed as a curriculum genre, then there are stages and phases in the curriculum genre where there are recurrent, typical functions to be achieved in these different stages and phases; just as in other spoken genres that occur in everyday life (e.g. a debate, a political speech, a television interview, etc.), there are different stages and phases, in which language is deployed typically for certain stage/phase-functions. For instance, typically in the first stage of a debate, the motion is introduced, followed by the stage of introducing the positive side and arguments for it, and then the stage of the negative side and arguments for it, and so on. A curriculum genre for a content lesson in a bilingual programme can also be analysed and planned systematically to enhance the achievement of the curricular goals designed for the programme. It will be interesting to see how L1 and L2 can be systematically planned and designed for the different stages and phases of the curriculum genre to facilitate the achievement of the curricular goals.

The research gaps outlined above speak to the need for an interdisciplinary approach (e.g. sociolinguistics, genre analysis, and curriculum studies) to researching the use of L1 in bilingual classes. However, the ideological environment of immersion programmes has made it difficult to have a more balanced, open-minded (e.g. neither 'normalising' nor 'condemning') view towards the potential role of L1 in CBI and bilingual education programmes (see discussion in the first section). CLIL, with its curriculum goals and pedagogical principles quite distinct from those of the immersion approach (at least in its conceptualisation, if not in all of its actual, instantiated models; but see a different view from Cenoz et al., 2014), seems to provide a more favourable intellectual space for conceptualising and researching the potential role of L1 in CLIL classrooms.

Conceptualising the potential role of L1 in CLIL

In this section, I shall first outline the curriculum goals and pedagogical principles of CLIL that seem to distinguish CLIL from immersion approaches to bilingual education and CBI, and how these goals and principles are compatible with giving a role to L1 in CLIL curricula. Then, in the final section, I shall outline some directions for further research in conceptualising the potential role of L1 in CLIL.

(i) CLIL has provision for the curriculum goals of both L1 and L2 academic language development

CLIL is explicit and clear in its conceptualisation of its plurilingual goals. For instance, in the *CLIL Compendium* (Marsh, Marshland, & Stenberg, 2001), it is stated that the Language Dimension of CLIL aims to:

- improve overall target language competence;
- develop oral communication skills;
- deepen awareness of both mother tongue and target language;
- develop plurilingual interests and attitudes; and
- introduce a target language.

It can be seen from the above-listed goals of the Language Dimension of CLIL that there is an explicit affirmation of the goal of developing bi/multi/plurilingual interests and attitudes as well as awareness of both the mother tongue (L1) and the target language (L2). Although many actual CLIL programmes might not have both L1 and L2 academic language development as their twin goals, at least at the level of conceptualisation the CLIL approach does provide for the possibility of having both L1 and L2 academic language development among the worthy goals of a CLIL programme.

(ii) CLIL has a clearly stated dual focus on both content and language development

CLIL has a clearly stated dual focus on both content and language development (even though there might be variability in the degree of success achieved in the existing CLIL programmes with reference to these twin goals). For instance, under the four guiding principles of CLIL (the four C's: content, communication, cognition, and culture), the principle of communication explicitly states:

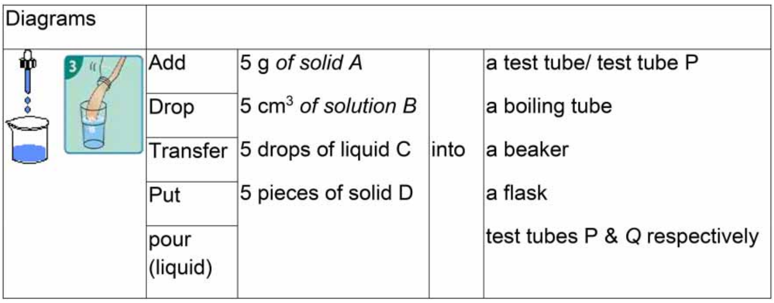
> Communication goes beyond the grammar system. It involves learners in language using in a way which is different from language learning lessons (of course CLIL does involve learners in learning language too but in a different way). (Coyle, 2005, p. 5; underlining original)

Coyle (2005) goes on to elaborate how this dual focus on both content learning and language learning differs from the focus on language learning in a typical foreign language (L2) learning lesson:

> … it is content that determines the learning route. … If the content requires use of the past tense and learners have not studied this, then CLIL lessons will enable learners to access the language needed in the defined context in different ways. This may initially be in the form of using key phrases in the past tense without studying the whole tense formation at this stage. The emphasis is always on accessibility of language in order to learn. (Coyle, 2005, pp. 5–6)

In curriculum planning terms, the ideal CLIL learning syllabus should include *both* the target content topics *and* the language demands – for example, learning of the imperative structure for writing the procedure in an experimental design in a science class – associated with the activities in the learning of these content topics. However, it does not mean that the entire system of imperative structures needs to be taught in a science CLIL class, but only those key phrases useful for writing procedure in an experimental design. For instance, a science teacher in a Secondary One (equivalent to Grade 7) science class in Hong Kong has designed a language support sheet (see Figure 1) for her students to help them to write key sentences in the experimental procedure without delving into teaching the entire system of imperative structures. This explicit attention to the language demands of content learning topics and activities (at least in the conceptualisation of CLIL principles) seems to distinguish CLIL approaches from immersion approaches.

However, it can be argued that the above two points still cannot sufficiently distinguish CLIL approaches, as key writings on the two-way immersion approaches in the USA also include developing additive bilingualism and multilingualism and bi-literacy as goals of immersion programmes (Genesee, 2008). Also, many immersion scholars have increasingly described the need for immersion teachers and other teachers practising CBI to identify two types of language objectives (content-obligatory and content-compatible) to



Diagrams				
	Add	5 g *of solid A*	into	a test tube/ test tube P
	Drop	5 cm^3 *of solution B*		a boiling tube
	Transfer	5 drops of liquid C		a beaker
	Put	5 pieces of solid D		a flask
	pour (liquid)			test tubes P & Q respectively

Figure 1. Excerpt from the language scaffolding 'sentence frames' provided by a science teacher to her Form 1 (Grade 7) class (Courtesy: Miss Emily Cheung of Munsang College, Hong Kong).

maximise student language learning and use (Snow, Met, & Genesee, 1989). So, it can be argued that immersion approaches have also given due attention to the above two points. Then finally, it might be the following point that will contribute in the future to distinguishing CLIL approaches from monolingual immersion approaches.

(iii) CLIL allows for the planning of systematic and functional use of L1 and L2 in different stages and phases of the learning process

Traditional immersion programmes adhere to a separation approach, as Cammarata and Tedick (2012) put it:

> Immersion programs have traditionally adhered to separation of instructional languages, particularly on the part of teachers but also on the part of students as they gain L2 proficiency over time. The instructional principle of language separation was initially articulated by Lambert and Tucker (1972) in the context of their evaluation of the St. Lambert French immersion program. Others (e.g. Legarreta, 1981; Milk, 1982; Wong-Fillmore, 1982) called for separation of instructional languages in bilingual education largely in response to the negative impact of concurrent translation in bilingual classrooms. … For some time now this axiom has been challenged by researchers. (pp. 253–254)

This axiom of immersion approaches has been increasingly challenged by researchers (e.g. Cummins, 2007; McMillan & Turnbull, 2009) although this axiom is still firmly upheld by the official policies of the ministries of education in many immersion contexts such as those in Southeast Asia (Lin & Man, 2009; Lin, 2013b). CLIL approaches can potentially distinguish themselves from monolingual immersion approaches at the conceptualisation level by becoming more balanced and open in the future in their stance towards the potential role of L1 in CLIL. For instance, Laupenmühlen (2012) reports on a study of the systematic and functional use of L1 and L2 in the biology CLIL lessons in a school in Germany with an innovative approach called 'Bilingual Reconstruction of Biology Concepts' (BiRBiC) to deepen the cognitive processing of science concepts through engaging students in explicit comparative analysis of L1 and L2 terms of biology concepts. As Laupenmühlen (2012) describes:

> The study conducted at Wuppertal University is based on the hypothesis that a teaching scheme for biology with the objective of multilingualism should implement BiRBiC in form of a complementary and comparative use of the Ll and the L2 in the classroom that enables the students to meet the various demands they face in global and local interaction. A teaching scheme that does justice to the concept of multilingualism is not about simply alternating the language in the classroom every school year. Nor does it imply to do the same learning activity twice, once in the mother tongue, and once in the target language. Instead, a complementary use of both languages is to be achieved which uses both the Ll and the L2 functionally. (p. 247)

For instance, the English noun 'red blood cell' can illustrate why and how engaging students in comparing the science terms in L1 and L2 can yield richer cognitive processing and bring multiple perspectives (from both L1 and L2) to bear on the understanding of the science concept. Red blood cells bring oxygen to the body and transport carbon dioxide that is to be breathed out. The everyday German term 'Rotes Blutkorperchen' contains the notion 'Korperchen' instead of 'Zelle'. There are different concepts behind the two words: Korperchen can suggest that red blood cells are not proper cells, because fully mature 'Rote Blutkorperchen' do not have a nucleus although they are still proper cells even without a nucleus. The everyday German term 'Rotes Blutkorperchen' thus might be less accurate than its English equivalent. In contrast, the scientific terms 'erythrocytes' (in English) and 'Erythrozyten' (in German) refer to the same science concept. Engaging students in an explicit comparison of L1 and L2 (both everyday and scientific) terms like these will provide a fruitful learning opportunity deepening the cognitive processing of the science concepts (vs. everyday concepts). In the same vein, the Chinese word for 'heat' (technical term, a noun) and 'hot' (everyday word, an adjective) has the same form and pronunciation (熱) and this would have an impact on Chinese students' understanding of the science concept of 'heat transfer' (Fung & Yip, 2014). Engaging students in the explicit contrastive analysis of the L1 (Chinese) and L2 (English) terms for 'heat' (science term) and 'hot' (everyday term) will deepen students' cognitive processing of the science concept behind the terms. Even if the teacher does not engage students in explicit contrastive analysis, many students might still use their L1 (Chinese) understanding of the terms (i.e. thinking that 'heat' and 'hot' refer to similar things) to grasp the science concepts, and without a chance to explicitly contrast the L1 and L2 terms, many students might be confused if they are only presented with the L2 (English) terms, 'heat' and 'hot'.

This brings us to the point of the need to draw on multiple resources in the communicative repertoire of the students to provide language and semiotic support to them when they are learning content using a second or foreign language (an L2). Elsewhere, I have delineated the following principles in supporting students who are doing L2 content learning:

- developing multiple flexible approaches to content-based L2 instruction;
- breaking away from the traditional immersion model as the only approach to designing L2 content programmes;
- drawing on multimodal and continua theories of language and communication;
- drawing on genre-based multilingual, multimodal, and popular cultural resources to provide basic-L2-proficiency students with access to L2 academic content and literacy (Lin, 2012, p. 81).

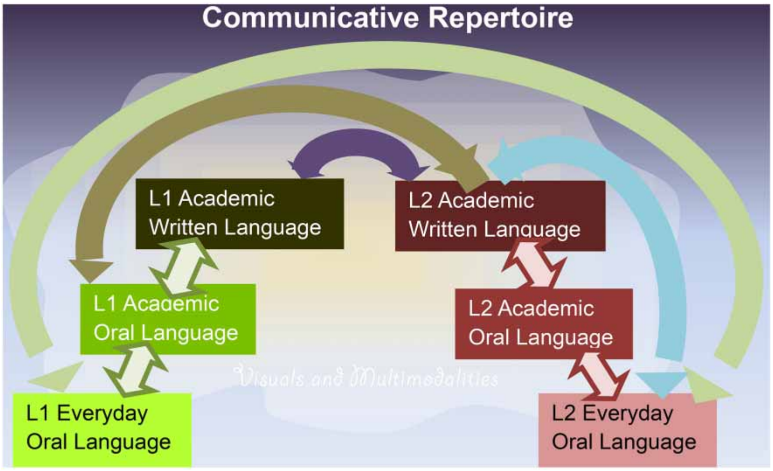

Communicative Repertoire
L1 Academic Written Language
L2 Academic Written Language
L1 Academic Oral Language
L2 Academic Oral Language
L1 Everyday Oral Language
L2 Everyday Oral Language
Visuals and Multimodalities

Figure 2. Bridging multiple resources – ultimate goal: expanded repertoire.
Source: Adapted from Lin (2012, p. 93).

Figure 2 summarises the above principles in what I call a ‘rainbow diagram’ which emphasises the importance of valuing and building on all the resources in the communicative repertoires of the students with the goal of expanding the students’ ultimate communicative repertoires.

Laupenmühlen (2012, p. 249) also offers a conceptualisation of how the functional use of students’ L1 and L2 can be systematically planned for the different stages and phases of the CLIL curriculum to achieve the dual goals of academic content learning, cognitive flexibility, and L1 and L2 academic language learning.

The role of L1 in CLIL: directions for future research

In this section, I shall propose directions of research and discuss how the notion of the ‘curriculum genre’ (Christie, 1993; Rose & Martin, 2012) can be drawn upon in researching the potential role of L1 in CLIL.

In line with the conceptualisation work started by Laupenmühlen (2012) in planning the systematic and functional use of L1 and L2 in the learning process which might stretch across a number of lessons in a unit of work, I draw on the notion of ‘curriculum genre’ to propose that since there are different stages and phases in a curriculum genre, L1 and L2 can be strategically planned to fulfil the pedagogical functions specific to the different stages and phases of a curriculum genre. As mentioned earlier, if the classroom lessons are seen as constituting a curriculum genre, then there are stages and phases in the curriculum genre where there are recurrent, typical functions to be achieved in these different stages and phases, just as in other spoken genres that occur in everyday life (e.g. a debate, a political speech, a television interview, etc.). One such curriculum genre that I have been conceptualising is the Multimodalities/Entextualization Cycle (MEC) (inspired by David Rose and Jim Martin’s Reading to Learn [R2 L] Cycle; see Rose & Martin, 2012). Below I shall delineate this cycle and the potential role of L1 in this curriculum genre.

The Multimodalities/Entextualization Cycle

A cluster of useful scaffolding strategies in L2 content learning involves shunting between different kinds of textual and multimodal mediation of academic content/experience. The core processes behind the use of these strategies can be summarised in the following three stages of the MEC:

(1) Create a rich experiential context to arouse students’ interest, and immerse the students in the content topic field using multimodalities such as visuals, images, YouTube videos, diagrams, demonstrations, actions, enquiry/discovery activities, and experiments – for instance, watching a YouTube video on air pressure – ‘The Egg and Bottle’: https://www.youtube.com/watch?v=28TIyWdfxxc; this YouTube video can provide a rich experiential context for stimulating students to think, talk, discuss, inquire, read, and write explanatory texts about the science topic in joint activities with the teacher later on. In this stage, the familiar languages of students (e.g. L1 everyday language, L2 everyday language; see the ‘rainbow diagram’ in Figure 2) can be used to help the students grasp the main gist of the experience.

(2) Engage students in reading a coherent piece of L2 academic text on the academic topic introduced in Stage 1 (e.g. a short explanation text to explain the scientific process behind the experiment), and then engage students in note-making or mind-mapping tasks that require some systematic ‘sorting out’ or re-/presentation

of the L2 textual meaning using different kinds/combinations of *everyday* L1/L2 spoken/written genres and multimodalities (e.g. bilingual notes, graphic organisers, mind maps, visuals, diagrams, pictures, oral description, story-boards, comics, etc.); these activities help students to *unpack* the L2 academic text using L1/L2 everyday language and multimodalities.

(3) Engage students in *entextualising* the experience using L1/L2 (spoken/written) *academic* genres (e.g. experimental design, explanation texts, and procedural text) with language scaffolds provided (e.g. key vocab, sentence frames, writing/speaking prompts, etc.).

These three stages form a curriculum genre which I call the MEC. The MEC can be reiterated until the target CLIL learning goals have been achieved. Furthermore, the Teaching/Learning Cycle (TLC) (Rothery, 1994) and the R2 L Cycle (Rose & Martin, 2012) can also be inserted into the MEC at a point deemed appropriate (e.g. between Stages 1 and 2, or 2 and 3, or 3 and 1). The key principle is to use L1 and L2 everyday languages and genres together with multimodalities (e.g. see a YouTube hip hop rap on the scientific method: https://www.youtube.com/watch?v=bUa-ilQqEv0) to scaffold students' learning of L1 and L2 academic languages and genres (Figure 3).

When we adopt a balanced and open-minded stance towards the potential role of L1 in CLIL, there is a lot of systematic planning and research that we can do to try out different kinds of combinations of different L1 and L2 everyday resources (together with multimodal resources) that can scaffold the development of L1 and L2 academic resources. However, in terms of evidence-based research, we still have a long way to go, as Swain and Lapkin (2013) put it:

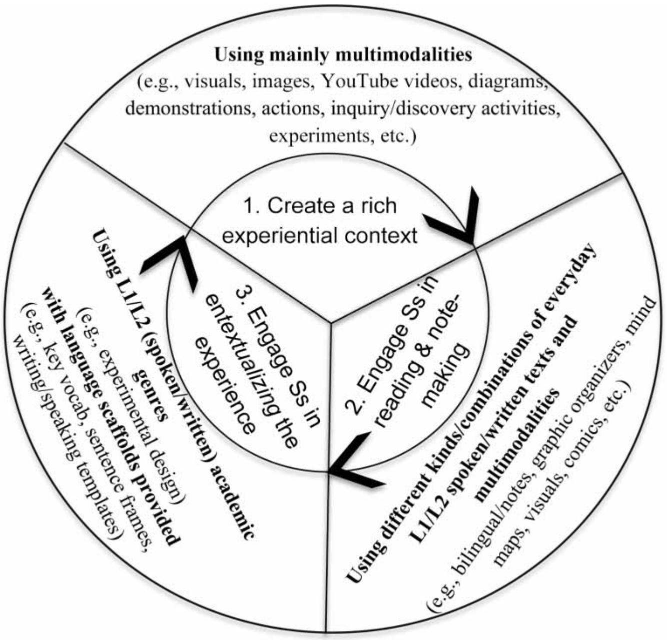

Using mainly multimodalities
(e.g., visuals, images, YouTube videos, diagrams, demonstrations, actions, inquiry/discovery activities, experiments, etc.)
1. Create a rich experiential context
2. Engage Ss in reading & note-making
3. Engage Ss in entextualizing the experience
Using different kinds/combinations of everyday L1/L2 spoken/written texts and multimodalities
(e.g., bilingual/notes, graphic organizers, mind maps, visuals, comics, etc.)
Using L1/L2 (spoken/written) academic genres
(e.g., experimental design)
with language scaffolds provided
(e.g., key vocab, sentence frames, writing/speaking templates)

Figure 3. The MEC developed by Lin (2010).
Note: Diagram designed by Karen Lai.
Key: Ss, students.

> … we need to extend the research conducted in immersion classes. … It is clear that the L1 is used for languaging both cognition and affect, but what is the impact of this L1 languaging on L2 development? We need both qualitative and quantitative studies, descriptive and experimental studies that focus on this issue. (pp. 123–124)

What CLIL can potentially offer immersion research (and vice versa) in this respect is the conceptualisation of the differential functions and roles of L1 and L2 in the different stages and phases of a curriculum genre. In light of the above discussion, future research would benefit from the following considerations:

(1) Do not focus on analysing the isolated functions of naturally occurring instances of classroom spoken L1 alone (as most studies in the literature have done so far; see review in Lin [2013a] and above); focus on studying the possible impact of systematically planning the functional use of both L1 and L2 (e.g. both everyday and academic registers; both spoken and written) in the different stages and phases of a *designed* curriculum genre (e.g. the TLC, the R2 L Cycle, or the MEC; see discussion above); design empirical studies that can generate evidence connecting this systematic planning to the development of L1 academic language as well as L2 academic language.

(2) Consider other important factors mediating the role of L1 in CLIL, in particular: the age and degree of cognitive maturity, and the level of L1 academic literacy of the students; for example, the role of L1 might be greater in secondary and tertiary CLIL classes than in kindergarten or primary CLIL classes, and might be greater with students with some foundation in L1 academic literacy; however, these are all empirical questions to be investigated.

(3) Adopt interdisciplinary approaches – we need to be ‘disciplinary plurilinguals’ (Lin, 2013a, p. 14) in order to develop evidence-based approaches to researching the role of L1 in CLIL. There have been many more qualitative than quantitative studies in the existing literature but we need both kinds of approaches in the same study.

In light of the above discussion, the ideologies underlying monolingual immersion approaches (e.g. the adherence to the separation approach, the administrative worry that once L1 is allowed, then ‘irresponsible’ teachers will overuse it, etc.) need to give way to a new era where there is more systematic planning and evidence-based research in future conceptualisation and enquiry of the potential role of L1 in CLIL, especially in diverse sociocultural and educational contexts in Europe and Asia that differ from the original Canadian immersion contexts. In this new era, both CLIL and immersion research studies can inspire and learn from each other (Cenoz et al., 2014; Lyster, Quiroga, & Ballinger, 2013), and the theoretical conceptualisation and empirical investigation of the potential role of L1 in CLIL can become much more balanced and comprehensive. This will become a fruitful direction when our research efforts are free from both the ‘normalising mission’ (of having to justify the role of L1) and the monolingual immersion ideologies (e.g. of excluding the role of L1 from the outset).

Disclosure statement

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