SOME COGNITIVE ASPECTS OF CONTENT AND LANGUAGE INTEGRATED LEARNING

Considering what it is and what you can do with it

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ABSTRACT • The paper provides a compact discussion of some of the relationships obtaining between content and language integrated learning (CLIL) and some of the underpinnings of human cognition. The paper starts with a short description of a personal reminiscence from the author's school days, and uses this as an empirically-based introduction to the notion of content and language integrated learning. The author specifically suggests that there are a number of cognitively motivated reasons for adopting a CLIL approach on a variety of teaching missions. First, the approach is based to a notable extent on the explicit use of concepts, which in turn are essential to any attempt at clarifying or even explaining various phenomena in the language-external world. Secondly, the CLIL approach also seems to be compatible with and supported by much of the motivation for what is commonly known as the constructivist notion of teaching, that is, the idea that the type of successful long-term learning which results in profound understanding of the world is inherently dependent on the view that students should be made active participants in the process of acquiring knowledge and not be allowed to play the part of a passive recipient in a teaching situation. Finally, the CLIL approach also makes it clear why certain analogies between the human brain and a regular computer do not necessarily hold by making it explicit that learning processes crucially involve both the possibility and the need to change, including the possibility of forgetting things, which is demonstrably beyond the capabilities of present-day computers.

KEYWORDS • CLIL, cognition, learning, teaching

Non scholae sed vitae discimus
(Seneca)

1. Introduction

Let me begin this essay by reminiscing about my last few years at school. I wish to start my inquiry into the essential properties of the methodology known as content and language integrated learning or CLIL in this particular way because I wish to demonstrate two things. First, I wish to establish that the notion of teaching students something about language at the same time that one is teaching them something which belongs to a non-language subject is much older than the term which we now use to refer to the goal of this particular teaching

strategy, that is, content and language integrated learning, CLIL.[1] Secondly, this slightly roundabout way to the main topic of this essay will also make it possible for me to argue that once one decides to apply a CLIL method in one's teaching, one is in fact committed to a notable extent to a specific type of teaching, frequently referred to as the constructivist way of teaching, which is, in some essential respects, distinctly different from the traditional idea of teaching and which is, partly for that very reason, more labour-intensive than the teaching methods of the past. For the last three years at school before taking my matriculation examination, I studied, among other subjects, French. Our class had a native speaker teacher of French, which was rather exceptional in those days in the early 1970s. Usually, languages teachers were non-native speakers of foreign languages who attended universities for the requisite teacher training in the languages they taught. Our teacher was Monsieur G. He never used any other language than French in class despite the fact that we, the students, were all native speakers of Finnish, and had had no previous introduction to the French language even though we had been studying other languages such as English and Swedish for a few years before embarking on this French adventure.

It was not until some years after I had left school and had already begun my university studies that I fully realised that Monsieur G was a forerunner of CLIL. While he was practising language teaching he was also teaching us, his students, a number of other things, although he of course did this, with great success, in a most furtive manner so that we never realised that we were being served many nonlinguistic pieces of information too in addition to what Monsieur G explicitly taught us about the French language. Let me offer you here just one example of how he did this. Because we, the students, were all young people, it occasionally happened that some of the boys especially in the back row got somewhat too noisy and somewhat too inattentive, possibly because ours was a mixed class with a fair number of girls too. Whenever this happened, Monsieur G applied a special technique which quickly made us boys pay attention to his teaching again. What was, in hindsight, remarkable about his technique was that he never raised his voice to gain control of the situation. Instead, if he was writing something on the blackboard (blackboard? Now, it all happened such a long time ago…) he just turned around, straightened his back fully, raised his chin a little bit so that we could all see that he was looking at something or some people at the back of the classroom, and made an excessively long pause of some five to six seconds, sometimes even seven seconds (I did some counting on more than one occasion), so that everyone started paying attention to him, including us, the boys at the back row. When Monsieur G had secured attention on the part of the gentlemen at the back (and he did treat us boys as gentlemen), he uttered a single word: *Messieurs*. In fact, on most occasions he did not utter even that much: since he was offering us a course in real, usable French rather than in textbook French, he only used the latter part of the word: *sieurs*, adding a very low-key movement of his hand. When the boys then looked at Monsieur G, he just lowered his chin inquisitively and uttered, clearly to indicate a combination of a question and a request, another word of French: *d'accord*? When the gentlemen in the back row then nodded in agreement, Monsieur G smiled ever so slightly, and uttered a third word of French, clearly satisfied with what he had achieved: *bon*. And even in the back row everything was back to normal again.

What has Monsieur G´s behaviour to do with content and language integrated learning? The answer is quite simple: it has everything to do with it. Consider what a cognitively remarkable achievement Monsieur G managed to perform with that extremely limited but at the

[1] For general introductions to the basic assumptions and principles of CLIL, see e.g. Dalton-Puffer et al. (2010) and Deller & Price (2007).

same time appropriately selected sample of the French vocabulary. Monsieur G was offering us a chance to participate in content and language integrated learning by combining what he taught us about the French language with what he considered important and our worthwhile to learn about French culture, in particular, about manners in daily life in a French-speaking environment. In short, he enabled us to learn not only some French but also to acquire some knowledge about how we were expected to behave on certain types of occasion in a French-speaking community so that we would, later in our lives, be able to get along in such circumstances and especially to understand why people in French-speaking communities behave in that way. And I do not think that you can ask any language teacher for more than that.

2. On the foundations of the CLIL approach

It is not always easy to realise how much teachers sometimes achieve with such a seemingly minute effort because such cases of success are typically based on a considerable amount of careful advance planning, which nevertheless does not often show in any explicit way in the teaching situation. Thus, in the case of Monsieur G, we, the students, also learnt without ever becoming conscious of it, the extremely useful lesson in language pragmatics that you can catch the attention of inattentive young and perhaps even older male persons by using the barely audible latter part of the single word Messieurs – if you know how to do it. We also learnt that you can express even implicit or assumed agreement by using the single word d'accord – if you know how to do it. And finally, we learnt that you can express satisfaction in the outcome of a conversation by using the single word bon – if you know how to do it. For a recent discussion of some of the main aspects of what it takes to use a CLIL approach, see e.g. Escobar (2013).

Against this background, consider what happens when someone engages in content and language integrated learning and why the learning experiences on such occasions are pedagogically important and thus worth studying in some detail. In such situations one of the goals is obviously to make the person learn, little by little, a foreign language to a sufficient extent and at the same time to make the student understand something about a phenomenon or an event in the physical world outside language, e.g. why architecture in different countries exhibits somewhat different tendencies or why public transportation is not organised along similar lines in all countries.[2]

One of the first observations which such an analysis of CLIL-based student behaviour enables us to make is this: the linguistic and nonlinguistic aspects of content and language integrated learning make our brain resort to partly different strategies when trying to make sense of what is going on. As regards the language part of the situation, the student obviously needs to be able to use some of the relevant language skills. Thus, as language learners, we need to understand what a certain word or longer expression means because the words of a language are needed whenever we wish to refer to something which is situated in the physical world outside language. But this is not enough. We need to be able to decide if a particular expression is an appropriate label for something which exists in the world so that we can choose to use this word rather than that word. For instance, in English we refer to some buildings by using the word house but not to all buildings. We are masters of categorising things which exist in the world.[3] How do we do this? Our brain analyses the situation, the context, and the role of the relevant

[2] For an exposition of some of the research done on CLIL especially in European contexts, see Pérez-Cañado (2012).
[3] For a lucid exposition of the salient issues involved in the process of categorisation, see Roy (2013).

phenomenon, object or event in that context, and we then decide on the basis of this swift and largely unconscious analysis which particular expression we should use. And this examination of the world around us we do by resorting to data which is provided to us by our senses and which is interpreted by our brain so that we can ultimately decide whether we are seeing a dog or a wolf, and can then act accordingly. In this latter type of analysis of the external world, it is the nonlinguistic cues rather than the linguistic ones which make us label a dog differently from a wolf, for instance.[4]

Most of the time all of this is thus being taken care of by the brain unconsciously since our language use is largely based on past experience, and is for that reason automated in many ways – which is why past experience is often though not invariably a reliable guide for future action.[5] What is remarkable about the differences between interpreting linguistic cues on the one hand and making sense of nonlinguistic data on the other is the fact that the different strategies employed in the two types of analysis seem to complement each other and therefore provide the brain with a kind of cross-checking mechanism: if the search for a suitable word for something in the language-external world makes the brain conclude that there is a potential candidate available (e.g. that we should call something a dog because we have been observing the animal´s appearance for some time and can thus at least tentatively make this conclusion), our brain does not leave the matter at that. Some additional cross-checking is performed e.g. by observing the animal's behaviour, after which a final conclusion is usually reached and a word selected. It should be noted here that although such word selection is intimately connected with the language learning process to begin with, this is not all there is to the matter. This is arguably so because speakers occasionally make mistakes in labelling language-external entities even after the language learning process has been completed. That is, we may mistakenly conclude that a particular animal is a dog when the animal is in fact not a dog but a wolf, for example. Such erratic behaviour on the part of a language user, often referred to as mistaken identification, is of special significance e.g. in the case of eyewitness testimony (see Cutler and Penrod 1995).

How should we understand this in terms of content and language integrated learning? For one thing, it seems clear that such cognitive behaviour is typical of most if not all learning situations: we seldom rely on one type of clues only; rather, whenever we infer something, we tend to check the validity of our inferences, whenever necessary, by some means which are sufficiently different in quality from the techniques we used to arrive at the inference in the first place so that we can convince ourselves that the result is indeed likely to be correct. Consider the following scenario. A person is checking in at a hotel abroad, and wants to know what time breakfast is being served. The person at the reception replies: "We serve breakfast in the hotel restaurant from 6 am to 2 pm." The guest is speaking a foreign language because he is abroad, and is therefore not fully convinced that he understood the reply correctly. He wishes to confirm that he heard what he thought he heard, and asks: "Excuse me, did you say from 6 am to 2 pm?" The receptionist smiles and replies: "Yes, we are a small hotel, and we are therefore able to provide our guests with such an exceptional service. We run this hotel as a family business and live in the annex next to the hotel building itself, so we can be here virtually all the time." As you can imagine, this is something that actually happened to me sometime in the past.

[4] It is specifically argued at some length by Ting (2010: 4) that "there *can* be a very clear link between CLIL and what is known about how the brain processes information and learns" (emphasis in the original – PH).

[5] See e.g. Berger (2007). For a lucid account of the main interrelationships between the brain and cognition in general, see Baars & Gage (2010, especially Chs. 8, 10 and 14).

This is one of what I would consider the indisputable benefits of content and language integrated learning, where the word content encompasses especially what falls under the culture associated with a particular language: it is an approach which enables us to cross-check a result we have arrived at by one type of analysis by seeing whether the result is compatible with what is suggested by some other, qualitatively different approach. It is also something which is inherently connected with those aspects of one's language learning and one's familiarisation with foreign cultures that relate to translation, in particular. Specifically, all translation is both based on and limited by the fact that different languages make their speakers conceptualise and therefore categorise the world somewhat differently. As native speakers of different languages, we tend to categorise and therefore also view various aspects of the world a little differently from each other. Saying this is not tantamount to repeating any strong form of the 1930s claim by Benjamin Whorf to the effect that language determines the way we think[6] nor to endorsing in any categorical manner the famous tenet by Ludwig Wittgenstein that the limits of my language are the limits of my world. Instead, what I am saying here is that as long as we need to use language for communication, we have to accept that – since languages reflect their surrounding cultures especially in terms of their vocabularies – we sometimes do not have a lexicalised way of referring to something which speakers of some other language can identify by means of an existing vocabulary item, either by using a single word or by means of a longer expression such as a phrase, for example. In some other languages, there simply is no corresponding or, as some people would put it, equivalent word or expression.[7]

Again, consider what this implies as far as content and language integrated learning is concerned. First, what I say above makes us realise that the role of concepts in this kind of approach to learning is of the greatest significance. This conclusion in turn makes it necessary to develop what we consider to be the associated suitable terms so that we can name the concept, a term being the name of a concept. Since different languages conceptualise the world in slightly different ways, we will need to examine whether we need to resort, on some occasions, to some special measures through thinking about these differences to be able to reconcile the differences between languages and their vocabularies to a sufficient extent so that we can produce adequate, functionally appropriate translations. Vietato fumare is not Forbidden to smoke in proper, functional English even if the English sequence is grammatically correct and even if it makes sense semantically. Instead, as we all know, speakers of English expect to see No smoking signs. Why? Because the concept of forbidding is resorted to and expressed in English somewhat differently from the way it is done in Italian.

There are probably more reasons than one behind this difference, at least some of them being most likely of a cultural and historical nature, but as a point of comparison, which may be of some intrinsic interest here, I would like to mention that in my mother tongue, Finnish, the traditional form of the corresponding expression is Tupakointi kielletty (literally 'smoking forbidden'). If you are teaching your students something about the culture and history of a foreign country, you might find these kinds of differences and similarities as well as their associated conceptual bases worth exploring in some detail.

Secondly, conceptual analysis can also be viewed as a tool which one can use to make students' learning curve less steep in some cases since such an analysis also provides us with the possibility of explaining, that is, making understandable, notions which might otherwise be hard

[6] For a relatively recent discussion of some pertinents issues related to the notion of linguistic relativity, see Gumperz & Levinson (1996).

[7] In all fairness, it must be mentioned here that there have also been critical opinions expressed on certain aspects of CLIL; see e.g. Šulistová (2013: 50) for a list of some potential shortcomings of the CLIL method.

to capture on a given occasion. Suppose a student of English is not familiar with the meaning of the verb forget. You can explain the meaning not by asking the student to consult a dictionary but by offering the student additional pieces of linguistic data which ultimately make it possible for the student to infer what the verb forget means. Typically, you might do this by resorting to notions which are conceptually related to forgetting and which are thus likely to be cognitively helpful. You could, for instance, make the meaning of the verb forget clear to the student by making use of the intended aspect of the notion of remembering and say, for example, that you have forgotten something when you no longer remember that something.

Such an approach to the language component of CLIL is obviously based on the assumption that the words of a language are related to each other in certain specifiable ways. What is sometimes overlooked is that the brain does not process all types of information in the way it handles language data. Thus, assuming, as I pointed out above, that non-linguistic data received through the senses is at least sometimes used to cross-check the results arrived at through linguistic analysis or language processing, it follows that the criteria we use to evaluate the learning achievements of students should reflect this difference and should not measure student performance on one axis only. Specifically, if teachers decide to apply CLIL in their curricula, they should make sure that the tests which are used to check student performance are sufficiently varied to check both the language component and the non-language component of the course alike. This seems like a reasonable requirement also in that different students have different talents so that if a student can clearly comprehend the contents of a reading comprehension task but cannot express himself or herself very well linguistically, the student should be rewarded for the success in comprehension even if the linguistic expression of this comprehension should leave something to be desired.[8]

3. CLIL, cognition, and the contstructivist approch to learning

There is one more point I wish to make here before wrapping up what I have said above. The point concerns the constructivist notion of teaching, that is, the idea that the teacher should try to make the students learn things by discovering those things themselves rather than by explicitly providing information about those things to the students. In other words, constructivists basically argue that “people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. In any case, we are active creators of our own knowledge. To do this, we must ask questions, explore, and assess what we know” (http://www.thirteen.org/edonline/concept2class/constructivism/). This kind of approach to teaching and learning has important implications as regards our assumptions about how the human brain works. It is still sometimes suggested that the human brain is analogous or at least comparable to a computer.[9] I wish to argue here very briefly on the basis of what is suggested especially by the evidence provided in CLIL environments and the experience which has so far been gathered in teaching and learning situations crucially involving the constructivist

[8] Mehisto (2012) provides a recent discussion of CLIL materials development. The article considers, in particular, the question of what criteria should or could be used for the purpose of creating materials specifically intended for CLIL purposes. It is obvious that there should equally be a similar discussion of the criteria used for the purpose of assessing the results of tests based on such CLIL materials.

[9] Cf. the critical discussion of this issue already in Searle (1990).

type of teaching that the human brain is qualitatively different from any of the digital computers we currently have.

For one thing, the human brain has an in-built safety mechanism which occasionally makes us forget things. This is also true of learning within CLIL curricula, where the language learning process is typically supported by the content part of the teaching situation: a durable content-related memory image may well help a student remember a word or expression associated with the image but is no guarantee for remembering the item on every recall.

Computers do not forget things in the same way. If a person undergoes a traumatic experience, the mental suffering caused by the experience is sometimes alleviated by the person's brain disconnecting certain paths in the brain so that the details of the painful experience are forgotten in the sense that the conscious mind will not have to process them because such a processing task would entail an excessive cognitive and psychological load on the brain.[10] Thus, certain events which are related to situations which are cognitively demanding may prove less conducive to learning even if there are qualitatively different learning paths available as in the case of CLIL environments.

Secondly, the human brain is spontaneous in a way which our current computers cannot imitate in anything like a successful manner. This is another reason why a CLIL environment may and sometimes does prove very successful: the processing of a suitable combination of linguistic and non-linguistic data occasionally fires in the brain certain clusters of neurons which do not fire if only one type of stimulus is provided. However, if this one type of stimulus alone is not powerful enough to reach the requisite threshold value for a neuron to fire and an idea to emerge, the idea may emerge when the stimulus is strengthened with another stimulus of a different type. And this is exactly what a CLIL environment does: it provides students with stimuli of different kinds, and may thus enhance the creativity of students. Such a combination of clues also seems to be behind the familiar experience which we often express by starting a turn in a conversation by saying "Oh, that reminds me of…".[11]

Thirdly, computers process information in one, on-off way only whereas the human brain to all intents and purposes resorts to a number of different approaches even if there are some similarities between the approaches. In particular, we should note that language comprehension and especially its speed is based to a remarkable extent on anticipation: we do not process all incoming linguistic information consciously but rather rely on anticipation created by past experience and thus intuition. Computers do not have intuitions about anything the way human beings do.

Consider what all this means as regards CLIL in particular with regard to what teachers may take for granted in the learning situation and what they may need to provide for explicitly. It seems that CLIL teachers will need to work with concepts, in particular, to be able to explain things and to make them understandable. This is so because students just like other people typically handle world knowledge by categorising the knowledge in suitable ways. We do this especially for the purpose of being able to focus on selected issues at selected times: conceptualising is a technique which helps us dissect the world into manageable pieces. The CLIL method is, I would argue, almost by definition an approach which makes teachers and students alike resort to concepts which make the whole language learning process both more transparent and better structured than many traditional methods.

Concepts also constitute one of the links between CLIL and constructivist teaching, that is, the idea that as a teacher one should first and foremost try to help students initiate their personal

[10] See e.g. McNally et al. (2004).
[11] For some discussion of some of the background to this issue, see Baars and Gage (2010, Chs. 3 and 9).

learning processes to enable students to discover and evaluate knowledge for themselves rather than simply, so to speak, pour knowledge into the heads of students. Therefore, since the constructivist variety of teaching is an approach which requires active contributions from the students, it makes sense to argue that assigning such a central role to concepts in one's teaching is useful also and especially in that all such teaching inherently helps students practise thinking. This in turn is most desirable in that making students capable of thinking will not only enable them to understand the issues discussed on a specific teaching occasion but also provides them with a technique which they can later apply to any other case they will need to deal with. In sum, CLIL supported by constructivist teaching seems to be a combination which not only makes it possible for students to understand specific, individual aspects of the world but, what is far more important, which can convince students that what they learn are not just isolated facts but rather the principles of discovering, connecting, and assessing facts whenever they need to do so.

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