

**“HOW DO WE MAKE QUESTIONS? WE CAN OR  
CAN WE?”**

**AN EXPLORATORY STUDY ON FOCUS ON FORM IN A  
CLIL CLASSROOM.**

Treball de Fi de Grau, Estudis Anglesos

Supervisor: Dr Elisabet Pladevall Ballester

Ariadna José Flores

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## **Abstract**

This paper seeks to provide insight into the integration of content and language in the teacher's discourse of a CLIL (Content and Language Integrated Learning) local context in a high-school in Catalonia. Its main aims include knowing to what extent FonF (Focus-on-Form) is present in a CLIL classroom, analysing which types of FonF appear in the teacher's discourse and exploring what effect co-teaching has in relation to FonF. Nine CLIL sessions were observed, audio-recorded and transcribed. After analysing the data, results furnished the idea that there is a gradual movement towards a true integration of content and language, revealing a certain degree of FonF in the teachers' discourse. In the content teacher's discourse the main types of FonF found in her speech were pre-emptive lexical FonF and L1 use, which show a clear tendency towards implementing CLIL as a mainly meaning-focused approach and leaving the more related language FonF to the assistant teacher. In the discourse of the assistant teacher, reactive phonetic FonF and reactive lexical FonF were found to be the types of FonF most widely used. No instances of pre-emptive grammatical FonF were found. Therefore, there is still an urgent need to focus on form to truly integrate content and language.

## 1. Introduction

There have been many educational approaches throughout the history of Europe to enhance foreign language learning. Nevertheless, there has been a recent growing interest in Content and Language Integrated Learning (CLIL). The term CLIL was adopted in 1994 (Marsh, Maljers and Hartiala, 2001) within the European context and it was used to describe teaching and learning through an additional language.<sup>1</sup> The emergence of CLIL is said to be driven by two different forces (Coyle, Hood and Marsh, 2010). *Reactive* forces refer to the fact that CLIL has emerged as a response to situations where the competence in a foreign language is deficient and *proactive* forces refer to the fact that there has been an increasing willingness to create situations that will improve and enhance Europe's level of multilingualism, which is greatly desired due to globalization.

Therefore, as the implementation of CLIL becomes a crucial issue, many studies have been conducted to show how CLIL has to be executed or which are the main components in order to implement it. This paper seeks to provide some insight as to how CLIL is being carried out in order to know whether the integration of content and language is really being done or if it is biased towards content rather than language, as some previous studies have shown (Pérez-Vidal, 2007). Many studies (Long and Robinson, 1998; Lyster, 2007; Long, 2009) have stated that a key form to integrate content and language and make it more efficient is through focusing on form. Thus, this study intends to cast some light on how and if Focus-on-Form (FonF) is used in the teacher's discourse within a CLIL classroom. Still, different studies (Pérez-Vidal, 2007; Coyle, 2012) show that, in fact, FonF is nearly absent in many CLIL contexts. In order

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<sup>1</sup> An additional language usually refers to the learner's foreign language but it can also be a second language or a heritage language.

to be able to explore such issues, a class in a secondary school of Catalonia has been observed and audio-recorded for some sessions. The CLIL sessions observed are from a 1<sup>st</sup> grade of ESO class who are studying *Science* through English. This is done by means of a collaboration of two teachers, namely the regular Science teacher, who teaches all sessions, and a native-like language assistant, who is only present in one of the two sessions per week.

It is widely agreed that CLIL should integrate both focus on meaning and focus on form. Nevertheless “the integration of content and language learning brings into the fore the well-documented tensions between focus on meaning and focus on form which have been ongoing for several decades” (Llinares, Morton and Whittaker, 2012: 188). Therefore, the balance between FonF and focus on meaning is something that has been broadly questioned and studied but it still seems that no consensus has been reached. Research has shown that focus on meaning is highly realized in CLIL settings but research regarding FonF is still minimal. Thus, the focus of this study will be, mainly, FonF and how it is implemented in a series of CLIL lessons. The main research questions that will be tackled are:

- 1) To what extent is FonF present in Science CLIL lessons?
- 2) What types of FonF are being used?
- 3) What is the role of co-teaching? Does the assistant teacher have a specific role regarding FonF?

To be able to provide an answer to such questions, data will be extracted from field notes and transcribed lessons, where all the instances of teachers’ discourse (both the content and the assistant teacher) will be analysed and quantified, to show empirically if and to what extent FonF is present. Data collected from an interview with

the content teacher will also be taken into account in the analysis and discussion of the data.

This paper is organized into different sections: in the second section, a review of the relevant literature for the topic concerning this paper will be provided. In the third section, the methodological aspects of the study will be presented. The results obtained through this study will be presented and discussed in the fourth and fifth section and in the sixth section, conclusions will be drawn.

## **2. Literature Review**

### **2.1 CLIL and FonF**

Within the context of a multicultural Europe, the interest in foreign language teaching has become predominant and as a result, new teaching approaches have emerged. As previously mentioned, CLIL is one of these new teaching approaches that is being put forward throughout Europe. Despite the increasing interest in CLIL and the different studies being done regarding its implementation, FonF is still understudied if compared to other aspects of CLIL. Therefore, the studies from Pérez-Vidal (2007) and Costa (2012) will be analysed in depth since they are the most appropriate and relevant ones for this study.

The notion of CLIL is based on the assumption that content and language are integrated or as Coyle (2007) describes it, “CLIL refers to programs or classes that incorporate an integrated approach where both language and content are conceptualized on a continuum without an implied preference for either” (2007: 545). Thus, there is the implication that content and language will have the same weight and amount of attention in class. The learner will be able to acquire the content of the subject and increase the knowledge of the additional language.



The rationale of content-based instruction has proven to be successful and well-founded (Snow et al. 1989). Nevertheless, it has been made clear that CLIL is not a panacea, and that it has to be carefully planned and implemented to obtain positive results. It has been shown by different studies that CLIL is being implemented but biased towards meaning (Coyle, 2011; Gajo and Serra, 2002). Thus, integration of content and language is not really achieved, which means that learners are only gaining subject content knowledge since as seen in Canadian immersion programmes, FonF is central to enhance L2 proficiency and if the focus is only on meaning, the learner might not improve or progress on the learning of the L2.

Lyster (2007) proposed a counterbalanced approach to instruction to overcome the tendency of implementing CLIL as a, basically, meaning-focused approach. Thus, he advocates for a counterbalanced instruction that:

[...] promotes transfer-appropriate learning through activities that differ from a classroom's usual instructional routine. Counterbalanced instruction thus extends the scope of form-focused instruction by encompassing instructional practices that range from form-focused interventions at one end of the spectrum to content-based interventions at the other. [...] Students in content-based classrooms need to do so much more than briefly and fortuitously "focus on form", paradoxically, [...]. (Lyster, 2007:133)

As Lyster (2007) argues, a counterbalanced approach balances the amount of attention and focus that is given to meaning and form. He states that within content-based instruction, FonF needs to be much more than just an incidental focus on linguistic forms, but rather a planned and awareness-raising FonF. Therefore, a counterbalanced approach systematically integrates content-based and form-focused instruction, which makes it a central notion to a better implementation of a CLIL model, in which learners have balanced opportunities to process and negotiate language across the curriculum.

Another central aspect to take into account is the differentiation postulated by Ellis (2001) regarding form focused instruction (FFI). FFI is an umbrella term for any type of instruction that focuses its attention to language forms, thus, Ellis (2001) draws a categorization of the different types of FFI. He differentiates between *Focus-on-FormS*, which is the traditional approach to grammar teaching, and *Focus-on-Form* which is drawing the attention of the learner to language while doing a meaning-focused or communicative activity. Another distinction to bear in mind is between *incidental* and *planned FonF* where the central difference is previous preparation. In *incidental FonF*, attention is drawn to language as result of communication and in *planned FonF*, the teacher has previously selected which linguistic form of language s/he wants to get learners to focus on. Ellis (2001) also draws a distinction within FonF and differentiates between *reactive* FonF, which involves a focus on language as a reaction to learners' errors and *pre-emptive* FonF which involves any attempt by the students or the teacher to shift the focus of attention towards language, even though no error has taken place.

## **2.2 Previous research on FonF in CLIL programs**

As Pérez-Vidal (2007) postulates, there is a need for FonF in CLIL approaches. Even though CLIL is characterized mainly as a communicative approach, she states that FonF plays a key role in language acquisition in formal instruction contexts. In this study, Pérez-Vidal (2007) analyses multilingual lessons in Catalonia. She conducts a study on three different school programmes in Catalonia, two of which are from a secondary school in which the CLIL subjects are *Physics* and *Biology* and the remaining study is done in a primary school where the CLIL subject is *Geometry*. The main difference between the three schools is that even though all subjects deal with Science, in the case of the secondary schools the learners had extracurricular English classes, thus, they had additional hours of exposure apart from the conventional amount of

exposure received from the school curriculum. The lessons were video-recorded and after transcribing and analysing the recordings, they were categorized using Bernhardt's (1992) study as a base. Therefore, after selecting all the instances of CLIL strategies, thirteen different strategies were grouped into either "language input or output strategies", "managing strategies" or "other strategies". The techniques comprised in the first category, "language input or output strategies", were used to adapt meaning, to make sure that learners had understood everything and, to adapt language but they also included explicit and implicit FonF moves, explicit moves to encourage learners to produce output and code-switching. In the second group, "managing strategies" included references to content, materials or parts of the lesson and in "other strategies" references to other subjects in the curriculum were included.

Results showed that most teachers devoted their efforts to convey meaning, therefore, concentrating on the interactional level of the classroom, making interaction and communication among students central, avoiding a breakdown in communication. Moreover, there were no instances of explicit FonF, code-switching or interdisciplinary reference. Therefore, Pérez-Vidal (2007) states that CLIL lessons are being implemented as highly communicative, being focused mainly on meaning and negotiation of meaning but leaving language unattended, since no instances of explicit FonF were encountered. Language is seen only as the vehicle to communicate and not as the goal. Thus, she finally concludes that there is a need to look back on Canadian immersion programmes and learn from them, since they had already showed that FonF plays a key role in integrated pedagogy. There is an urgent need to implement FonF within CLIL lessons, to have a true integration of both content and language that provides students with content knowledge and enhanced L2 proficiency.

Another study that deals with the use of FonF in ICLHE<sup>2</sup> classes is Costa (2012), who analyses Italian university lecturers teaching Science through English. The study was conducted by means of observing six different Italian lecturers from three different universities. The focus of the study is on the analysis of the existence of FonF since it is a key element to be able to see to what extent there is integration between content and language. The lectures were observed, audio- recorded and transcribed. Results showed that each lecturer, all native Italian speakers, had different preferences and managed their talk in different ways when focusing on language. All instances of FonF were classified in different categories: *lexical pre-emptive FonF* (Ellis, 2001), which meant that during the class a lexical item had been explained or its meaning had been provided, *grammatical pre-emptive FonF* (Ellis, 2001), where a grammar element is explicitly dealt with or explained, *typographical input enhancement* (Sherwood Smith, 1993; White, 1998), which made input visible to the learners, and *code-switching*, which meant that the teacher translated a lexical item or an expression from one language to another. Despite only having 76 episodes of FonF during the lectures, they represent attention given to language, even if it is rather sporadic.

Even though results revealed that each lecturer had their own preference, overall, lecturers used mainly lexical pre-emptive FonF and code-switching. One of the implications that Costa (2012) draws from the results is that there is less focus on grammatical forms than on lexical items due to a feeling of uneasiness on the part of the teachers. They were content teachers and they might have felt unprepared for explicit language teaching. Thus, she argues that the preference for lexical clarification or code-

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<sup>2</sup> CLIL is an umbrella term used to refer to pedagogical approaches that use the target language as the vehicle of instruction. Nevertheless, in higher education the term used is Integrated Content and Language in Higher Education (ICLHE).

switching is due to the fact that they are less recognizable as language features or less specifically linked to language teaching but rather to general teaching.

The study shows the degree of attention paid to language, in lectures strongly aimed at meaning, and what has been highlighted is that there are instances of FonF, even though they are mainly targeted at providing meaning or an explanation of specific lexical items. Nevertheless, these findings represent a gradual implementation of integration in ICLHE. Therefore, Costa (2012) argues that the instances of FonF found in the study are evidence of a move towards the implementation of an integrated content and language model in Italian universities that will provide knowledge of the subject but also increase the competence and proficiency in the L2.

There are different studies worth mentioning since they also deal with FonF but through focusing on instances of corrective feedback or repair in negotiation sequences, which are categorized as instances of reactive FonF. As Mariotti (2006) points out, the main two factors that allow learners to focus on form are negative feedback and comprehensible output. Therefore, Pavesi and Zecca (2001), Mariotti (2006), Serra (2007) and Dalton-Puffer (2007) will also be reviewed to reach a better understanding of FonF.

Pavesi and Zecca (2001) observed two Italian high schools where CLIL *Science* was being taught by means of co-teaching. After analysing the data, they observed that in CLIL contexts the attention of teachers was mainly focused on teaching specific lexis (FonF). The teachers answered a questionnaire and the results showed that code-switching is one of the main strategies used by content teachers when facing difficult elements that would lead to a breakdown in communication. Therefore, they showed a preference for presenting difficult content first in the L1. The survey found out that there is a risk in co-teaching, since the subject teacher seemed to neglect language in

favour of meaning due to the presence of the language teacher. The role of teaching language and focusing on form seems to be left for the language teacher which is something not desirable since the time of L2 use would be reduced and integration would not take place, thus leaving the learner with fewer opportunities to improve his language proficiency.

In her study, Mariotti (2006) studied the negotiated interactions and repair patterns in three Italian high schools where *Biology*, *Geography* and *Natural Science* were being taught through CLIL. Twenty-two classes were observed and tape-recorded; the learners were aged from 13 to 18 and ranged from beginner to intermediate level. After analysing the data, she found that negotiation of meaning was not equally distributed since learners tended to start negotiation sequences with much more frequency than teachers. Regarding negative feedback produced by the teachers, it was clearly shown that teachers rarely used negotiation moves as corrective feedback and that they rarely pushed learners to produce comprehensible output during negotiation sequences. Despite being clearly observed that learners negotiated for meaning and had an active role, it has been shown that the presence of negotiation of meaning does not entail corrective feedback on the part of the teacher, since as it happens in this study, teachers favoured comprehension over accuracy. Therefore, Mariotti (2006) claims that teachers need specific training to be able to exploit the full potential of focusing on form through negative feedback and comprehensible output.

Serra (2007) conducted a longitudinal study in three different Swiss primary schools where three classes of German speaking pupils were taught 50% of the curriculum through Italian or Romansch. Nevertheless, some learners already had knowledge of Italian or Romansch. She proposed an integrative bilingual teaching model that focuses on form by means of an alternation of the L1 and an L2. After

analysing the data, Serra (2007) observed that bilingual pupils increased the dynamics of the classroom and captured the attention of monolingual learners. FonF was mainly connected to content activities, where not only it was used to solve problems with comprehension but also, to solve perceived problems in production.

From a conversational point of view, the main pattern consisted of three conversational turns (obstacle, repair, ratification). Conversational recasts dealt mainly with meaning through the treatment of a specific form. Serra (2007) stated that bilingual teaching provided more opportunities to focus on form and on meaning. Thus, she argued that the model of bilingual implementation of a CLIL model which overtly gives a role to the L1, not banning its use, proved to be very successfully implemented, since content and language were truly integrated, mostly, due to a controlled use of language variation of the L1 and L2, being used consciously as a metalinguistic device.

Dalton-Puffer (2007) mainly analysed classroom language in CLIL. She argued that there are four different key elements that have an impact on the development of CLIL classroom language which are: FonF, focus on meaning, interaction in the class and teacher knowledge of the L2. It is widely agreed that FonF and focus on meaning are central to CLIL since attention has to be paid both to language and content. Nevertheless, Dalton-Puffer (2007) argued that the level of interaction in a CLIL class is central since learning takes place when using the language, and the knowledge of the teacher is also a crucial element since s/he has to be able to know and be aware of different explanations of language items that can be embedded in different discourse subjects, so the teacher needs to have a good command of the L2 to be able to intervene and construct linguistic knowledge.

In her study, Dalton-Puffer (2007) found that discussions in the CLIL class were carefully controlled by the teacher, perhaps due to his limitation in knowledge of the L2

since she also found that the teacher's interventions were more technical and less humorous than in a class made by the same teacher using the L1. These findings are corroborated by Nikula (2010), since she also found that in CLIL lessons there was less variety in the teacher's discourse. When analysing classroom language, the well-known interaction pattern of Initiation-Response-Feedback (IRF) is often seen as limited and restrictive. In a CLIL setting, what would be desired instead of providing direct feedback is to prompt the learner, to scaffold him, in order to enrich the dialogue and interaction of the classroom. For Dalton-Puffer, CLIL should have a multi-perspectival analytical framework, thus, focusing on the different speech acts present in CLIL, analysing the main genres, oral practices and discourse grammar. She argued that classroom interaction is central to CLIL and if teachers are aware of it and they use the adequate speech functions or conversational repairs, language learning goals will be realized.

Myers (2008) also studied FonF but only focusing on one type of FonF, code-switching. She conducted a case study on English university learners studying to become French teachers. The focus of her study was on the effects of code-switching on a CLIL course. Therefore, she conducted the study by means of creating a "social semiotic space" model within a simulation activity. This simulation activity was called "my school community" and it mainly consisted of problem solving activities through the L2, which reflected the students' experience in learning the L2. Thus, the learners could develop their strategies for integrating content and professional vocabulary (language). The simulation activity was carried out over a short term. Every week learners were presented with a new problem to solve, and they had ten minutes to do so. After analysing all the data, Myers (2008) stated that there is no doubt that learners developed and increased their level of communication in the L2 and she also observed



language gain regarding specific vocabulary terms. Nevertheless, the overall grammatical competence of students did not seem to increase. She argued that to be able to determine to what extent code-switching has an effect on second language learning, a longitudinal study would be needed to cast some insight on the long-term impact of code-switching in activities similar to the ones proposed in her study. She also stated that the time-limited activity is very helpful to students since they can share their experiences and work together to become more proficient. In her study, it is also shown that code-switching is effective for different levels, since different students from different levels and contexts used code-switching at some point in the activity. In this particular study, the simulation activity and code-switching were really helpful to increase language competence of more advanced students. Nevertheless, the main findings suggest that discourse competence is what really increased and was developed by all students.

Previous research has taken into account code-switching, corrective feedback and repair in CLIL lessons as instances of FonF. Nevertheless, it has been clearly shown that there is a lack of research on FonF in CLIL contexts since there is a tendency to leave out FonF and favour focus on meaning and communication among students. This study aims at providing some insight into how FonF is realized in CLIL contexts.

### **3. Methodology**

This study attempts to shed some light into how FonF is present in a CLIL classroom by means of analysing the teacher's discourse. A class of a secondary school in Catalonia has been observed and audio-recorded to get a better understanding of the presence of FonF in CLIL classes, to explore what types of FonF are there and, since

the class was done by means of co-teaching, to know if each teacher had a different role regarding FonF.

### **3.1 Participants**

Even though the study does not focus on the students, some information on their profiles is included so as to better contextualize the lessons. There were eight students of 1<sup>st</sup> grade of ESO, thus, they were between twelve and thirteen years old and they were all male students except for one. Since it is an optional subject, one of the requirements for the students was to have a good command of English, approximately B1-B2 level according to the Common European Framework of Reference for Languages (CEFR).

As far as the profile of the teachers is concerned, all information was gathered through an interview which was carried out once the classroom observations and data collection had finished. The content teacher was a native Catalan and female teacher with no previous training on CLIL. Nonetheless, it was the second year that she taught *Science* through CLIL. Regarding content, she had a degree in Biology and regarding language, she had the First Certificate of English from the University of Cambridge. Apart from teaching *Science* through CLIL, she also taught EFL (English as a Foreign Language) in the same school. The assistant teacher was a female bilingual speaker of English and Italian from Canada and she also had some knowledge of Spanish. Moreover, she had just finished her degree in Earth Sciences in Ontario.

### **3.2 Instruments, Procedure and Data Analysis**

The study was carried out by means of observing and audio-recording the science subject taught in 1<sup>st</sup> grade of ESO in a secondary school in Catalonia. The

lessons were observed for one month (nine sessions), resulting in five hundred and forty minutes of observed and audio-recorded lessons.

Moreover, data was extracted from field notes, systematic classroom observations and from the interview with the content teacher to get to know her background education as well as training and experience in CLIL (see Appendix A for the interview). Observations were non-intrusive and field notes were taken completing an observation grid adapted from de Graaf, Koopman and Westhoff (2007) (see Appendix B). The recordings, to which the teacher consented (see Appendix C), were made using a USB digital voice recorder.

In order to answer the questions guiding this study, all instances of FonF were counted and classified into different types of FonF. The classification was adapted from Costa (2012) and Ellis (2002). Therefore, all samples of FonF were classified into the following categories:

Reactive FonF	Focusing on a linguistic form due to an error
Pre-emptive FonF	Making a linguistic item the topic of the discourse, it can be student or teacher initiated
Lexical reactive FonF	A lexical element is explained due to a an error.
Lexical pre-emptive FonF	A lexical element is explained or its meaning provided

Grammatical reactive FonF	A grammatical element is dealt with as a result of an error.
Grammatical pre-emptive FonF	A grammatical element is explained or dealt with.
Phonetic reactive FonF	The correct pronunciation of a specific element is given due to a mispronunciation.
Input enhancement	Input is made visible or clearer to the learners
L1 use	Using the L1
Code-switching	Combination of two codes in the same sentence.

Table 1. Classification of instances of FonF

## 4. Results

### 4.1 Quantitative analysis of FonF use.

All interventions of the content teacher and the assistant teacher were quantified to get a better understanding of the presence of FonF in the sessions. As can be seen in Table 2, a first categorization was drawn taken into account the discourse of both teachers. Within both teachers' discourse, the instances of FonF only represented 14.03% of all the interventions. If we focus on the content teacher's discourse, only 12.34% of her interventions were considered to be FonF and regarding the assistant teacher, 19.23 % of her interventions were instances of FonF.

	Teachers' discourse	Content teacher's discourse	Assistant teacher's discourse
Interventions	741	559	182
Instances of FonF	104	69	35
Percentages	14.03%	12.34%	19.23%

Table 2. Interventions and Instances of FonF in the teacher's discourse.

Table 3 displays a classification of the types of FonF used by the content teacher and the assistant teacher. As regards the content teacher, lexical pre-emptive FonF is the instance of FonF with a higher percentage, being present in 46.37% of her speech. The second type of FonF used in 18.84% of her discourse is L1 use and lexical reactive FonF represented 11.59% of her discourse. The other types of FonF were to some extent equally found in her discourse except for grammatical pre-emptive FonF which was not found on the content teacher's discourse. Focusing on the assistant's discourse, it is shown that phonetic reactive FonF was the type of FonF that was found in most of her discourse, since it represented 45.71% of her form-focused interventions. Grammatical reactive FonF represented 31.42% of her discourse and the other types of FonF were to some extent equally found in her discourse except for L1 use and grammatical pre-emptive FonF since no instances of those types of FonF were found. Figure1 visually represents the types and frequencies of use of FonF in the two teachers' discourse.

	Content teacher's instances of FonF	Percentages in the content teacher's discourse	Assistant teacher's instances of FonF	Percentages in the assistant teacher's discourse
Lexical pre-emptive FonF	32	46.37%	2	5.71%
Lexical reactive FonF	8	11.59%	3	8.57%
Grammatical pre-emptive FonF	0	0%	0	0%
Grammatical reactive FonF	6	8.69%	11	31.42%
Phonetic reactive FonF	4	5.79%	16	45.71%
Input enhancement	2	2.89%	2	5.71%
Code-switching	4	5.79%	1	2.85%
L1 use	15	18.84%	0	0%

Table 3. Instances and percentages of different types of FonF.

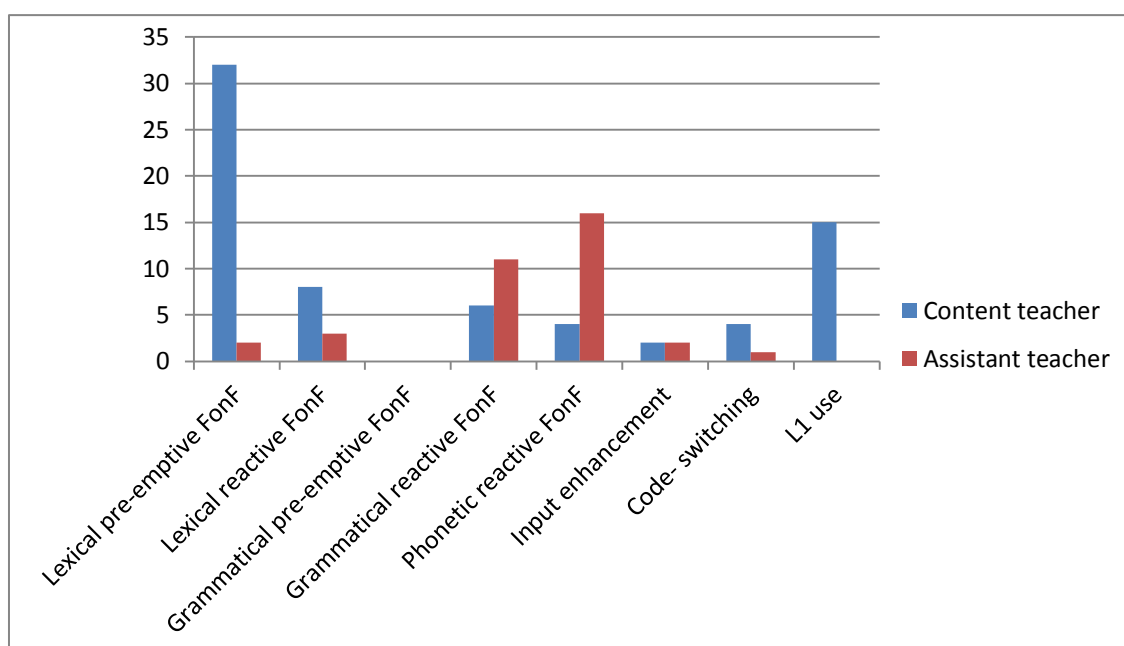


Figure 1. Types of FonF in relation to teacher's discourse.

## 4.2 Qualitative samples of the content teacher's FonF use

As was seen in the quantitative analysis, the content teacher's most widely used form-focused intervention was pre-emptive lexical FonF. The following extract illustrates its use:

T: So, with this activity... what do we have to learn about this activity? Is it important to memorize things?

S<sub>1</sub> & S<sub>2</sub>: Yes

T: No, it's important to (1.5) **starting with a 'u' (.) 'un..' understand**. There's a lot of things that if you don't memorize you won't remember but there are a lot of things that you must understand. Otherwise, if we do this activity in the third term, it will happen the same. You won't remember the answers. So, try to understand and then, if necessary, memorize.

We can see that the content teacher was focusing on a specific word that she wanted her students to say. Since there had not been any previous error to her statement, it is considered pre-emptive lexical FonF. The second type of FonF that she used with more frequency was L1 use:

T: So, okay what do you think it means? The atmosphere stops, the surface heats.  
L'atmosfera stops. What does it mean stops?

*The atmosphere*

S6: para

*Stops*

T: **llavors l'atmosfera atura l'escalfor i fa que no se'n vagi perquè if that happen what will be the temperature in our planet? Will it be warm? Or will it be cold? Si tota la temperatura s'escapés? Quina temperatura faria?**

*Then the atmosphere stops the heat and prevents it from getting away.*

*If all temperature escapes? Which will be the temperature?*

S6: calor

*Hot*

T: **si tota la temperatura s'escapa, fa molta calor?**

*If all temperature escapes, will it be very hot?*

S6: ah, no.

T: **no, si tota la temperatura s'escapés faria molt de fred,** right? And we would die.

*If all temperature escapes, it would be very cold, right?*

As we can see, the content teacher used the L1 in different moments during the sessions when students did not understand or they needed further clarification. By contrast, code switching involves a combination of two codes in the same sentence. There were fewer instances of code-switching than of L1 use. Nevertheless, in some specific occasion the teacher used code-switching. An example of code-switching is also provided here:

T: you have to remember that amount is **quantitat**, eh?

((Bell rings))

In the content teacher's discourse, we can also observe reactive lexical FonF. As it is attested in this extract, student 5 made an error and the teacher, as a reaction, provided first, a clarification and afterwards the correct form of the word.

T: you will have to study, the important things that aren't in your power point, yes? Because is not nice to read, is better to explain, yes? So, you will have to study like for an exam, yes? It's not a long part and you're doing it in pairs, so it's not difficult, it's easy. You can start, if you have any questions, you can ask me.

((Students working in pairs, teacher going around the classroom.))

S5: quin és el màxim de diapositives?

*Which is the maximum of slides?*

T: In English.

S5: the maximum of [diapositivs]?

T: [**diapositivs**] is not an English word, you mean slides. And what do you think?

S4: I don't know



The only type of FonF that was not attested in the content teacher's discourse was grammatical pre-emptive FonF since she did not plan any grammatical intervention. By contrast, some instances of grammatical reactive FonF were attested.

S1: però Ana, com ho podem fer?

*But Ana, how can we do it?*

T: I don't understand.

S1: How we can do this...

**T: how do we make questions? We can or can we?**

S1: how can we do this PowerPoint?

As is attested in this extract, the content teacher pointed out a grammatical error and therefore, brought a grammatical form to the student's attention. The last two types of FonF, phonetic FonF and input enhancement were the least frequent in the content teacher's discourse. Some instances of phonetic FonF were attested when the teacher corrected the pronunciation of words of their students as we can see in this extract:

T: okay, what's in this video? (.) Well, before we play the video I want you to translate, yes? (.) Don't play the video. ((Writing some words on the board)) and have you checked the pronunciation of these words? Can you repeat those words?

S1: [pressur]

T: **pressure** (1.5)

S2: [mesur]

T: **measure**, right? Well, you've got some words wrong pronunciation but, (.) so, let's check in Catalan.

The last type of FonF observed in the teacher's discourse was *input enhancement* which is understood as making the input more visible. The instances that were classified as *input enhancement* were when the teacher tried to explain something already mentioned by means of body gesture.

A: because it has no smell, no colour and no taste.

S4: smell?

T: ((**pointing at her nose**)) smell.

### 4.3 Qualitative samples of the assistant teacher's FonF use

In the assistant teacher's discourse, the most frequently used types of FonF were phonetic reactive FonF and grammatical reactive FonF. In this extract, some instances of phonetic reactive FonF and grammatical reactive FonF are shown:

A: okay, so you need to put it. Okay, if you want you can make it appear after. Like this, (1.5) okay, doesn't mind. Go on.

S4: [nitrogen]

A: **nitrogen** /'naɪtrədʒ (ə) n/

S4: nitrogen, this gas has not smell

A: does not smell

S4: does not have smell

A: **does not smell. Or you have two options has no smell or does not smell.**

S4: has not smell

A: has **no** smell.

S4: has no smell ((writing down)) has not colour

A: **no** colour

S4: has no colour and has no taste. [...] [oxigen]

A: **oxygen** /'ɒksɪdʒ (ə) n/

S4: oxygen (1.5) this gas has not coloured

A: no colour

S4: no colour, no smell and no taste. It's necessary for [combustion] and respiration

A: **combustion** /kəm' bʌstf (ə) n/

S4: carbon dioxide

A: **dioxide** /daɪ' ɒksaɪd/

S4: dia... Dioxide

A: dioxide. Don't laugh. You're next. ((Directing to s3))

S4: carbon dioxide has no smell, no colour and no taste. This gas is (3.5) [soluble]

A: **soluble?** /'sɒljʊb (ə) l/

S4: [solub- solub-solubleb]

A: **the last sound is blah not Leb. So-lu-ble**

S4: so-lu-bleb. No, so-lu-ble. Soluble! Just like water vapour that has no smell, no taste and no colour.

In this extract, there are different instances of phonetic reactive FonF in which the assistant teacher corrected the pronunciation of the students until they produced the correct pronunciation. Moreover, there are also instances of grammatical reactive FonF in which she dealt with the use of negatives. An additional example of grammatical reactive FonF can be found in this extract:

A: you want to write this down because you're going to forget about it. (1.5) David, are you practicing? Or writing down what I say because I'm correcting different mistakes.(2) okay, harmful, another space there and (2) I'm not positive if it is one l or two "l"s. Can you check on the book?

S3: one

A: one, okay. It's not my first language so I have to check. (2) It reflects, with an s.

S4: and here?

A: no because here you have it does not contain. So, you've already the s in the does. Have you studied this? **If you have an s in does then you don't put it in the verb, no? Well, it only works because contain is linked with does.** So, here reflects it does not have a does so that's why we put an s. I'm sorry, I'm not very clear. (3.5) okay, so this layer contains, if you leave the does, okay?

As is seen in the extract, the assistant teacher was trying to explain to the students a grammatical form, in this case the third person singular *-s* and the use of the auxiliary *does*. Other types of FonF were found in the discourse of the assistant teacher that were used with the same frequency, for example, lexical pre-emptive FonF and lexical reactive FonF

T: Yes, the train won't be able to follow its way so we can have an accident.

A: Us, in Canada, we have that problem because the temperature between the summer and the winter is very, very, different. So, on our bridges we have joints that leave the space for the different changes due to temperature. So, I don't know every few meters, we have a joint... **Do you know what a joint is? It's like a separation...ah... something that brings two things together.** But ... because they don't construct the whole thing in one piece, instead, they make a piece and then a joint and then another piece, and that joints permit... let the expansion and contraction of the metal. It's very, very important.

[...]

A: what happens to that water?

S3: it vapours

A: yes, it evaporates.

The assistant teacher presented a new word, *joint*, and proceeded to explain its meaning without any previous student error. In the second case, we can see that the student commits a mistake and then the assistant teacher corrects him, which is an instance of reactive lexical FonF. As in the case of the content teacher's discourse, the assistant teacher also basically had some instances of *input enhancement* in her discourse by means of body movement and gestures:

((S2 reading))

S2: to contract?

A: to decrease is to reduce, to go lower. And to contract to ((**non-verbal gesture, moving hands**)) squeeze.

Even though no instances of L1 use were attested, one instance of code-switching was found in the assistant teacher's discourse. This instance of code-switching where she alternates between two codes was a reaction to a student's question and the assistant teacher chose to answer by using another code, in this case, the L1 so that the student would clearly understand it.

T: the temperature increases... què vol dir increases?

*What does it mean increases?*

S<sub>3</sub>: increases no sé...

*I don't know*

T: we have said that before...

A: **augmentar**, yes?

*Increase*

Therefore, after analysing the results, it is clear that FonF is present in the teachers' discourse but that it only represents 14.03% of their discourse. Moreover, there are different types of FonF that seem to be preferred by each teacher. Lexical pre-emptive FonF and L1 use prevail in the content teacher's discourse whereas phonetic reactive FonF and grammatical reactive FonF are favoured in the assistant teacher's discourse. Such results will be discussed in the following section along with the research questions that have led this research study.

## **5. Discussion**

The results obtained will be discussed in relation to the three research questions that have guided the present study, namely to what extent FonF was present in Science CLIL lessons, what types of FonF were used and what the role of each teacher was regarding FonF.

Regarding the first research question, after classifying and quantifying all instances of FonF, the results obtained are in line with previous studies (Pérez-Vidal, 2007, Costa, 2012) since FonF is shown to be barely present in the teachers' discourse in Science CLIL lessons. As Pérez-Vidal (2007) stated, it is clear that CLIL lessons are being implemented as highly communicative, mainly focused on meaning and negotiation of meaning and leaving language unattended. Even though it is true that FonF only represents 14.03% of the teachers' discourse, its presence is a token to be valued since neither the content teacher nor the assistant teacher had previous CLIL training and were not aware of how integration of content and meaning is to be achieved. The results showed that the content teacher basically devoted her efforts on conveying meaning and making interaction and communication between students central. Taking into account the attested instances of FonF and the information obtained

from the interview with the content teacher, it is clear that FonF is not something to which the teacher devoted time or any previous planning. Thus, following Ellis (2001), all instances that have been attested have been categorized as incidental FonF.

Regarding the second research question, there seems to be a wide range of types of FonF in the teachers' discourse. Nevertheless, the content teacher used pre-emptive lexical FonF and L1 use the most. The high use of pre-emptive lexical FonF could be argued for, as Costa (2012) implies, due to a feeling of uneasiness on the part of the teacher since she might feel unprepared to teach a CLIL class or due to the fact that lexical FonF is perceived as less threatening and more meaning-related than grammatical FonF. L1 use was widely used by the content teacher. When facing some problems in communication with students, she turned to their L1 for support. The use of the L1 in EFL contexts or communicative contexts is something highly discussed and it was thought to be detrimental for the students. Nevertheless, as Serra (2007) pointed out, a bilingual model of a CLIL lesson which overtly gives a role to the L1 has proven to be very successful regarding content and language integration. Therefore, L1 use of should be seen as something positive, if it is a controlled use of language variation in which the L1 is used consciously to avoid communication breakdowns and also as a metalinguistic device.

If we focus on the most widely used types by the assistant teacher, we observe a clear distinction in terms of preferred types of FonF. She used reactive grammatical FonF and reactive phonetic the most. As has been attested, all types of FonF were used by both teachers except L1 use that was only used by the content teacher and grammatical pre-emptive FonF which was the only type of FonF that was not used by any teacher. This has an underlying implication since neither of them had really language training, they were both content teachers. Nevertheless, the content teacher

assigned the role of language specialist to the assistant teacher due to a higher supposed linguistic knowledge assumed due to her close status to a native-speaker. The fact that no teacher used any grammatical pre-emptive FonF could be explained, as Coyle (2011) or Lyster (2007), stated, due to a tendency from content teachers to implement CLIL as a, basically, meaning- focused approach. By contrast, Costa (2012) implied that content teachers tended to focus less on grammatical forms due to the fact that grammatical forms are specifically linked with language teaching and thus, it was perceived as threatening for content teachers. The lack of L1 use on the part of the assistant teacher can be explained due to her high proficiency in the L2 but also as an unconscious moving towards a more form-focused approach.

As Dalton-Puffer (2007) states, there are four different key elements that have an impact on the development of CLIL classroom language: FonF, focus on meaning, interaction in the class and teacher knowledge. Focus on meaning has been observed to be highly achieved in the CLIL Science lessons that have been analysed whereas FonF has been shown to be under realized. The interaction level of the class has been attested in all classes since, as attested in our classroom observations, the teacher provided a lot of opportunities for interaction in the class. If attention is drawn to teacher knowledge, it is clear that the level of proficiency of the teacher is not as high as it would be expected to teach a subject through CLIL. In the interview with the content teacher, she mentioned that she did not have any preparation or training in CLIL but she had a degree in Biology and that her level of English was a B2 level, according to the CEFRL. The effect of the proficiency of the teacher was seen on the sessions, where sometimes the content teacher committed some mistakes and even in some cases, the assistant teacher corrected her. There are different instances of reactive grammatical FonF on the assistant's discourse that are geared at correcting mistakes of the content teacher.



T: Okay and do **liquid** have definite shape?

A: Do liquids...

T: Do liquids have a definite shape?

In this case, after having committed a mistake the assistant teacher immediately corrected the content teacher. The assistant teacher not only corrected grammatical errors from the content teacher but also wrong pronunciation of specific words. As it can be seen in this extract:

T: the [geisous] part of the Earth, yes?

S4: crec que sí

*I believe so*

A: the gaseous /gæsiəs/ part of the Earth.

[...]

T: so what [geises] can you find and so on

A: /gæ/, gases

Taking into consideration the third research question, we can see that co-teaching has different roles regarding FonF. The fact that the assistant teacher corrects the content teacher together with the observed lack of communication between teachers seems to reflect quite a difficult situation for the content teacher. In the interview, when the content teacher was asked about the role of the assistant teacher, she answered that her role was to make communication more fluent and dynamic. When she was asked about FonF, she did not have a clear idea of what it meant and judging by the results, it seems that the role of focusing on form is left for the assistant teacher. If their discourse is separated, it is clear that the assistant teacher has a higher percentage of FonF (19.23 %)

in her discourse than the content teacher (12.34%), even though she was only present in three out of the nine sessions observed.

There is a central difference between the content teacher and the assistant teacher in terms of FonF. When the assistant teacher was not present in the class, the content teacher provided some instances of reactive grammatical, lexical and phonetic FonF but when the assistant teacher was present in the lesson, she only seemed to focus on lexical FonF and leave the more language-related FonF to the assistant teacher. This, as stated by Pavesi and Zecca (2001), is negative for students since it means that students will have fewer opportunities to focus on form and integration will not take place.

One possible account for leaving the task of focusing on form to the assistant teacher could be that the content teacher feels that the assistant teacher is more prepared to deal with language since she has higher proficiency than her. Even though it is true that the assistant teacher has more linguistic knowledge and confidence, she does not have any training on how to teach English. Furthermore, there is an instance where the assistant teacher tries to explain a grammatical form, she fails and then apologizes for it:

A: no because here you have it does not contain. So, you've already the s in the does. Have you studied this? **If you have an s in does then you don't put it in the verb, no? Well, it only works because contain is linked with does.** So, here reflects it does not have a does so that's why we put an s. **I'm sorry, I'm not very clear.** (3.5) okay, so this layer contains, if you leave the does, okay?

She is conscious that she is not prepared to teach explicit grammatical FonF since she does not have any language teaching training. Therefore, even though the role regarding FonF seems to be distributed between the content and the assistant teacher depending on

whether it is more meaning or language-related, both teachers only have training and knowledge on the content of the subject and neither of them are language specialists. As Mariotti (2006) stated, teachers need specific training to be able to exploit the full potential of FonF and CLIL. It is not enough to have a teacher with a native-like pronunciation and a high level of proficiency, as it has been attested, if the teacher has no training on language, it is of no use the high level of proficiency because without real integration of content and language, students will not be able to improve their L2 proficiency.

## **6. Conclusions**

The aim of this study was to determine to what extent FonF was present in CLIL lessons. After having analysed the data, it was shown that FonF was present in the teacher's discourse even though it only represented 14.03% of their discourse. Nevertheless, this was a token to be valued since it showed a move towards true integration of content and meaning and as Costa (2012) showed, this was also a tendency in ILCHE. Therefore, this study supported the idea of a gradual implementation of CLIL but also reinforced the idea that there is an urgent need for FonF in CLIL lessons. FonF should be more present in the teachers' discourse, otherwise students will not be able to increase their L2 proficiency.

Some important limitations should be acknowledged. The CLIL class was only observed during a month. A longer period of time should be studied to have a better and more empirical understanding of how CLIL is carried out. Another important factor to bear in mind is the number of students that were in the group. Since it was an optional subject only eight students were enrolled in it. This was initially not considered to be a limitation since the focus of the study was the teacher's discourse. Nevertheless, it

cannot be denied that the number of students in a class influences the teacher's discourse. It is not the same to have eight students than forty students in the class. In order to see if the number of students has an impact on FonF in the teachers' discourse, a study with a larger group of students should be carried out.

All in all, FonF and the integration of content and language in CLIL contexts deserve further attention. A great number of CLIL teachers are currently unaware that CLIL should foster integration so further research is needed to get a better understanding of CLIL and the possible applications of FonF when targeting at enhancing the L2 proficiency of students.

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## 7. Appendices

### 7.1 Appendix A: Interview with the content teacher.

I: interviewer (3.2) an interval between utterances (3 seconds and 2 tenths)

T: Teacher (.) pause

I: well, I'll ask you some questions to know a little bit more, okay?

T: okay.

I: how old are you?

T: 33

I: okay, and what are your background studies?

T: tinc una llicenciatura en Biologia, de quatre anys.

*I've got a degree on biology, it was four years.*

I: val, de quina universitat?

*Okay, from which university?*

T: a la Autònoma, la UAB

*From the UAB*

I: okay, and your english qualifications ? which level do you have? Is it difficult to cope with English?

T: aviam, tinc cinquè de la EOI i el first certificate de Cambridge.

I: okay, and how do you cope with English?

T: de cap manera en especial.

*there's nothing special about it.*

I: aha, and have you had training in CLIL? If so, where and for how long?

T: No

I: mm, de cap mena? (0.5) okay. And (1.5) is this the first time you teach this subject?

T: sí, és el primer any perquè tot i que ja fa tres anys que es fa, he estat de baixa per maternitat.

*Yes, it's the first year because even though we've been teaching this subject for three years now, i've been on maternity leave.*

I: val, and how do you plan a class?

T: com qualsevol altre, cada dos setmanes més o menys fem un nou topic, depenent de quin topic doncs potser més llarg o més curt.

*Just like any other, every two weeks more or less we make a new topic, depending on which topic it can be longer or shorter.*

I: okay, so you've been teaching CLIL for a year?

T: ah! Espera, no, aquest és el segon anys perquè vaig estar de baixa el primer any que es feia l'assignatura.

*oh! Wait no, this is the second year because it was the first year of the subject that I was on maternity leave.*

I: okay, so two years teaching CLIL and only Science, right?

T: yes.

I: and what's your overall opinion about CLIL? Do you think that it is an improvement?

T: Yes, clar com sempre com més hores exposats a la llengua més benefici pels alumnes.

*Yes, of course, the greater the exposure to language the better for the pupils.*

I: okay, and do you know what Focus on form is?

T: Sí, és com una metodologia, que fa que les classes siguin dinàmiques amb més activitats i així, no?



*Yes, it's like a methodology, that makes classes more dynamic and with more activities and that, no?*

I: sí (2.5) més o menys. (3.5) and if CLIL is content and language integrated learning, how do you integrate them?

T: Bueno amb el llibre, on ja està integrat i amb materials extra.

*Well, with the book, where it's already integrated and with extra materials.*

I: okay, and do you think that content should be given more importance than language? Or vice versa?

T: no, the same, s'ha de tenir en compte tot , el nivell perquè clar si tu vols que ells desenvolupin, no pots penalitzar els errors típics com la s, de tercera persona.

*The level has to be taken into account, because if you want them to express main ideas, you cannot penalize typical errors such as the third person singular -s.*

I: okay, and what is the role of the assistant? Is s/he a language teacher? Has s/he had CLIL training?

T: Bueno ella ajuda als nens a entendre-ho tot millor i ho fa més dinàmic. I no, no ha tingut cap training, ella només té la carrera de ciències.

*Well, she helps children to understand better and it makes it more dynamic. And not, she hasn't had any training, she only has a degree in Science.*

I: okay, and since there are other subjects being taught through CLIL in your institution, is there a CLIL team or do you get help from the EFL teacher?

T: no, no hi ha cap departament. Per Anglès sí, estem Jo i unes quantes professores més, però per aquesta assignatura, ho faig Jo sola.

*No, there is no department or team, for English, as EFL, yes there's me and other teachers, but for this subject, I do it alone.*

I: okay, and is there continuity in further levels?

T: No, de moment, no tenim cap altre assignatura semblant a altres nivells de l'ESO però si tenim més demanda, llavors podria haver-ni. De moment, altres assignatures tenen més demanda que aquesta.

*No, at the moment, there is no similar subject in further levels of ESO but if there is more demand, then maybe we could have it. For the moment, other subjects have more demand than this one.*

I: okay, so that's it.

T: okay, so if you have any other question or later on you come up with more questions, you can just sent me an e-mail and I'll answer.

I: okay, that's perfect, thank you very much.



### 7.3 Appendix C: Consent form

#### Consent Form

I agree to take part in a research study investigating CLIL: Content and Language Integrated Learning in secondary schools.

I understand that my name and my specific work will remain confidential and that I will not be identified in any report or presentation which may arise from the study.

I understand that while I may not benefit directly from the study, the information gained may help achieve a better understanding of CLIL and its application in a class.

I understand what this study involves and I hereby give permission for my recordings to be used for research purposes

Aunna Priats Ibañez  
Name

  
Signature

12/11/2015  
Date

## 7.4 Appendix D: sample transcription

### Transcription Conventions

(Adapted from: Richards, K and P. Seedhouse (2007) *Applying Conversation Analysis*.)

Hola translations into English are italicized and located on the line below the original utterance.

*hello*

((T shows picture)) non-verbal action or editor's comment

[ particules ] in the case of inaccurate pronunciation of an English word, an approximation of the sound is given in square brackets.

(.) a very short untimed pause

(3.2) an interval between utterances (3 seconds and 2 tenths in this case)

Word underlining indicates speaker emphasis.

### 1<sup>st</sup> Session

T: Gerard Can you explain what have you done all those days?

S<sub>1</sub>: ski... ammm... I ski.. I go ski

A: How do you say that in the past?

S<sub>1</sub>: I went... went to...

A: You can say I went skiing. I went skiing. Uh? Where did you go?

S<sub>1</sub>: A la masella

*To la Masella*

A: Okay. Is that very far?

S<sub>1</sub>: No... Is near here.

A: Okay. And how long did you stay?

S<sub>1</sub>: hmm... Three days.

T: Did you go there because you've got an apartment there or was this the first time?

S<sub>1</sub>: No, it was an... an offer to go there and it was cheap, it was not that car.

*expensive*

T: So it was cheaper yeah? It was not expensive going there those days. (1.5) How many days have you been skiing?

S<sub>1</sub>: three

T: three days? Do you want to ask anything to Gerard?

All Students: No

T: No? Okay. So what did we do last day? What did we do on Thursday? Do you remember?

((Silence))

S<sub>2</sub>: Christmas' activities

T: Christmas' activities. So what did we have to do?

((Silence))

T: you worked in... groups? Or you worked in...?

S<sub>3</sub>: alone...

Other students: No

S<sub>3</sub>: yes! The readings yes, the expositions..

T: you worked in pairs? Doing what?

((Silence))

S<sub>3</sub>: the... the...

T: what did you do?

S<sub>1</sub>: the expositions of that thing

T: but before that? What did you do?

S<sub>1</sub>: ah! *Vale*... read the...

T: you had to read an a.. a what?

S<sub>2</sub>: An study

T: an article. Yes? And then...

S<sub>3</sub>: explain

T: explain it to the...

S<sub>3</sub>: class

T: to the class, Yes? To your classmates. Good! Now I told you that we would start a new unit today...So I need your books on the table.

A: Gerard, Do you have it? (1.5) No? ((Gives her book to him))

T: What page Roger?

S<sub>4</sub>: twenty-three

T: Page twenty-three, right! So...

S<sub>1</sub>: twenty?

T: twenty-three, please! States of matter. Do you remember that we did an activity?

S<sub>4</sub>: ah si...mmm em sona.

*Ah...yes, it rings a bell.*

T: and I think... who thinks ...you remember the activity we did on the board?

((Students muttering))

T: Gerard! Gerard that you don't have book come with me and Ot, you don't have the book come with me on the board and will see what can you remember about an activity that we did the first term.

((Giving them the papers and material)).

T: So with different papers.. explain first the activity.. you cannot tell them right? Properties of..?

S<sub>1</sub>: the water

T: the water? Or in general? Matter, in general.[Students start doing the activity on the board]

T: David! What are the different states of matter?

S<sub>3</sub>: the different states... sòlid, liquid and gas.

*Solid, liquid and gas.*

T: solid, liquid and gas. So do they have the same properties or they don't?

S<sub>3</sub>: Yes!

S<sub>5</sub>: No.

T: Do they have? Do they have the same properties?

S<sub>3</sub>: ah! The same?

T: Yes, the same.

S<sub>3</sub>: Ah no, no!

T: No they haven't. So, we did a game on the whiteboard, yes? Now, they have to...guess. Yes? Do you remember? I wanted you to do it in pairs. So let's see if you remember all that we did on the first term.

S<sub>1</sub>: podem mirar el llibre?

*Can we look in the book?*

T: Yes, you can have a look.[] While they do this.. I want you to... Ot Do you think you know the answer? (0.5) Well... let them think a bit and we will go to page twenty-six. (1)Do you think temperature is important in matter states? Do you think it affects or it doesn't?

A: did you say yes? Do you have an example? (2) For example, if you ...uhmmm...put some water to boil, you're augmenting the temperature right? What happens to that water?

S<sub>3</sub>: it vapors.

A: yes, it evaporates so it changes of states, right? It changes from liquid to gas. So, that's... they have different properties. So depending on the temperature, you have different properties. Can you tell me an example of a property that is different for liquid water and gas water?

S<sub>6</sub>: Uhhh...

T: Anyone? (1.5)

S<sub>7</sub>: the?

A: a different property of liquid water and gas water which is vapor.

S<sub>6</sub>: Com? Un altre exemple?

*How? Another example?*

A: No, the example that I gave was that you have different properties if you change the temperature. Maybe it's going to be simpler if I lower the temperature, okay? You have liquid water, okay? It has certain properties, right? If you freeze it... then it becomes ice. It has different properties, right?

Students: right!

A: Can you explain the difference?(.) And the change that we did is that we changed the temperature. So the temperature does matter right? It is important. So, what are the differences between the properties of the liquid water and solid water, which is ice.( 0.5) Do you have an idea? You raised your hand.

S<sub>4</sub>: it expands...

A: yes it expands. Anything else? So the volume, uhum. Do you remember, Yes?

S<sub>4</sub>: the...molècules move less

*molecules*

A: they would move less. That's true; they stop (0.4) they vibrate very small, so that's true.



T: very good! That's the main idea of page twenty-six. Very good, Roger. (0.5) So let's have a look at this text. Maybe we can read a full stop each starting with Arnau.

S<sub>5</sub>: la pàgina?

*Page?*

T: Yes. If there's anything that you don't understand we will translate it later. Okay?

S<sub>5</sub>: quan no l'entengui paro?

*Do I stop when i don't understand something?*

T: uhh... Just underline that word and we will translate it later. Okay?

((S<sub>8</sub> reading the text))

T: Okay! Just stop there, do you understand? (1.5) what does it mean "when we heat"? Something...

S<sub>3</sub>: escalfar

*Heat up*

T: yes, when we increase its temperature, good! So then something happens that changes their properties. David, what else?

((S<sub>2</sub> reading))

A: the distance between the particles increases...

((S<sub>2</sub> reading))

A: to decrease is to reduce, to go lower. And to contract to ((non-verbal gesture, moving hands)) squeeze.

T: So let's have a look to all this. Liquids, solids and gas have a definite volume. Have you finished? Can we check your answers?

S<sub>1</sub> & S<sub>2</sub>: Yes

T: Okay! So let's check volume according to solids and liquids. (1) Okay, listen to me. I want to know your answer on solid and liquid now.

T: So...so according to Volume your answer was definite volume which is right! Can you give it to me? ((S<sub>1</sub> giving the card to the teacher)) Thanks, this was about solids and about liquids your answer is?

S<sub>1</sub>: variable volume

T: hmm... You agree with them? Definite, right? So definite, definite, right? Okay!

A: Do you understand why we say definite volume for a liquid?

S<sub>4</sub>: that's...very hard.

A: Do you understand why we say definite volume for a liquid? For example, if I give you a cup of water there are a hundred milliliters in that cup and then I give you a vase, which is bigger and it's thinner and I tell you to pour the water in the vase, okay? How many milliliters are in the vase?

S<sub>2</sub>: one hundred.

A: Yes, a hundred. So, the volume is the same, okay? So, definite means it's the same.

T: but it changes when we heat that, and the important thing is that particles inside can expand or contract. Is that everything that you don't understand? In here? First paragraph? Anything that you want to ask me? Or Rafaella? No?

A: Show me what it is to expand, with your hands. Put your hands like this and show me what it is to expand.

((Students do non-verbal gestures with hands))

A: Alright, and show me now... decrease or contract. ((Students do non-verbal gestures with hands)) very good!

T: So, increase, decrease right? Next.

((S<sub>7</sub> reading.))

T: What is pressure?

S<sub>4</sub>: pressió

*Pressure*

T: and what can happen if there's a lot of pressure in a container?

S<sub>4</sub>: Boom!

T: yes, it can explode, right? (0.5) Good, so let's check their answers and we will allow them to sit down. Ah... Roger can you correct their answers?

Yes

T: do a solid have a definite shape?

S<sub>1</sub> & s<sub>2</sub>: yes

T: Roger?

S<sub>4</sub>: Yes

T: Okay and do a liquid have definite shape?

A: Do liquids ...

T: Do liquids have a definite shape?

S<sub>1</sub>: Yes

T: Roger? (.) Is that right? What does it mean 'shape'?

S<sub>4</sub>: forma

*Shape*

T: that's right. So.. uhmm.. This table is it a solid or a liquid?

S<sub>1</sub>: A solid

T: Yes, it is a solid and does it change when I put it here or here? Does it change?

S<sub>1</sub>: No

T: No, it does not change. What about if I got a glass and I pour it on the glass? Will it change shape? No. and what about a liquid? What's your favourite liquid? Is it water, coke, trina?

S<sub>2</sub>: Water

T: Okay, water. What about if we've got a glass of water here... and then I ask you to pour the water on the table. What will happen?

S<sub>4</sub>: it will...

T: it will... just expand through the desk, okay? It won't stay any longer like this, so liquids can change shape according to the place where we have them (1.5) and what about gas? What do you have?

S<sub>1</sub> & S<sub>2</sub>: variable shape

T: Roger? Yes?

S<sub>4</sub>: Yes.

T: Just like liquids, if we've got a gas here it's got the shape and if we change the container, the shape will also change. So, about gas you have to tell me about volume. Yes?

S<sub>1</sub> & S<sub>2</sub>: it has variable volume.

T: Variable volume? Yes, and why? (.) Why does it have variable volume? What happens with gas if we heat it up?

S<sub>4</sub>: it expands.

T: yes, it expands. So if we've got gas in a small container (.) imagine that I have a small bottle full with gas. So, what will happen with this gas? It will go through all the space and it will

expand very fast. So, with this activity... what do we have to learn about this activity? Is it important to memorize things?

S<sub>1</sub> & s<sub>2</sub>: Yes

T: No, it's important to (1.5) starting with a 'u'(.) 'un..' understand. There's a lot of things that if you don't memorize you won't remember but there are a lot of things that you must understand. Otherwise, if we do this activity in the third term, it will happen the same. You won't remember the answers. So, try to understand and then, if necessary, memorize. Okay, right. And what about you? Did you know all the answers? Okay right, so expansion and contraction do we understand that? This room.. ahh.. is the same thing if we think about people so(.) how many people are there now in this class?

S<sub>7</sub>: ten.

A: there's one in the back.

S<sub>8</sub>: eleven.

T: so, if I ask you to expand, will you be able to move? Yes, because you've got space to move but if we were two hundred people, would you be able to move?

S<sub>1</sub>: yes

S<sub>7</sub>: no

T: two hundred people? yes? Well, maybe, we're not going to try that. Okay? But do you think that you will be able to move as much as now?

A: if there are two hundred people in this classroom, will you be able to move as much?

S<sub>1</sub>: Maybe, yes

Other students: No

T: what does it mean maybe yes, Gerard?

S<sub>1</sub>: jumping

A: if we have the class full of two hundred kids your age and size, okay? Let's say that we have two hundred of you, in this room. It's not a good idea but still. Will you be able to move as much?

S<sub>1</sub>: Maybe, yes doing castells.

Castells, *human towers*

T: definitely not, Gerard, okay? Good, okay, so that's what happens with particles. They have different properties if they are liquid, solid or gas particles. Okay, so let's have a look. Temperatures can affect, okay? But also if they are.. if they have definite volume or definite

shape it affect how the particles move, okay? Next to read, not Gerard because you've done the activity Roger.

((S<sub>4</sub> reading.))

T: So, do you understand what is happening here? What happens?

S<sub>4</sub>: the particles move.. expand

T: if they've got place to do that... because if the container is flexible they will try to do that, to move as much as they can.

A: what would happen if you heat up a closed container which is rigid? What would happen if you heated up a gas?

S<sub>3</sub>: it explodes

A: yes, it would explode. So, look at the two drawings, your first balloon is small and the second is bigger because it has expanded due to the heat.

T: do you think is the same balloon? Yes, right? So, the only thing that has changed is the particles right? No, the particles have not changed, what has changed is the temperature.

A: Changes in volume are due to changes in temperature. For example, if you use your football ball in a hot day it will be slightly bigger than in a cold day.

T: okay, what's this next picture on the left? Can you describe it, Jordi?

S<sub>5</sub>: rail...

T: railway, right. Why do you think that this picture is here? Is quite similar to the one with the balloon, why? Yes?

S<sub>1</sub>: because it expands.

T: because when it's summer it expands a bit, only a bit, and when it's winter it(.)Can you find the word on this text? It...Contracts. So, it is important to let place to this physical situation happen? What is going to happen if we do not let space for the particles to move? What is it going to happen with the railway in summer if we don't leave space?

S<sub>5</sub>: crash

T: yes, it will crash. And if it breaks do we have a problem?

S<sub>5</sub>: Yes, the train

T: Yes, the train won't be able to follow its way so we can have an accident.

A: Us, in Canada, we have that problem because the temperature between the summer and the winter is very, very, different. So, on our bridges we have joints that leave the space for the different changes due to temperature. So, I don't know every few meters, we have a joint... Do

you know what a joint is? It's like a separation...ah... something that brings two things together. But ... because they don't construct the whole thing in one piece, instead, they make a piece and then a joint and then another piece, and that joints permit... let the expansion and contraction of the metal. It's very, very important.

T: Yes? What would happen if they constructed their bridges with only one big piece?

A: if there were no joints? What would happen to the bridge?

S<sub>4</sub>: Es faran forats.

*There would be holes*

A: Well yes, it will start to ...not fit and ...then collapse.

T: So, do you want to study architecture? Would you like to study it? (1.5)No? Well, this kind of information is very important to know how to construct bridges and houses. So let's have a look to activity... well we will finish reading but more or less is the same that we have explained. Mae, could you read?

((S<sub>6</sub> reading))

T: Yeah? Can you translate it in catalan, Mae? No? Then why don't you ask? I know that it's difficult but you *must* ask if you don't understand it. Who can translate this last part in Catalan?

S<sub>3</sub>: que en un container... amm... coses rigides...

*In a rigid container with rigid things*

A: rigids sides is this ((moving hands))

T: sí, l'exterior. Aviam, quan tenim un contenidor que té l'exterior rigid, què pasa?

*Yes, the outside. Let's see, when we have a container with a rigid outside, what happens?*

S<sub>3</sub>: la pressió exerta amb el braç ...

*The pressure done with the arm*

T: the temperatura increases... què vol dir increases?

*What does it mean increases?*

S<sub>3</sub>: increases no sé...

*I don't know*

T: we have said that before...

A: increase is augmentar, yes?

*Increase*

T: You can write it down, with a pencil, in case you don't know the meaning.

S<sub>3</sub>: perquè les partícules nedant...

*Because the particles swim...*

T: *Aviam, aviam, tornem-hi. Diu: si el contenidor és rígid quan la temperatura augmenta.. què passa?*

Wait a moment, let's go back. It says: if the container is rigid when we temperature rises, what happens?

S<sub>3</sub>: la pressió exerta...

*The pressure exerted*

T: Exercida

*Exerted*

S<sub>3</sub>: Amb el gas

*With the gas*

T: El gas...

*The gas*

S<sub>3</sub>: També

*Also*

T: *També és més forta...* okay, you must think about the examples of the balloons or the birdges, right? If they allow you to move, will you be angry or will you be relaxed?

*It is also stronger*

((Students muttering))

Si a vosaltres us deixen moure estareu relaxants, right? If it's a rigid container and they don't allow you to move, how will you be?

*If you are allowed to move, you will be relaxed*

S<sub>5</sub>: stressed

T: that's what happens with the particles... quan el contenidor és rígid doncs encara ho fan amb més força.

*When the container is rigid then they do it with more force.*

S<sub>3</sub>: I això ocorreix perquè les partícules del gas estan movent-se de manera més ràpida i colisionen dins del container.

*And this happens because the particles of gas are moving in this way quicker and they collide inside the container*

T: okay, so particles behave differently according to two things: temperature and the container where they are. Okay... so let's practice a bit with some activities, page twenty seven. I want you to speak with your partner, two minutes, right? So let's divided this... you answer part a, you part b and so on.

((Students talking to each other in the L1 while doing the exercise))

T: okay, are you ready? Okay so write down the answers. Let's see first question, read the question and say the answer.

((Bell rings))

T: Well, we will continue next day, okay?