

CLIL Teaching: an Opportunity to Teach Chemistry

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Abstract

This paper presents a classroom experience in a technical secondary school in Jesi (AN), Italy. As research in L2 has shown students are motivated when they use it as a tool for communication, and when they see the purpose for mastering a language (1), the school decide to apply for a project called English 4 U funded by the Marche Region. Under this project our school was able to develop a Chemistry course in English using the CLIL approach. The students, in groups of 15, had their lessons during the afternoon once a week with 2 teachers in the Chemistry Laboratory. During the lessons the students had been trained to 'think' in different languages (the mother tongue Italian and the L2 English), these promoted the development of their mental processes and conceptualization. During the lessons a lot of activities with different tools had been done to enhance levels of motivation, students' active participation and self expression. The benefits for the students using CLIL for Chemistry learning was that they used the target language in meaningful situations, they increased their participation, collaboration and socialization developing language and intercultural awareness.

Language is a means not an end, and when learners are interested in a topic, they are motivated to acquire language to communicate. CLIL bridges existing curricular and disciplinary boundaries, creating a more integrated learning environment and energizing the disciplines in new ways.

The lessons with CLIL builds intercultural knowledge and understanding and develops intercultural communication skills and mainly increases learners' motivation and confidence in both the language and the subject been taught.

Introduction

This paper presents a classroom experience in a technical secondary school in Jesi (AN), Italy. As research in L2 has shown that students are motivated when they use it as a tool for communication, and when they see the purpose for mastering a language (1), the school decide to apply for a project called English 4 U funded by the Marche Region. Under this project our school was able to develop a Chemistry course in English using the CLIL approach.

Carrasquillo and Rodriguez (132:2002) spell out the challenge to chemistry teachers who work with learners through English: "Science is, in itself, a language and each different science (Biology, Chemistry, Physics) is a separate language.

Kelly (2) states that an awareness of the "languages", as well as pedagogy for dealing with the language, is important for the science teacher working with learners in an additional language. Subject-specific language in Chemistry can best be described as the information carrying words, which are usually noun phrases such as sulphuric acid or the process of acidification. Clearly, subject-specific language is important for learning any subject. In this paper we can see that when students are learning Chemistry in an additional language they may need increased exposure to the general academic language in Chemistry and classroom time invested in practicing that language. Teachers may need to rethink how they provide opportunities for learners to process the input and practice the output of the Chemistry language. Learners may also need more opportunities to think about concepts

in the foreign language as well as time to internalize the formal language, express it in their own words, and translate their own words back into the formal language in Chemistry. All these works to enhance the learning motivation of the students, in both Chemistry and English language.

Description

The students involved in the project were following the 4th year at the Istituto Tecnico per Attività Sociali "Galileo Galilei" in Jesi (AN), during the school year in their curricula they have 6 hours per week of Organic Chemistry and 2 hours of English. For this project, we decide to develop some Organic Chemistry lessons in English using CLIL methodology. The students were 17 years old and they have been studying English since the primary school, in general their English level was B1 so we prepare the lessons for them taking into account their English level. The students, in groups of 15, had their lessons during the afternoon once a week with 2 teachers in the Chemistry Laboratory, one of the teachers was a Laboratory Chemistry teacher and an English teacher too and the other one was a Chemistry teacher with knowledge of English. During the lessons the students have been trained to 'think' in different languages (the mother tongue Italian and the L2 English), these promoted the development of their mental processes and conceptualization.

During the lessons a lot of activities with different tools had been done to enhance levels of motivation, students' active participation and self expression.

Research has shown that good teaching practices can do more to offset student indifference than extraordinary efforts to attack motivation directly. Most students react positively to a well organized lesson taught by an animated teacher who has an authentic interest in students and what they learn. A good teacher has to be enthusiastic about his topic to generate an atmosphere that is open and positive. When students are treated well, respected, encouraged and the work has meaning, high levels of motivation will automatically develop. Whatever level of motivation the students bring to the classroom, it will be altered either negatively or positively, by what happens in that classroom; so we decide to create the best conditions in the class to motivate the students in their interest in Chemistry and in English.

The aim of the lessons were to:

- Build intercultural knowledge and understanding
- Develop intercultural communication skills
- Improve language competence and oral communication skills
- Develop multilingual interests and attitudes
- Provide opportunities to study Chemistry through different perspectives
- Allow learners more contact with the target language
- Complement other subjects rather than competes with them
- Diversify methods and forms of classroom practice
- Increase learners' motivation and confidence in both the language and the subject been taught.

To achieve the goals of the project during each lesson the students were involved in different kinds of activities as:

- The students watched a video about security in the Organic Chemistry Laboratory followed by discussion about the content, the similarities and differences between what they saw and their own laboratories. Afterwards they worked in pairs and they made questions about what to do in different dangerous circumstances as fire, broken glasses, manage of toxic substances, etc.
- The students received information about specific vocabulary of instruments, organic compounds, etc. at the whiteboard, with photocopies or other forms. They worked in pairs to learn the specific vocabulary by making descriptions or questions between them. Afterwards each student went to the front of the class and had to describe himself as an object without

pronouncing its name, the class tried to discover the proper word. This kind of exercise was very useful for the students to earn confidence and self-esteem, it was very good to increase their skills in conversation and it facilitated the ability of learning to learn and improved their oral communication skills.

- The teachers introduced a practical experiment involving the students in the preparation of all the steps to follow during the practical activities. One by one all the students took part in the description of the steps that had to be done during the experiment, the same for the eventual graphs or calculations that follows the practical activities. The students were divided in groups of two, each group made their experiment and a scientific report about what they had done. Afterwards each student described what they had done, the problems that they had and the results that they obtained.
- The students were involved in some games as puzzles, cross words, Chemistry collocation quits, description with cards, etc. This informal way of using the language and the specific language increases learners' motivation and confidence in both the language and the subject been taught.
- The students were working in pairs on the comprehension and translation of short Chemistry dossier; underlined key words in a Chemistry text and they had given explanation of their meaning in English and they used the new words in different contexts. They had looked for text-specific chunks and general chunks working with their partner.
- Little research had been done in the web about specific laboratory techniques related to the practical experiences that they had to develop, they had prepared the experiments and they did the experiments in the laboratory. The experiments that they had done were about General Techniques in Organic Chemistry as determination of boiling point, determination of melting point, extraction with solvents, recrystallisation, ect. Organic Chemical reactions of Hydrocarbons, Aliphatic alcohols and aliphatic Aldehydes and Ketones.

It was very important to achieve the aims of the project that we had used the enquire learning for our lessons.

For the first stage "Tuning in" the strategies that we used were brainstorming, asking questions, discussion and making diagrams. For the second stage "Finding out" the strategies were videos, research on web, reading, experiments. For the third stage "Sorting out" classifying, grouping, sorting, charts, graphs, narrative process. For the last stage "Reflecting" the strategies were self /teacher evaluation and assessment and peer/teacher evaluation and assessment. (3)

The skills that the students had been used during the lessons were questioning, organising, sharing ideas, listening, talking, planning, predicting, estimating, observing, summarising, reading, not taking, finding resources, making decisions and choices, time management, writing, reporting, responding, performing and clarifying.

During all the lessons the activities that had been done were designed to support individual learning taking care of all the different kinds of intelligence and ways of learning as linguistic/verbal, visual, auditory, manipulative, logical-Mathematical, interpersonal, intrapersonal, kinaesthetic and experimental. (4) The model that was used during the lessons was a bottom up model which allowed the teachers to gain an insight/window into what students know and don't know before the lesson so that teaching could start from a clear point where both content and language needs had been clearly flagged up.

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Conclusions

Successful learning depends on the amount, quality and richness of input (5). While not all input becomes intake, the teacher had to find means to adapt the way to teach so as to take account of the extra demands present due to the language medium not being the mother tongue of the learners.

One of the challenges in content based teaching is to bring content that is of interesting, relevant and appropriate to the students.

The benefits for the students using CLIL for Chemistry learning was that they used the target language in meaningful situations, they increased their participation, collaboration and socialization developing language and intercultural awareness.

It is hoped that the learning of Organic Chemistry in English will stimulated the student's interest in this important branch of Chemistry and will stimulated the student's interest in learning more English.

It is clear that a radical change is required in the way teachers are prepared for teaching chemistry when they are expected to work with students who are learning through English as an additional language. It is a move from the subject to the learner and from the content to the language of the subject. It is through language, communication and real-life contextualization of chemistry that we will make chemistry meaningful to young people.

Teaching Chemistry with CLIL methodology was a big opportunity for students and teachers to improve the learning/teaching process.

References

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