



A CLIL Case Study on Blended Learning for Building Students' Capacity to Learn Interdisciplinary Subjects

Immacolata Ercolino¹, Daniela Amendola², Cristina Miceli³

Abstract

This work focuses on Science teaching at high school using the Content and Language Integrated Learning (CLIL) as methodology. In the last years the CLIL teaching methodology became mandatory in Italy for all upper secondary schools. However, there are still difficulties for its implementation. Some of them are here reported: i) short number of CLIL trained teachers, ii) lack of appropriate teaching materials; iii) many experienced teachers find overwhelming to cope with the great responsibility to plan a CLIL unit and experiment in class and evaluate both the linguistic and cognitive results. Our work will contribute to the creation of innovative materials for CLIL scientific courses in the field of biology, by including updated topics that also contain ethical and societal challenges such as: genetic inheritance, stem cells, and cloning. Bioethics debates give to the students an opportunity to cope with some of the most challenging and engaging ethical issues that our society is facing as a direct consequence of advances in the life sciences. In this way science teaching will help students to become better informed and responsible citizens. In order to facilitate and support the work of the teachers, we developed CLIL teaching materials and resources according to the model of the 4C's (Coyle 1999, Content, Communication, Cognition and Culture). To test the efficacy of our materials and of the CLIL methodology, we delivered our courses to two classes of a science high school, using an e-learning environment. After an initial meeting in classroom for the project overview, the students started to work in the Moodle e-learning platform of the University of Camerino studying teaching materials and carrying out the proposed activities. Efficacy is currently tested by a statistical analysis of questionnaires and activities. We believe that an e-learning environment may facilitate personalized learning and the use of a large number of interactive multimedia resources. E-learning environment also enables the tracking of all learning activities in order to obtain useful information for the elaboration of experimental data on the efficacy of the methodology.

1. Introduction

This paper focuses at a CLIL (Content and Language Integrated Learning) case study in the last science class of high School for the development of scientific competence.

CLIL, in comparison with other European countries, has only been introduced relatively recently in Italy since it became mandatory in the last year of most of high schools and was spread considerably in the last ten years. The European Union's aspiration to be "united in diversity" underpins the whole European project [5]. Each Government of the Union strongly encourages in learning at least two languages other than the native language. In addition, European government's [6] educational programme fosters the utilization of information and communication technology (ICT) in education, training, and mobility. Languages generally can build bridges between people, stimulating growth and jobs. CLIL appeared in the Italian school system by pilot projects (2003). Now it is mandatory in the last year of all upper secondary schools. In addition, high schools with focus on foreign languages are now required to teach a non-linguistic subject in a foreign language in the last three years of study (15–18-year-old students).

The Ministry of Education set the bar for teachers' language level at B2. In addition, teachers need to gain both linguistic and methodological CLIL training certification at the University in order to teach with CLIL methodology in class.

As reported by Marsh in 2002 [1], "CLIL refers to situations where subjects, or parts of subjects, are taught through a foreign language with dual-focused aims, namely the learning of content, and the simultaneous learning of a foreign language". Teaching science in another language, however, is not easy for Italian teachers. CLIL challenges science teachers to instruct through an additional language

¹ International School of Advanced Studies, University of Camerino, Italy

² School of Biosciences and Veterinary Medicine, University of Camerino, Italy

³ School of Biosciences and Veterinary Medicine, University of Camerino, Italy



that needs a wide range of skills for organizing detailed scaffolding lessons on innovative topics and related assessments in order to motivate learners to become more reflective and autonomous. They have to cooperate with other teachers in order to implement this new activity. Moreover, a teacher has to identify and analyze students' different learning styles and foster them to communicate in a foreign language in class.

The involved teachers need to be well skilled, flexible, and have a high level of language proficiency and generally they suffer from lacking of available resources for professional improvement. In fact, to create new resources requires many extra hours of work and extra responsibility that has not yet considered in the high school teacher profession.

2. Research design and methods

In order to extend teaching resources to facilitate CLIL implementation in class, we developed CLIL teaching units on emerging topics such as 'Stem Cells and Bioethics' and 'Genetic inheritance' that we uploaded on a partition of the educational Moodle's platform[2] of the University of Camerino. We uploaded videos and innovative teaching materials in order to facilitate the student learning in a more attractive way. Videos were used to increase motivation and the graphics were made on our own. Each teaching unit contains many scaffold activities and also hands on activities as role play, karyotyping and protocols for DNA extraction, cloze tests, and crosswords.

A first objective of this work was to prepare original CLIL units in order to foster student motivation and give our contribution in enhancing students' self-esteem and self-reliance in their listening, reading, speaking, and writing skills in English to be used in their future working careers [3,4].

A second objective of this work was to test the efficacy of the original CLIL units and of the CLIL methodology. For this purpose, units were administered to two classes of the last year of a science high school in Naples. The school selected has been interested for years in foreign language teachers training and Erasmus projects. In one class we have administered the stem cell and bioethics teaching unit in English by CLIL methodology and we have planned to administer the genetic inheritance teaching unit in Italian language in the coming months. In the other class, we have done the reverse (complete CLIL scaffolding activities on genetic inheritance and the stem cell teaching unit in Italian language). The activities (by CLIL and classical learning) last the same time and are based on very similar materials. Additionally, for each class we have already administered an entry test and planned a post experiment test on content questions related to each unit and two perception tests at the beginning and after the end of the course about the student perception of learning in a foreign language. A conceptual map of the investigation method is shown in Fig.1.

3. Preliminary findings

So far we have elaborated some quantitative values of the perception's questionnaire filled in by 46 students at the beginning of the course (two classes). All the data are already available on the e-learning Moodle platform of the University of Camerino. The platform allowed us to perform a quantitative analysis of the tests. Preliminary data are reported in the figures 2, 3, 4 and 5.

In Fig. 2 we reported the results about the questions on "How the students are interested in studying a not linguistic subject in a foreign language". The analysis of the results showed that 82% of the students have a positive thought about it. This is very relevant because the interest turns on the motivation, improving the students' performances.

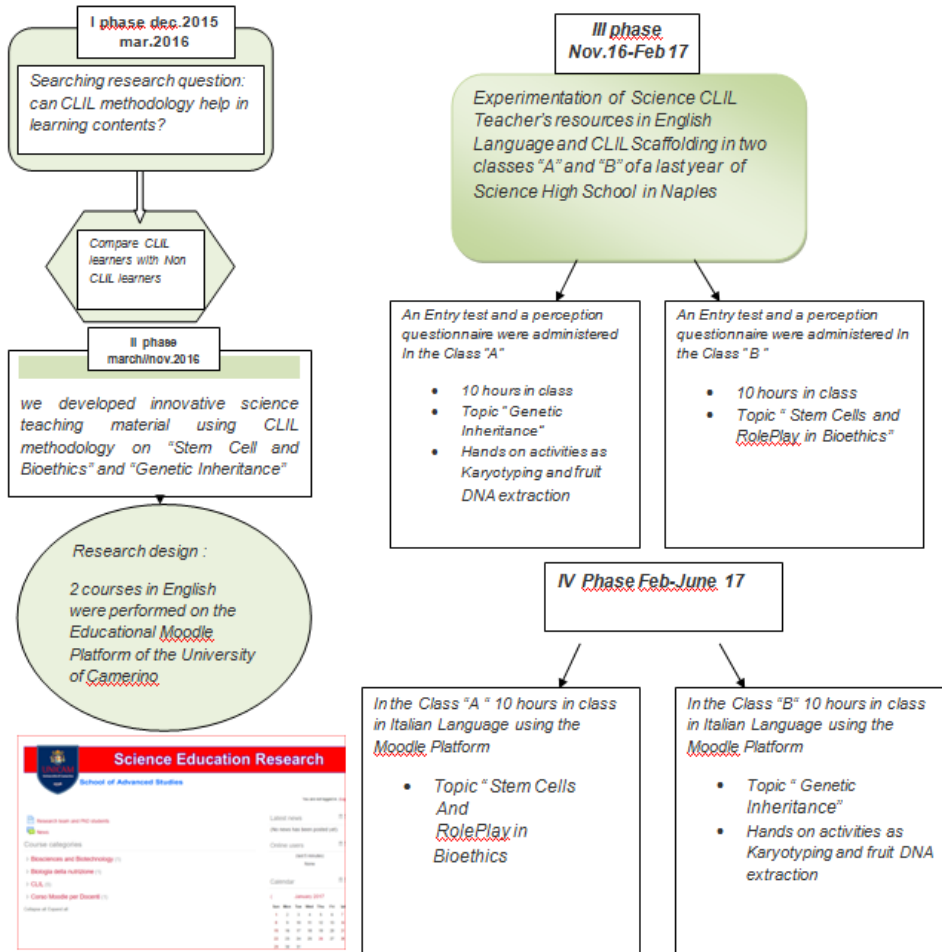


Fig. 1 Conceptual map and flow of the investigation method adopted.

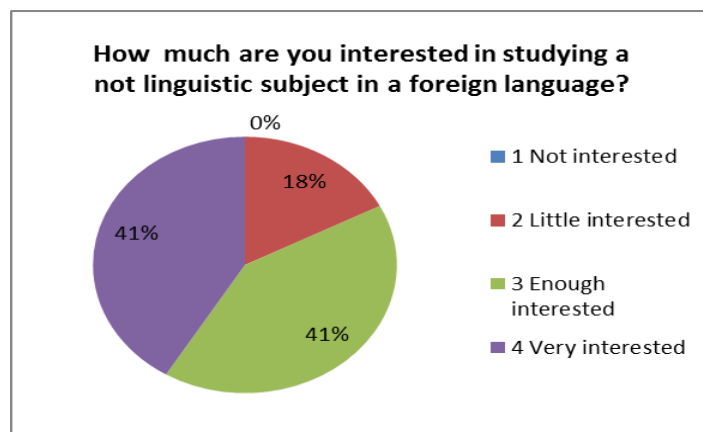


Fig. 2 Students' opinion about the use of foreign language to study a not linguistic subject.

In Fig. 3 we analyzed the students' answers about their perception on the use of the CLIL methodology in fostering their interest on the main concepts of the course. Also in this case we found very positive results (80 % of the students agree or strongly agree).

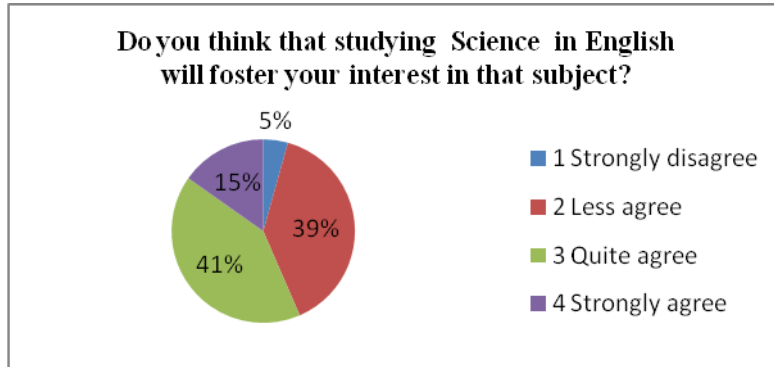


Fig. 3 Students' opinion about use of CLIL in fostering the interest in the subject.

In Fig. 4 we reported the list of the main difficulties that the students think to encounter during a CLIL experience. We have an ex-aequo of 26 students that find as main difficulties writing texts in English, expressing orally scientific contents and understanding audio/video texts. These results suggest that it is very important to introduce more exercises on listening, writing and speaking in order to make students more confident in both scientific discipline and language.

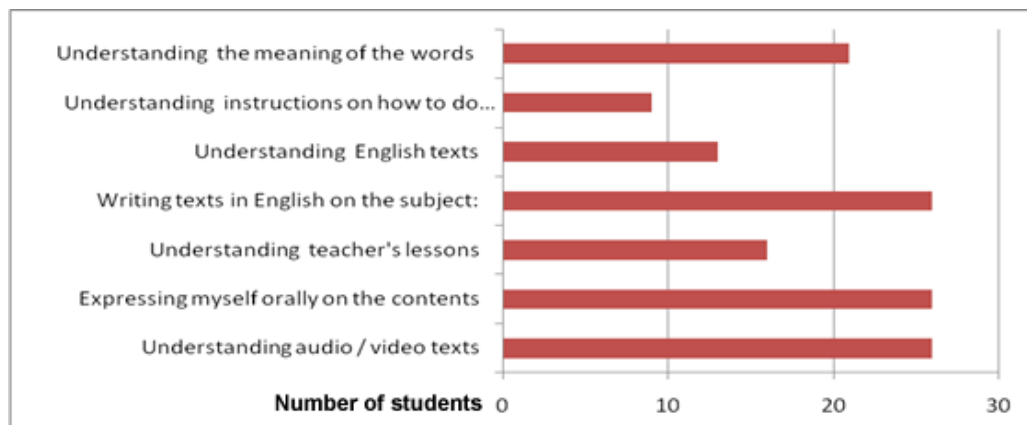


Fig. 4 The main difficulties that students encountered during CLIL experience.

In Fig. 5 we reported the results about the students' perceptions on the usefulness of the CLIL course. The figure shows that 85 % of the students consider CLIL experience as an useful experience for their future, probably improving their employability.

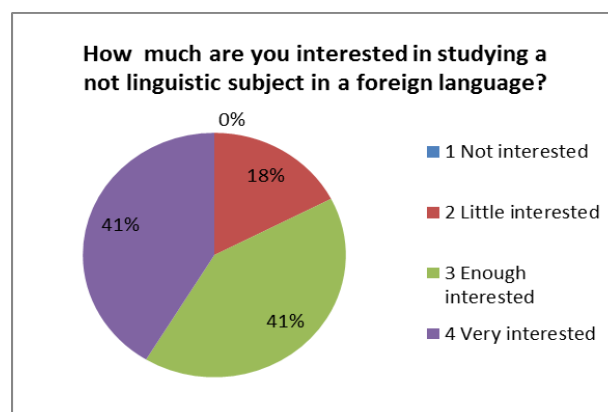


Fig. 5 Students' opinion about the useful of the experience.



4. Conclusions and perspectives

It is interesting to notice the perceived positive effect of CLIL that seems to be generalized in the two classes. The spread of CLIL needs to be viewed with caution if teachers do not receive the required training. After all, CLIL teaching is first and foremost related to good teaching: in fact, it has to face similar pedagogical challenges [7]. We are at the beginning of our research. First of all, we have to investigate more deeply on CLIL and classical class learning, observing the cognitive skills but also the students' satisfaction rate in their learning. This objective will be obtained throughout administering pre and post experiment questionnaires. Secondly, the aim is to enlarge the number of students involved in order to collect more data to analyze. In the next months research will continue in different types of high school, such as the linguistic high school. It could be also a very intriguing objective to find a role for the University in connecting and supporting the school's classes, producing new materials and supervising teachers, thus making a bridge between schools and higher education. This already occurs successfully in other countries, such as Japan. This objective could reduce the distance between schools and universities for an efficient growth of both of them.

References

- [1] Marsh, D. (2002). *CLIL/EMILE - The European Dimension: Actions, Trends and Foresight Potential*. DG Education & Culture, European Commission.
- [2] Amendola D., Miceli C. (2016). *On line "Genomics Computer Laboratory with Collaborative Activities"*. International Conference Proceedings Edited by Pixell. ISBN978-88-6292-705-5 (pag 370-374).
- [3] Ercolino I. (2016). *"Teaching Science with technologies: science CLIL activities in class in order to prevent teenage drug abuse"*. CLIL + Science: New Directions in Content and Language Integrated Learning for Science and Technology - Universidad de Navarra ISBN: 978-84-8081-496-6
- [4] Ercolino I., Maraffi S., Sacerdoti Francesco M. (2016). Could Smartphone in science teaching foster motivation and positive attitudes in students. International Conference Proceedings Edited by Pixel www.libreriauniversitaria.it edizioni ISBN978-88-6292-705-5 (pag 127-131)
- [5] English translation of the SPEECH by Mrs Nicole Fontaine President of the European Parliament at the Special Meeting of the European Council in Feira on 19 June 2000 publisher: European Parliament.
- [6] European Commission, (2015). 2015 joint report of the council and the commission on the implementation of the strategic frame work for European cooperation in education and training (ET 2020) new priorities for European cooperation in education and training. Brussels: European Commission.
Retrieved from: http://ec.europa.eu/dgs/education_culture/repository/education/documents/et-2020-draft-joint-report-408-2015_en.pdf.
- [7] Breidbach S, Viebrock B., (2012). CLIL in Germany – Results from Recent Research in a Contested Field of Education. International CLIL Research Journal, Vol 1 (4).