TRAINING IN CONTENT AND LANGUAGE INTEGRATED LEARNING OF MARINE AND ENVIRONMENTAL SCIENCES IN THE UNIVERSITY OF CÁDIZ (SPAIN)

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Abstract

One of the main factors affected by the Bologna process is related with internationalization of Universities in terms of teaching. The need of internationalization constitutes an opportunity, as well as a challenge, to change the teaching programs and to promote the inclusion of activities in a bilingual context, in which English is incorporated as a lingua franca in Higher Education. The University of Cádiz and in particular, the Faculty of Marine and Environmental Sciences is doing an effort to insert activities in English in the teaching programs of the degrees of Marine Science and Environmental Science.

In order to guarantee the success of the implementation of English activities with students, professors from the Faculty of Marine and Environmental Sciences have participated in a specific training program named “English for Marine and Environmental Sciences” during the course 2013/2014. This program has been developed and carried out in cooperation with the Higher Center for Modern Languages (HCML) of the University of Cádiz (UCA). Training was based on the application of Content and Language Integrated Learning (CLIL), combining lectures with innovative activities during the lessons that allowed interaction within students and with the professor. This way, development of transversal skills as discussion, criticism, and pro-activity among others are also incorporated to the activity in the room.

During training sessions, professors prepared a CLIL based lecture for other participants as if they were students, developing all the activities planned under the supervision of a CLIL teacher from the HCML. Afterwards, the lecture and the proposed activities were analyzed by the group and the teacher from the HCML offered an alternative presentation about the same topic, providing a wider spectrum of tools that could be used by professors with their students. The scientific aspects treated during the CLIL training covered a wide spectrum of topics related with Marine and Environmental Sciences, due to the participation of professors from Genetics, Applied Physics, Biology, Analytical Chemistry, Toxicology, Ecology, and Botany. Some examples of the lectures offered by professors were “Environmental Impact of Renewable Energy”, “Simple Pendulum”, or “Genomics: From Human to Fisheries”.

As a consequence of the training program, participant professors improved their level of English and started including different activities in English during their lectures in the degree studies. For instance, in the case of Environmental Sciences, a seminar in English was included in the subject Instrumental Technique of Environmental Analysis, as well as different materials in English language were elaborated by professors. In the case of Marine Sciences, participants elaborated teaching materials in English that were available in the virtual campus of UCA for students.

The response of participant professors was highly positive, and some of the treated topics have already been taught using English in the degree programs, with high level of acceptance from students. Taking into account the need of implementing the use of English for internationalization of teaching programs and the good acceptance of the training CLIL program, professors of the Faculty of Marine and Environmental Sciences of the UCA continue developing bilingual activities to enhance the quality of their teaching and the attractiveness of the Center for foreign students.

1 INTRODUCTION

After the Bologna process was launched in 1999 [1], Universities in Europe have made a big effort to adapt their programs and academic activities to a common framework, which should promote their
internationalization. This internationalization must be understood in two ways: the first is giving national students not only the tools for a technical future work, but also technical language skills that allow them to become professionals in a different country; the second is related with the exchange of students and professors, resulting in international programs that attract students from different countries.

As for many other aspects, English has become a lingua franca for professionals all over the world and in particular for academic relationships. For this reason offering programs in English as well as giving students enough English skills present a main challenge for Universities in Europe and in particular in Spain. For these reasons, professors must be properly trained not only in technical and teaching aspects, but also in English communication.

The Faculty of Marine and Environmental Sciences of the University of Cádiz is a reference center for teaching and research, with especial international recognition in the case of Marine Science research. However, despite the center participates in some international Erasmus Mundus Master, there are not international programs in the degree and master levels, and national students do not receive contents in English. These facts constitute drawbacks for students who become professionals that will find difficulties to work in other countries of the European Union (EU), or overseas.

Among the causes of the low use of English during lectures and activities with students, the most important are that professors feel insecure teaching in English and that students that have difficulties to follow a lecture in English. For this reason, the Direction of the Faculty of Marine and Environmental Sciences of the University of Cádiz applied for a project to improve the English skills of professors as well their capability to teach in English to Spanish students.

The project consisted in a specialized training program named "English for Marine and Environmental Sciences". This program was developed in coordination with the Higher Center for Modern Languages (HCML) of the University of Cádiz. The program was based on the Content and Language Integrated Learning (CLIL) methodology [2], in which during a session students work on technical aspects and English skills simultaneously. Taking this into account the objective of the course, professors were trained in methodological aspects at the same time they had the chance to improve their English.

There is an interesting aspect in the case of the Faculty of Marine and Environmental Sciences related with the multidisciplinary character of the degrees and masters offered by the center. Normally, professors have enough English skills in a certain area of science that is normally related with their research lines. However, for teaching in this Faculty in English the vocabulary and concepts must be broader due to this multidisciplinary character. In order to facilitate getting this goal, several professor from different departments participated in the training program, including professors from Analytical Chemistry, Biology, Genetics, Physics and Toxicology.

2 METHODOLOGY

In order to give professors sufficient tools to prepare their lectures using the Content and Language Integrated Learning methodology, a specialized course was developed by a teacher of English from the HCML of the University of Cádiz. In this section the methodology used by the English teacher to train professors during a session is described.

2.1 Organization of the course

During the first session of the course, the teacher presented the main aspects of CLIL methodology, and explained how the course would be organized. In this case, the course consisted in 12 sessions of 2 hours, including the first session. In the following sessions one participant professor had to prepare a CLIL session for the rest of professors as if they were students. Ideally, the session was about a topic related with a subject in which the professors had the intention to implement English activities. The lecture by the professor should be no longer than 1 hour, and the rest of the time was used for analysis of the lecture and English training.

2.2 Pre-tasks

One week before the corresponding session, the professor prepared a presentation to be used during the lecture that was sent to the English teacher. The presentation must be in English and should be prepared on a CLIL way, including activities that allow the students practice the both aspects: the technical and the English skills. An important aspect that can be also included in mother language
programs is that the presentation must be oriented to promote the participation of students to make them not only to receive information in English, but to give a feedback to the professor. This way communication must be in both directions: from professor to students and vice versa.

The presentation was submitted to the English teacher for analysis. The English teacher listed the vocabulary that could be particularly difficult regarding its pronunciation, and corrected the English mistakes that professors could make in the presentation. The pronunciation list and the corrected presentation were sent back to the professor before the day of the lecture to give time to prepare it properly.

2.3 CLIL session

During the CLIL training session, the professor gave the CLIL lecture to the rest of the professors participating in the course as if they were students. A key factor for the success of the project was the participation of the rest of the partners as active students during the lecture, because it offered a measure of the fitness of the activities proposed by the lecturer to be implemented in a real session with students.

After the presentation, the attendants gave their opinion to the lecturer as a feedback of the applicability of the activities with students, and the English teacher analyzed all the language mistakes made by the professor during the session. Special attention was always paid in the case of pronunciation and explanation of the main concepts related with the topic. This way, the lecturer as well as the rest of participants could improve their English for following sessions.

The next step was the presentation of an alternative session about the topic by the teacher from the HCML. This part of the session took from 45 to 60 minutes depending on the session. The objective of this part was to show additional CLIL techniques or activities that could have been included in a lecture about the topic, to increase the set of tools available for professors when preparing a CLIL session.

Finally, the last minutes of the session were employed by the teacher to reinforce some language aspect that was identified to be difficult for participant professors during the previous sessions.

2.4 Virtual Campus

In order to assist and to facilitate learning by professors, a virtual campus course was open for the training program. The virtual campus was used as a platform for communication between professors and the English teacher during the course and also to upload materials related with the course.

Among the materials uploaded, the presentations of participants, pronunciation and vocabulary lists, as well as additional resources to prepare CLIL materials for all the topics treated in the course could be found.

3 RESULTS

The project resulted in an improvement of English skills of participant professors, mainly focused on teaching. As the studies (degrees and masters) in the Faculty of Marine and Environmental Science have multidisciplinary character, a total number of 11 professors from 5 different departments participated as students. This fact made the training program highly profitable because in most of cases they could improve their English skills in different areas of knowledge, what is particularly useful for teaching in the Faculty of Marine and Environmental Sciences.

Apart from the improvement in teaching and English skills, the program resulted in a series of CLIL presentations, which could be used in different subjects of the Faculty, materials for CLIL sessions that could be used by other colleagues, and the activities that were implemented in different subjects of the degrees of Marine and Environmental Sciences.

3.1 Presentations

As every professor prepared a presentation about a different topic, 11 presentations were created, presented, tested, analyzed and improved before they could be used with real students in the classroom. For these reasons, in the case they were used in the corresponding subject, they had a high degree of acceptance from students.
Taking into account the number of participants per department, 3 presentations were prepared by professors from the departments of Biology and Applied Physics, 2 presentations from Analytical Chemistry and Genetics, and 1 from toxicology (table 1).

Table 1. CLIL presentations created for the course

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling: much more than taking sample</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>Environmental impact of Renewable Energy Resources (RES): A general overview</td>
<td>Biology</td>
</tr>
<tr>
<td>The affected environment: elements that may be affected by impacts and environmental inventory</td>
<td>Biology</td>
</tr>
<tr>
<td>Introduction to Genomics</td>
<td>Genetics</td>
</tr>
<tr>
<td>Characterization of genes of interest in aquaculture. Genetic maps</td>
<td>Genetics</td>
</tr>
<tr>
<td>Analysis of heavy meals in seawater by graphite furnace atomic absorption spectroscopy</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
<td>The simple pendulum</td>
<td>Applied Physics</td>
</tr>
<tr>
<td>Regla Beach Nourishment</td>
<td>Applied Physics</td>
</tr>
<tr>
<td>Time series analysis. Linear correlation Fourier Analysis</td>
<td>Applied Physics</td>
</tr>
<tr>
<td>Pest control</td>
<td>Toxicology</td>
</tr>
<tr>
<td>Let's know microalgae</td>
<td>Biology</td>
</tr>
</tbody>
</table>

The variety of topics presented by professors from a same department shows how the multidisciplinary character of the teaching in the Faculty of Marine and Environmental Sciences makes this type of integrated training programs highly useful.

3.2 Materials for CLIL sessions that could be used by other colleagues

As a result of the preparation of CLIL sessions for the training program, different materials and activities that could be useful for other professors were designed. Some of them could be used as pre-tasks for CLIL sessions as a video in which the nourishment of a beach is explained [3]. Other resources that can be useful as additional materials are glossaries of technical terms, which help students to follow the lectures.

Something interesting when videos are used as teaching tools, is that they can be displayed with subtitles or not depending on the level of English of students. Finally, to make watching videos an useful tool in teaching, an activity must be added after the video to make students keeping attention on the both the content and language.

In the case of materials to be used during the lesson, several games were developed by professors, being the most commonly used:

- Quiz games, which can be used as ice breakers at the beginning of the session to introduce some vocabulary that will be useful during the rest of the lecture, or at the end of it as a conclusion and feedback. These games must always be constructive, so the design has to consider the previous level of students, otherwise they could feel frustrated, and motivation could be lost.

- Matching games were proposed to ease the establishment of connections between complex concepts that are related but are not the same. A particular type of matching that resulted highly accepted by participants was that in which images had to be connected with a concept, because it is more intuitive than connecting sentences.
- Crosswords have been used by several professors to check if students correctly understood concepts and definitions.

- Incomplete reports or reports containing mistakes have been proposed for practical sessions. In this case a report with the most typical mistakes made by students was showed to them and they had to identify those mistakes.

Activities like demonstrations are useful during the lecture and they are particularly useful if students can participate in them. During the training program demonstration about how a simple pendulus works or how water samples for trace analysis can be collected, were carried out. These demonstrations can be recorded so students can have them as additional material to be revised, which is in English language, and even more important, they have participate in it.

Independently on the type of activity used, the most important aspect to succeed in the learning process is that the professor and students clearly understand which the objective of the video, the game or the exercise proposed.

3.3 Implementation of the CLIL activities developed during the training program in the subjects of degrees of the Faculty of Marine and Environmental Sciences

After the training program was completed, some of the professors implemented activities in English in the subjects they teach in the degrees of Marine and Environmental Sciences.

In the case of Environmental Sciences, a seminar about spectroscopic techniques for metals analysis was taught in the subject “Instrumental Techniques for Environmental Analysis” using the CLIL presentation “Analysis of heavy metals in seawater by graphite furnace atomic absorption spectroscopy ”. For this same subject, professors used the material developed during the training program to make a glossary of essential terms for Instrumental Analysis that was uploaded to the Virtual Campus of the subject.

Regarding Marine Sciences, professors from the department of Genetics uploaded presentations and manuscripts in English to the virtual campus as material for study. In the case of Applied Physics, the students made a glossary of technical vocabulary for the subject “Coastal Engineering”, and in the subject “Acquisition and processing of oceanographic data” the guidelines and protocols for laboratory practice were provided to students in English. Moreover, in the subject “Marine Botany” taught by professor from the department of Biology, the professors gave the students a paper without abstract, and the students were asked for writing the abstract, after reading the rest of the manuscript.

4 CONCLUSIONS

The training program “English for Marine and Environmental Sciences” has supposed a starting point to implement English activities in the subjects of the degrees of Marine and Environmental Sciences of the University of Cádiz. Moreover, the multidisciplinary character of the scientific topics of the Faculty, has allowed participant professors to improve their English skills as well as their teaching skills following the Content and Language Integrated Learning methodology. Furthermore, the program was highly welcome from professors and also by the students who afterwards received the lectures and activities from participants in the training program.

Additionally, different materials were produced for CLIL lessons that are available for other colleagues. For this reason, the training program can be considered profitable for all professors and students in the Faculty.

REFERENCES


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