Teaching and learning about food technology in English: an experience of conten-based English instruction at university level

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Abstract

This article is aimed at presenting the design as well as the pilot study for a two-year project intended to explore the feasibility of introducing content-based English instruction in an undergraduate course at a Spanish university. The project focuses on the potential of the figure of the ‘language teaching consultant’ from the point of view of his/her role in the design and implementation of the course curriculum. The first part of the article includes a description of the specific goals of the project, the research methodology employed and the different steps involved. The second part of the study is devoted to presenting a sample of the teaching/learning activities that were used in the pilot study together with an analysis of the results.

Key words: (1) CLIL (Content and language integrated learning), (2) TEFL (Teaching English as a foreign language)

Introduction

This paper reports on a project aimed at exploring the feasibility of integrating the teaching of a foreign language (Marsh (1999a, 1999b), Masih (1999), Stoller (2004)) (English) in the curriculum of a university degree in Food Science and Technology through the collaboration of a “language teaching consultant” and a “content instructor”. The study has been thought out in response to the urgent need many universities in Spain face of offering courses in foreign languages (especially English) in order to increase the multilingual competence of future graduates and to make their programmes more accessible to international students. Among the possible reasons for the scarce offer of content courses in a foreign language (FL) in Spanish universities, we can mention the relatively low proficiency of students entering university. However, there seems to be another important reason, which is the instructor’s lack of confidence in their communicative skills in English. In order to confront this second problem, we want to investigate the potential effects of introducing the figure of the “language teaching consultant” as a collaborator with the “content instructor” in the design of the course materials and their implementation in actual teaching sessions. The ultimate goal of the proposal is the optimization of the teaching situation through making of the foreign language an essential means of learning, thereby speeding up the language learner’s acquisition process.

The project has been designed with four specific goals in mind: (i) designing a programme for an introductory course in Food Science and Technology, which simultaneously attends to the needs of the students in connection with their FL proficiency and their knowledge about the course contents; (ii) analyzing the process of implementation of the programme; (iii) evaluating the results of the implementation in terms of the students’ learning and
satisfaction; and (iv) assessing the feasibility of the experience on a larger scale and at an institutional level.

From the point of view of its theoretical background, the project is based on three main traditions in educational research: ethnography (Watson-Gegeo, 1997 & McDonough, 1997), activity theory (Lantolf (1996) Lantolf & Pavlenko, 2001), and action research (Winter, 1989).

**Design of the two-year project**

The students’ academic profile was in the area of Engineering and, more specifically, within the department of Food Science and Technology. The course, “New non-thermal technologies for food preservation”, is taken by third-year students on an optional basis during the first semester (from mid-September to mid-January). With regard to their individual linguistic competence in the L2, according to the results of the questionnaire they responded, most of them had not received any further instruction than that from their high-school years. Hence, the average level in the L2 was between elementary and intermediate. However, two of the 6 students admitted being enrolled in an advanced English course outside university. The department responsible for the course, Food Science and Technology, is made up of a multidisciplinary group of teachers, and is considered one of the leading Spanish university departments in the field. With regard to the teaching tradition, the dominant model is very much teacher-centred.

The pilot study for the project was carried out in November 2005, and it involved the design, implementation and analysis of one of the units of the course program. The aim of the pilot study was twofold. Firstly, we wanted to explore the students’ response to the new dynamics introduced in their academic practice through the use of English as a vehicle of instruction and the participation in a set of learning activities which were very different from the ones they were used to. Secondly, we aimed at exploring the level of collaboration between the two lecturers involved, namely, the language teaching consultant and the content specialist, by focusing especially on the latter’s level of comfort with the new classroom dynamics.

The students’ response to the experience, taking into account individual interview and the quality of their participation in the learning activities, was utterly positive despite their initial skepticism. Most students found the new learner-centered methodology very helpful. In addition, they explicitly posed the example that if the content teacher had simply switched into the L2 while adhering to the very same lock-step approach, none of them would have been able to deal with the content delivered in the L2.

The collaboration between the instructors has been very close right from the beginning, which has made the whole experience very rewarding. The content instructor was responsible for providing the language teaching consultant with not only the specific content objectives but also materials, and the language teaching consultant’s task was to devise activities to be implemented through a learner-centred methodology that would also take into account the linguistic objectives. Despite the changes introduced, the content
instructor felt very comfortable with the new methodology, to the point of questioning his personal approach.

The following stage in the development of the project involves the design of the different units constituting the program, with a two-fold emphasis on (i) competencies related to the academic field of food technology, and (ii) language competencies. From the point of view of the language competencies, the main aim is to provide students with different types of learning activities that will engage them in meaningful situated action through English, and which, at the same time, will enable students to develop both their perception capacities and autonomy as language learners.

The last stage of the project involves the implementation of the course program designed, paying special attention to the assessment of the results. These results are understood not only in terms of the two sets of competencies involved in the course, food technology and English, but also in terms of the level of student satisfaction with the innovation introduced in their curriculum. The following data collection instruments will be used during the implementation of the syllabus: journal of the language teaching consultant, classroom observation: (including audio-visual recordings), interviews with the content instructor and the students, course assignments produced by the students.

**A sample of activities from the pilot study.**

The didactic unit entitled “Hydrostatic Pressure Treatment of Food: Equipment and Processing” was especially designed to be implemented as a pilot study previous to the full implementation of the course “New non-thermal technologies for food preservation” in the following year. It consisted of ten different activities intended to cover the four language skills, namely, speaking, writing, listening and reading. The unit was distributed into 2 two-hour periods of class. Only six students, out of the 15 who were officially registered for the course, took part in this pilot study. In this section we will the present the goals of the didactic unit together with a sample of three activities.

**Goals of the pilot study**

The unit was designed with the following content and linguistic aims alongside with specific teaching / learning procedures:

A. **Content objectives:**
   - High pressure generation
   - Batch and semicontinuous processing
   - Trends on equipment design

B. **Linguistic objectives:**
   - To encourage students to use the L2 as a functional tool to learn and acquire key concepts and skills of the subject matter.
- To acquire new vocabulary and linguistic structures both related and non-related to the content matter.
- To provide enough learning opportunities in all four language skills.
- To develop academic language skills in the L2 through cognitively demanding activities.
- To allow the use of the L1 to be able to draw on prior knowledge (declarative and/or procedural).

C. Teaching / learning procedures:

- To promote the students’ use of a variety of language learning strategies: analytical, metacognitive, social, etc.
- To regulate the level of difficulty in the L2 by adhering to Cummins’s framework (1991).
- To encourage autonomous and cooperative learning through collaborative work within heterogeneous groups.
- To provide multiple opportunities for students to engage in active practice of language and content.
- To encourage the cognitive development of thinking skills by means of challenging questions from the content teacher to the students, by modelling the learning process, and by engaging in verbal interaction with the students.

Activity 1: Warming-up
The first activity of the unit included a worksheet (see Appendix 1) with a picture of some high-hydrostatic equipment followed by questions through which students were asked to discuss in pairs issues related to high-hydrostatic pressure. The main purpose of this activity was to help students delve into the contents of this specific unit by also breaking up the ice in trying to use for the first time the L2 in the classroom.

Activity 3: Matching-up vocabulary
Activity 3 (see Appendix 2) was a matching-up vocabulary game-like activity, in which students were supposed to match the different words and phrases with their corresponding definitions. In order to carry it out, students were split into pairs and each pair was provided with a set of cards with both vocabulary and definitions. The main purpose of this activity was to help them not only learn new vocabulary but also try to develop those cognitive strategies that can enable them to go on gradually acquiring, in a much more autonomous way, all those vocabulary items and sets of structures that they might encounter in the future. Likewise, the specific design of this activity also responded to a need to cater for multiple intelligences, as it intends to develop intellectual ability in a non-restricted and non-restrictive way by exposing students to different learning styles so that they can interact more easily with the ones they are naturally more prone to.

Activity 7: Listening comprehension gap-filling exercise
Activity 7 (see Appendix 3) consisted of a listening comprehension exercise based upon a short PowerPoint presentation delivered by the content teacher in the L2 on the effects of high hydrostatic pressure on food processing. In this way, students were supposed to listen
carefully to the presentation so as to fill in the gaps with the missing information. Thus, the main goal of this activity was to help them develop successful listening strategies to be able to not just follow the contents of an oral production but also trying to discern what might be relevant to them from the overall context of the delivery. Such a listening strategy, like note-taking, might turn out to be extremely useful for them in the future to be able to follow, for instance, the contents of a field-related lecture.

Results of the pilot study

Once the pilot study has been implemented, it can be concluded that both sessions were fairly successful as both content and linguistic objectives were appropriately met; although there are some aspects that ought to be improved before the full implementation of the CLIL course.

With regard to improving the students’ linguistic competences though, the overall results of this pilot study have shed some light onto the need of paying greater attention to the acquisition of technical terms in the L2 related to the field of Food Science and Technology. This is mainly due to the fact that, according to the results, there is a worrying lack of competence in the mastering of these concepts, in spite of the fact that most students have an intermediate level in English and that most literature in this specific field is already written in English.

As regards class management, we concluded that at the end of each lesson there should have been some kind of recapitulation, as the lessons ended in a far too abrupt way which failed to provide the students with some rounding up of what had been dealt with in the class. This would have been helpful for the students as it would have given them a much cohesive and meaningful picture of the contents of each individual session in particular as well as by extension of this didactic unit as a whole. This recapitulation could also be used as a means of carrying out self-assessment and could be shaped in the form of a mind map, which could also be used as a means of enhancing learning and acquisition.

Finally, one language skill that appears to demand urgent consideration is that of improving the students’ speaking skills along with that of writing, as in general all students showed evidence of mastering receptive skills, that is, reading and listening, much better than productive ones, namely, speaking and writing. However, looking more onto the bright side, one of key conclusions that should be highlighted at the end of this new and challenging experience is the outstanding fact that CLIL implementation is perfectly feasible in tertiary education.

Conclusions

In this article we describe the first part of an on-going two-year research project on the introduction of content-based instruction in English at tertiary level. After contextualising the project in terms of the goals, theoretical background and stages of the research, we have presented the main aspects of the pilot study that was carried out. Although it is too early a
stage to derive any conclusion, the initial insights that we have obtained from the experience have shown not only the feasibility of implementing such an innovative educational approach but also the degree of both appropriateness of the given methodology and satisfaction among instructors and students alike.

References


Appendix 1:

HYDROSTATIC PRESSURE TREATMENT OF FOOD: EQUIPMENT AND PROCESSING

WARMING-UP

1.- Group work. Discuss with your partners the answers to the following questions:

a) What do you know about Hydrostatic pressure technology?

b) How would you relate this technology to food processing?

c) Guess who! Whose law states that pressure exerted at any point upon a confined liquid is transmitted undiminished in all directions?

Source: http://grad.fst.ohio-state.edu/hpp/
Appendix 2:

3.- VOCABULARY. Matching-up activity. Match the vocabulary on the left to its definition on the right.

<table>
<thead>
<tr>
<th>WORDS</th>
<th>MEANINGS</th>
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<tr>
<td>1.- Shelf life</td>
<td>a) Uniform pressure throughout a food.</td>
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<td>2.- Chilling</td>
<td>b) A round container used especially for holding</td>
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<td></td>
<td>liquids.</td>
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<td>3.- Isostatic</td>
<td>c) Increasing in temperature and becoming liquid</td>
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<td></td>
<td>or soft.</td>
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<td>4.- Batch processing</td>
<td>d) Processing in large quantities.</td>
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<td>5.- Thawing</td>
<td>e) The length of time that corresponds to a</td>
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<td></td>
<td>tolerable loss in quality of a processed food.</td>
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<td>6.- Preserve</td>
<td>f) Reduction in the temperature of a food to</td>
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<tr>
<td></td>
<td>between –1°C and 8°C.</td>
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<td>7.- Frame</td>
<td>g) To surround with a solid protecting edge. To</td>
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<td></td>
<td>put a border around.</td>
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<td>8.- Bulk processing</td>
<td>h) Processing a quantity of material or number of</td>
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<td></td>
<td>things at one time.</td>
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<td>9.- Vessel</td>
<td>i) The ratio of vapour pressure of water in a solid</td>
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<td></td>
<td>to that of pure water at the same temperature.</td>
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<td>10.- Water activity</td>
<td>j) To keep in good condition for a long time by</td>
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<td></td>
<td>some special treatment.</td>
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Appendix 3:

7.- LISTENING COMPREHENSION & NOTE-TAKING. Listen to the teacher talking about the effects of High Hydrostatic pressure on food processing and fill in the gaps from the worksheets with the information he provides you with. At the end of the talk, compare your notes with those from your partner/s.