

EXPERIENCE IN INTRODUCTION OF ENGLISH TERMINOLOGY IN ENGINEERING LESSONS: METHODOLOGY AND EVALUATION

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Abstract

This communication explains a experience for the introduction of English terminology in a technical degree of higher education. We present the methodology and assessment procedures used to evaluate the way the students perceived the introduction of terminology in English in two different subjects from 3rd and 5th year courses of a Computer Science degree in which English was not the vehicular language. We propose a strategy based on two main pillars, namely: 1) The design of materials, explanations, and exams, paying particular attention to the way in which the specific terminology was exposed to the students, and 2) The assessment of the impact in the students by means of the analysis of the feedback trough a set of enquiries. Our experience showed that the students responded very positively to the introduction of English terminology, and presented an affirmative feedback about the impact that an improvement of their linguistic abilities would have in their future work. Further, we present statistics regarding the use of English as the vehicular language for technical reports, which is envisaged as very useful by the students. Finally, we propose a set of questions for further debate which are centered in the role that English terminology should pay in technical degrees, and about the way in which universities should deploy resources in English languages within the different Syllabus.

Introduction

This contribution provides details about the methodology and assessment procedure used in a experience for the inclusion of English terminology in an academic environment. Particularly, we explain our practice in two subjects related to Computer Science Engineering in Universitat Autònoma de Barcelona (UAB).

Since English language has become an international language, especially in the technological areas of knowledge, the inclusion of the English terminology in the learning environment of the Higher Education is a mandatory task for the teachers and curricula designers. This is strictly related to the development of (transversal) communication competencies embedded into the framework of the European Higher Education Space (Bologna 1999, 2000), and it supposes one of the main challenges which both students and teachers are facing currently. This challenge is even especially evident in the field of technical studies within the framework of the Information Society (SI 2005), in which most of the documentation is provided exclusively in English. In this sense, our approach is based on the assumption of several facts which motivate that a special attention should be paid on this issue:

On the one hand, there is a generalized consensus, year by year assessed by the results presented in different studies (OECD 2009), that the linguistic competences related to English

language in Spanish pre-university students are below the average European standards. In this sense, primary and secondary schools appear to fail in providing Spanish students with high standards of English skills in comparison to neighbor countries, and far away from the northern Europe reality. This lack of linguistic competence is pulled along by the student through the whole learning age, and in many cases, higher education institutions adapt themselves to this reality by avoiding the exigency of higher linguistic skills. This explicit renounce is contextualized into a learning framework in which higher education institutions hold the assumption that improving the linguistic abilities of the students in a foreign language is out of the scope of their tasks.

On the other hand a different approach to this problem relies on the assumption that, although a good background in English is preferable to be attacked during early years, the fact of having a weak background of a foreign language in early stages is not determinant at all for the final goal of achieving a good standard of English at adulthood. Conversely, there are two major factors which compensate for the former lack, namely: 1) The improvement of the quality of the input, and 2) The extension, as much as possible, of the exposition to the input (Muñoz 2005).

In this work, we hold the aforementioned philosophy and propose a experience in which we aim at improving the linguistic competences of the higher degree students by setting a strategy for the introduction of English terminology in which : 1) We improve the quality of the input by providing materials which are specifically designed for this experience, particularly oriented to fix the terminology, and exposed by a teacher with fluent English skills, and 2) We extend the exposition to the input by including English as a natural tool in the lecture room, or in other words, we assume English as a transversal ability to be acquired by the student in several or all the subjects.

With this experience, we aim at showing our first steps in a simple methodology which allows to get the following targets:

- The inclusion of English terminology in the syllabus of the subjects in Computer Science Engineering, which enriches the knowledge of the student regarding the subject.
- The improvement of the linguistic abilities of the students in a two-fold way: 1) The increase of (specific, but also) general vocabulary, and 2) The development of the ability to put into correlation terms in different languages.
- To provide the students with an essential value, such as the domain of the main language in which the core documentation is written, in order to be best positioned for finding a better job.

Development

Background of the subjects and rational for the inclusion of English terminology

We developed our experience in two different subjects, namely: *Database Systems* (3rd course) and *Expert Systems* (5th course). These two subjects span one quarter within the five-years graduate degree for *Enginyeria Informàtica*. *Database Systems* focuses on the main strategies and models of data base management systems in the Internet, while *Expert Systems* addresses multimedia formats and standards. These two subjects have the particularity that the technological standards that they study are explained in white documents which, in most of the cases, have been edited in English exclusively, and the availability of the original documentation

in a translated version is very limited. For this reason, these subjects suppose an excellent area of implementation of the aforementioned strategy.

Database Systems was a 3rd course compulsory subject which comprised 70 students, aged around 21 years old mostly. *Expert Systems* was a 5th course optional subject which comprised 46 students, mainly about 24 years old, but with a wider spectrum of ages. The reason for the wider spectrum of ages in *Expert Systems* roots in the fact that some students, which are combining their studies with working, can select this subject so that they can complete the minimum number of credits needed to obtain their degree.

In both cases, none of the students of these subjects had ever had another subject in which terminology were explicitly showed both in the vehicular language and in English in a systematic way. None of them had English as their main language and all of them were from Catalonia. None of them were asked before to write reports in English within the University environment. Finally, none of them were ever asked to present their work aurally in English.

Methodology

The methodology of our experience was based on two main pillars, namely: 1) The design of materials, explanations, and exams, paying particular attention to the way in which the specific terminology was exposed to the students, and 2) The assessment of the impact of this methodology in the students by means of the analysis of the feedback trough a set of enquiries.

Design of Materials

We provided the students with all the written materials in electronic format in the vehicular language of the subject (which was, in both cases, Catalan language). This means that the students had access to subject dossiers and slides through the Virtual Campus in Catalan language. Where original documentation in Catalan language was not available, we developed specific slides in which the well-fixed Catalan terms were present. If not stable terminology was identified for a particular technical word, we did not provide our own contribution, but used the original English term exclusively.

In addition to the former, we provided the students with new documents exclusively in English, which corresponded to the original papers which dealt with the specific issues. In this way, the students had two separate sources of information, one exclusively in Catalan, and one exclusively in English. The process of correspondence between the terminology in Catalan and English is then both implicit and explicit. The implicit correspondence comes for the presence of documentation regarding similar topics in separate sources. Since the students will need to have access to both sources, the integration of the related terms in different languages is inherent to the learning process. The explicit integration is achieved by the strategy used for the explanations in the lecture room, which is explained in the following paragraph.

Explanations in the lecture room

During the teacher's explanations, which as mentioned above were performed using the Catalan language, English language was used whenever a technical term was mentioned. Catalan terminology was explicitly mentioned just once in the moment of the introduction of the term. With this strategy, the students have a starting point for the explicit correspondence of terminology. Particularly, all the terms written in the blackboard are exclusively in English, and never in Catalan, though the teacher must be checking for feedback regarding the right understanding of the terminology.

Monthly reports

In addition to the former, and exclusively for the subject of *Expert Systems*, the students were asked to write monthly assignments as technical reports (this was understood by the teachers as suitable for the last year students, but not suitable for the third year students). In order to allow the students develop their reports, the teachers spent one lesson in providing the students with a template which the most usual ways of starting sentences and connectors for technical reports in English. The students were told that they would not be evaluated for the number of mistakes, but they were strongly encouraged to adapt the templates provided to their particular cases. These templates consisted of common sentences used for starting a given section of the report and included, just mention a few: "In this report, we show that...", "This technology/methodology/procedure consists of ", "The main conclusions of this work are...", etc. The students had one hour each week in which, distributed into groups of 4, prepared and edited their reports. During these lessons, the students had the possibility of asking whatever linguistic doubt to the teacher. All the questions were allowed to be addressed in their native language and answered in English by the teacher.

Exam test

The final exam consisted of a 30 question test, which the students should answer in 80 minutes. For this test, the students were allowed to bring to the exam all the written documentation that they found suitable. With this strategy, the students were boosted to read all the sources of documentation provided, since they would be of potential use in the moment of the test.

Assessment of the experience

In order to assess the impact of our experience, we collected data regarding the impact of our methodology in the learning process by means of a anonymous final enquiry addressed to the students. The methodology of test and inquiries were already studied by the authors in previous works (Vilariño 2005). In order to obtain a quantitative result, evaluation by ranking was chosen instead of multiple choice questions (Whimbey 1985; Paxton 2000).

This enquiry consisted of 3 questions to which the students should answer with a number associated to their degree of satisfaction (0 minimum, 5 maximum). The three questions proposed and the average value obtained in each subject are shown in Table 1.

Table 1

#	Question	Subject	
		Databases	Expert Systems
1	Do you think that the inclusion of the terms in English is a positive value?	3.7	3.5
2	Do you think that your skill of linguistic competence is higher now?	2.1	2.0
3	Do you find the inclusion of the English terms useful for your future work?	3.9	4.0

In addition, 3 extra questions regarding the use of reports were proposed. The results are shown in Table 2.

Table 2

#	Question	Expert Systems
1	Do you find the edition of technical reports in English to be useful for you?	3.1
2	Can you identify an improvement in the quality of the reports that you can generate now?	3.4
3	If case that you have experienced any improvement, do you believe that the fact of editing the reports in English has to do with the improvement in quality?	2.9

The analysis of the results of the enquiries show that, in both the subjects, the students perceive the introduction of the English terms as highly useful for their future job (question 3), although the perception of the inclusion of English as a positive value is a little bit lower (question 1: this could be related to the fact that the inclusion of terms in English implies an extra work for the students). However, the students of both subjects do not have the feeling of getting their linguistic competence improved (question 2).

With regards to the edition of technical reports in English shown in Table 2, there is a generalized opinion among the students that the use of the English language for the edition of technical reports has a positive impact in the quality of their assignments (questions 2 and 3), although this opinion is not as strong as that expressed for question 3 in Table 1.

Conclusions and perspective

One of the main conclusion to be pointed out is related to the highly shared perception of "utility" accepted by the students regarding the inclusion of the terms in English. This experience shows that it is possible to deal with multilingual terminology in a natural way in the lecture room, without the need of external support.

From another point of view, the improvement of the linguistic competences through the inclusion of terms in English is not perceived by the majority of the students. This could be due to different factors, one of them related to the very definition of "improvement of linguistic competences". In our opinion, this point should deserve a deeper attention and study.

Finally, it is very relevant to assess that most of the students correlate the edition of technical reports in English with the improvement in the quality in the documents. This result can be interpreted as showing up a previous lack in basic abilities for writing good reports. It could happen that while the students are improving their abilities related to the foreign language acquisition, in a parallel process, they could be improving too those basic abilities related to the edition of good reports (structure, synthesis, accuracy, etc.), with independence of the language in which the reports are written. Certainly, if this is the case, this would show a lack of basic skills in the students, which, on the one hand should definitely have to be tackled in previous

stages of the learning process, and that, on the other hand, the methodology we are proposing in this work could help to compensate.

Another relevant point to be highlighted, in addition to the quantitative results provided above, is related to the evolution in time of the perception of need of the inclusion of English terms. The first response of the students after announcing the methodology in the first day of class was very skeptical. The experience was visualized both as a challenge and an added problem, and some students showed certain hostility. But with the evolution of the course, and once the students perceived that the teacher was involved in the learning process by helping in the assimilation of the terminology, this attitude shifted towards a more interested and natural approach.

Questions and/or considerations for debate

In our opinion, there is a need of formalization of the linguistic profile in the current syllabus, in order to face the new challenge of a globalised world. This is particularly true in the framework of a high quality teaching, which includes mobility programs within the European Space for Higher Education. The inclusion of English language is currently understood as a "transversal" competence. In many cases, when this competence is to be evaluated, special groups in which all the lectures are completely in English are offered to the students. In this case, extra credits are associated to this courses, since it is assumed that the fact of the lessons to be in English implies an extra difficulty. Under the light of the results of this pilot study, we propose this perspective to be revised, since the students are perceiving the acquisition of English terminology not as an addendum, but as a most relevant part of their learning process.

Specifically, we can identify the following nine questions for debate:

1.- This paper addressed a experience in which written English is used, but no written competences or abilities are assessed. Since the use of a proper edition abilities, independently of the language, are needed and greatly demanded both in academic and industrial environments: **Should the students of technical degrees have a specific subject for "writing good reports", or should it be understood as a transversal competence?**

2.- This paper does not address aural assessment either. From this perspective: : **Should the students of technical degrees have a specific subject for "performing good public presentations", or should it be understood as a transversal competence too?**

3.- In connection to the former two questions, since English language is nowadays an essential tool: **Should there be within the Syllabus of the different degrees a specific subject oriented to develop the competences of writing and speaking technical English properly?**

4.- As far as mobility is one of the main features of modern university in the European Space for Higher Education, there is an increasing number of foreign students attending to lessons in Catalan universities. Since English is a current de facto language taught in all European countries: **Should the Catalan Universities provide an English version of their Syllabus, including all their materials (slides, talks, exams, etc.)?**

5.- As far as this mobility scheme in the European Space for Higher Education comprises the share of different teachers/researchers from different origins (including different cultures, religions and languages), and since many of these teachers/researchers are expected to spend

only a short stage in the Catalan universities: **Should the Catalan universities aware their students that English would potentially become one of their natural vehicular languages in the Lecture Rooms?**

6.- In connection to the former question, as far as excellence has definitely become the reference for the development of current university, and since the most excellent researchers within the common European Space for Higher Education are expected to join Catalan universities: **Shouldn't it be natural that those subjects to be addressed by these researchers would be taught exclusively in English?**

7.- In this sense, it is a common practice in some universities to set up several groups for the same subject, and reserve one or more of those groups for lessons in English. This creates the possibility for the students to choose between English and native language for that subject. Sometimes, those who have the lessons in English have a premium, such as extra ECTS credits. In the formerly described scenario: **Is it fair that those students who are receiving their lessons in English would receive a premium? Should there be any compensating strategy in order to gradually adapt students to lessons in English, or conversely, should English be understood as a natural language from the beginning, without any convergence time?**

8.- On the other hand, teachers that are carrying out their lessons in English can receive a reduction in terms of hours of lecturing. **Is this strategy fair in the aforementioned scenario?**

9.- If English is the lingua franca of research, and professors, associate professors, associate researchers, lecturers and assistant teachers of Catalan universities are expected to fulfil the excellence requirements proposed in the European Space for Higher Education: **Shouldn't there be ad hoc programs within the Catalan universities especially oriented to provide the university staff with the appropriate level of linguistic competences in English which needed to take care of English speaking audiences? –It is a well-known and not argued-against fact that secondary education in Spain failed in doing this so far.**

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