Interactive multimedia course aimed at independent learning of prosody

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Abstract

In view of the importance of information and communication technologies in today's society and the process of adapting educational programmes to the European Higher Education Area in which universities are enmeshed, there is a need for new ways of learning which make both independent study and dealing with the subjects in both classroom and out-of-classroom settings possible. The purpose of this project is to create an interactive, multimedia theoretical-practical website in which students can learn about prosody (with information, literature, links, image and sound documents analysed and commented, exercises and self-tests). The goal is for the contents to cover the needs of two groups: those who want to embark on basic research in linguistics, and those who want to improve their communication skills. The results of the introduction of this innovation as a support to the classroom work are promising from both the quantitative and qualitative standpoint.

General area of interest of this innovation

The website PROSODIA is targeted at students of phonetics and oral expressions who are interested in prosodic analysis of utterances, either at the Universitat Autònoma de Barcelona or other universities. Given the fact that this encourages independent learning and blended learning, it can contribute to facilitating the adaptation of the courses to the European Higher Education Area. Its use in blended learning environments, especially when combined with active monitoring and evaluation methods, can help students profit more from the course and can have an impact on their academic performance (see, among others, the document by the European Commission, 2000 and the monograph by Pérez Batista and Mestre, 2007).

1. Objectives

The purpose of the project is to create an interactive multimedia theoretical-practical website in which students can learn about prosody (with information, literature, links, image and sound documents analysed and commented, exercises and self-tests). With it, we hope to provide students with a point of support in their work, contribute to effective time management in bimodal or hybrid environments (using blended learning) and improve academic performance. The overarching goal is for students to develop their ability to learn independently, gain experience in selecting relevant information appropriate for the goals, improve their knowledge of the subject and fine-tune their mastery of the technology.

2. Description of the project

With this project we aim to alleviate the scarcity of materials that examine prosody (not just intonation) on the Internet, with which students who wish may make progress in learning the contents while also analysing speech samples and doing exercises. The website can be useful in language and humanities programmes, and in any degree programme in which prosody must be analysed. It is considered especially apt for courses on oral expression and phonetics. For example, a humanities student whose goal is oral expression is perfectly able to familiarise himself with the basic notions that enable them to interpret the graphs and analyses provided in order to place them in relation to his own communicative purposes. They would likely be interested in studying lecture samples and discussing – among other relevant aspects – the prosodic details of elocution. A language student, on the other hand, might be interested in the relationship between acoustic variation and the determination of phonological units and in the perceptive validity of the results of the acoustic experiments. Professors and students can choose the most appropriate information according to their needs, level and the degree of detail they need to examine the subject in each course.

The content of the website is organised into ten topics. Each one states the goals and the sub-topics, offers progress exercises and provides a series of references on both paper and Internet. The topics are explained by using hypertext so that students can create their own line of reading depending on their interests and needs. At the end of the topics, self-evaluation exercises are available. Once the response is chosen, students receive explanations that can help them to understand why the answer is regarded as «correct» or not. The goal is to ensure that learning takes place in this phase as well. The exercises were prepared with the help of the interactive programme *Hot Potatoes* (developed by Stewart Arneil and Martin Holmes at the University of Victoria).

Each of the versions of the website which have been developed, and which are the natural continuation of an endeavour begun some time ago (de-la-Mota, 2004), were made available to students in case they might be somehow useful as a complement to the classroom, despite the fact that they contained materials under construction. In

this article we shall focus on the results from the first term in academic year 2007-2008, after introducing the innovation in a course devoted to phonetics and phonology.

3. Methodology

3.1. The design of the web pages, texts and illustrations

The contents are presented in a series of informative files based on the use of hypertexts and designed, in terms of both their format and length, taking into account the fact that they should facilitate reading and working from a computer screen. Care was taken with everything from the font style to the amount of information that should be included in a given page. Each of the written texts, graphs, sounds and videos included on the website have a conceptual function, plus they also contribute to ensuring that the explanations are more user-friendly. We can illustrate this with several examples. *Time of Silence* is a novel that contains an interesting written passage which stands out for the value of the pauses for the speakers. Rhythmic expressions can be described in different aspects of life, of art. One example that shows us rhythm in music and dance is the performance «Castrati» by the National Dance Company. Students can follow this link and see a brief video. Naturally, gymnastics can also be a good example of rhythm. In Figure 1, you can see the distribution of bodies, batons and hoops.

Figure 1. Batons and hoops. Example 1. Olyarg Banner.

3.2. Speech samples

Some voice files included on the website come from a corpus of research experiments and high quality recordings made prior to this project. However, many of the voice and video samples that can be seen have been created just for the project. The recordings were done in silence, mainly in the Bleacher Room, the Auditorium and the soundproof chamber in the Faculty of Philosophy & Arts at the UAB. The following equipment was used:

1. A *lavalier* microphone from a SHURE WL185 condenser and a SHURE PGX4 receiver.

2. A MicroTrack 24/96 digital recorder.
3. A Panasonic NV-GS230 video camera and a Starblitz TS-360 tripod.
    For the editing, processing and signal analysis, the following programmes were used:
1. *Audacity. The Free, Cross-Platform Sound Editor.*
2. *Praat: doing phonetics by computer,* a complete, advanced acoustic analysis
    programme developed by Paul Boersma and David Weenink of the Institute of
    Phonetic Sciences at the University of Amsterdam.
3. *Windows Movie Maker, Video editing software package.* Microsoft.

3.3. The files with speech fragments

In the case of the set of samples that are commented on in detail, each of the sequences
has a specific website: a «file» where you can listen to the voice and see the film of
when the fragment was produced, examine the graph showing the acoustic analysis and
read a brief comment. The files can be see both on the same page and in an expanded
version on a different page. All the speech fragments can be downloaded for students
to analyse from their own computer, if they want.

The acoustic analysis was performed with the *Praat* programme. Each graph
includes several different illustrations of the sound wave: the oscillogram, the spec-
trogram, the fundamental frequency contour and the intensity curve, so that the melodic
evolution and difference between loud and soft sounds can be studied easily. The
website also contains the segmentation into phonetic syllables and the transcription
(Figure 2).

Figure 2. Oscillogram, spectrogram, fundamental frequency contour and a phonetic
transcription of the sequence «Juan dice que lo resuelva él»
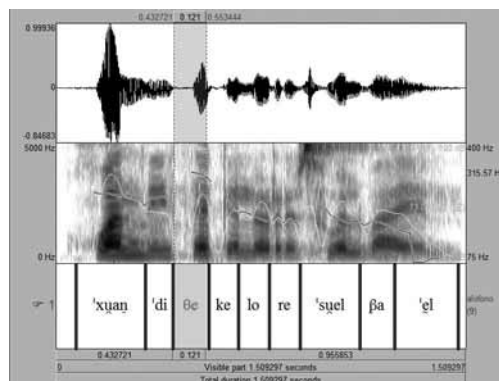
The file obtained by integrating all this information can be seen in Figure 3.

Figure 3. File on the sequence, «¡Marina, que llegamos tarde!»

3.4. Technical aspects of the website

PROSODIA is an interactive website written in PHP language on the Wordpress platform. MySQL is used as the database server. Both the programming language and the database are open source technologies. The website is compatible with all browsers and puts a premium on user-friendliness and downloading speed, essential components for all online projects.

4. Results

The first result of the project is the existence of the website, which is constantly undergoing revisions. The second results is the effect that the innovation might have on student learning. In order to have a point of reference that enables us to assess the impact of the teaching innovations undertaken, we shall present the quantitative and qualitative data on a first-year course taught in the first term in the Spanish Language and Literature programme, Spanish Language I, a compulsory core course. This course is devoted to the phonetic analysis of the language, including both the sounds and the prosody.

During academic year 2007-2008, students were given regular access to Internet, to the website developed, to the analysis programmes and to other electronic materials, as all the sessions were held in the computer classroom in the Faculty of Philosophy & Arts. For the evaluation, the students had two possibilities: either a single exam (an option that ultimately no students chose) or continuous assessment based on a supervised team project and an individual portfolio, in which students compiled the topics, resolved exercises, expanded on the essential points with literature, and maturely reflected on what they had learned, taking note of the skills they had acquired, the difficulties encountered and how they were resolved, their accomplishments and weaknesses, and the amount of time they spent on the topic and their expectations.

The students spent 15 classroom hours studying prosody. The first few sessions were used to introduce the topic and present the organisation and contents of the website, which then remained available in case students wanted to use it later on as a support and check it outside class time, just as they tend to do with the recommended literature. The other classroom sessions were used to discuss the topics, answer questions and do exercises using the materials on the website, both individually and cooperatively. The learning portfolio was turned in three weeks after the topic was finished.

Below are some of the indicators that enable us to assess the impact of the website on student learning: the satisfaction surveys, the assessments in the portfolios, the results of the SEEQ questionnaire on the teacher's performance, the analysis of the use of the website and academic performance.

4.1. Satisfaction surveys

With the goal of finding out students' perception of the quality and usefulness of the PROSODIA website, to obtain indicators on their degree of satisfaction, and to reveal the aspects that needed improvement, we administered a survey. The possible responses were: «not at all», «very little», «somewhat», «quite a bit» and «a lot». To the question «Do you think the PROSODIA website meets your needs?», 52.63 % responded «quite a bit», 42.11 % «a lot» and 5.26 % «somewhat». To the item «The PROSODIA website has helped me to learn», 68.42 % answered «quite a bit», 26.32 % responded «a lot» and 5.26 % said «somewhat». When asked about the interactivity of the website: «Do you think that the comments made on the answers in the self-evaluation exercises contributed to your learning?», 47.37 % said «quite a bit», 31.58 % answered «a lot» and 21.05 % said «somewhat». And the organisation of the website was even more highly rated, if possible. To the question «Do you think the website is well-organised? Can you find information easily?» 63.16 % answered «a lot», 31.58 % said «quite a bit» and 5.26 % said «somewhat» (see Figure 4).

The results of the surveys are positive and stand as an indicator of quality. Based on the information available, we can consider the most highly rated aspects and introduce new improvements.

4.2. Assessments in the portfolios

Learning portfolios were used as a methodological strategy to foster autonomous, reflective and meaningful learning during the course. They were not envisaged as a mere compilation of projects, rather as a re-creation or re-interpretation of students' knowledge and as a reflection of the evolving development of the skills taught in the course. Among the many aspects they deal with, students shared their opinion on the PROSODIA website and its impact on their learning: «I think it's a very useful resource, well-organised and especially comprehensive» (S.H.) and «It helped me to understand the grasp concepts that hadn't been covered in class before. It is clearly organised, its contents are precise but comprehensive and the design is simple and clear, even though

Figure 4. Degree of satisfaction with: meets needs (necesidades), helps students learning (aprendizaje), usefulness of interactive comments (interactividad) and organisation of the website (estructura).
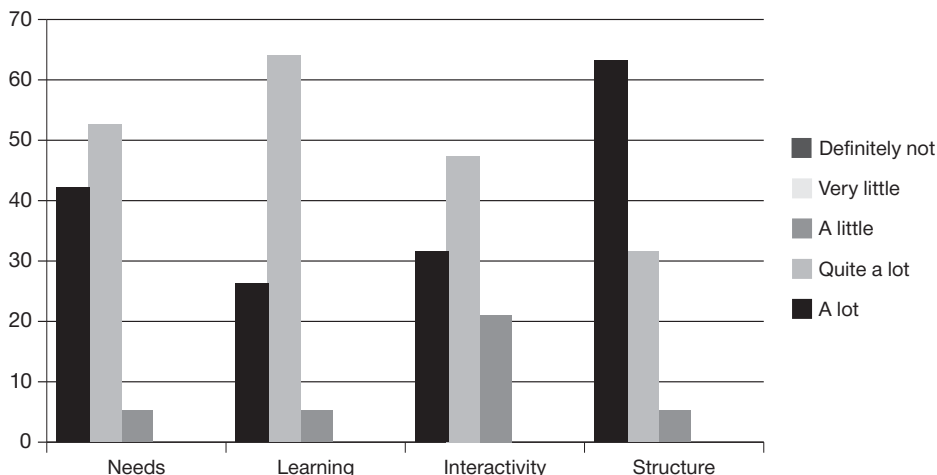
the result of the website is being developed» (M.R.). «It is easy to use, has a simple design that helps people who are not very familiar with computers to not have too many problems using it. I think that the content is well explained and told step by step, this helps a lot when understanding the syllabus.» (A.G.).

### 4.3. The SEEQ (Student Evaluations of Educational Quality) questionnaire

The SEEQ questionnaire on teacher performance, which is regarded as the standard instrument for evaluating teaching worldwide, provides information on a variety of factors: learning, enthusiasm, organisation, interaction with the group, personal attitude, content, tests and difficulty of the workload. Each factor is rated on a scale of one to five: the top score is five. At the end of the term, the responses to the questions most directly related to the materials used during the course, which therefore might include the assessment of the website, were very positive.

10. The course material was well prepared and carefully explained.	4.2 (d.t. 0.77)
29. The literature, additional material, assignments, etc., contributed to improving the assessment and comprehension of the material.	4.1 (d.t. 0.64)

4.4. Analysis of the website

Use of the website was monitored using *Google Analytics*. Figure 5 shows data from the period falling between the 14th of January and the 17th of February 2008.

Figure 5. Analysis of the traffic generated by the PROSODIA website between the 14th of January and the 17th of February 2008. Data obtained using the web analysis programme Google Analytics.
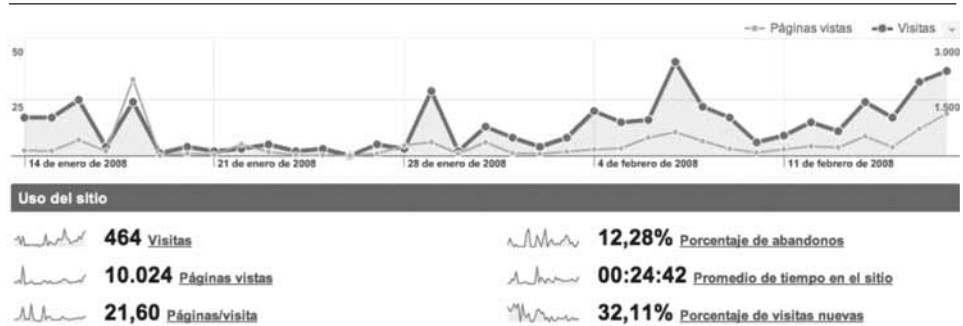
During this period there were 464 visits, which generated 10,024 pages visited, with an average of 21.6 pages consulted on each visit. This figure, along with the figure on the average length of the visit, 24 minutes and 42 seconds, shows that users easily navigate through the website and that they consider the materials published there worth using. Likewise, the website also had several intense days of activity, actually recording more than 1,000 pages visited on a single day.

4.5. Academic performance

In order to check whether the academic performance attained was different from before, we made a comparison between the marks in the first course held in academic year 2007-08 and those from the courses held in 2000-01 and 2002-03, years when the theoretical part of one group in the course was also taught by the professor in charge of this innovation. At that time, even though the students did several different projects in the course, they were evaluated with a single exam, and all the theoretical classes were held in a conventional classroom.

The number of students who showed up for the exams rose in the year of the innovation. In academic year 2000-01, 55.36 % of the students registered showed up for the exams, while in 2002-04 57 % showed up and in 2007-08 65.71 % showed up. With the exception of one case, the students who did not show up for the exam had not attended class and were not following the course. The success rate was very positively affected by this innovation. In the first course held in 2000-2001, 41.94 % of the students who showed up for the exam passed it, and in 2002-03 55.55 % did the same. In academic year 2007-08, 95.65 % of the students passed the exam.

In terms of the marks earned, in the first course in 2000-01, 22.58% passed with an E or D according to the ECTS grading scale, while in academic year 2002-03 22.22% did. In academic year 2000-01, 16.13% earned a C or B according to the ECTS grading scale, while in academic year 2002-03 25.92% did. In academic year 2000-01, 2.32% earned an A according to the ECTS grading scale, while in academic year 2002-03 7.4% did. In academic year 2000-01, 58.06% of the students failed the class in the first round, and 2002-03 somewhat fewer, 44.44%, did. However, during the first round of academic year 2007-08, 34.78% of the students who showed up for the exam passed with an E or D according to the ECTS grading scale, 39.13% earned a C or B, and 21.74% earned an A (40% of which passed with honours). The percentage of failures is also much lower: just 4.35%. This shows a very pronounced quantitative and qualitative improvement after the innovation. Not only did more students show up for the exams, more of them passed and they passed the course with higher marks.

5. Conclusions

The PROSODIA website can be considered yet another tool to help in the teaching and learning process which can contribute to fostering independent work among students which, in blended learning environments, can be used as a complement as long as its use is guided by the goals of the course and the topics being addressed. After introducing this innovation in a first-year course on the phonetic study of the language in which we encouraged the use of technology in the classroom and used active teaching and evaluation methods, we could see first that students were satisfied with the organisation and contents of the materials on the website and secondly that the teaching methodology was effective, as reflected in the academic performance attained. Having the student evaluations is an engine for improvement that will unquestionably contribute to more accurately focusing the future changes in the website in terms of both design and content.

References

European Commission (2000). Communication from the Commission *e-Learning – Designing tomorrow's education*. Brussels.
Online: http://ec.europa.eu/education/archive/elearning/comes.pdf

DE-LA-MOTA, C. (2004). «La enseñanza de la prosodia. La aplicación de las tecnologías de la información y la comunicación en un entorno bimodal», *Virtual Educa 2004*, Quinto Encuentro Internacional sobre Educación, Capacitación Profesional y Tecnologías de la Información, Universal Forum of the Cultures, Barcelona, 16th-18th of June [CD-ROM edition].
Online: http://liceu.uab.es/~carme/delaMota_VE04.pdf
Online: http://www.virtualeduca.org/2004/es/actas/17/3.17.6.doc

PÉREZ BATISTA, Reynaldo and MESTRE, Ulises (2007). *Monografí a sobre B-Learning o aprendizaje Bimodal*. Havana: Editorial Universitaria.
   Online: http://revistas.mes.edu.cu/eduniv/02-Libros-por-ISBN/0601-0700/978-959-16-0633-4-B-Learning.pdf. [The retrieval date of the information available online was the 27th of February 2008]

Interesting links
Readers can get an idea of the website by looking at the materials available at: http://hipatia.uab.cat/prosodia [2008]

Keywords
virtual resources, blended learning, partial classroom learning, independent learning, prosody, language.

Financing
This project was financed by the AGAUR programme on improving the teaching quality in Catalan universities (MQD) for 2005 (identification number: 2005 MQD 00117).

Supplementary materials on the CD-ROM
Video showing a sample of the materials found on the course website and the procedure to be followed.

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Presentation of the project leader and the working group
Carme de-la-Mota, who holds a PhD in Spanish Language and Literature and a Bachelor's in Catalan Language and Literature, and is a Full Professor of Spanish. Her research is devoted to studying oral language, especially the prosodic description of speech. She has researched for the Reference Centre in Linguistic Engineering (CREL) of the Generalitat de Catalunya and has worked on contracts with companies like Telefonica I+D, CSELT (currently Telecom Italia Lab) and Loquendo. Montserrat Marquina, who holds a Bachelor's in Spanish Language and Literature and Catalan Language and Literature and a diploma from the *Graduate Programme on Linguistic Correction and Quality*, has worked for Telefónica I+D and the Barcelona Media Foundation on projects related to speech technologies. Pere Rovira holds a Bachelor's in Physics from the Universitat de Barcelona, a graduate degree in the Digital Economy from the

University of California, Berkeley, and a Master's in Information Systems from the London School of Economics. He was director of operations at Anuntis Segundamano, is specialised in web analytics and online marketing, and is in charge of www.webanalytics.es.

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