Phonetics in a Virtual Learning Environment

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Abstract This paper reports a project which aimed at making available most of the elements of traditional on-campus phonetic training within a Virtual Learning Environment (VLE). Benefits of the VLE over standalone e-learning tools are examined. Technical issues associated with the use of phonetic symbols and of recorded sound in the teaching materials and communication tools of a VLE are addressed. Possibilities for a wide range of online courses are outlined, and two specific examples reported. An eight-week pilot of a distance course in English phonetics with associated exercises, ear-training and assessments attracted 25 students across five continents, and revealed a healthy global market for a course of this type; retention rate to final assessment was 64%. In a second application, the same techniques are being used to support a two-week on-campus short course, providing a range of preparatory, practice and reference materials.

1 Introduction While there have been many previous demonstrations of standalone online learning tools for phonetics, this project aimed to reproduce all the elements of an extended on-campus course, with tutorial material, exercises, practical training and assessment embedded in a VLE. An advantage of face-to-face phonetic training is that students work collaboratively and learn from each other (Ashby et al, 2005). A VLE can in principle provide corresponding interactivity for distance learners — but it will only work for phonetics if it enables users to exchange the appropriate media. Existing VLEs are not well adapted even for the display of phonetic symbols on pre-prepared course pages so that they can be read by all participants regardless of computing platform and browser. The present project attempted to research solutions within a VLE to the specific multimedia needs of distance learning in phonetics, and as an example, to design and trial a distance-learning course in English phonetics.

2 Phonetic symbols To maximize interactivity within the VLE, phonetic transcription is needed not only in prepared course materials, and in students' exercises and assessments, but also in spontaneous discussions, in emails – and ideally even in chat forums. The VLE employed in this project, WebCT, is typical in providing levels of font support and editing capability inadequate for the current application, and differing markedly across its various communication tools. With a view to eventual transportation of output between VLEs, a general decision was made to adopt Unicode for phonetic symbol display, either in the form of HTML character references or as fonts.

2.1 Unicode is the only logical choice for HTML handling of phonetic symbols. It offers the prospect of universal compatibility, but has hitherto been cumbersome to use, especially in word-processing applications. For this project a Unicode Phonetic Keyboard was developed for Windows (now distributed as a free resource: http://www.phon.ucl.ac.uk/resource/index.html), and materials were originated directly in Unicode fonts. At the same time, pages were produced guiding participants in the installation and use of Unicode fonts for their own written submissions.

2.2 With appropriate tutorial guidance, HTML also provides a general solution for participants' use of phonetic symbols within a VLE's Discussions and Mail forums – and

freely available internet tools can assist the Unicode character to HTML reference conversion if required. As an overall fallback, and for Chat forums without HTML support, resort can be had to the all-ASCII system SAMPA.

3 Audio Trials were carried out to define the protocols for recording format and sampling rate, and to investigate signal-to-noise requirements. A workflow was established in which reference quality recordings were originated at 44.1 kHz in an anechoic chamber and then downsampled in batches to give 16 kHz WAV files. A comprehensive system of filenames was evolved, permitting all the textual, graphical and audio resources of the system to be clearly identified. We foresee that a family of online courses will be able to draw on a shared battery of such resources.

Ample server capacity and student satisfaction with achieved download times made it unnecessary during the pilot to compress audio files, though a range of MP3 options had been evaluated.

4 Types of online course We can envisage a broad spectrum of online courses, spanning levels from absolute beginners to research and Continuing Professional Development for clinicians.

4.1 The pilot was designed as an e-learning distance course in English Phonetics at an introductory level, and its aims (modeled on successful on-campus courses) were defined as (i) ability to use and produce transcribed material in a specified variety, (ii) knowledge and understanding of theory sufficient to underpin transcription, and (iii) competence in relevant auditory discrimination skills. It thus provided a preview of many of the requirements for an online course at any level, and many of the resources assembled for the trial course can be migrated directly to other applications. Examples are (i) the "Getting started" pages which guide participants through the process of browser set-up, and installing phonetic fonts, (ii) the standard list of phonetic symbols with associated sound files, and (iii) references and links outside the course (for example, to online dictionaries).

4.2 As a first extension of the techniques developed for our online distance course, they have now been migrated to provide online support within a VLE for an annual two-week summer course, which is live for a period before and after the on-campus course. Components such as "Getting started", References and Links, and the Virtual Listening Centre are virtually unchanged from the distance course pilot, whereas the tutorial content is replaced with study guide material linked to the conventional on-campus lectures, with a preview of content and terminology, a spoken version of keywords, and suggested background reading. The intention is that the online support should make the single strand of lectures accessible to participants covering a wide range of previous knowledge and experience.

4.3 By its nature, interactive online presentation encourages the inclusion of research findings and favours integration of descriptive and acoustic approaches. The traditional separation of acoustic and descriptive articulatory approaches was already challenged by the ready availability of acoustic analysis tools (Huckvale, 2005) and this can only accelerate within a VLE. Participants in our pilot were encouraged to install and use acoustic analysis tools alongside the course.

4.4 Online presentation calls for interactive course pages, with sound file links throughout. In developing the pilot, we found no currently available text was entirely appropriate for the requirements of the course, and certainly none made use of the opportunities which online delivery offers. It seems likely that this finding would be repeated for other courses, whatever their focus and target audience. For the pilot, original material was written in the form of eight units, of which the text runs to 28,000 words.

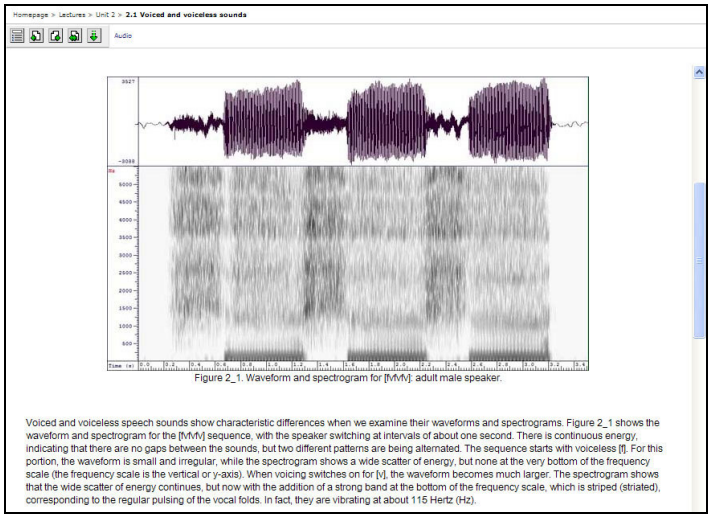

Figure 1. A sample course page from the pilot, introducing the distinction between voiced and voiceless sounds. Links on the pages take the user to illustrative sound files

Course material was converted to HTML, uploaded as draft course pages within the VLE, and systematically assessed and modified for compatibility with a range of browsers on both PC and Macintosh platforms before release. The information accumulated during these trials enabled us to add increasingly specific guidance to the "Getting Started" section of the course dealing with computer and browser settings, and to deal with individual technical problems as they arose. This material is directly exportable to other courses as they are prepared

5 Exercises There is an established range of formative exercises in phonetics, involving data-oriented tasks such as transcription, problem solving, and the drawing of diagrams to analyse speech movements. It was in developing the corresponding online exercises that the greatest obstacles were encountered from the limited functionality offered by the VLE. JavaScript was used to augment the repertoire of possible tasks, enabling such features as drag-and-drop and diagram-building exercises, as well as immediate feedback in the course of a task. All exercises were tested and progressively modified in an effort to make them run within the VLE regardless of the browser or computer platform in use.

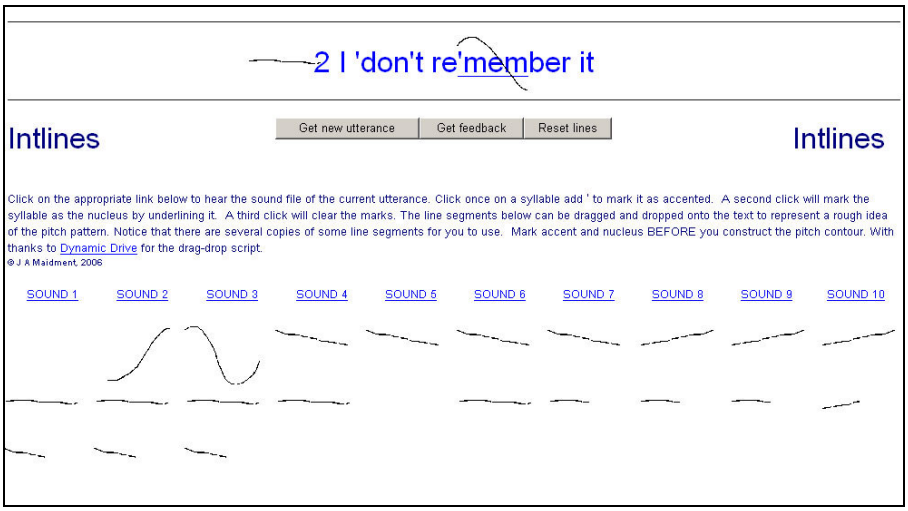

Figure 2. A drag-and-drop exercise on intonation, in which the student must sketch auditory pitch curves from an inventory of pattern pieces before receiving feedback.

5.1 Each batch of exercises concludes with ear-training practice, which presents recorded material which must be transcribed. Separate from the program of eight units, and providing a learning resource in its own right, a virtual Listening Centre provided a library of recorded and transcribed material which was constantly available for reference and practice. This is a provision which we intend to replicate in further online courses.

6 Assessment Each unit of the pilot included an assignment to be submitted for grading. Submission took the form of a Word document or PDF, and made use of the VLE's standard provisions for uploading and logging assignments. Unsurprisingly, the grading and feedback process proved challenging and time-consuming. A two-tier system of detailed feedback was evolved, in which general feedback relevant to all students was supplemented by individual explanations targeted at each participant. Once issued, the general feedback was kept available as a resource within the assignments area of the course.

7 Future research In further work now in progress, we aim to develop opportunities for greater interactivity and particularly to explore the use of further audio tools (such as VoIP), both within and in parallel to the VLE, to achieve this.

8 References

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