A MULTIMEDIA APPROACH TO LEARNING PHONETIC TRANSCRIPTION

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ABSTRACT
The Linguistic Interactive Phonetics Software (LIPS) program uses digital video clips to provide audio-visual examples of the speech sound inventory of Canadian English and a phonetically balanced set of words. This Windows-based CD-ROM program teaches students to identify phonetic symbols and labels and to progress to word-level phonemic and phonetic transcription. Transcription is performed via keyboard strokes with a widely used font. Not only do students learn the phonetic symbol, they also gain the use of a tool for keyboard entry of transcription outside the realm of the program. Each level of the program has a test module providing feedback on student progress. A final test examines students on recognition and identification of symbols, labels and sounds and finally to perform transcription from the audio-visual database of words. A database-driven algorithm automatically generates test questions ensuring that no two tests are identical.

1. OVERVIEW
The program described in this paper is designed as a tool for students to learn phonetic transcription. We found a need in our phonetics teaching to provide an environment where students could practice phonetic theory and transcription at their own pace and receive feedback as to their progress. The LIPS (Linguistic Interactive Phonetic Software) program accomplishes this by using a series of audio-visual clips representing the speech sounds of Canadian English as well as a phonetically balanced set of over 200 words also presented via audio-visual clips. As well as providing an opportunity to develop analytic listening skills and ear training, the use of the audio-visual clips affords the opportunity for close observation of articulator interaction. The software allows manipulation of the video image so that the student can step through the video frame by frame. The view shown in the videos is a close-up of the lips affording the student a view similar to what a lip-reader would see.

All program modules are accessible to students at anytime. So although the modules are laid out in a linear fashion in the program work area, students can move freely between and amongst the various program modules. Navigation is easily accomplished through mouse-clicking on the specific module topic. We have found that students often head straight for the test modules. Because the test modules report percentage of correct responses and track the incorrect responses, students can easily identify the areas where they need further work.

1.1. Multi-Media and Phonetics Teaching
The teaching of phonetic transcription often starts with the introduction of the IPA symbols and labels. Ear training has traditionally been developed with the instructor producing the sounds of the IPA symbols and perhaps playing tape recordings of the IPA sounds [1] and of different languages. In more recent years, technology in education has used computers to deliver digitized samples of speech via CD-ROM as a vehicle for ear training [2, 3]. An assessment of materials that have been used to teach phonetics and transcription has revealed a group of multimedia programs with differing capabilities. Some of the programs which perform these tasks are the IPA Labels [4], the IPA Tutorials [5], Higgins [6], and Video Phonetics [7].

All of these programs offer digitized audio samples of the phonetic symbols, and some offer video clip close-ups of speakers pronouncing the IPA Symbols (Higgins and Video Phonetics). The IPA Tutorials provide transcription practice by allowing students to listen to a sentence, view its digitized waveform and assign IPA characters to the appropriate locations in the waveform by clicking on the appropriate IPA symbol. The selected symbol then appears at the designated spot in the waveform. However, with the exception of the LIPS program, none of the programs mentioned above combine video clips and reading exercises, or allow natural keyboard entry for transcription of the IPA symbols.

This last point is a valuable asset of LIPS. By implementing the readily available SIL IPA font as the vehicle for transcription, students learn to use the keystrokes that activate this font. Transcription may also be performed by mouse-clicking on a select symbol to have the symbol appear in the transcription area. The disadvantage of presenting the seamless combination of the mouse with the keyboard is that students may then use the SIL IPA font for other transcription applications or to include phonetic symbols in their academic work outside the realm of the program. The SIL IPA font is shareware available at no charge through the SIL website.

2.0 Program Content
The LIPS program uses the speech sounds of Canadian English to introduce a subset of IPA symbols and labels from within the program’s Phoneme module. Students have the opportunity within the Phoneme module to learn the IPA label and symbol for each of the phones. They may select a phone group by either its place or manner of articulation, thus choosing to work with some of the inventory or the whole inventory. Once the phone workset is chosen, the student then advances to a view screen which displays the audio-video clips. In this view screen, students can examine all the sounds identifying each one in turn or comparing between the sounds. Transcription performed within this module is broad phonemic transcription.

Allophones are introduced in the Phones module, thus initiating students to a more detailed phonetic transcription. Further ear training and transcription practice is available by accessing the digitized sound files in the program’s Other Languages module. Students then have the opportunity to practice their transcription skills of another language by
Figure 1. This figure shows the matching IPA label to IPA symbol task for the Canadian English consonant inventory. The LIPS program displays the IPA label along the banner at the bottom of the work area. Students must then click on the symbol which corresponds to the label. An algorithm within the program ensures that the test questions are presented in a random order each time the test module is initiated. Correct responses are reported at the bottom left corner of the work area.

Figure 2: This figure shows the module which tests the ability to match the transcription to the audio-visual clip. Note the tool tip inviting users to adjust the slide to “step-through” the video frame by frame, enabling close observation of articulator interaction.
Figure 3. This figure shows transcription from within the phonemic module. Students may click on the IPA symbol at the left or use the keyboard to enter their transcription. Note the tool tip in the IPA symbols column which shows the keystroke for the IPA symbol. Also note the “Hint:” banner which cues students to the next correct symbol.

Figure 4. This figure illustrates one of the Tutorial Modules. Note the tutorial promotes analytic listening by playing three different samples which focus the student to listen to the phonetic feature under discussion.
transcribing the digitized speech samples of Miriam. The Austronesian language Miriam was chosen as it uses elements from the same phone set as Canadian English, but exhibiting a much simpler vowel inventory. This affords students the practice to listen and transcribe at a purely phonemic level rather than drawing upon the phonology of their own language.

Each level of the program has a test module providing feedback on student progress. Students receive immediate feedback as to whether their answers are correct. Correct responses are reported as an overall percentage. The program tracks incorrect responses. The questions are repeated within the test module giving students a second opportunity to answer them correctly. This feature alerts students to the areas where they need more practice. Test questions are automatically generated by the program. This is accomplished through a database-driven algorithm which creates a question with the correct answer but also simultaneously generates plausible distractor answers. Question and answer types are generated in a random order so that no two tests are alike. This serves to keep the test modules truly interactive in that a student cannot memorize the order of the questions or their answers.

The Tutorials module in the program covers such topics as Aspiration, Voicing, Vowel Length, the Glottal Stop and the Flap. The concept under discussion is unfolded as students work their way through a series of screens. Audio visual clips serve to focus the student on the concept being discussed. This technique of focusing the student on a particular phonetic feature develops a student’s analytic listening skills as proposed by Ashby et al. [8] at University College London. See Figure 4 for illustration of a tutorial view screen. Tutorial information is supplemented by an on-line Glossary that is accessed through its own module.

3.0 Pedagogy: Phonetic and Otherwise
LIPS embraces the philosophy that students learn by doing. In keeping with learning theory, the instructional design of the program provides the venue to allow students to learn at their own pace, presenting a variety of learning scenarios in discrete modules that build upon one another and develop different phonetic skills. Students must distinguish between and amongst the phones both auditorially and visually. They are asked to extend this knowledge to the word level, first learning to transcribe at the phonemic level and then at the phonetic level. They are tested on their reading skills, their listening skills and their transcription skills. The program provides the environment for repeated practice of these skills and feedback is provided through the test modules at each level.

Finally, LIPS has been tested by students of Introductory Linguistics and Introductory Phonetics at the University of Victoria’s Computer Assisted Language Learning (CALL) Facility. The program was accessed via network through Windows 95 based IBM Pentium systems. Many of the students were also learners of English as a Foreign Language and found the program very useful particularly to practice and analyse the Canadian vowel system. Of particular interest was the ability to focus on vowel length and tense/lax distinctions. One student was even observed using a mirror to practice lip positioning modeling the example provided by the program.

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REFERENCES

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