Using a multimedia program in teaching French as a second language

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Abstract

This paper introduces a Multimedia approach to teach the prosody of French as a second language. This pilot experiment studies the effect of real time visual feedback on the learners in the acquisition of French prosody. The study was realized with the 2015 version of WinPitch LTL software. On the one hand, we will briefly discuss the case of migrants, i.e. young adults learning French in a French-speaking environment. The students have to repeat French sentences after the model pronounced by a French native speaker as well as possible. It turns out that the visualization feedback helps the learners in improving the intelligibility of their foreign-accented speech. On the other hand, we will present the case of English-speaking undergraduate students of French trying to improve their prosody with WinPitch LTL. The first results are encouraging and should be followed by a further experiment to include other groups of students learning French as a second language, using other and more specific oral exercises that would help them better understand the French prosodic system. This procedure will also help the learners in listening to themselves in order to control their intonation and pronunciation and to be more confident while speaking French.

Index Terms: prosody in second language acquisition, French second language teaching, speech visualization.

1. Introduction

Intonation visualization, realized in real-time, can be traced back at least to 1964 [1]. Many other designs have been proposed [2], [3], [4], [5], [6], [7] with debatable success pertaining to their effectiveness when applied to intonation language teaching. Indeed, one of the possible reasons for their limited efficacy may stem from the lack of any theoretical background which would guide the learners in their acquisition of prosodic specific features of the language in question, as they were more than often asked to globally imitate an abstract melodic curve displayed on a screen [4]. Many users were quickly discouraged when the acceptability of their realizations were not evaluated against a clear phonological intonative target.

By contrast, WinPitch LTL, the software developed by Philippe Martin, used in our experiment, was specifically designed to incorporate clear on screen indications of the phonological features considered important by an expert author, free to elaborate sets of sentences grouped in lessons. Among other features, the software automatically retrieves in the learner imitation of a given sentence model.

2. Methodology

Two different groups of students were used in this experiment, with different levels in Phonetics and overall French language knowledge. The first group of young adult migrants, living in France was learning French as needed in their daily life. They have different levels of background education in their mother tongue, but everybody had a good A1 level in French. The students followed intensive courses five days a week, six hours a day. Basic phonetics has been explained and some repetition exercises has been done only three hours per day once a week. This first experimental group had a corpus of ten short declarative and interrogative sentences to produce, as well as a short text. They were asked to record themselves with WinPitch Pro (WP Pro is a general purpose speech analysis program) and after that, they worked with WinPitch LTL (WP LTL).

The second group includes undergraduate American students learning French in the French Department at UCLA. These students had an advantage in comparison to the first one, insofar as they were learning French phonetics in a French Department three times a week during one-hour classes. That's why we practiced more individually and with very little review of some phonetic features to produce the same sentences and text as the group 1. The aim of our practice classes was therefore to identify the individual difficulties and to help the students in improving their French intonation and pronunciation. The focus was especially on prosody, including F0 pattern, stress, tempo, rhythm and phrasing.

At the beginning, the students of the second group were asked to complete a small questionnaire to categorize them according to the Common European Framework of Reference for Languages (CEFR). This gave the teacher a rough idea about the students' language proficiency. Then, the students had to complete three different tasks: 1) self-recording without the model; 2) prosodic training with visualized model speech; 3) final control recording with WP LTL.

It was expected that the second group will have a generally better performance in fluency and prosodic features than the first group, because of their knowledge in English and French phonetics and linguistics.

3. Multimedia and Phonetics teaching

French language, has a fixed phrase stress on the last syllable, which is generally longer in comparison to the unstressed syllables. It is well-known, that French is considered as a syllable-timed language, with no dropping or reduction (unstressed vowels are not centralized) of the unstressed vowels (except [ə]), while English, where stress position

varies according to the structure of the word, is stress-timed. Unfortunately, phonetic and prosodic skills, are not frequently taken very seriously in many foreign language teaching methods [10]. In fact, in the CEFR Grid for speaking tests, phonetics has only two points out of 25. In almost every language school, learners studying a foreign language, have to follow a program which is focused on grammar, vocabulary and acceptable oral expression. The reason could be that there are not enough teachers who have been trained in spotting and correcting the phonetic and phonological mistakes of their students. According to my experience, many teachers think that the phonetic proficiency will come naturally or maybe never, because of a strong influence of a mother tongue and the biological age of the learners. However, we believe that phonetic and especially prosodic features should be taught from the very beginning and that it is very helpful in a spoken exchange with natives, to be considered without any prejudice. Moreover, the students will be more familiar with the "music" of the French language, when doing the repetition exercises. They have to focus their attention on syllables, with the function words like determiners, prepositions, conjunctions, auxiliary verbs, and so on, all unstressed. The stress contributes to define a 'prosodic word' (or a 'rhythmic group'), and that is the main challenge for the students learning French.

Multimedia technology in teaching, i.e., computer-assisted language learning has been used for more than 30 years to cope with the individual difficulties of the students. Philippe Martin's real-time speech visualizing devices have been developed since the mid-70s. WP LTL, a software dedicated to language teaching and learning, was first described and offered to potential users in 2000 [6] and has also been continuously developed. In France, there are some other speech visualization programs currently used to teach foreign languages. We may quote Rosetta Stone (1992) which includes now Tell me More, the first software commonly and widely used. A more recent software is SpeedLingua. These programs have been developed with a commercial purpose, whereas WP Pro and WP LTL have been created and developed as research tools with practical applications.

3.1. Using WinPitch

The present version of WP LTL has the same principles as that the version, presented previously in [6]. In the current LTL version, though, it is easier to navigate with the help of warring sings: red for waiting, yellow to get ready and green to speak (cf. Figure 1, pink ellipse). It is therefore easier for the student to get ready for the recording. As in the previous LTL version,
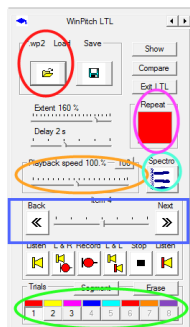

Fig. 1: WP LTL toolbar

the students have up to eight trials (green ellipse), and the student, as well as the teacher, have access to the original training files to analyze the evolution process, i.e., they can easily navigate among all the sentences (model and student) by clicking on 'next' or 'previous' button (blue box). It is furthermore possible for the student to slow down the speed (orange ellipse) or to visualize the spectrogram (turquoise ellipse). Before the students can work with WP LTL, the instructor has first to create a so-called 'wp2' file with WP Pro. Both WP Pro and WP LTL are now combined, so the switch from one to the other is easily possible.

Other function included in WP LTL allows to highlight some specific speech segment considered important for pronunciation training. This segment is normally related to some specific phonetic features, such as stress, melodic contour, *liaison,* i.e., linking, stop consonant aspiration, and so on. When the learner records the sentence according to the model, the corresponding syllables or segments in her/his imitation are automatically highlighted in the same color as specified in the model. The learner can then easily visualize eventual differences in phonetic realization compared to the model. It is also possible to automatically display information at the point of pronunciation in HTML format in a dedicated window, placed inside the LTL command box.

4.   Practical applications

In this section we will demonstrate practical applications of the WinPitch software and compare two different experiments: one presenting the WP Pro visualization of the speakers first recordings of the sentences corpus with Audacity, and the other one, demonstrating a final recording of the same speakers with WP LTL, after a training with the model.

Figure 2 shows a sample record of Male speaker 1, group 2 during his first recording of the sentence *Léa est française*? (Eng. *Is Léa French?*), as transcribed over the F0 curve. The teacher made some WP Pro manipulations to help the student paying more attention to his errors and its corrections.
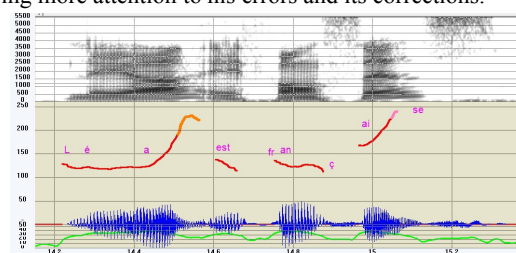

Fig.2: Msp1 gr.2, WP Pro visualization

With the help of WP Pro, the teacher can modify suprasegmental as well as segmental errors, as shown for the utterance in Figure 2. In this record, the student did not correctly produce the linking between two vowels (*enchaînement vocalique*) in the first two words. This part is marked in orange to indicate that there is a problem concerning the expected vocalic linking, which is very common and normal in French. Besides, at the end of this example recording, the student produced a devoiced consonant [s] (see the part of the F0 curve indicated in pink). When looking at the corresponding spectrogram above the production (narrow band with visible harmonics), we see that there is no voicing bar at the end. That means that the last

syllable of the French word "*française*" should end with voiced [z] sound and also be longer then its devoiced equivalent.

Next, we will analyze the same sentence produced by the same speaker, after a training with WP LTL.
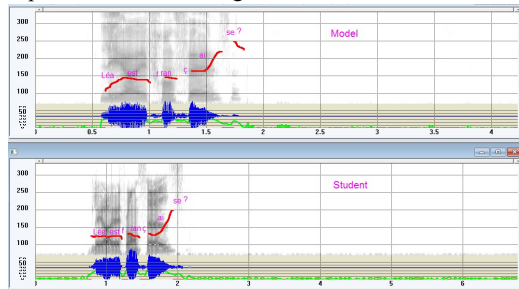

Fig.3: Msp1 gr.2 Control recording with WP LTL

Figure 3 shows the WP LTL layout with two windows, corresponding to the two tracks of a tape-recorder, as in some traditional language labs: the model is shown in the upper window and the student's production in the lower one. A main advantage in using WP LTL is that the student, while speaking, can visualize the model production and after a small delay his own production. This gives him the possibility to look at the melodic curve of the model while listen to it, and try to reproduce it in his own during the record and then to compare the two recordings. He can also listen to previous trials by clicking on the numbers from 1 to 8.

Let us insist on the fact that, both WP Pro and WP LTL offer the possibility to show the spectrogram. This is useful when the teacher would like to concentrate more on formants, or to verify that F0 is correctly detected, but also when the student has to work on segmental aspect (aspirations, stops, VOT, nasals, etc). The teacher can add some text aligned above the F0 curve, which will appear at the same time when the learner hears and sees the successive syllables or words, according to the cursor movement. For example, in Figure 3, speaker 1 was therefore able to correct the two mistakes he made in his first recording, the linking as well as the final voicing.
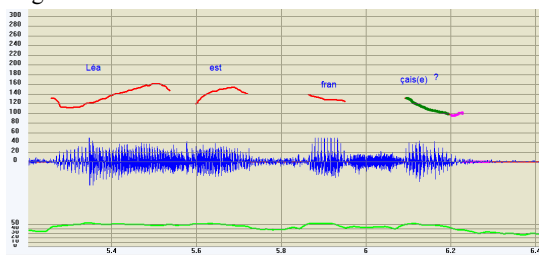

Fig 4: Msp.1 gr.1 visualization with WP Pro.

Let us compare the production above to another one made by a Male speaker from the first group, given in Figure 4. This speaker didn't pay attention to the orthographical question mark and produced a declarative sentence, moreover, he missed the final [z] consonant, thus producing a final [ɛ] vowel, as it was the masculine form. The sentence was chopped and not linked in a natural way.

In Figure 5, this speaker produced the sentence "Is Léa French?" correctly, because he had worked with the model speech and visualized the melodic curve. He had also be helped by the teacher comments about his first recording. So, eventually, the sentence was pronounced naturally.
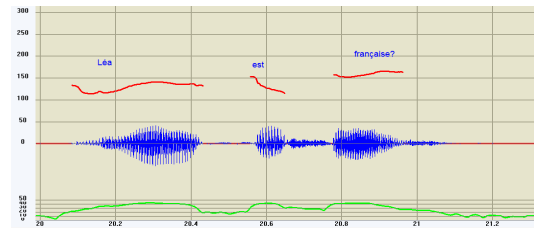

Fig. 5: Msp.1 gr.1 visualization with WP Pro.

The following example shows the case where a group 2 Male speaker pronounced the expected declarative sentence *Antoine va au marché* ("Antoine goes to the market"), with prosodic pattern associated to imperative for a native French listener. As shown in Figure 6, he erroneously stressed the verb *'va'* (it became 'go') making it more prominent than 'Antoine' which gives an imperative meaning. The teacher highlighted the wrong syllable.
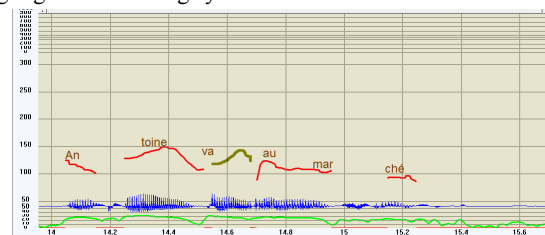

Fig. 6: Msp.2 gr.2 visualization with WP Pro.

Figure 7 illustrates this student production after a training with the model in WP LTL. The speaker produced the sentence in a right way, with two prominent syllables: "*toine*", the highest peak, and then a descending movement on the final accented syllable "*ché*" - a declination line.
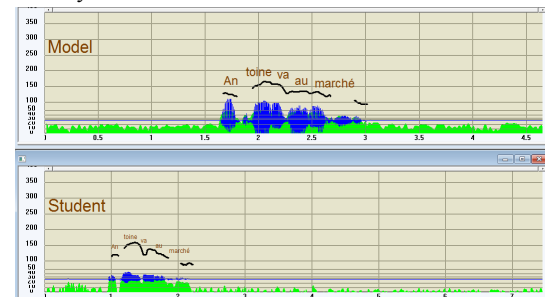

Fig. 7: Msp.2 gr.2 visualization with WP Pro.

Let us consider now a longest text sentence #3 recorded with WP LTL: *Papa dit qu'il faudrait tout de même profiter un petit peu du beau temps pour aller à la pêche* ("Dad says that it would be so nice to make the most of the good weather and go fishing"). As we can see in Figure 8, the F0 curve is highlighted in different colors: red, green or blue, they are representing successive contours, phonologically pertinent according to the principle of the melodic slope contrast [11], [12]. The student should meet the different targets to imitate the model better, to sound more French. The melodic movements of this example are note produced at random in the model. On the contrary, the follow the principle of melodic slope contrast, which predicts for instance a fall (in green) on the last syllable of *profiter*, and a rise (in red) on the last syllable of the group *du beau **temps***. The final conclusive melodic contour is highlighted in blue. This migrant student had to repeat up to 8 times the sentence to produce it correctly.

In his production we can perceive some reading style, as it does not sound spontaneous.
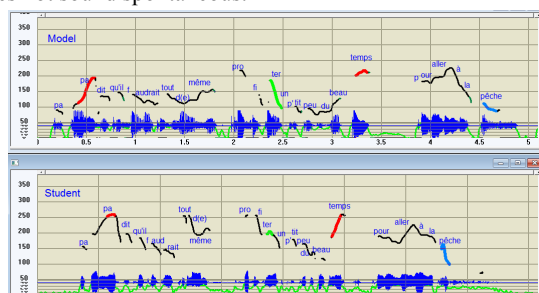

Fig. 8: Msp.3 gr.2 recording with WP LTL.

The student native speaker of English was working hard, and had not only suprasegmental difficulties but also segmental. Moreover, he didn't realize that he speaks loud and thanks to WP he managed to control his production and to link the words in the sentence more naturally. He also met the model contour targets. He eventually did a very good job and his production turned to be better than the previous one of the Male speaker 2 from the group 1, see Figure 9.
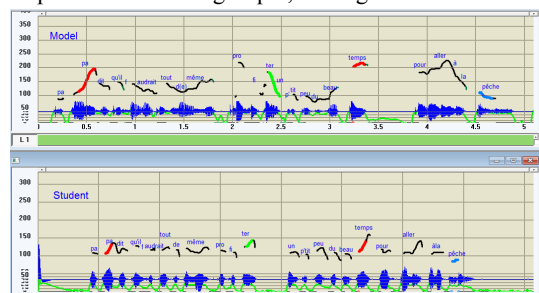

Fig. 9: Msp.2 gr.1 recording with WP LTL.

In all these examples we have seen that the teacher is able to give visual feedback to the student. When the student is working on the computer, the color chosen by the teacher will automatically indicate if the student is repeating his former error. That means that in a first step, the teacher first analyzes all the individual oral productions to identify the errors, and to indicate which color corresponds to which error. In our experience it turns out, that when the teacher is orally informing the student about the error, he/she reproduces only once the correct utterance and then in a later repetition, the error in the utterance comes back. On the other hand, when the student has a visual feedback in real time during his/her training, the chance that he/she will pay more attention to his/her difficulties is much higher, so that it is more likely that she/he will try to correct the wrong production.

4.1. Prosodic Morphing

In this paragraph, we introduce the prosodic morphing feature function of WP Pro. This re-synthesis functionality of WP Pro allows the student, with the help of a teacher, to become his own model by modifying the pitch contours of her/his own voice. This teaching/learning technique is particularly helpful for students who are not really able to perceive prosodic movements. With WP Pro, the teacher is able to modify suprasegmental features like the F0 curve, duration, stress and even segmental errors such as aspiration or glottolization. In this way it is possible to show the student the correct

movement and tempo with his/her own voice. Let's go back to the first example *Léa est française?*
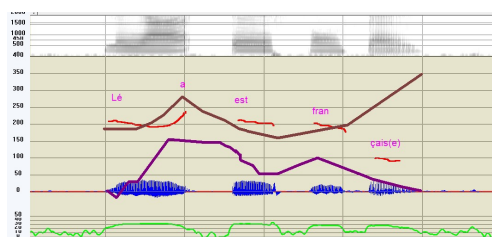

Fig. 10: Fsp.1 gr.2 Re-synthesis example

Figure 10 shows the recording of a female student after the first trial, the student pronounced it as a declarative one, as we can see in the falling F0 curve. In a next step, the teacher modified the duration of the segments (purple bold line), as well as the F0 (brown line).
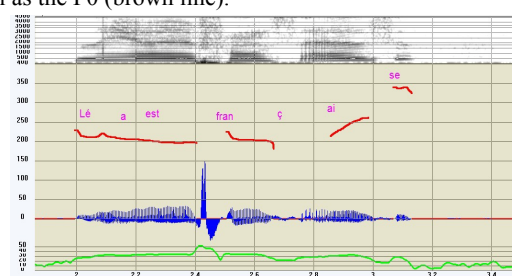

Fig. 11: Fsp.1 gr.2 visualization with WP Pro

Figure 11 shows the final recording of Female speaker 1, after the teacher had modified the sentence by re-synthesizing the student's voice, to obtain the correct F0 rise and duration. She produced this senctence correctly.

5.   Conclusions

In this paper, we have presented a few examples of the French learners' corpora. It is well known that the learner's mother tongue is assimilated in a very natural way into the foreign language. That is why for the foreign language learning, our perception influences articulation, and speech production in turn influences the possibility of our perception. Our results show that the teacher's intervention, individual work and training with WP LTL and its visual feedback, help the students to achieve the expected intonation. This type of training, should improve the production of natural French sentences in daily life not only for the learners in total immersion (as for migrants), but also those, living in a foreign country.

In conclusion, our experiment has shown that the visual feedback in WinPitch LTL helps the learner to be more conscious.

6.   Acknowledgments

7. References

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