Pronunciation Feedback for French learners of German by using spectrograms

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French and German are two languages that differ on segmental and suprasegmental levels. French is classified as a syllable-timed-language with a phrase final accent. German on the other hand is classified as a stress-timed-language with word stress on polysyllabic words.
French learners have specific difficulties with the pronunciation and prosody of German like the correct realization of German phonemes, applying the rules of word stress as well as reducing unstressed syllables (e.g. Zimmerer, Trouvain 2015; Hirschfeld, Trouvain 2007)
Developing phonological metacompetence (Wrembel 2007) through pronunciation training and feedback should help French learners of German to improve their awareness, which should lead to better performances in their German speech.
Neri, Cucchiarinia and Strik (2008) emphasize that feedback should be individual and easy to understand by the learner. One of our aims is to link the learners' matacompetence with possible feedback to allow students to progress even when the pronunciation class comes to an end.
Our research questions are:

1) whether spectrograms as a visual feedback in a classroom situation can help to improve pronunciation quality better than only auditory input
2) whether participants who use spectrograms as an aid to improve their individual pronunciation progress faster and with higher quality than their pairs who don't use spectrograms individually.

The participants are French first year undergraduate students majoring in English and German with an age range between 18 and 21 years. Their competence levels in German vary between A2 and B2 according to the CEFR. Only participants with a mono-cultural background are chosen for the study.
Participants are divided into two groups. Both groups get explicit instructions on the segmental and suprasegmental differences between French and German as well as oral exercises in production and perception that are performed in the classroom. In addition, participants of both groups have to record themselves at home. These recordings happen at four different moments across the semester to assess individual pronunciation progress over time.
Only one of the two groups get an introduction to PRAAT as well as comparative spectrograms between German native speakers and French learners of German. Participants of this group are free to use PRAAT as an individual feedback at home to analyse their own productions. The individual use is assessed over a questionnaire at the end of the semester. The other learners group will only get comparative audio files.
Individual pronunciation quality is defined by segmental and suprasegmental properties of the utterances: consonant realization especially for /h/-onsets, /ç/ and /ŋ/, vowel quality, length of syllables and reductions of unstressed syllables as well as word stress positions.

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