

Feedback methods to improve phonetic and phonological skills in foreign language acquisition

1 Introduction

- Difficulty of making learners aware of pronunciation problems
- Strong accent can interfere with intelligibility
- Pronunciation has been mainly left out in L2 teaching

>> **Computer Assisted Pronunciation Training (CAPT)**

Learner: <les amis> "[leami]"

Explicit correction	"No, it's [lezami]."
Recast	"[lezami]."
Clarification request	"Did you say [leami] or [lezami]?"
Metalinguistic fb	"You have to pronounce it with a [z] because the word following <les> starts with a vowel."
Elicitation	"No, it's...?"
Repetition	"[leami]?"

Fig. 1 Hypothetical example of six types of corrective FB found in a classroom study (Lyster and Ranta, 1997)

Visual	Aural
Segmental marks using a color scale	Resynthesis of voice
Oscillogram	Reference video
Individual written information about correct articulation	Different speech rates
(Animated) vocal tract	Listening to own voice and reference speaker
Overall articulation score	
Pitch curve	
Explicit correctness information	
Spectrogram	
Info about pitch movement	
Formant graph	
Reference video	
Feedback on duration	

Tab. 1 Visual and aural FB used in 11 CAPT systems including the amount of systems offering these particular features

French native speaker	German native speaker
Realisation of /h/ and /ʔ/	Liaison and enchaînement consonantique
Oral vowel + nasal consonant	Nasal vowels
Consonant cluster, affricates	
Vowel quantity	
Realisation of [ç x]	
Location of word stress	
Aspiration of /p t k/ and realisation of voiced sonorants in final position	
Postvocalic /r/ variations	
Reductions, elision, assimilations	
Realisation and location of pitch accents	
Location of contrastive accents	
Mistakes induced by orthography	

Tab. 2 Typical mistakes that might appear in non-native utterances and will require FB

5 Influence of individual learner strategy

- More than one learner strategy: only aural, only visual, combination of visual and aural (Eskenazi and Hansma, 1998)
- Test for learner strategies (games, questionnaires)

2 Feedback (FB)

- Facilitates self-regulatory processes in order to accomplish a task
- Lyster and Ranta (1997) found six types of corrective FB (Fig. 1)
- Needs additional information/instructions on how to improve the mistake
- Lack of FB characterizes the negative side of current CAPT systems (Engwall et al., 2004)

3 Analysis and evaluation of feedback methods in CAPT

- 11 CAPT systems have been analysed (Tab. 1)
- Graphical displays (e.g. wave forms) are difficult to interpret without phonetic knowledge
- None of Lyster & Ranta's (1997) FB types have been used
- **Not a single system gives immediate information on how to correct the mistake**

4 Proposed feedback methods

FB will be provided for typical mistakes in non-native utterances (Tab. 2)

- Explicit instruction on how to improve a mistake (Fig. 2 and 3)
- Descriptions for non-phoneticians
- Interactive graphical displays, e.g. vowel quality, pitch variation ("what you see is what you do")
- Similar acoustic parameters of golden speaker
- Resynthesis of voice
- Self-manipulation of prosodical features
- ...

Exercise: Liaison

You will see a single sentence on the screen, e.g. "Les enfants sont arrivés."

Read and record the displayed sentence.

You will receive automated feedback on your pronunciation

Fig. 2 Possible exercise instructions

Les enfants sont arrivés.

You have made 2 mistakes.

The underlined consonants should be pronounced in combination with the following vowel. **Try again?**

Record

Play Reference

Play

Play Reference (slow)

Fig. 3 Blueprint for a possible graphical representation of FB

6 Future work

- Offline experiments to test proposed FB (individually)
- Perception experiments
- Consider different learner strategies

References

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