

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

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## 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]"

<b>Explicit correction</b>	"No, it's [lezami]."
<b>Recast</b>	"[lezami]."
<b>Clarification request</b>	"Did you say [leami] or [lezami]?"
<b>Metalinguistic fb</b>	"You have to pronounce it with a [z] because the word following <les> starts with a vowel."
<b>Elicitation</b>	"No, it's...?"
<b>Repetition</b>	"[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	5	Listening to own voice and reference speaker	11
Oscillogram	5	Resynthesis of voice	3
Individual written information about correct articulation	4	Reference video	2
(Animated) vocal tract	4	Different speech rates	1
Overall articulation score	3		
Pitch curve	3		
Explicit correctness information	3		
Spectrogram	2		
Info about pitch movement	2		
Formant graph	2		
Reference video	2		
Feedback on duration	1		

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]	<i>Liaison and enchaînement consonantique</i>
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

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## 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)

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## 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 aspect of current CAPT systems (Engwall et al., 2004)

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## Analysis and evaluation of feedback methods in CAPT

- 11 CAPT systems have been analyzed (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**

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## 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

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## Future work

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

## References

- Engwall, O., Wik, P., Beskow, J. & Granström, B. (2004). Design strategies for a virtual language tutor. *Proc. ICSLP 2004*, pages 1693-1696.
- Eskenazi, M. & Hansma, S. (1998). The Fluency pronunciation Trainer. *Proc. StiLL Workshop on Speech Technology in Language Learning*, pages 62-76.
- Lyster, R. & Ranta, L. (1997). Corrective feedback and learner uptake: negotiation of form in communicative classrooms. *Studies in Second Language Acquisition*, 20, pages 37-66.