Developing a CALL System for Practicing Oral Proficiency: 
How to Match Design and Speech Technology 

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1. Introduction 
Aim of the DISCO project: 
oral proficiency CALL application for practicing pronunciation & grammar (syntax & morphology) 

Current paper: focus on 
matching design and speech technology 
• develop speech technology and 
determine what is (not yet) feasible 
• use this knowledge for design 

ASR of non-native speech is problematic challenges in developing an ASR-based CALL system 
• designing exercises that 
allow enough freedom to practice pronunciation & grammar 
• but can be handled automatically by ASR 

2. Design 
Design of the DISCO application: 
• starts with a relatively free conversation simulation 
• choose from a number of prompts at every turn 
• errors → remedial exercises, with little freedom 

Closed response conversation simulation courseware and 
interactive participatory drama (IPD) (scenario, agents) 
The use of drama is beneficial for various reasons, 
a) it “reduces inhibition, increases spontaneity, and 
enhances motivation, self-esteem and empathy” [3], 
b) it casts language in a social context, and 
c) its notion implies a form of planning, scenario-writing and fixed roles, 
which is consistent with the limitations of ASR 

3. Speech technology 
Two-step procedure 
1. speech recognition: determine what was said (content), 
tolerate deviations, handle disfluencies 
2. error detection: determine how it was said (form) 
strictness is required 

3.1. Speech recognition 
Try to elicit constrained responses by presenting several prompts 
for each prompt 
• 3 versions (punctuation, morphology, and syntax) 
• list of predicted, correct and incorrect, responses 
• utterance selection & utt. verification (UV); acc. > 90% 

3.2. Error detection 
Pronunciation: CMs for phones; acc. > 90% 
Syntax, mainly: words are pronounced or not 
• Incorrect versions in predicted list: acc. >90% 
• Possibly in combination with: CMs at word level 

Morphology: different types of morphological errors 
(c1) “gisteren maakte hij” (yesterday made he) 
incorrect: maak, maakt, maakten, maken, etc. 
• use this knowledge for design 
ASR performance is not 100% 
Wrong /barb4right 
Phases 1 & 2 & 3 & 4 

3.3. How to deal with technical limitations 
ASR performance is not 100% 
• feedback contains errors: false accepts (FA) and false rejects (FR) 
Phases 1 & 2 & 3 & 4 

4. Conclusions 
The results of the preparatory studies conducted so far have indicated how we can 
take account of the limitations of non-native ASR and still develop an application that is 
in line with current views on L2 learning and that 
“can help promote ‘some means of Focus on Form that is socially provided 
during meaningful communication and that 
recruits the learner’s explicit conscious processing”.

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http://taaluniversum.org/taal/technologie/stevin/