

## PDF hosted at the Radboud Repository of the Radboud University Nijmegen

The following full text is an author's version which may differ from the publisher's version.

For additional information about this publication click this link.

<http://hdl.handle.net/2066/116091>

Please be advised that this information was generated on 2018-08-19 and may be subject to change.

# GOBL: Games Online for Basic Language Learning

*Polina Drozdova<sup>1</sup>, Marijn Huijbregts<sup>1</sup>, Catia Cucchiarini<sup>1</sup> and Helmer Strik<sup>1,2</sup>*

<sup>1</sup>Centre for Language and Speech Technology, Radboud University, Nijmegen, the Netherlands

<sup>2</sup>Department of Linguistics, Radboud University, Nijmegen, the Netherlands

{p.drozdova,m.huijbregts,c.cucchiarini,w.strik}@let.ru.nl

In the GOBL project [3] we develop and test small web-based mini games for low-educated and disadvantaged beginning learners of Dutch, English, and French. An innovative aspect of this project is that we incorporate speech and language technology (SLT) to practice speaking skills.

Educational mini games are small and self-contained games which focus on specific well-defined learning topics, which are highly reusable, cost-effective, and motivating. The main advantage of using games for language learning is that the user tries to achieve a non-linguistic goal: reaching a new level, obtaining more points, etc. It makes the process motivating for language learners [1] and it has been shown that educational mini games lead to fast gains in L2 vocabulary and to increased speed of lexical access [2].

## The mini games

Throughout the development of our games, language teachers and learners have been involved to provide input for system design. At the beginning stage of the project, interviews with these groups formed the basis for the list of user-related and pedagogical requirements and eventually, for the three mini-games that we have developed:

- 1) The lie-detector game, where the learner has to decide whether the sentence pronounced by the suspect is correct or incorrect;
- 2) The finger print-collector, where the learner has to collect finger prints in the form of the words, which can be used to fill in the gap in the sentence;
- 3) The roof-surfing parrot, where the learner has to move a parrot and save it from smog by pronouncing or clicking on the sentence to continue the dialogue.

All the games are time-paced, so that the learner has to provide an answer within a given time. In the case of an incorrect answer, the learner gets the “wrong” feedback from the system, and can see the result of his/her activity on the screen: the face of the suspect is changing from neutral to happy or sad, the finger-print is destroyed, the parrot is suffocated by the smog.

Our three mini-games were evaluated in Nijmegen with 32 adult learners of Dutch in three different groups (A1, A2 and B1 levels according to the European Framework of Reference) with diverse ethnic and educational backgrounds, learning Dutch to be able to pass the civic integration exam and/or to function better in the Dutch society. Most of the participants defined themselves as non-gamers or casual gamers, meaning that they never or only occasionally play computer games.

During the evaluation session participants had to fill in the questionnaire after playing each game twice, and indicate on the 7-point Likert scale whether they found the game easy, interesting and useful for learning Dutch, whether it was clear how to play the game, and whether they were good in this particular game. After playing all the games, they arranged the games in the order of preference, and participated in the discussion session. The aim of the discussion session was to gather qualitative feedback about what was particularly interesting or frustrating about each game and what can be improved, according to the participants.

The initial analysis of the results revealed that “The finger-print collector” was the most interesting for the users to play, whereas “The roof-surfing parrot” scored as the least interesting. Qualitative analysis of the comments made during and after the evaluation sessions, however, demonstrated that it can be connected with the difficulty of the game. The solution to this problem, as mentioned in the discussion sessions, can be making the speed of the games adaptive to the level of the users, or creating different levels of one game, giving users the opportunity to start with an easier level with less tight timing. Overall the learners found the games exciting to play, and mentioned that they would like to play them once again when they are available online to be able to practice and improve their results. Both the learners and their teachers liked the practicality of

the offered topics (e.g. “At the doctor’s”), since these are the topics they have to deal with in their daily life, and they are tested in the integration exam.



Figure 1: Screen-shots from the three mini-games. Top-left: the fingerprint game, top-right: the lie-detector game and at the bottom: the roof-surfing game. Especially the lie-detector and the roof-surfing games are well suited to play with the aid of ASR, pronouncing the sentences instead of clicking on them.

## Speech technology

Speech technology is now being integrated in the games. Automatic Speech Recognition (ASR) technology has reached a level of maturity sufficient for language learning applications, but still has a number of limitations, which need to be taken into account in the design process. First, in the context of web-based mini games, ASR technology needs to be optimized for web-based delivery, taking into account several platforms, browsers, and contexts in which it will be used. Second, ASR for foreign language learning needs to be adapted to the speech of non-native speakers, and to the kind of mistakes they make. Any concessions to the user interface due to ASR limitations will surely reduce the enthusiasm of our (normally non-gaming) audience.

For integration of ASR we will therefore focus on simplicity: Any speaker normalization will be done during the speech recognition task itself or by integrating a short “calibration” task into the game. Speech activity detection will preferably be done without the need for the user to press a button (push-to-talk). Instead, we will provide the user with clear visual and auditive queues of when to start and to stop talking. Finally, we will measure the quality of the audio input. If the conditions are too poor to perform ASR, the system will fall back on the mini-games without the use of ASR.

## References:

- [1] Herselman, M. E. (1999). South African Resource-Deprived Learners Benefit from CALL through the Medium of Computer Games. *Computer-Assisted Language Learning*, 12(3), 197-218;
- [2] Cobb, T., & Horst, M. (2011). Does Word Coach Coach Words ? *CALICO Journal*, 28(3), 639-661.
- [3] <http://www.gobl-project.eu/>