

# The Serious Game: weMakeWords

## From Developer Perspective and from Psychological Perspective

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### Abstract

We suggest digital serious games as a means to create individualized learning environments that train social skills in parallel to the content. In cooperation with a child psychology practice we developed the collaborative and adaptive serious game weMakeWords as a prove of concept. The game teaches children how to read in a fun and approachable way, while adjusting itself to the children's need. In first preliminary evaluations the concept has been highly successful concerning the leaning outcome as well as in fostering collaboration between children.

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**General Terms** Design, Human Factors

**Keywords** Serious Game, Learning, Preschool

### 1. Introduction

Learning is an extremely important part in today's Knowledge Economy. But not only learning content but also different soft skills, e. g. collaboration is crucial. Practicing under a personal tutor would be the ideal learning environment [1][4], but is neither affordable nor feasible. Instead we suggest using digital Serious Games utilizing different algorithms in artificial intelligence to reach a similarly effective learning experience. As a proof of concept we present weMakeWords a collaborative and adaptive serious game that helps children to practice their reading skills.

### 2. The Game

weMakeWords is a collaborative and adaptive serious game that helps children to learn reading. It is developed at the Technical University Munich together with a child psychology practice. Children collaborate in playing motivating stories like saving animals that escaped from the zoo into a dangerous city. They combine alphabetical words or Chinese ideographs out of individual letters or symbol components and are thus familiarized with German, English or Chinese.



**Figure 1.** In weMakeWords children spell the word on top, assisted by a watermark.

They also gain social competencies as the game only continues with the next round if all teammates fully built up their words. This immediately leads to communication needs between smarter and weaker children. To help each other they can send letters to teammates and ask for support when having difficulties. This behavior of the game also reduces frustration and encourages the cooperativeness.



**Figure 2.** Cooperation is crucial. Whenever I do not need a stroke I should send it to my teammates to help them.

### 3. Adaptivity

weMakeWords automatically adapts to the playing children. We do this on three different levels.

First the word or symbol we present is selected to become increasingly difficult with each correct answer. By this means we try to avoid boredom while at the same time give each child enough time to repeat when necessary. At the beginning we use estimations for the difficulty of each word given by the child psychologist. As the child plays this estimate is corrected so that words where the child seems to have problems are ranked as more difficult.

Second we hand the child different letters or strokes dependent on the current performance. If a child is making many mistakes in a row the number of letters or strokes that are needed for its word is highly increased so that it will eventually solve it even by guessing. This mechanism is primarily used to prevent frustration when playing alone.

Third we provide different amounts of scaffolding through a watermark. This watermark is shown below the position where the child is supposed to drag the correct letters or strokes. It dynamically changes its opacity according to the child's skill with the particular word or symbol.

### 4. Results

An evaluation with children aged between 4 and 8 years was conducted [2] to find out whether children understood the game and were able to learn with it. For this the Chinese version was used in order to avoid the need of evaluating previous knowledge.

All children were able to play the game after a short explanation from a supervisor. After playing the game for 15 to 30 minutes children remembered on average four Chinese symbols and their meanings. Many of the children were even able to draw them although the game does not directly practice this.

### 5. Conclusion and Future Work

In this paper we introduced weMakeWords as a serious game that does not only teach reading but also supports the development of social skills. Our preliminary evaluation of weMakeWords indicates that the presented approach is very promising. The game is now available on the App Store [3]. In the future improvements and more detailed evaluation of the adaptivity should be made to further improve the game. Also we want to research whether similar game concepts can be expanded to other topics and target groups.

### References

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