

Master Theses

## Revising a Game-Based Learning Platform for Computational Skills in Education

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This thesis describes the further development and introduction of a pedagogical concept in *sCool*. The Unity-based video game consists of two components: a mobile video game for students and a web application (ASP.NET) for educators. It was initially developed in 2017 in a cooperation between Graz University of Technology and Westminster University (UK). The general approach of the game is divided into two parts: concept-learning and practical working. In the first part of the game the students learn concepts in a textual way and in the second they must apply the concepts using the Python programming language. The creation of the content can be done in a web application that is designed especially for educators. The combination of both components provides a highly adaptive tool to teach computational skills.

To receive a tool with an encouraging game environment a learner-centred pedagogical concept some improvements are necessary. The thesis discusses the pre-evaluation that was conducted in two (academic) secondary schools to develop requirements and a concept for a further version. In terms of this pre-evaluation aspects like game engagement, emotions, and game-related questions were asked. Based on these findings the development of a revised *sCool* version started. This version extends the existing game environment with different game elements to provide additional concepts in computational skill teaching. The development also covers the work on the web application to make the new concepts as highly adaptive as possible. A central part of this thesis is the evaluation of the further developed *sCool* version. In workshops different aspects of the game has been evaluated. One of the evaluations has been conducted with ten computer science teachers to receive feedback about the overall pedagogical concept. The other experiments were taken in a primary school, an academic secondary school, and a university. The evaluation showed that the pedagogical concept is a key element for successful education. The revised version of the game helps to teach more concepts and improved some usability issues to get a more playable game.

