An Investigation of a Game Generator Tool to Teach Recursion

Abstract

Learning programming is difficult for most students. Particularly, the recursion topic. Although games have been proposed as an alternative instructional media given their motivational impact, their mainstream adoption rate in teaching still remains low. One reason given for this is that designing and developing relevant educational games is difficult, expensive, and time consuming. In this project, a game generator tool is proposed to support non-technical experts (teachers) to easily create serious programming games. Results suggest that the proposed tool is effective in supporting CS1 teachers and the generated games have the potential to help students better learn the recursion topic.

Objective

This research investigates the effectiveness of using a game generator tool to automatically create game instances to teach the recursion topic.

Research Questions

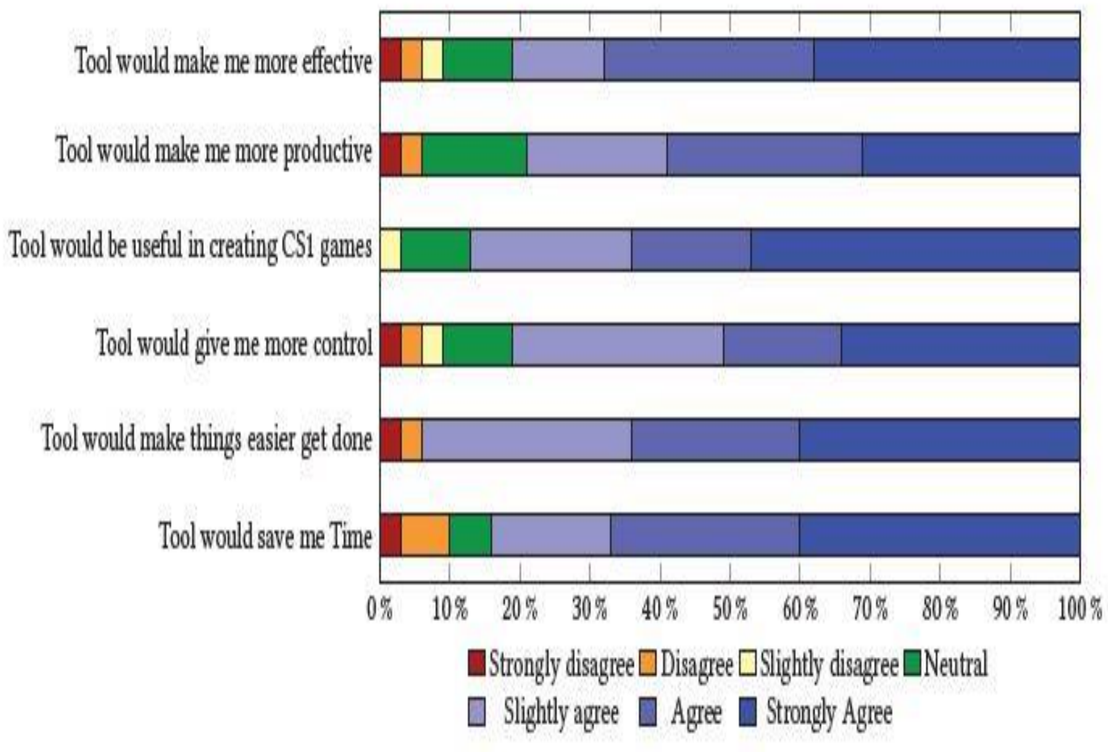
RQ 1. What conceptual attributes must the generator tool take into account in order to generate a game that can teach recursion?

RQ 2. How effective is the use of a generator tool in creating customised game instance to teach recursion?

Methodology

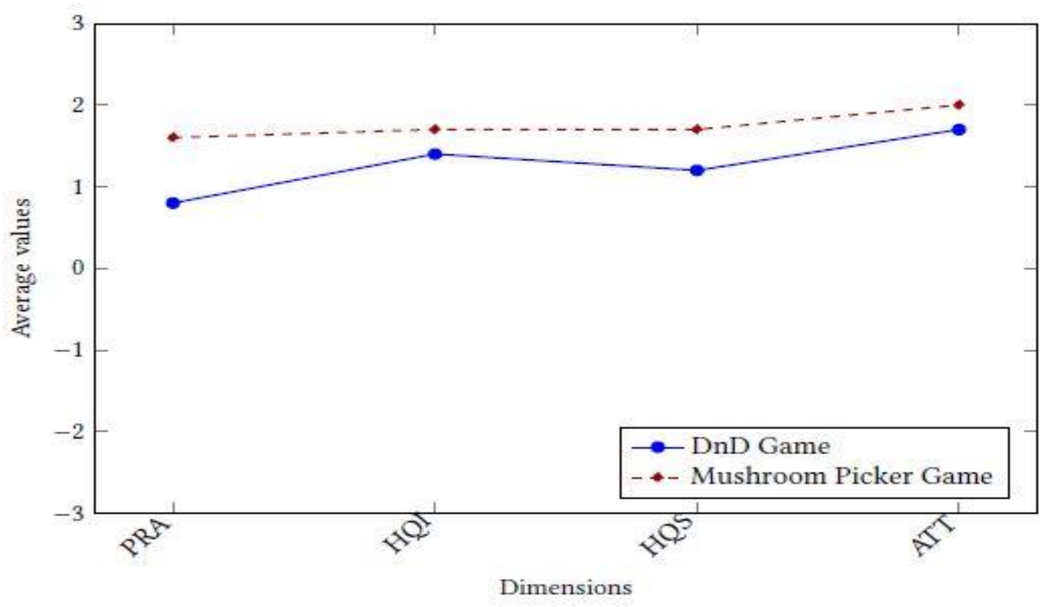
The study employs user centered design approach to develop a game generator tool. This is followed by user evaluations with introductory programming (CS1) teachers and students from Kenya and South Africa. Four experiments are conducted: (i) 2 online experiments with CS1 teachers , (ii) a controlled lab experiment with CS1 Trainee teachers, and (iii) an online evaluation study with CS1 students.

Results (Experiments 1 & 2)



- Tool has the potential to support non-technical teachers to easily create games
- Tool is useful(87%), easy to use and learn(80%).

Results (Experiment 3)



- CS1 students report a positive experience with the played games
- CS1 students say that the played games helped them to understand the recursion topic better

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