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Research Project: Developing Web-Based Collaborative-Scripted
Learning Mathematical Activities

Developing Web-Based Collaborative-Scripted Learning Mathematical Activities

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MOTIVATION

This project aims at developing a web-app as part of a platform for teaching linear mathematical functions in online classrooms. Specifically, it wants to offer an activity that improves the learning process of students for the understanding of the steepness of linear functions. Also, an emphasis has been put on making the activity fully compatible with its counterpart that has been developed for use with Cellulo robots, so that learning sessions with Cellulos can be expanded with the support of in-class use of the web-app, or with remote participation of students.

METHODS

The development of the web-app is based on using embodied learning and collaboration to improve the learning process of students. Through a simple and effective user interface, the student is invited to coordinate themselves with group members in order to reach a target position on screen. Tangibility is introduced in the activity by letting the students drag elements of the interface with their mouse, so that hand movements are directly translated to movement on the screen. To understand the steepness of linear functions, two students have to move an object along a path while each one of them controls movement on only

one of the two axes of the plane. A reward system is put into place to penalize students that do not follow the path closely enough. The activity is carried out during multiple turns, in which the roles of the students are always swapped to ensure that the students can experience multiple situations during the same session.

RESULTS

The project showed how learning sessions with Cellulo robots can be paired with web-apps developed for online classroom applications to improve learning of linear mathematical functions. It also showed the adaptability and effectiveness of activities developed for online classrooms. Test-runs with a group of participants aged more than the target group highlighted the potential of the activity in boosting the understanding of the steepness of linear functions.

