The use of ludic contexts in the learning of linear equations

Introduction

Doing mathematics has a lot to do with solving problems. Yet, for many students, mathematics is a problem! Students struggle with an array of issues related to the activity of problem solving, from understanding the problem statement, to devising a plan to solve it, to carrying out that plan, and to evaluating the adequacy of the solution they found. Though solving problems is a challenging activity for students, at all grade levels, there are other challenges in students’ learning paths. One of such challenges relates to the transition from arithmetic to algebra. In particular, the learning of algebraic topics such as linear equations poses students a large number of difficulties.

Aim

The overarching goal of our study is to investigate the role of playful elements in the learning of linear equations. Specifically, we seek to understand the learning processes of 7th graders (pupils aged 12 years-old) within an inquiry-based learning environment, based on tasks of different nature and posed in playful contexts, designed to support a meaningful learning of linear equations.

Methodology

Due to the restrictions imposed by the covid-19 pandemic, all schools adopted the remote learning mode. The Teams platform was chosen to support the teaching and learning process in the school where the study was conducted.

Most lessons were of exploratory nature, based on problematic situations framed in playful contexts, stimulating students’ explorations of new grounds, and privileging collective discussions to institutionalize new learning.

Results

Train of linear equations

The goal of this task was to understand the meaning of a solution to a linear equation. The task was presented as an interactive online game, with progressive difficulty levels.

1. Students’ understanding of solution to a linear equation

![Image](https://example.com/image1.png)

The students solved this task in small groups. In general, the students had no trouble in playing the game and in identifying the solutions to the various linear equations that came up. Some students forgot to present justifications, and only one showed difficulties in explaining why the solutions she found worked out!

2. The “train of linear equations” as a context to support learning

The generated enthusiasm and it did not work as a directive element. On the contrary, while having fun in solving equations by blowing up balloons, the students had to think each time faster in order to go up the game levels.

Teacher: What do you think you learned from this game?

Student 1: I learned to think faster … Thinking fast will help us in life because if something urgent is needed, quick thinking, we will think much faster and we will do that thing faster.

Teacher: What did you learn from the game?

Student 2: I understood better … It helped me to consolidate what an equation is and to solve it.

3. Students’ significant motivation with the activity

During class sessions, students did not have the time to move beyond level 10. Yet, their motivation to play the game led them to engage in solving the train equations in their spare time.

Some initial remarks

Initial data analysis suggests that the approach taken in the teaching experiment was quite motivating to students, who eagerly engaged in all task proposals. Despite the limitations imposed by distance learning, this emergency response to a nationwide lockdown ended up offering new opportunities for students’ class work, such as group work. This form of organizing students’ mathematical activity was quite important in the development of the teaching experiment, supporting students’ mathematical explorations in playful contexts. Students reacted very positively to the playful contexts of the tasks, be they games (as illustrated here), comics or humor situations.

Bibliography


