# EPFL

**CHILI**
computer–human interaction
in learning and instruction

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Center for Learning Sciences

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# Activity with Cellulo robots: How diseases spread ?

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## MOTIVATION

This project semester focuses on the propagation of a virus by developing a virtual activity with Unity platform (i.e on a computer or tablet) and physical activity (i.e with the real Cellulo robots). The goal is to create an environment to teach the topic of complex behavior to raise people's awareness of the propagation in terms of interaction between the agents in a system (e.g. a virus). It contributes by designing a learning activity and evaluating its effectiveness in a classroom scenario.
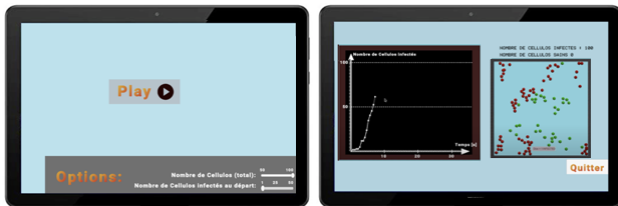


## METHODS

The study was conducted in a public school with one class of 23 students and lasted 70 minutes. We have investigated modes and benefits of the activities treated about the spread of diseases. The 2 activities proposed are activity contexts for developing skills of simulation-based inquiry, applying maths constructs (especially differentiate linear/exponential growth), and interpreting maths representation. Students were evaluated by assessments i.e tests and perception survey, to check respectively the learning gain and interest/facility/motivation/eng-agement/collaboration of these activities.

## RESULTS

The results showed an enhancement of students' performance (learning gain), interest, facility/confidence (for the exercises), engagement and future interest (for other courses). However, the construct 'collaboration' has a mixed outcome from the perception of the students. Globally positive results and in particular, the learning gain where significant score (with t-test) was detected. It suggests that the main phenomenon of propagation of a virus has been well understood by the students. Longer studies with more participants and more equipment (number of tablets and Cellulo robots) should be conducted in future work. Furthermore, we could involve more design of educational activities with the guidance of teachers to integrate the topic of complex systems in formal education (public school).



Link to the code repo and report: https://c4science.ch/diffusion/11289/cellulo-disease-spread.gite)