INVESTIGATING THE COMPUTATIONAL THINKING ABILITY OF YOUNG SCHOOL STUDENTS ACROSS GRADE LEVELS IN TWO DIFFERENT TYPES OF ROMANIAN EDUCATIONAL INSTITUTIONS

INTRODUCTION

COMPUTATIONAL THINKING (CT) – A skill or set of skills at the intersection of programming and problem solving, with or without computers.

OBJECTIVE

Do differences exist between 3rd, 5th, 7th and 9th-grade learners in Romanian centers (art vs. theoretical school(s); boys vs. girls; different grades) in their response to tasks that require computational thinking?

METHOD

Tests with masked computer algorithms. Dance (flamenco) is used as a metaphor. Students have to identify with a bailaor (male flamenco dancer) looking for his match among a sequence of possible female dancers (bailaoras).

It was inspired by the AlgoRythmics dance choreography illustration of the linear search algorithm and has the potential to reveal different abstraction levels.

TESTING TOOL

RESEARCH QUESTIONS:

RQ1: What is the potential CT growth pace?
RQ2: Does the CT growth pace depend on whether the center is an Art or a Theoretical School?
RQ3: Can any student—regardless of the grade—assimilate a basic computer algorithm?
RQ4: Does evidence exist of advanced CT at different levels or grades?
RQ5: Does the CT growth pace depend on students’ gender?

RESULTS

RQ1: The contribution or growth pace is low, a significant increase being only detected when dealing with distances of 4 years (or grades).
RQ2: Art education may have an additional potential to enhance CT development among students.
RQ3: Certain CT-related concepts can be effectively taught both to the youngest and to the oldest learners.
RQ4: Signs appear of a promising CT ability in the future.
RQ5: Progress in CT does not depend on students’ gender.

CONCLUSIONS

Our findings emphasize the need for a purposeful and coordinated infusion of Computer Sciences in K-9 education so that students’ CT development can be accelerated.