COMPUTATIONAL-ARTISTIC THINKING AS AESTHETIC MATHEMATICAL EXPERIENCE:

A CASE STUDY ON TEACHER EDUCATION IN BRAZIL

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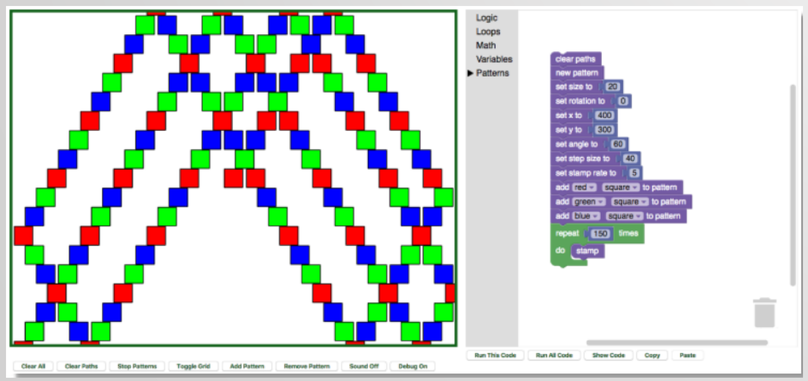
Purpose

Computational thinking has been highlighted at the several school levels of mathematics education, including pedagogic connections to art-based activities (Gadanidis et. al., 2017). This research aims to investigate mathematical thinking processes when preservice and in-service teachers explore computational-artistic tasks.

Methodology

The scenario was designed as a 20-hours knowledge mobilization course, organized by Sao Paulo State University, conducted at Maria Peregrina Catholic School, in Sao Jose do Rio Preto, Brazil. In total, 4 preservice teachers and 6 in-service teachers participated in the course, which was structured in five sessions focusing on the very notion of *aesthetic mathematical experience* (AME) (Gadanidis et. al., 2016).

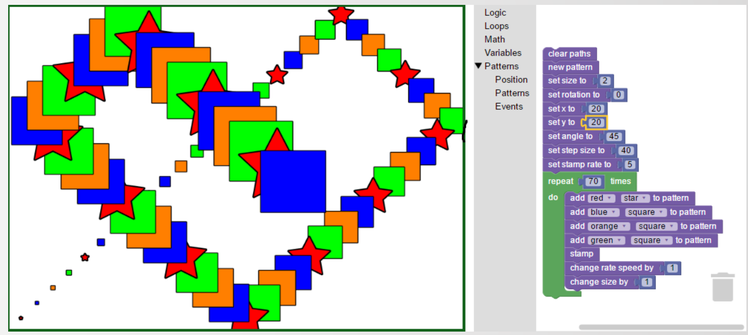
The sessions were: (1) theoretical framework (Boal, 2006, Dewey, 2010); (2) colors, music, embodiment, and computers in Grades 1-5; (3) patterns, sounds, and computers in Grades 6-9; (4) infinity, poetry, and music; (5) digital mathematical performance. Regarding the third section, participants investigated a task designed by Gadanidis (2017), available at: www.researchideas.ca/patterns.



Results

In our analysis, through educational computer programing involving artistic aspects (using *Blockly*), the task offered:
(a)orientations for teachers to become "users", and
(b) open-ended questions for "users" to become "makers". Along with puzzles, one may find instructions such as "*What new pattern can you create?*", and we found creative/surprising constructions made by participants.

A preservice teacher came up with a pattern aiming to "*proportionally increase the size of figures in constructing a heart, starting from the lower left corner, finishing closer to the center*" (see figure 1). The participant experimented with several hypotheses using the *loop/repeat* command.



Conclusions

The conjecturing moment of achievement of the constructed figure by the participant through numerical, algorithmic, visual, and auditory representations is conceptualized as a visceral component of AME. Thus, mathematical thinking was developed through connections of representations within an computational-artistic learning environment, that is, processes of teachers' thinking-with-*Blockly*.

References

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