

## SIMULATION GAMES FOR GEOMETRY LEARNING AND THE DEVELOPMENT OF MATHEMATICAL LANGUAGE.

Angela Piu (ID 2983) - Cesare Fregola (ID 2993)

University of Valle d'Aosta - University of Molise

### Short description of the Workshop Groups: organizers, aims and underlying ideas

*The aim of the workshop is to present educational interventions based on collaborative simulation games targeting geometry learning among primary school pupils. These games have been conceptualized, developed, and tested as part of Simulandia, a research project.*

*The games are designed to be a fun way of providing primary school students with an understanding of key geometrical concepts, stimulating the development of related skills and competences, including the gradual appropriation of mathematical language. They are informed by a semiotic perspective and by the theories and methods of teaching/learning basic geometry; their structure and characteristics foster the guided discovery of geometrical concepts, eliciting their internal and external construction and representation, the sharing and communication of related meanings via alternative modes of representation, and systematic review and formalization of new learning at the end of the game.*

*The workshop participants will be introduced to Cartolandia, one of the simulation games whose purpose is to introduce the concept of isometries. The goal is to first familiarize them with the features of the game and how these are related to the theoretical and methodological framework that informed the development of all the Simulandia games.*

*Attendees will then be invited to reflect on and discuss the teaching and learning process inherent in Cartolandia and how it is related to the structure and unfolding of the game, with a particular focus on patterns of transcoding. The aim is to provide participants with an experiential appreciation of how children can construct mathematical language based on everyday language and their current ability to represent reality and how they can abstract – both spontaneously and in response to the demands of the game – the concepts they progressively discover, representing them in different semiotic registers. Finally, attendees will debate the transferability of the simulation game technique to the settings in which they themselves teach, and discuss potential new lines of inquiry.*

### Planned structure:

Insert the planned structure of the workshop in the table below. You can insert rows if needed.

Planned timeline	Planned activity	Working format /Responsible person
10 min	Introduction and exploration of the participants' interests and expectations. Engaging with the game process.	Presentation and training agreement / Piu
15 min	Presentation of the theoretical-methodological framework underpinning the	Presentation and explanation of key concepts / Fregola

## *Last names of the organizers*

	design and implementation of the simulation games	
30 min	Experiential demonstration of the simulation game	<p>Videos explaining the structure and dynamics of one of simulation games, Cartolandia, which was designed to introduce the concept of isometries to primary school students.</p> <p>While watching the video, participants will be asked to observe and record:</p> <ul style="list-style-type: none"> <li>- interactions among the children that illustrate how the rules and constraints of the game serve to prompt the solution to the problem;</li> <li>- the process that leads the children to represent the targeted learning concepts, via a coding process of that describes both their actions and interactions;</li> <li>- the process leading to the mathematization of the simulation game.</li> </ul> <p>Piu – Fregola</p>
20 min	Debriefing: From experience to the structure of the game and from everyday language to mathematical language.	<p>Reflection and discussion of the observed teaching-learning approach and the characteristics of the simulation game process, particularly transcoding patterns, semiotic registers, and the formalization process.</p> <p>Piu – Fregola</p>
10 min	Exploration of follow-up lines of inquiry	Piu
5 min	Conclusions	Piu - Fregola

## **References**

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