Towards computational learning science: modeling creative problem solving in child-robot interaction through behavioral learning analytics

Margarida Romero, Frédéric Alexandre

Towards computational learning science: modeling creative problem solving in child-robot interaction through behavioral learning analytics

Margarida Romero [1,2*], Frédéric Alexandre [2]

* margarida.romero@univ-cotedazur.fr / https://margaridaromero.blog/
1. LINE & NeuroMod, Université Côte d'Azur, France
2. Mnemosyne Inria Team, France

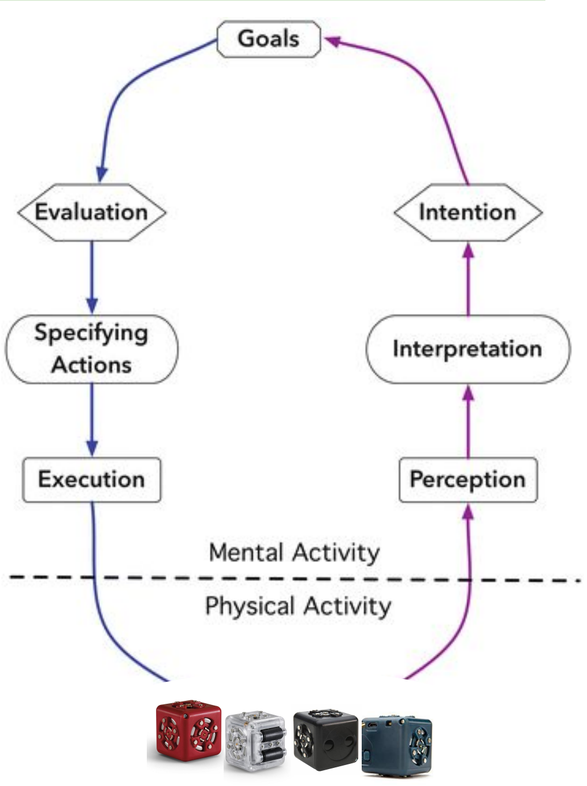
#CreaCube Big data corpus of creative problem-solving tasks (n>1300 experiments).

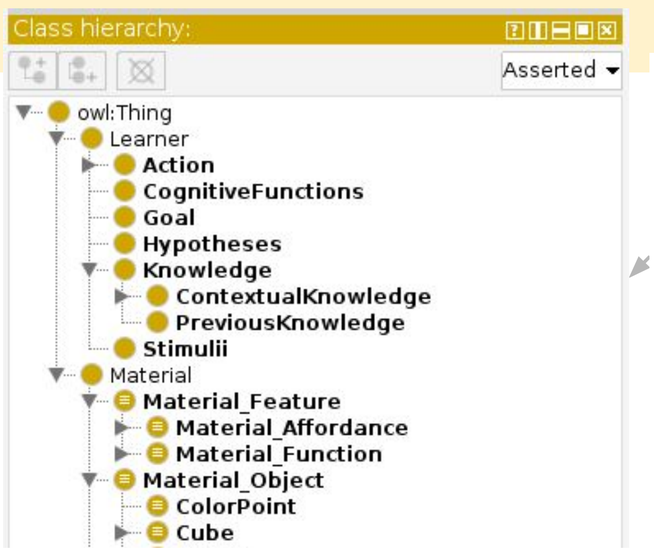
Each video is coded based on a behavioral learning analytics coding schema

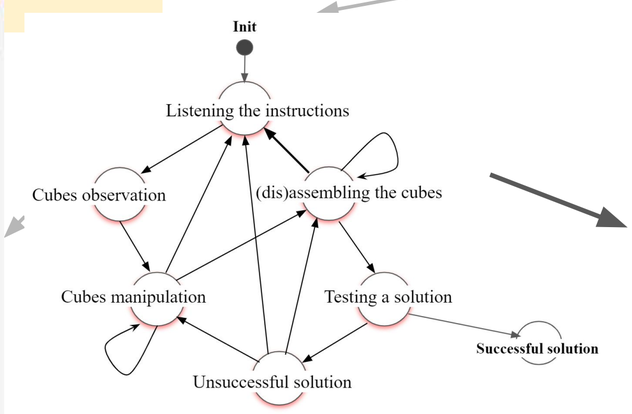
In **computational neuroscience and bioinspired artificial intelligence (AI)**, different studies aim at understanding the mechanisms of perception such as shape recognition and sensori-motor coordination such as grasping or pinching. A step further, as in the Mnemosyne research program, cognitive mechanisms are analyzed to better understand brain circuits responsible for reasoning and problem-solving by a biological or algorithmic agent.

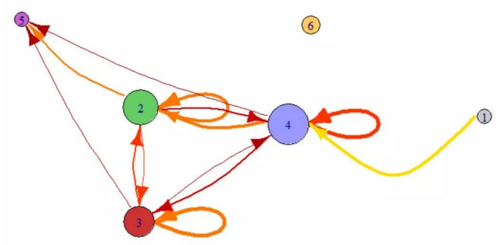
We engage the participants in an **ill-defined problem-solving** task whose goal requires them to explore the four unknown cubes placed in front of them. The affordances are important in the process of understanding the material and its features to configure it in a way to solve the problem (the goal state).

Goal : "Build a vehicle moving from a red point to a black point"



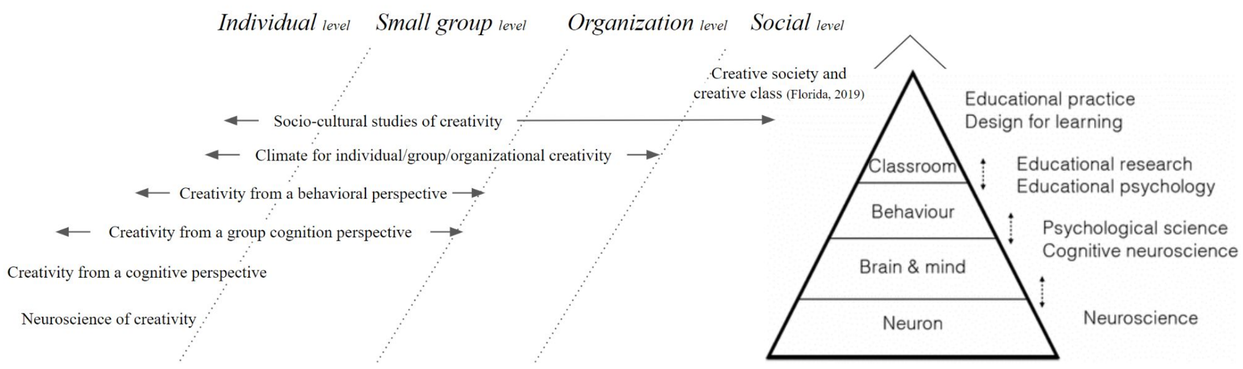






The ANR CreaMaker and AIDE projects aim to better understand **creative problem solving** by analyzing the interaction between brain processes and problem-solving activity from a behavioral perspective. The CPS behavior (intentions + CPS regulation) is analyzed based on learning analytics generated automatically and also through human analysis of this activity based on coding schemes.

#CreaComp is a research program in computational learning sciences for the advancement of the study of creative problem solving.



Levels of analysis of creativity (Romero, 2022) based on Lodge et al. (2017)

MSc SmartEdTech is an international master's program in edtech.

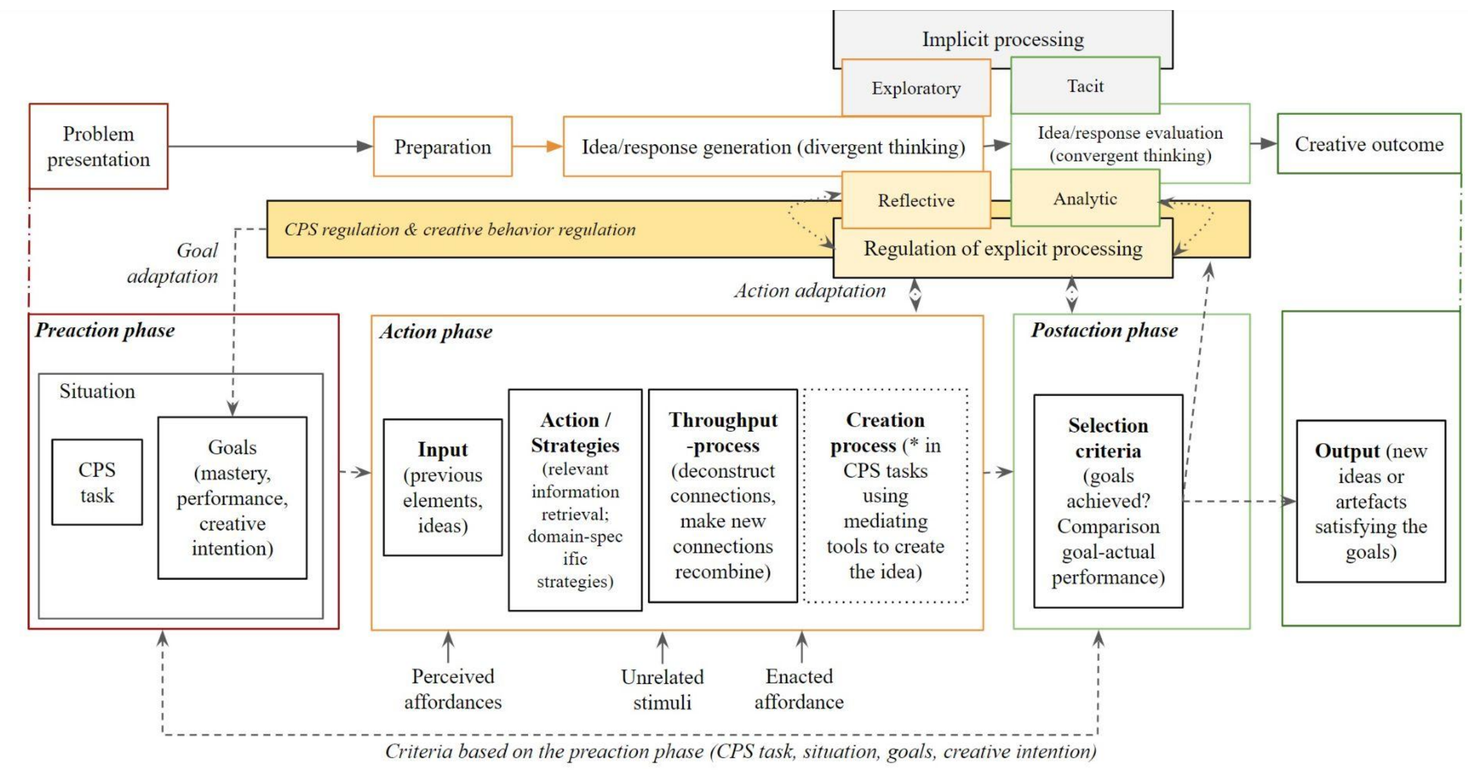
Artificial Intelligence Devoted to Education (AIDE) is an INRIA exploratory action aiming to advance the study of problem solving from a computational learning sciences perspective.

IDEX UCAJedi for Ukrainian researchers. Collaboration with Prof. Strutynska to evaluate wartime stress CPS, including learners in Kyiv and Ukrainian refugees in France.

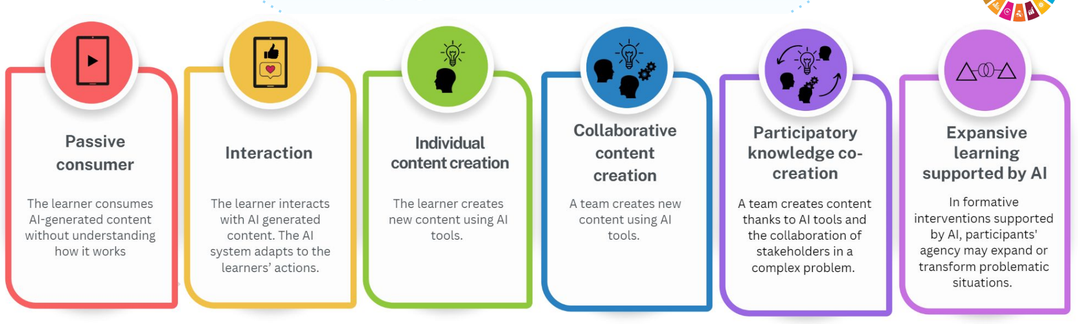
The Horizon AugMENTOR project adopts augmented intelligence to develop collaborative learning paths.

The GTnum #Scol_ia aims to advance the study of teachers' and learners' digital competencies required in the AI era.

The ANR CreaMaker project aims to advance the study of individual and collective creative problem solving through educational robotics.



Six levels of creative engagement in AI in Education (#PPai6)



2023 @MargaridaRomero, @SylvieBarma, @SimonDuguay3, @isaac_guillaume, @cduret, @LochrisH & @Viv_LllLake