



Auto
STEM

**For those who are curious but too tired to
ask :)**



Project partners and pilot schools



ANcybernetics



optimization



Table 1: Workshop session summary. SDT = Self-Determination Theory guidelines applied

Session	Country	Group	Dur. (h)	Female Facilitator	<i>N</i> _{pre}	<i>N</i> _{post}
01	Sweden	SDT	6	Yes	12	–
02	Sweden	SDT	3	Yes	12	10
03	Sweden	SDT	3	Yes	8	7
04	Sweden	SDT	6	No	9	4
05	Sweden	SDT	3	No	11	11
06	Sweden	SDT	3	No	11	9
07	Italy	Control	6	No	19	19
Total	–	–	–	–	82	60

Workshop structure

Part 1 – Concepts and foundations

- What is automatic control?
- What is programming and computational thinking?

Part 2 – Simulators

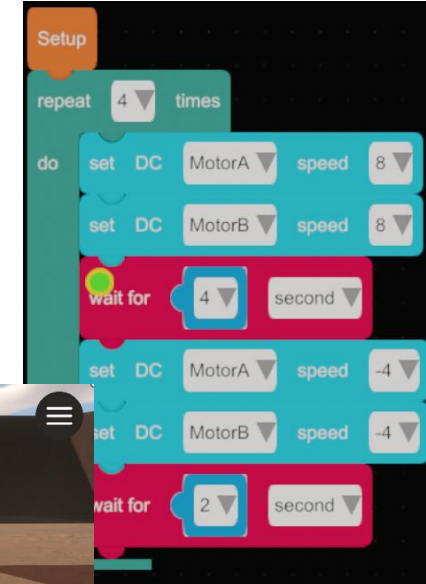
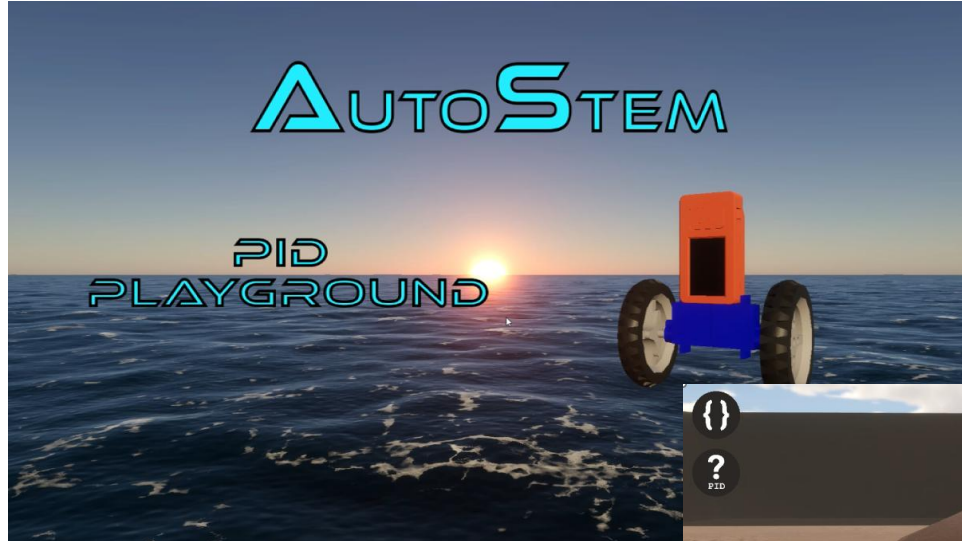
- What are simulators?
- Advantages and disadvantages of using simulators
- BRIDGE
- UiFlow interface
- PID controller

Part 3 – Hands-on

- Assemble a BalaC
- Deploy UiFlow
- Practical activities with BalaC
 - Activity 1: write on Display, light on
 - Activity 2: read data from IMU
 - Activity 3: power on motors
 - Activity 4: PID controller (with custom blocks)

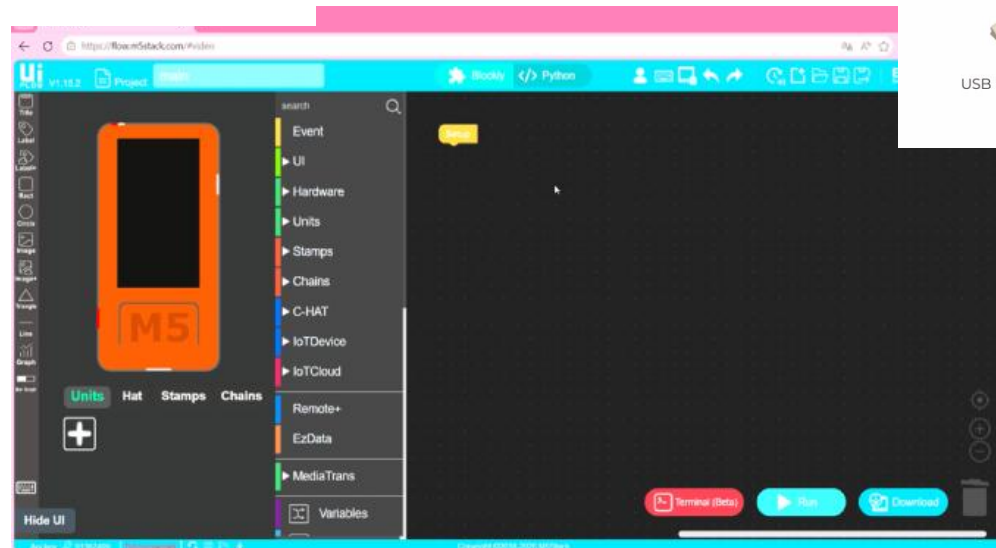
BRIDGE

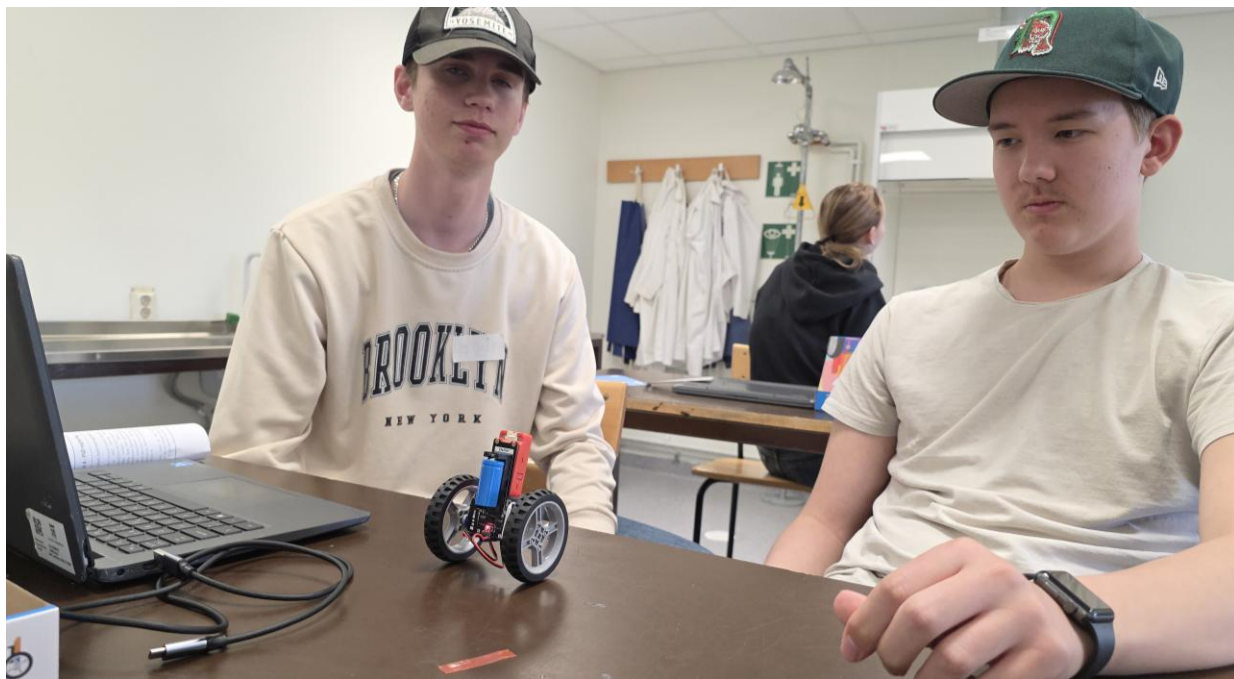
Building Robotics Intuition through Digital Game Environments



BalaC

From Simulation to Reality





Knowledge composite analysis

(K3) meaning of PID acronym
(K4) components of a PID controller
(K5) definition of autonomous motion
(K2) purpose of a control System
(K1) Definition of a serious game

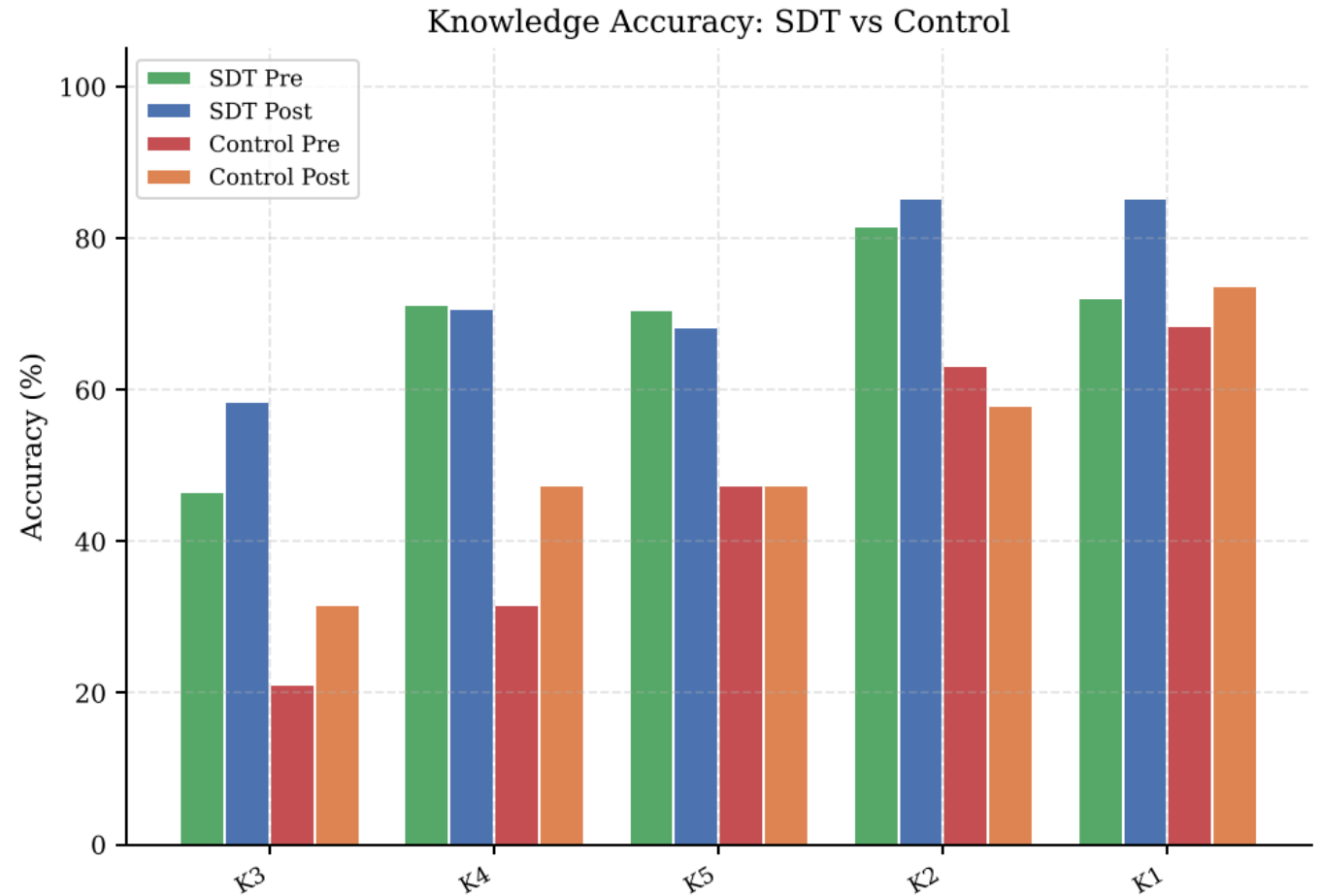


Fig. 12: Knowledge quiz accuracy: SDT (Sweden) and Control (Italy) groups, pre and post-workshop.

Perception composite analysis

(P1) I feel capable of understanding basic concepts of robotics
(P2) I feel capable of following an explanation about robotic systems even if the topic is new
(P3) I feel capable of applying robotics concepts in simple practical activities or simulations
(P4) I feel able to explain what a control system is
(P5) I feel able to explain how a PID controller works
(P6) I feel able to understand system behaviour by changing P, I, D
(P7) I believe that studying robotics can be useful for my future

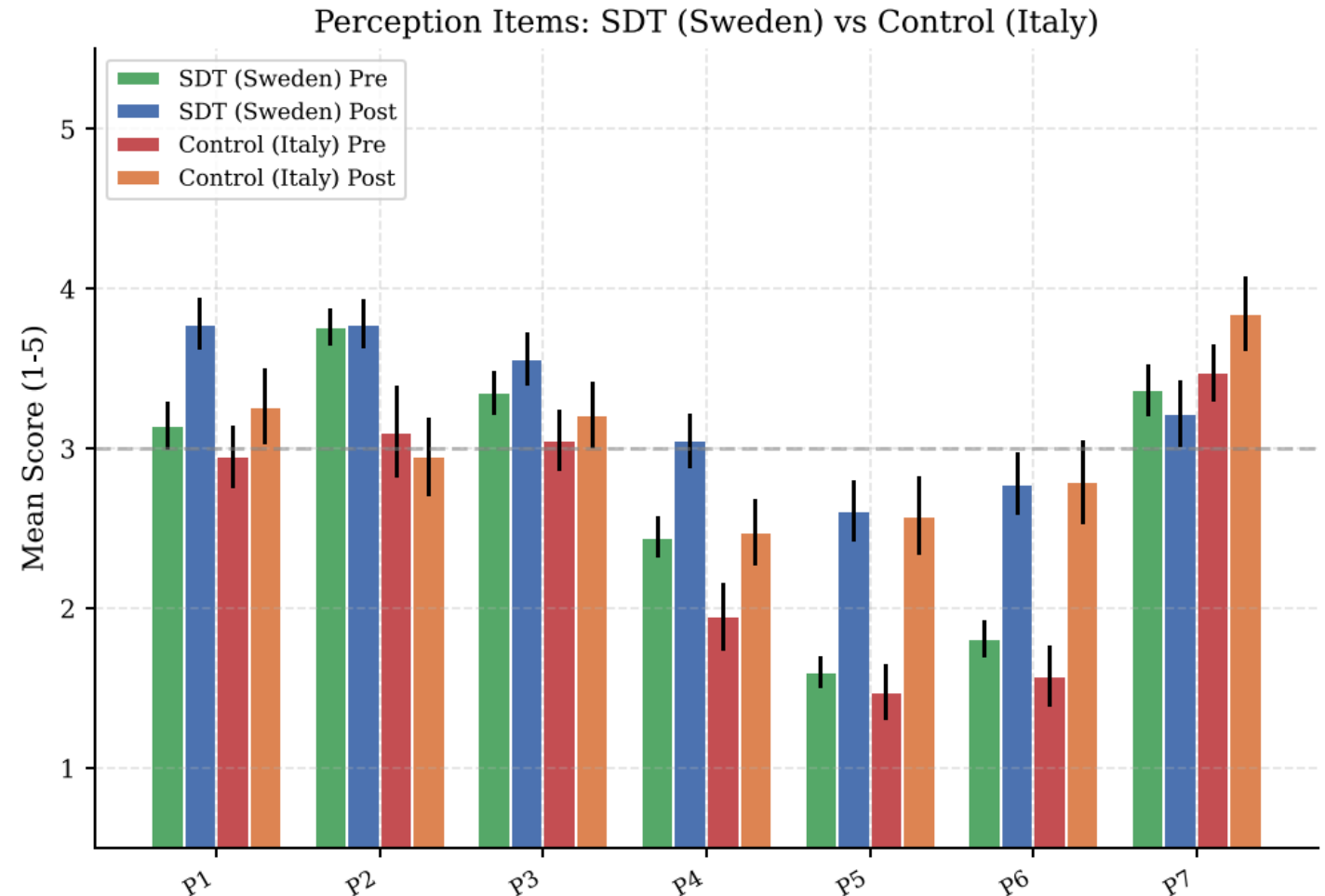


Fig. 10: Perception items: mean pre- and post-workshop scores for SDT (Sweden) and Control (Italy) groups. Error bars represent ± 1 SEM.



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