SIMPLE METHODS ARTIFICIAL INTELLIGENCE LEARNING EDUCATION

Fostering Awareness and Person Learning Artificial Intelligence

AI-LEAP
LEARNING PERSONALIZATION WITH AI AND OF AI

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Cultivating AI Culture

- Society needs to be equipped with the necessary **understanding, knowledge, and skills for the 'AI era'** (European Economic and Social Committee)
- **Teaching AI** effectively **by adapting** the contents, the learning environments, and the approach **to learners**.
- Two projects aim at **fostering the personalization of the learning experience:**
  - *EMPAI@SMAILE (ending in December 2023)*
  - *AI-LEAP (started in May 2023)*

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EmpAI @ SMAILE

Empowering AI Competences in Children

- Computer science and Psychology departments @ UniTO
- **HP:** "There are basics abilities functional to understand AI mechanisms"

1. Identifying **AI basic abilities** that can be stimulated in a natural way (playful and unplugged)
2. Devising a **training program** to exercise them
3. Verifying whether the training program promotes in kids:
   - **Programming abilities**
   - A **growth "mindset"** in computer science achievement
   - Better awareness about **what an AI machine does and does not**

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Basic Abilities for AI

We identified **4 abilities** functional to understand AI concepts

- Ability to differentiate between **syntax and semantics**
- Ability to **classify data**
- Ability to behave based on **test-operate-test-exit** units
- Ability to **plan**

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Training Activities Design

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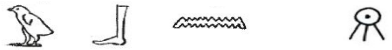
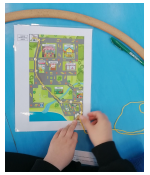
We designed **game-based** activities

- Unplugged
- Orchestrated by an expert
- **Target**: 5th and 6th grades in Italy
- Consist of three phases
  1. Presentation of the narrative framework and material
  2. Activity: Few rounds, increasing complexity
  3. Reflection phase made of Q&A

Trained Basic Abilities

Training 1		Training 2
1 Syntax vs Semantics The Egyptian room		**1 Focus and Cognitive flexibility** Egyptian anagrams
2 Data Classification The Naval Fleet		**2 Short-term Memory** The Memory Boats
3 Acting as test-operate-test-exit Rustle up a recipe		**3 Optimization** Chefs at work
4 Planning Cappuccetto Goffo's Map		**4 Problem solving** The city for you

Reflection Phase

Performed by children

1. **Summary** of the activity
2. **Reflect** on the **purpose**
3. **Analogies** in everyday life

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A Coding and AI course

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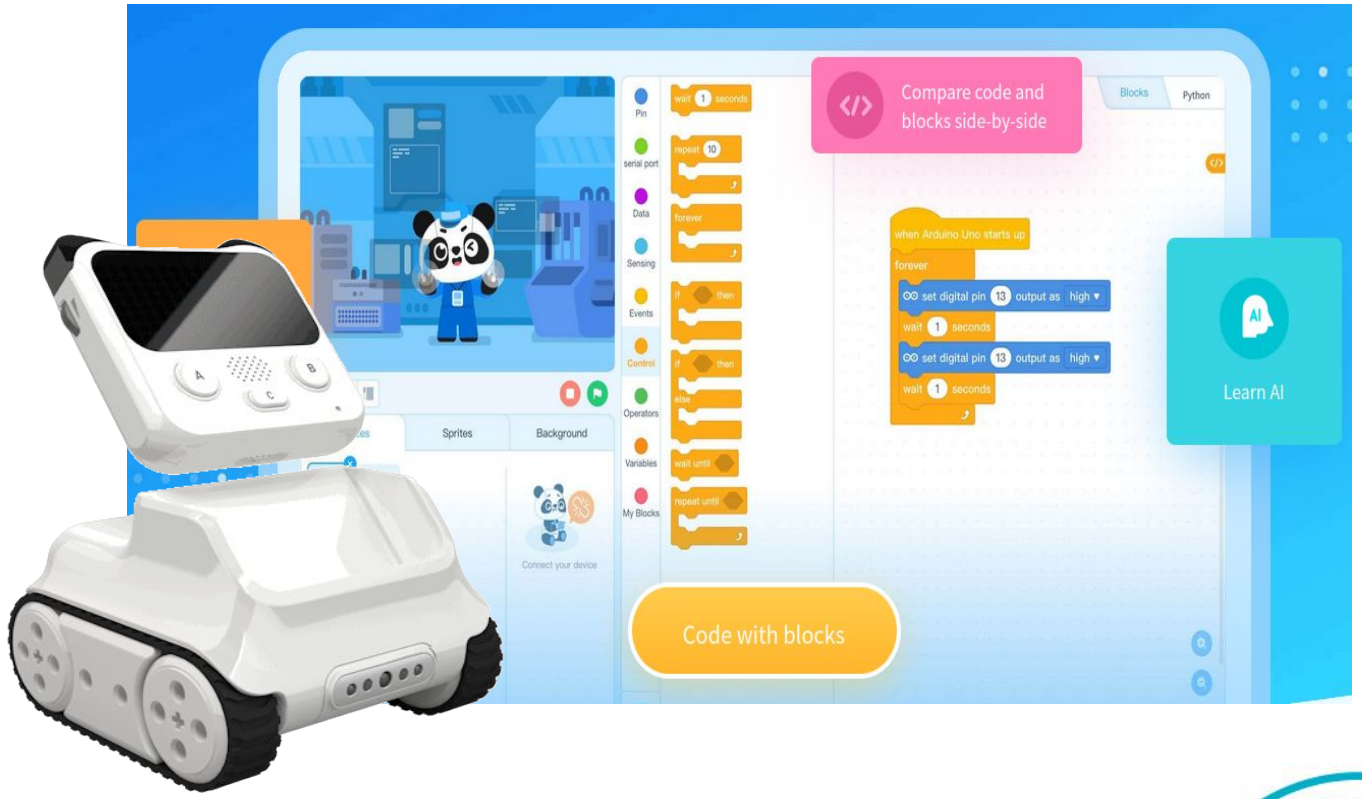
8 lessons introducing AI:

- Codey Rocky
- mBlock 5



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Courses and training about IA

Coding and IA	8 lessons; 2 hours each	24 + 3 classes (5th and 6th grades)	About 500 children	27 taught	432 hours of teaching
Training	4 lessons + 4 lessons; 2 hours each	24 + 3 classes (5th and 6th grades)	About 500 children	27 taught	216 hours of teaching
Introducing IA with Quercetti	3 lezioni da 2 ore	10 + 3 classes (5th and 6th grades))	About 220 children	13 taught	78 hours of teaching

Preliminary Results

So far we have collected data for training 1 and training 2 groups. They evince that:

- **Test di Coding e IA**
  Both groups improve their abilities and competence about coding and AI

- **AMOS** (Cornoldi et al., 2005)
  Both groups develop a mindset on human intelligence
  (i.e., intelligence as an ability that improves over time, it is not static)

- **AMS** (Di Dio et al., 2020)
  Both groups develop a mindset on artificial intelligence
  (i.e., they ascribe to intelligent systems fewer mental attitudes that are prerogative of human beings)
  A greater increased observed in the second group

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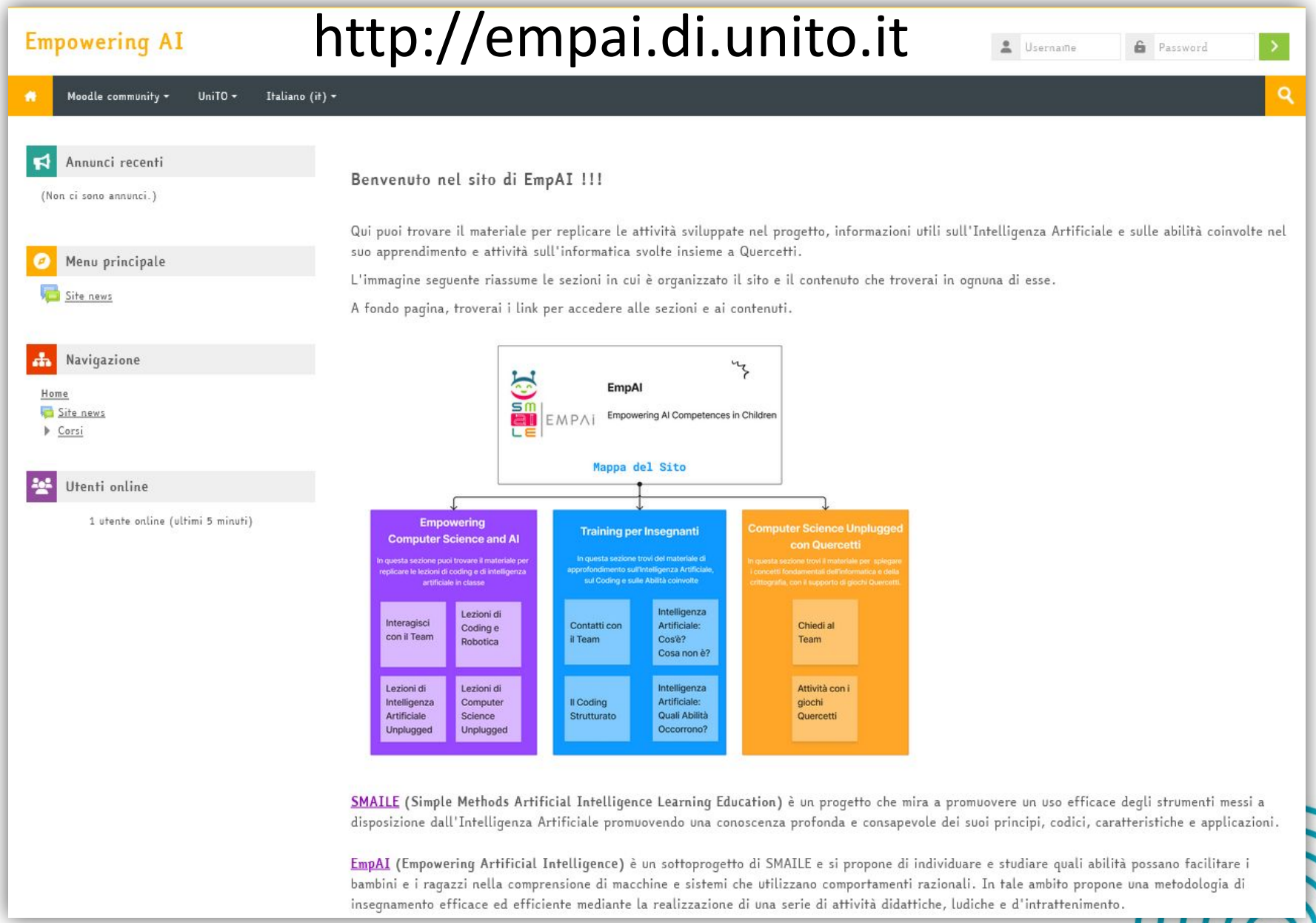
Educational Portal

http://empai.di.unito.it



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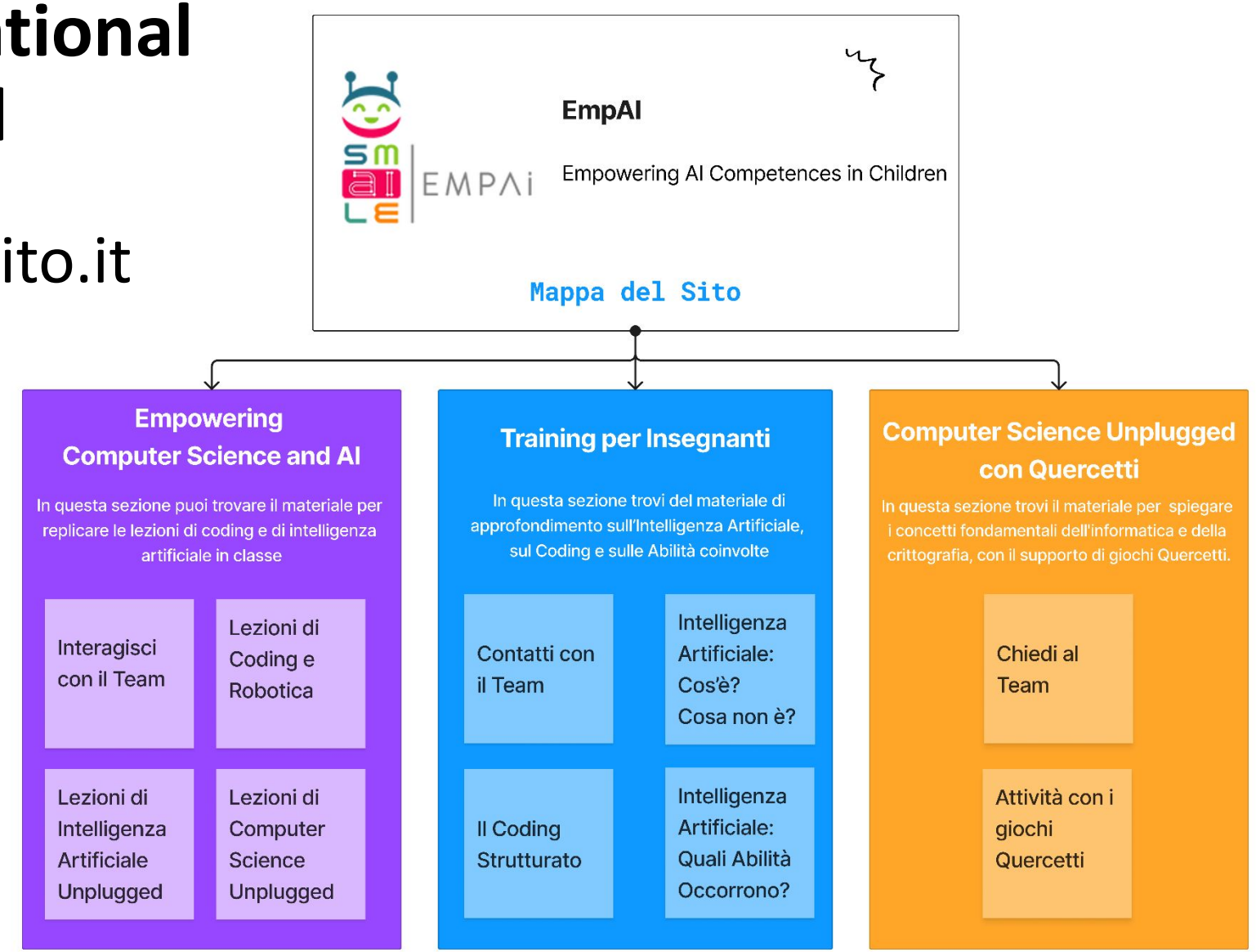
Educational Portal

http://empai.di.unito.it

- 7 courses for teachers
- Educational materials about coding and AI



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Outcomes & Future Developments

- Lot of enthusiasm from teachers and children
  - **Disclosure** of tests and results (by class)
  - **Collection** of the material on moodle
  - **Impar.IA.mo**: Teacher training program
- **AI-LEAP** - moving a step further: **Personalization of the learning experience**

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AI-LEAP at a glance

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Educational challenge: design **personalized learning experiences** (*how do learners differ in terms of cognitive abilities? How to organize learning materials?*)

Technological challenge: develop and implement **personalized tools** that can be tailored to the individual learner (*how can AI be used to avoid purely algorithm-driven execution?*)

Dissemination challenge: facilitate the growth of an **AI culture** (*how can fear/awe of AI be avoided? How can the actual functioning/benefits of AI be made accessible?*)

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>>> The main goal of the project is the personalization of learning experiences and the use of AI <<<

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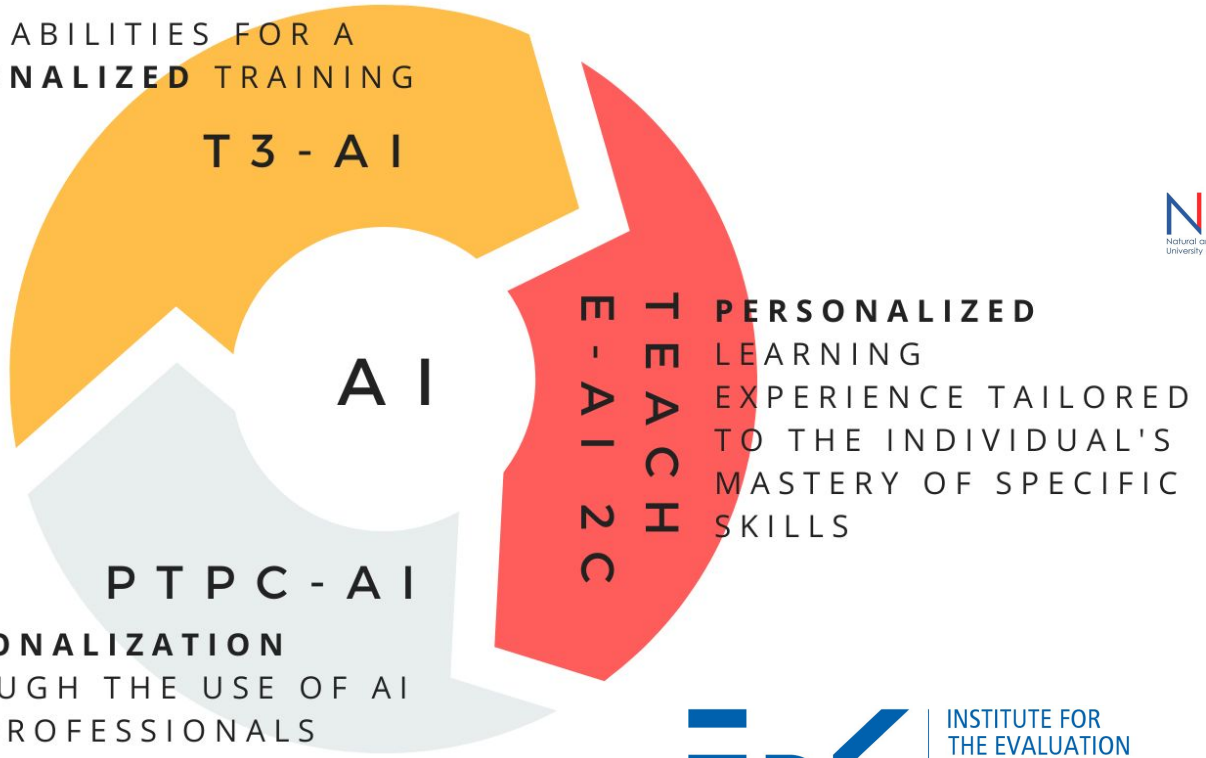

NACLAB
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FONDAZIONE IDIS CITTÀ DELLA SCIENZA

edulia
Treccani Scuola

UPO
UNIVERSITÀ DEL PIEMONTE ORIENTALE

AOAL
Azienda Ospedaliera di ALESSANDRIA

Pop Ai

FONDAZIONE BRUNO KESSLER
INSTITUTE FOR THE EVALUATION OF PUBLIC POLICIES

AI-LEAP subprojects

The project AI-LEAP is organized in **three sub-projects**:

- **T3-AI** (Personalizing Test to Tailor Training of AI), under the responsibility of the principal investigator (UNITO),
- **Teach E-AI 2C** (Teaching Embodied Artificial Intelligence to Children), under the responsibility of Progetto Partner Ricerca e Sviluppo 1 (NAC-UNINA, with Edulia Treccani Scuola and Città della Scienza as “partner territoriali”), and
- **PTPC-AI** (Personalized Training of Professional Competencies with AI) Progetto Partner Ricerca e Sviluppo 2 (AI@UPO, with DAIRI and Pop-Ai as “partner territoriali”)

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Future and In Progress Work

- Analize the result of the test
- Improve the activities / design new ones
- Experiment how well these activities perform on small groups
- Develop personalization learning activities

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Thank you for the attention