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Advanced Digital Skills in Data and AI: current demand, forecasted scenarios and expected gap

A Success Story in Delivering Digital Skill

14 June 2023

Agenda

- Digital Skills & Market Needs & Gaps in Digital Skills
- Experiential Learning
- Success Stories
- Conclusions & Outlooks

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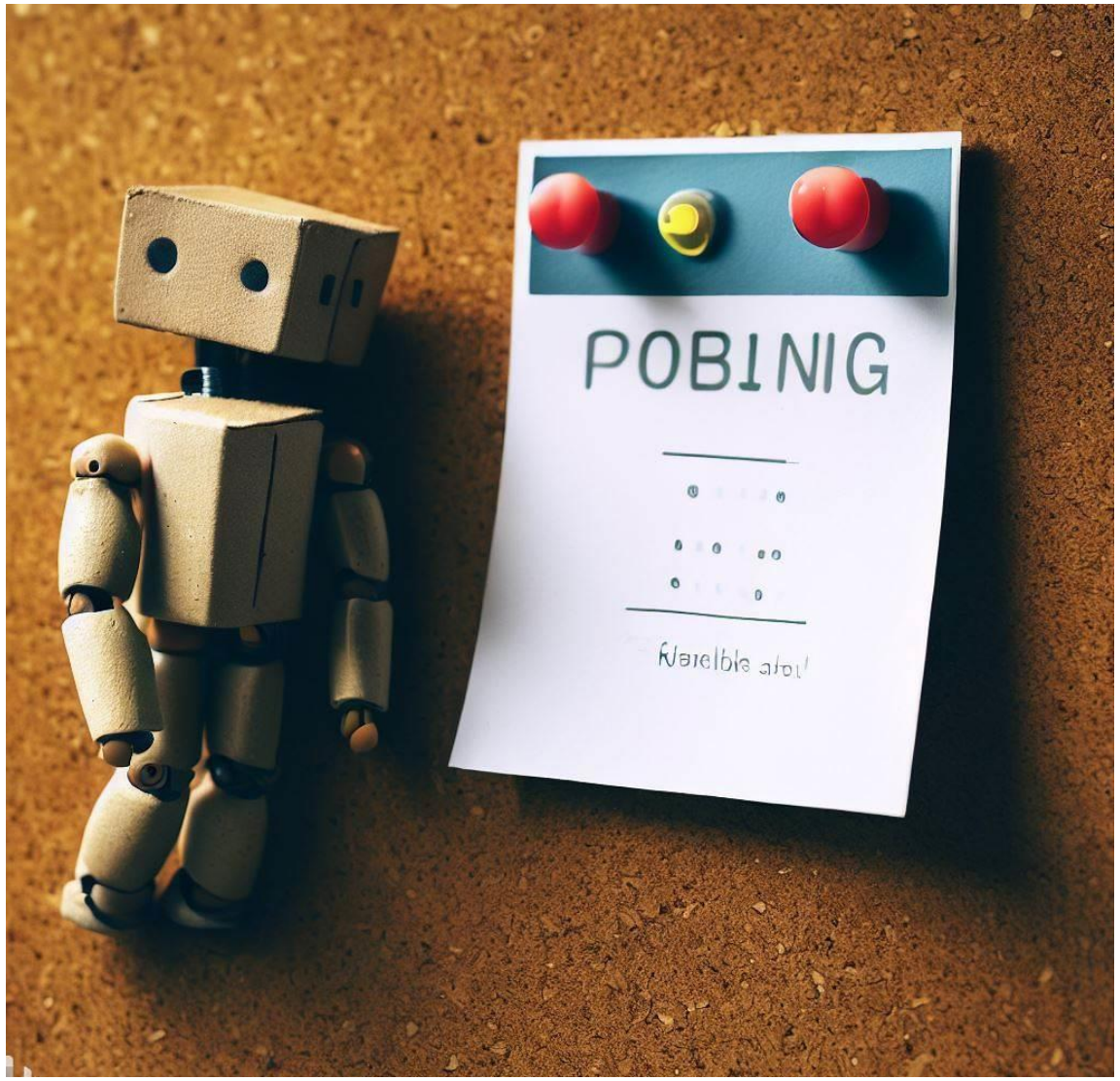
BUILDING THE FUTURE

Market Requests

- According to Indeed.com, the job with the highest increase in posting during 2022 was in IT, and especially in Big Data, AI and, generally speaking, in data analysis. (Top Jobs of 2022 | Indeed.com)

- STEM laureate are always indicated as the most suitable degrees to access these job positions.

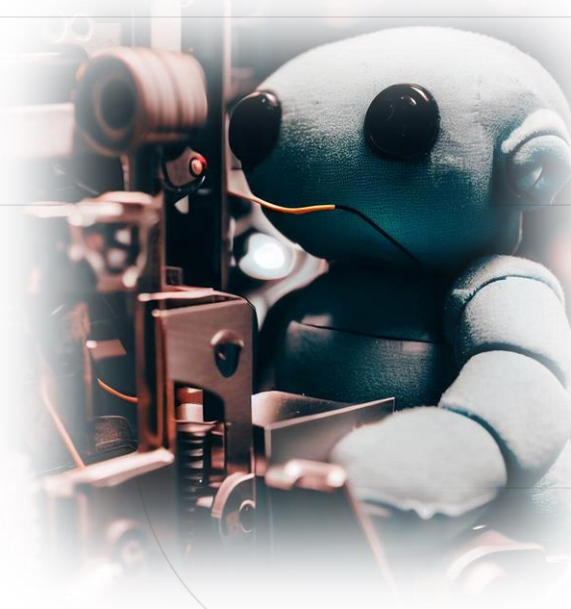
- However, a growing number of announcement **ask for additional masters** or **certifications** in Data Science/BI



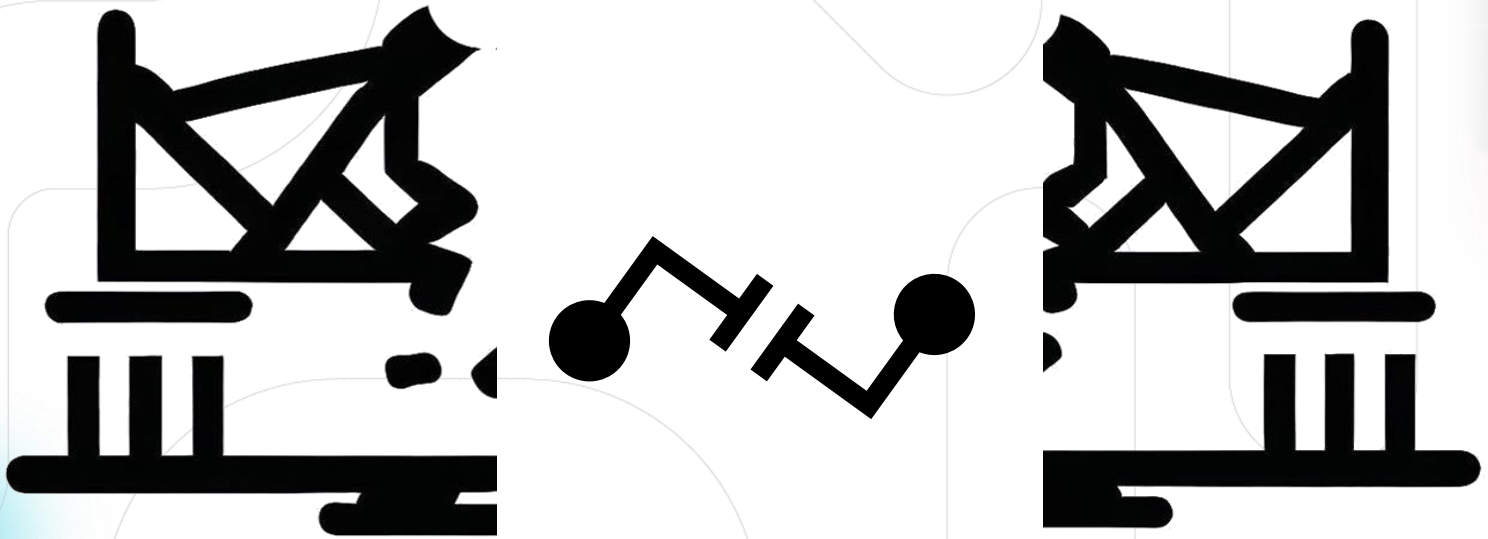
Skill Gap

- In Accademia tools are used with the clear and precise goal to **teach the fundamental of thinking** in a specific topic
- Usually, to contain costs and due to a high personalization request by Research Driven purposes, **tools** are personalized or **for a generic use**
- There is the need for a different or **complementary approach** to fill the gap between academia and workplace.

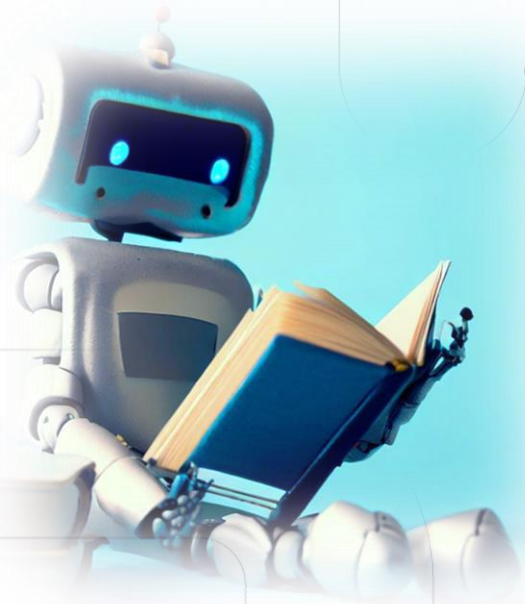
The Skill Gap



EDUCATION



Work Force



High School

- ✓ Willing to work
- ✓ Ease with new technology
- ✓ Basic Knowledge of IT
- ❑ Critical Thinking
- ❑ Advanced Math & Stat
- ❑ Business Process understanding
- ❑ Enteprise Grade analysis tools

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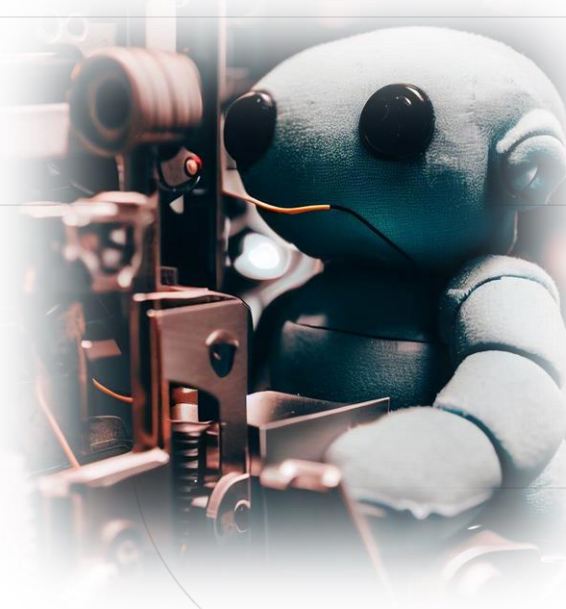
The Skill Gap



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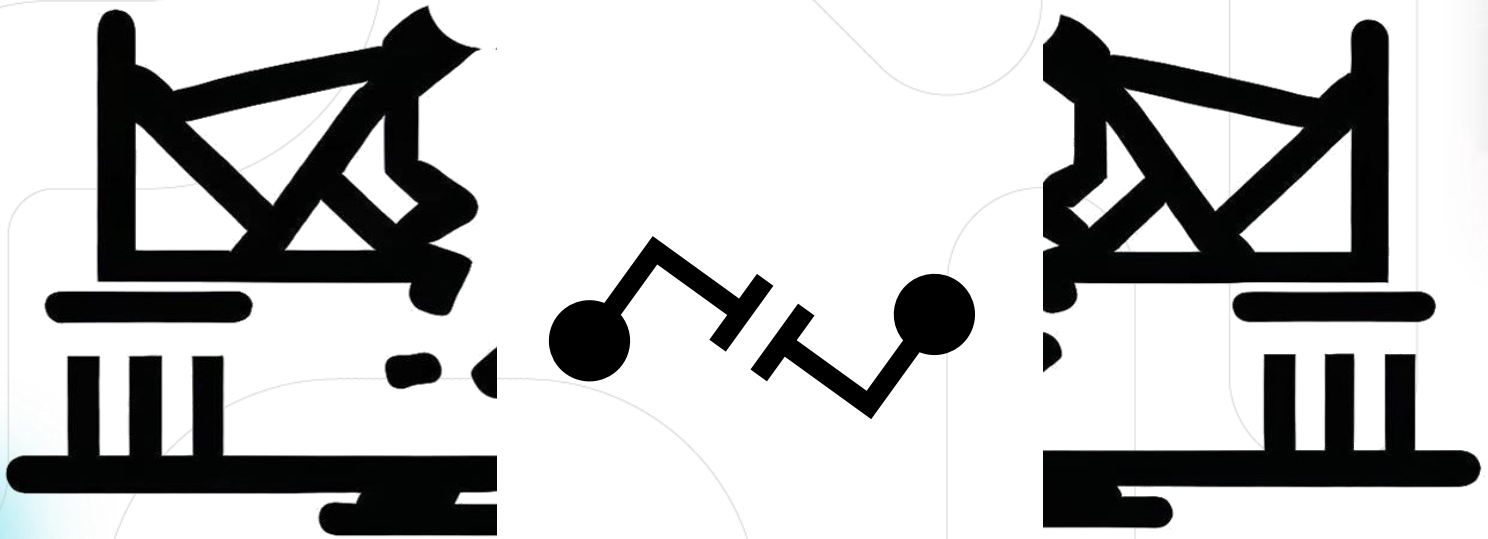

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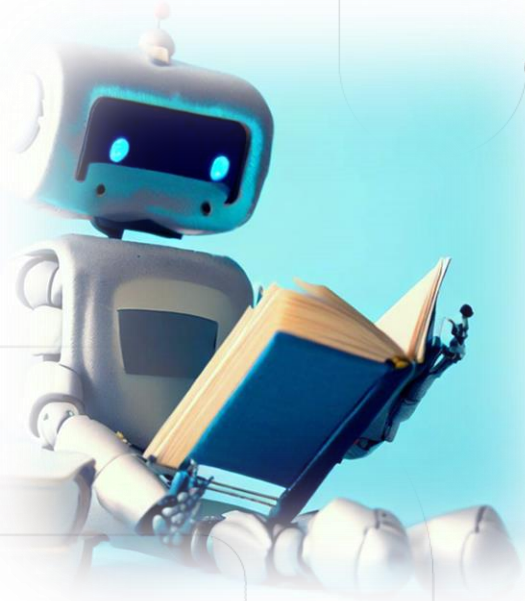

High School

Bachelor & Master

- ✓ Willing to work
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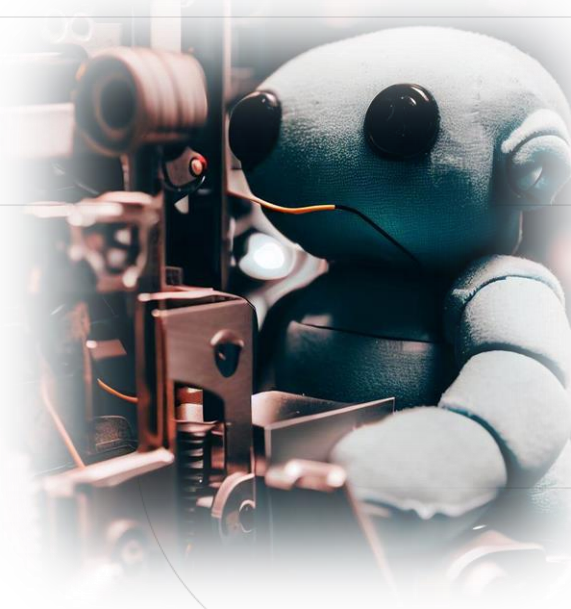

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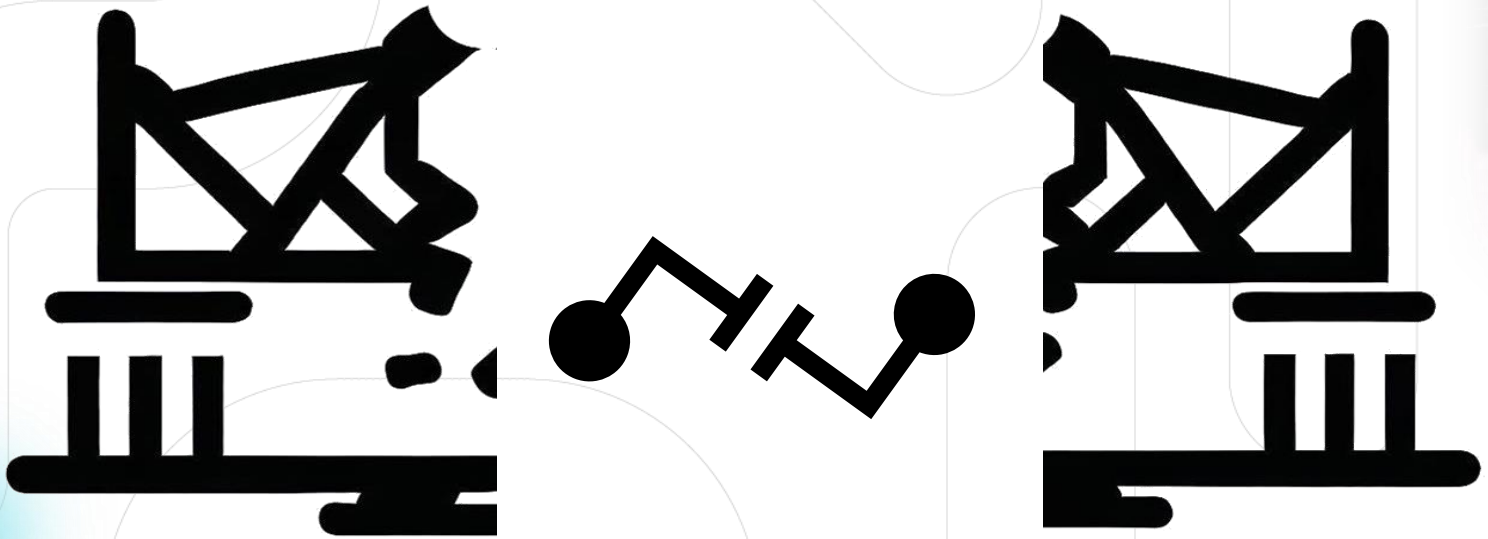

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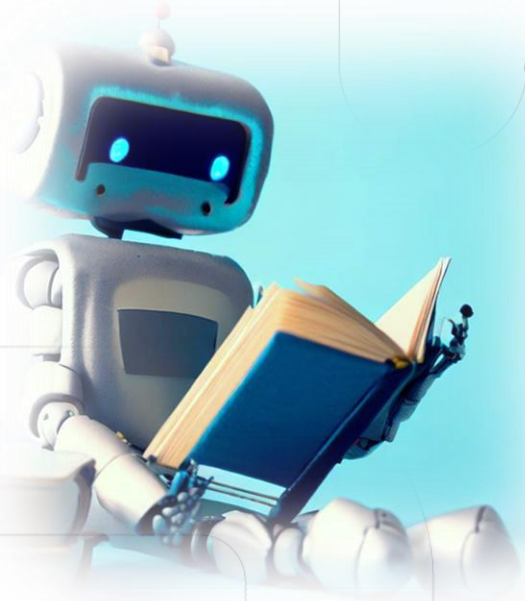

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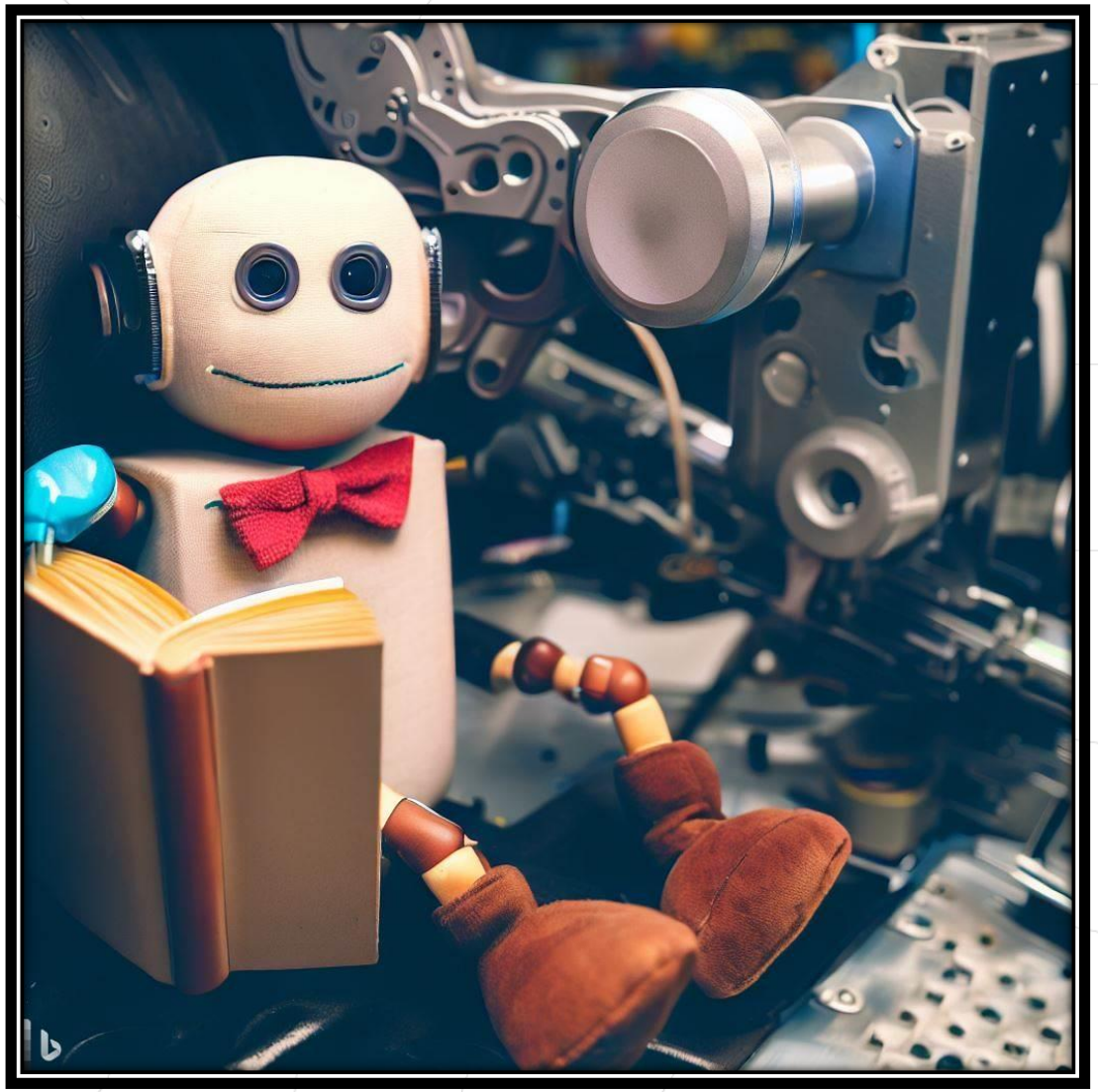
Experiential Learning

- ✓ ....
- ✓ Business Process understanding
- ✓ Enteprise Grade analysis tools

Experiential Learning (EL) is a pedagogic techniques that will leverage the process of learning through experience and is more narrowly defined as "**learning through reflection on doing**".

It is quite simply, learning by doing.

Need for specific approaches depending on the entry level of the students



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Experiential Learning

Top Down

- *Education Level*: Post-Grad (Bachelor/Master)
- *Course Time-Span*: 1-2 month
- *Skills to be acquired*: Enterprise grade tools, Business Process understanding
- *Macro-topics to be covered*:
  - Data engineering,
  - data analysis /data science,
  - cloud computing,
  - DevOps/MLOps,
  - Code Versioning, Accountability,
  - IoT
  - … business driver customization
- *Experiential Ratio*: 90%-100%

Bottom Up

- *Education Level*: High School Diploma
- *Course Time-Span*: 1-2 years
- *Skills to be acquired*: Enterprise grade tools, Business Process understanding, math & stat, critical thinking in business scenario
- *Macro-topics to be covered*:
  - Data engineering,
  - data analysis /data science,
  - cloud computing,
  - DevOps/MLOps,
  - Code Versioning, Accountability,
  - IoT
  - Soft Skill and public relation management
  - Math & Stat
- *Experiential Ratio* : 75%-85%

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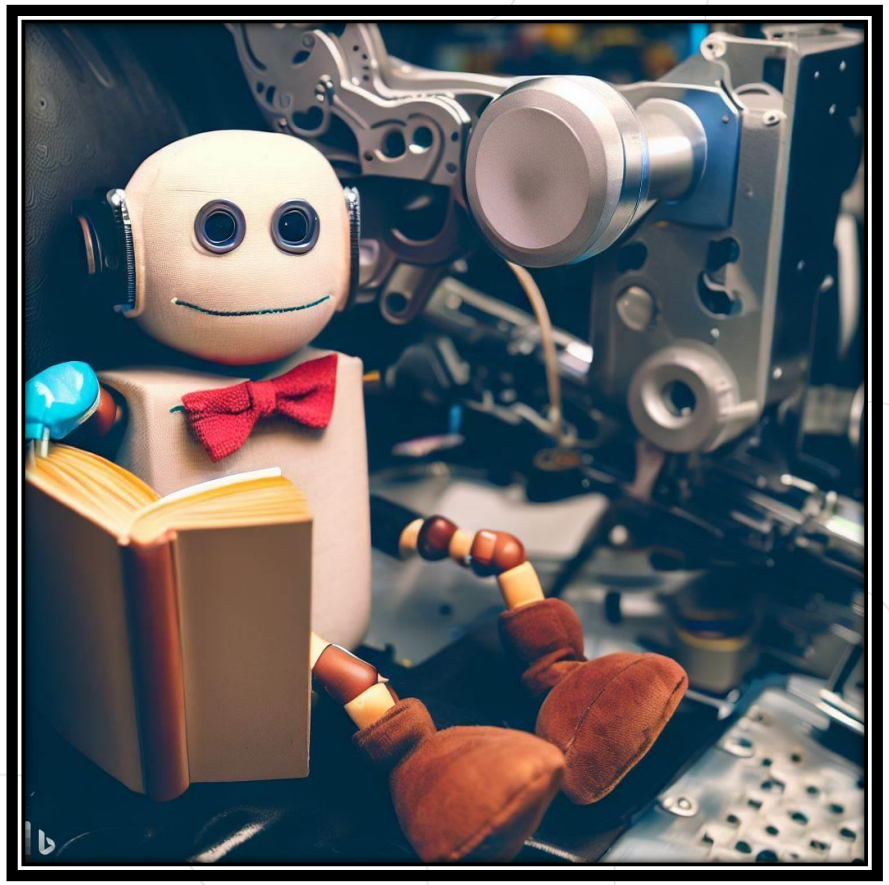
Success Stories



- *Top Down*: an Academy for post-grad with MSC Technology (Italy) S.R.L.
- *Bottom Up*: ITS Incom, a two-year course to enter the workforce with ease (Istituto Tecnico Superiore – Technical post-diploma School)
- Scale up the Experiential Learning: The journey with ESA

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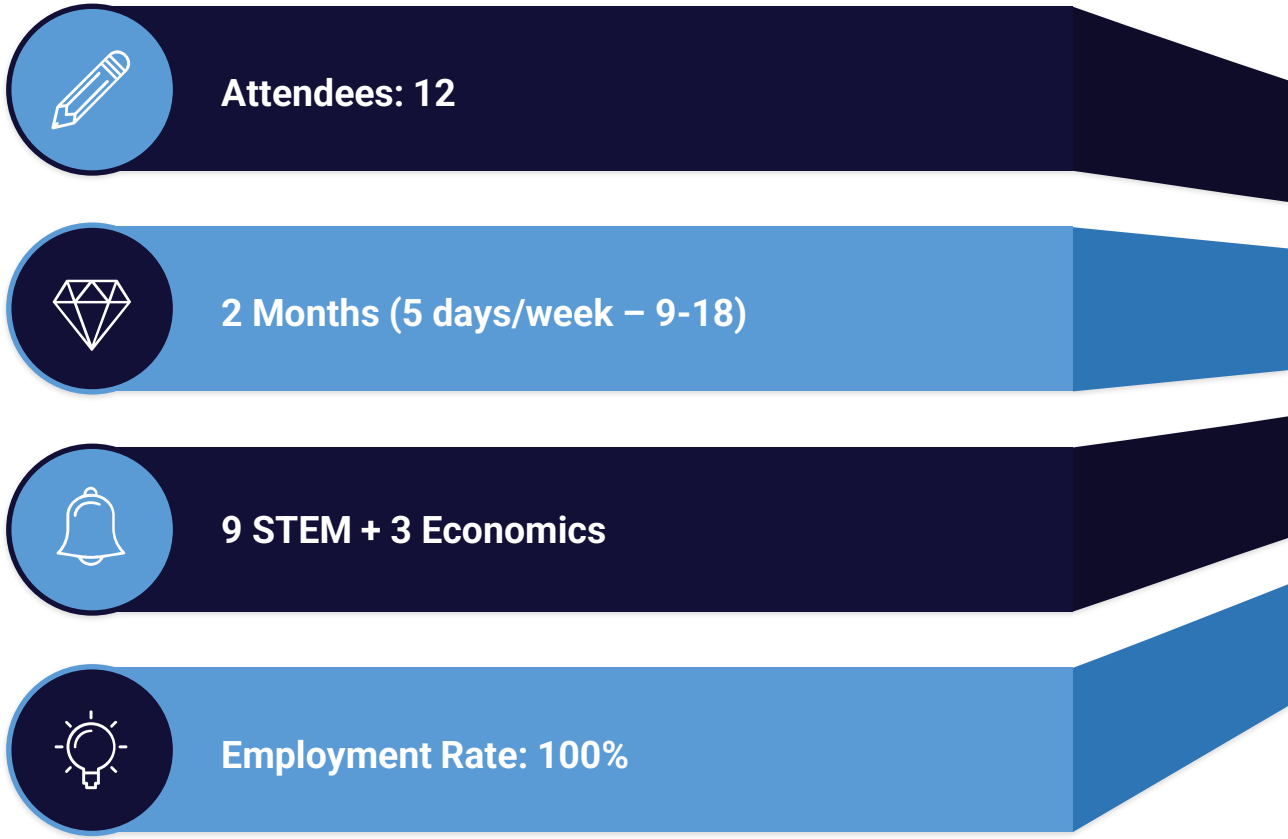
Academy with MSC Technology (Italy)

From **University to work environment**. Dealing with different levels of degrees: starting from bachelor, up to master and Ph.D., the participants need to learn the **practical and technical skills** to be able to work. Hand-on labs were conducted throughout the course with real-life scenarios and use cases

- Data management
- Data engineering
- Data Analysis,
- Data Warehousing,
- cloud provider
- cloud solution (IaaS, PaaS, SaaS)



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Academy with MSC Technology (Italy)

Attendees Background

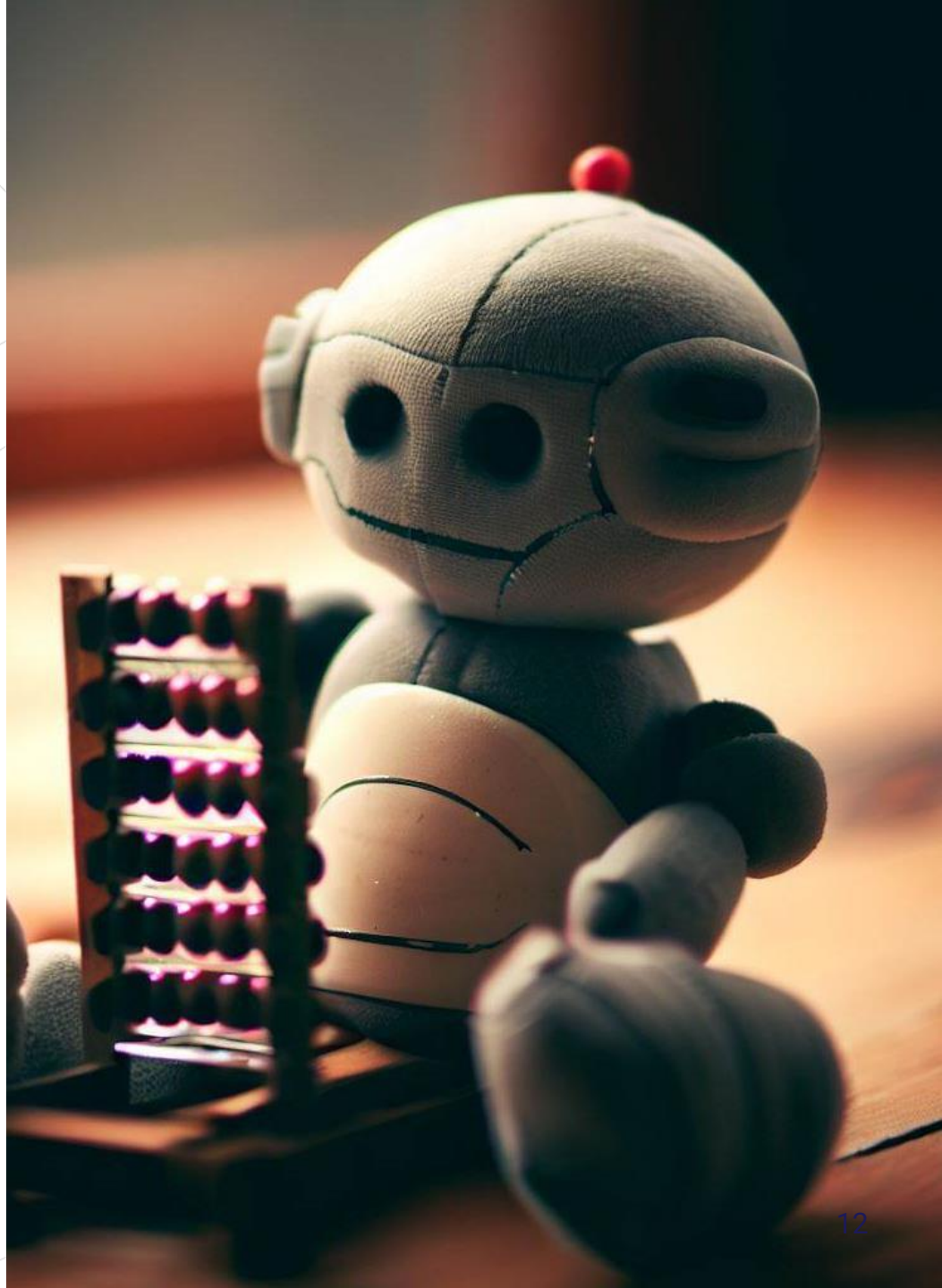
- 2 Math
- 3 Physics
- 4 Engineer
- 3 Economics

Experiential Learning

Project Works carried out all the courses as mean to evaluate (and self-evaluate) the grasp about the topic in each specific session.

Cost per Attendees

- Virtual machine: € 30/day/user
- Licensing: € 45/month/user
- Azure: € 25/user



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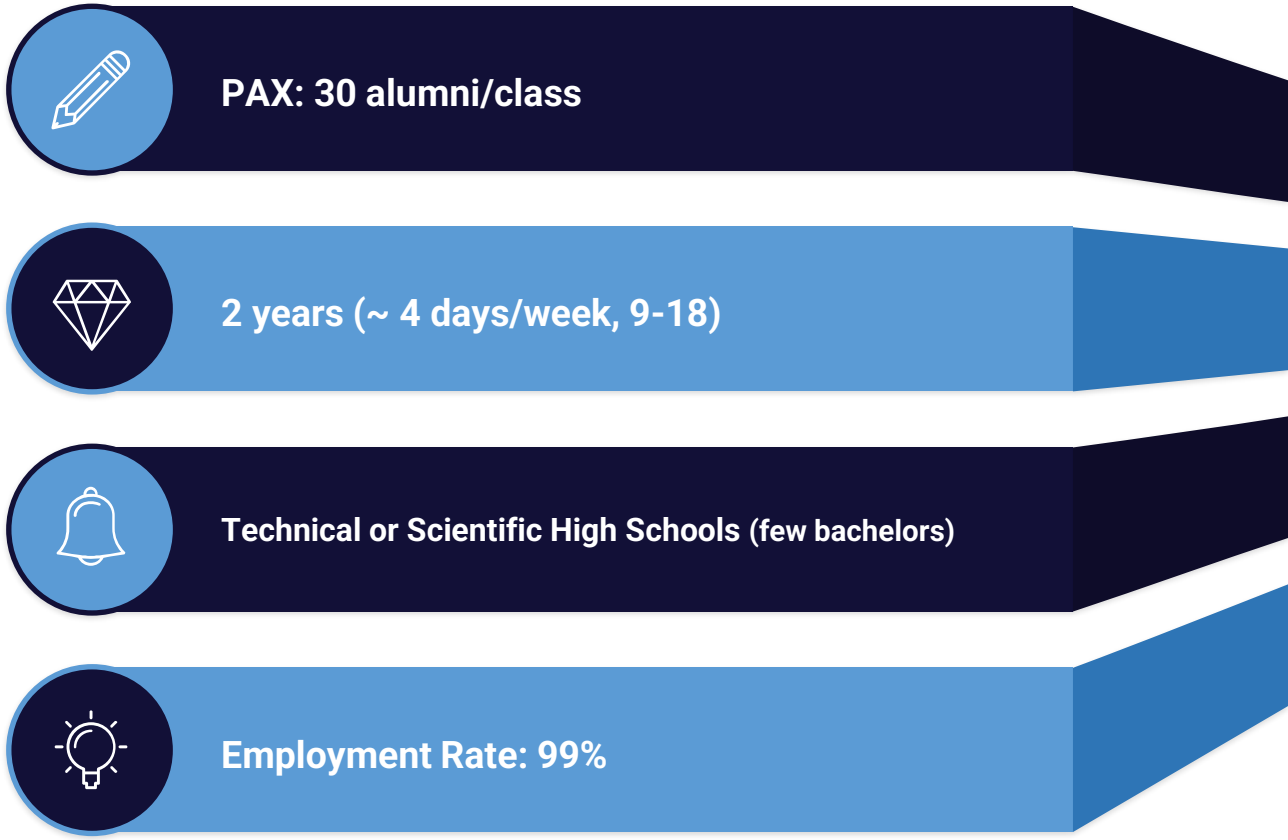
ITS Incom

Several two-year length courses:

- Big Data
- Cloud Developer
- IoT technology.

The approach of the course is mainly practical. After a brief introduction, in each technical course, about the tool, hands-on labs starting from the educational environment up to real-life scenarios proposed by external companies are the main teaching tools.

As a technical school, the final evaluation is based on the realization of an e2e solution to a real case problem



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ITS Incom

Course Main Topics

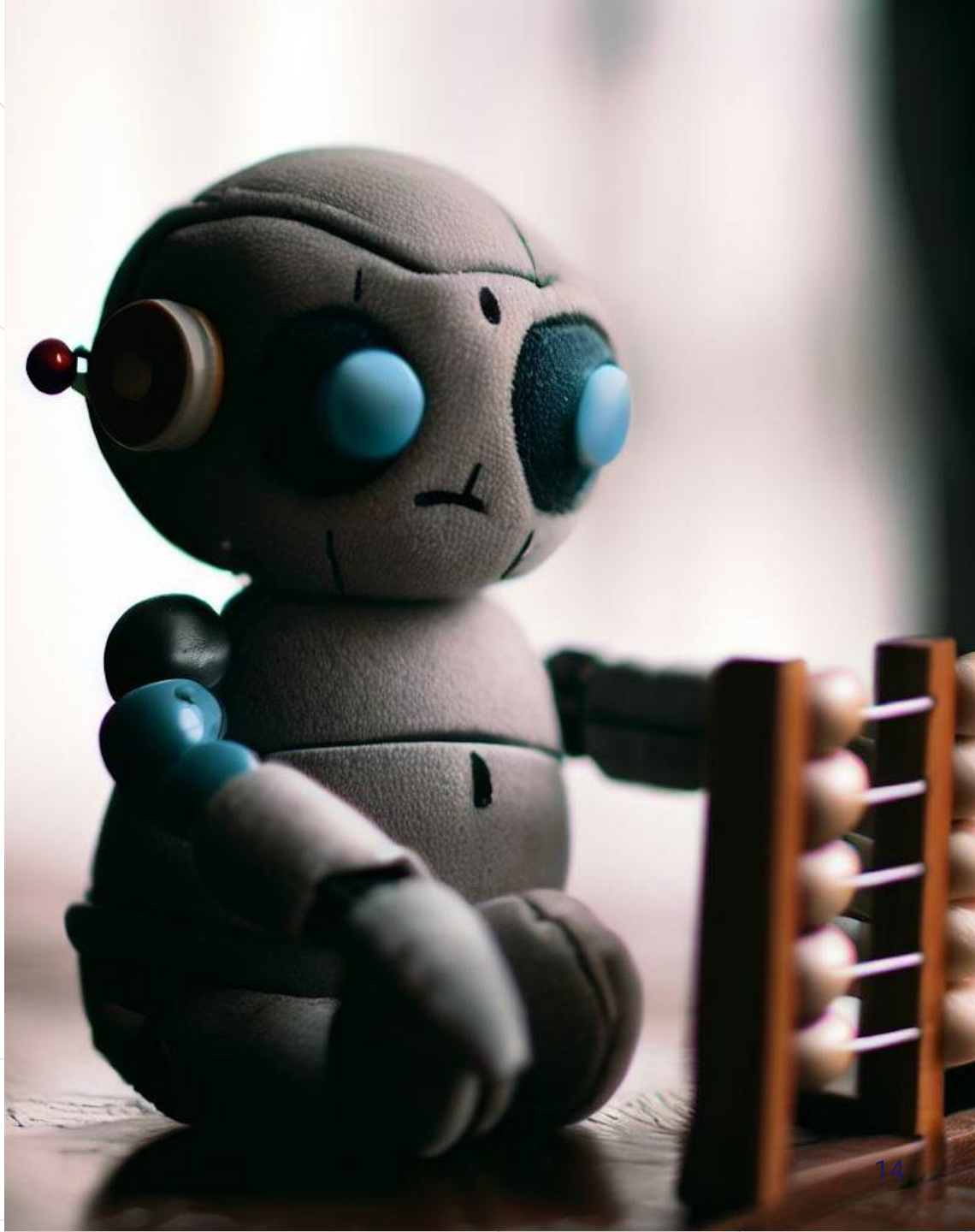
- Cloud Computing, Data Management, clearing and Analysis, ML/DL with pre-trained enterprise-grade Models as a Service
- Full stack development technologies (.NET, java cloud, docker, etc…)
- Hardwar management & firmware programming, IoT in edge/cloud continuum

Experiental Learning

~ 1200h of Lectures (200 theory, 1000 Hand-on lab)
~ > 850h in an educational internship

Cost per Attendees

- Personal computer to each student
- Licensing: € 15/month
- Azure subscription: €300/year



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European Space Agency

Microsoft Power BI Desktop is a self-reporting tool available for free.

ESA wanted to explore the possibility of a course to teach their employees the fundamental of this tool.

The main challenge was to be appealing to a plateau ranging from administrative officers to highly skilled professionals with considerable background in Data Analysis.

We proposed the Experiential Learning Approach.

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European Space Agency

Course Focus per Entry Level

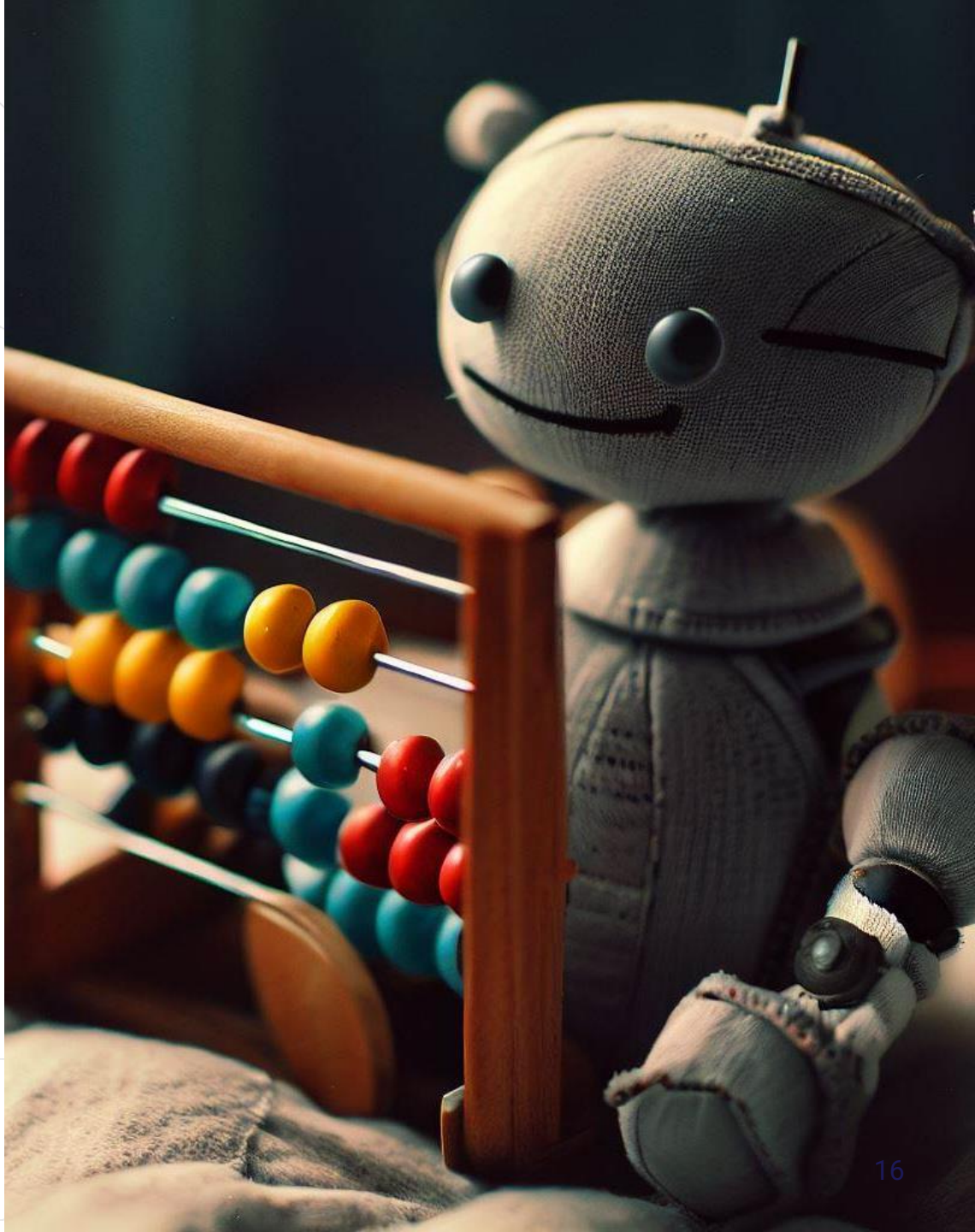
- From Zero to Hero
- Advanced
- Developer

Experiental Learning

30% of teaching with education datasets
70% of teaching with scientific-driven or administrative drive datasets

Cost per Attendees

In this case, licensing and computational resources was yet used by ESA, so no additional cost have been applied or explicitly identified, even if ESA put an effort in giving all the PAX right software, licenses, VMs etc..



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Hall of Fame

- Since 2017 Porini created a BU fully dedicate to education & learning.
- The BU applies ever since the Experiential Learning Approach.
- The BU counts 8 teachers, and more than 350 courses delivered
- The BU counts 6 MCT (Microsoft Certified Trainers) and all the teachers have a relevant technical background and certification about their topics

Porini Education Alumni

Total Teaching hours: > 13.000
Number of people trained: ~5000

Top-Down:
- *Total Teaching hours*: > 4700
- *PAX ~ 600*

Bottom-Up
- *Total Teaching hours*: > 1200
- *PAX* ~ 100

Reskilling Scale-Up:
- *Total Teaching hours*: > 7000
- *PAX > 4000*

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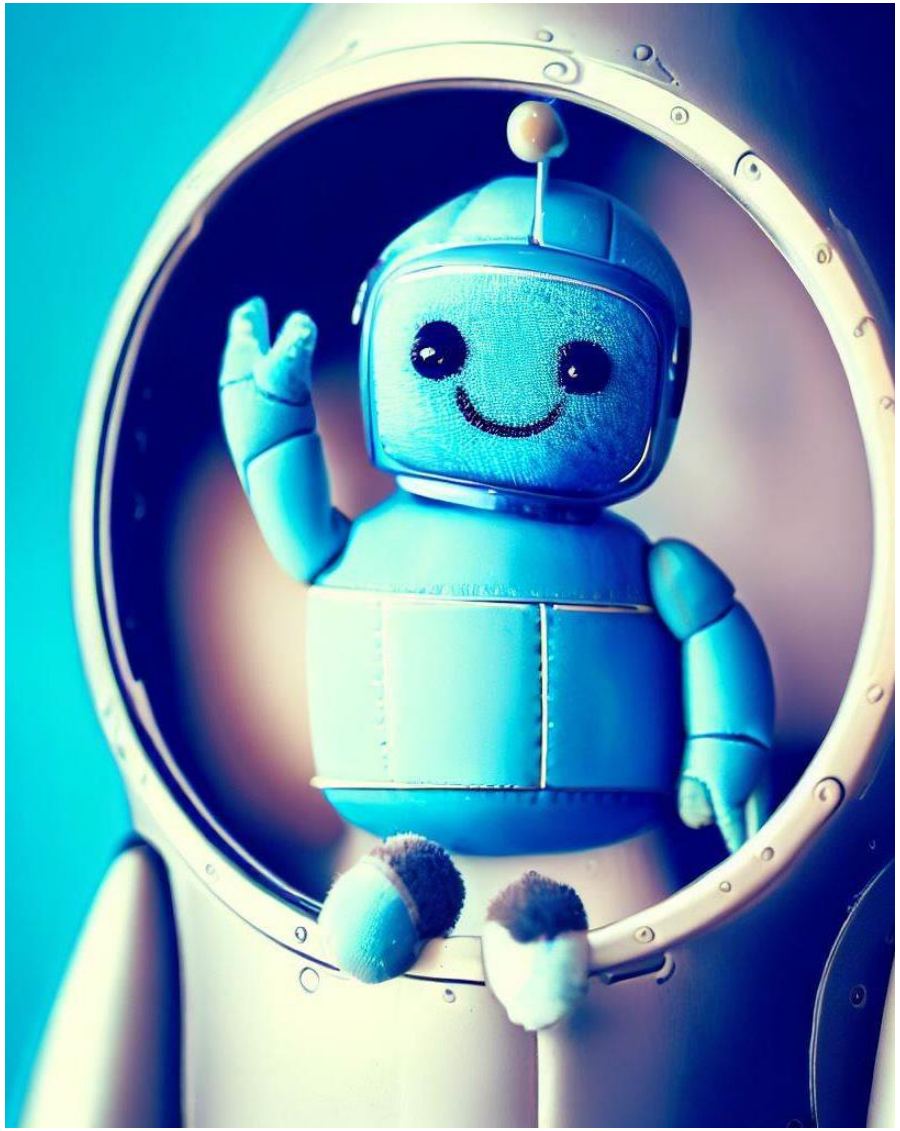
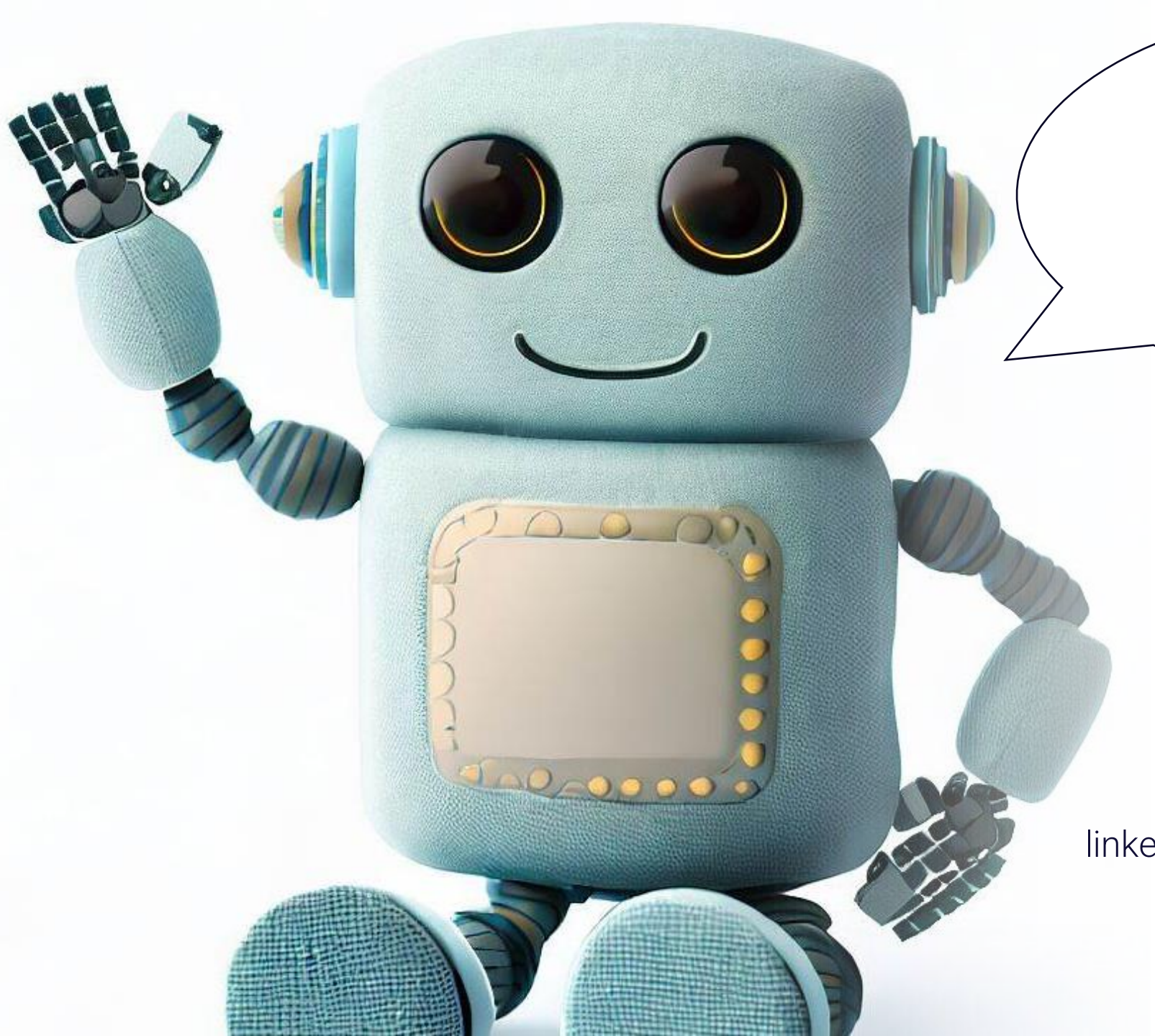
Conclusions & Outlooks

- Experiential Learning **has proven to be an effective teaching approach** not only in pedagogical contexts but also in advanced digital skilling.
- **It has a higher cost** compared to standard classrooms since a fully licensed, enterprise-grade software is required for each attendee.
- Both approaches (Top-Down and Bottom-Up) have proven to have a **high success rate**.
- The effort in creating the experiential learning environment can be **easily scaled and readapted** to serve the upskilling of existing and running companies.
- We hope that **Experiential Learning will play a key role** in projects and calls definitions.





Thank You for your Time!

Let's Keep in Touch!!

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