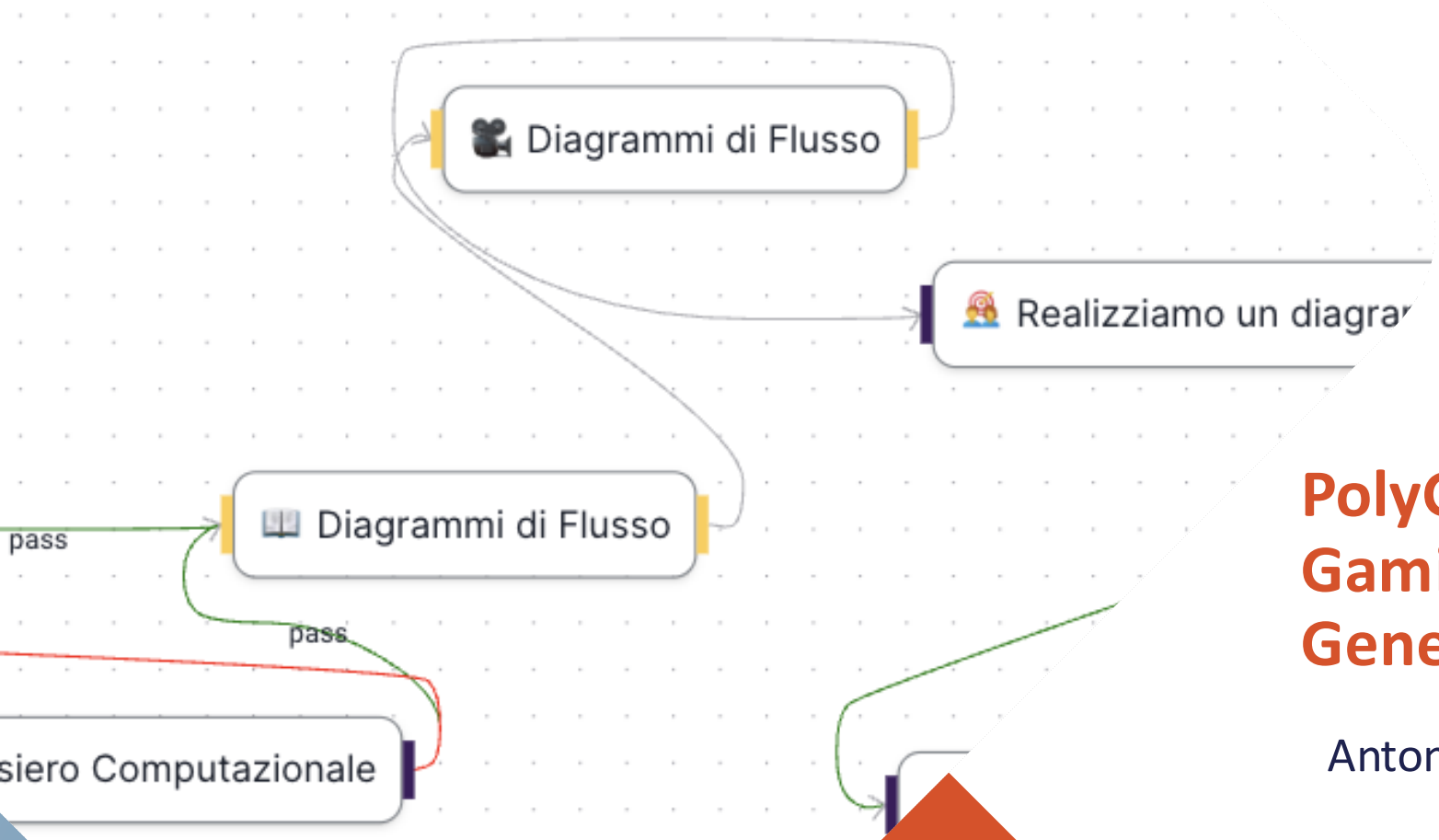
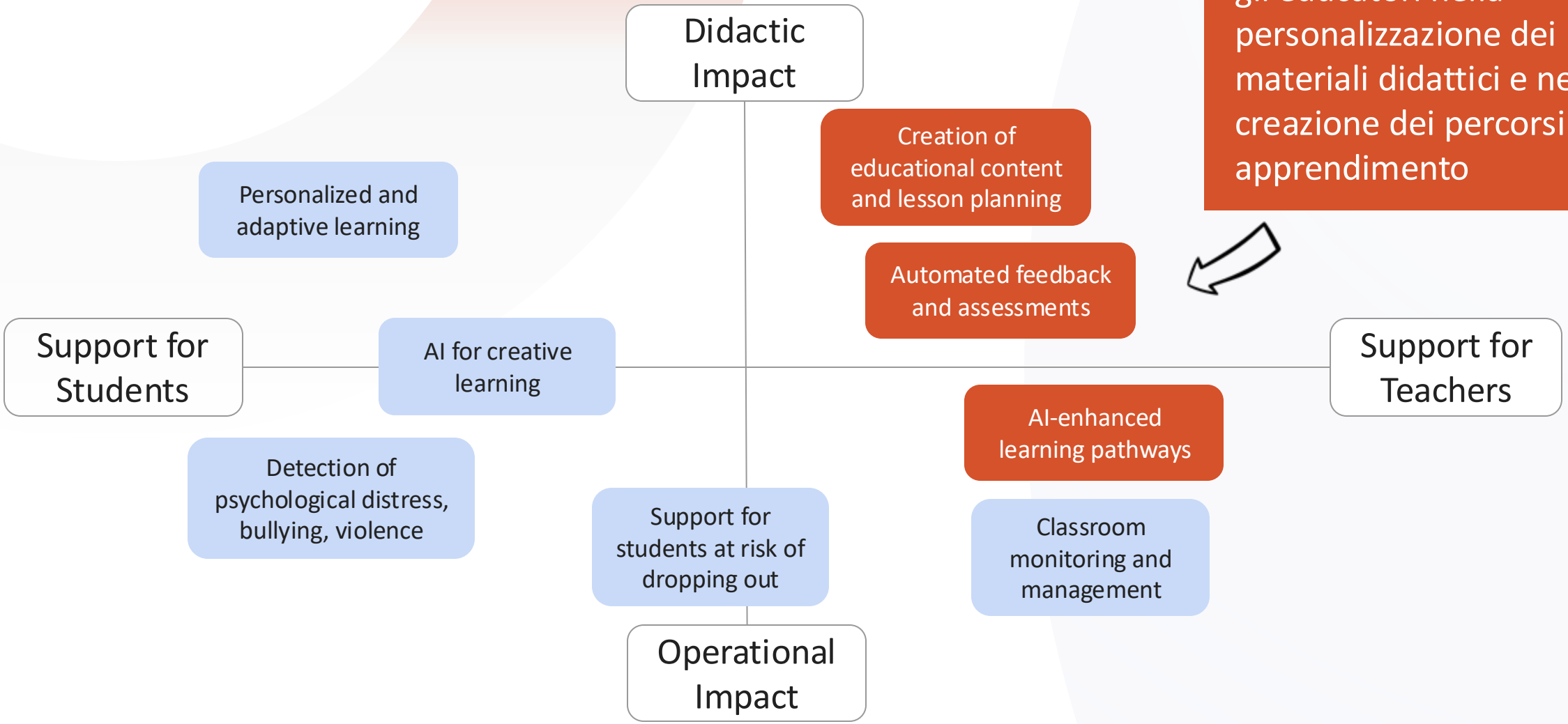


PolyGloT: Personalized and Gamified Learning Paths with Generative AI

Antonio Bucchiarone and Filippo Adami

AI in Education

Strumenti per supportare gli educatori nella personalizzazione dei materiali didattici e nella creazione dei percorsi di apprendimento



AI in and for Education

AI acceptance

Support individuals in **adopting**, **using**, and **integrating** AI-based technologies into their practices.

AI in Education

Equipping people with the **knowledge** and **skills** to understand and engage with AI technologies

AI for Education

Developing **AI tools** to **enhance** and **transform** educational practices for both educators and learners

POLYGLOT

A NEW FRONTIER IN EDUCATION

Our application combines **interactivity**, **gamification**, and **automated feedbacks**

to help **teachers** build ***adaptive learning flows*** that lead

to deeper learning experiences for **students**.

Comprehensive AI-Driven Learning Ecosystem

PolyGloT combines cutting-edge AI technology with proven pedagogical frameworks to create engaging, personalized learning experiences

Execution Engine

Orchestrates sequences of learning activities aligned with specific pedagogical frameworks like Bloom's Taxonomy, ensuring structured and effective learning progression.

Bloom's Taxonomy

AI Design Assistance

Intelligent assistance for teachers to create learning paths and generate high-quality content for each node, streamlining the course creation process.

Content Generation

Personalized AI Learning

Provides personalized activity recommendations, AI-based feedback, progress monitoring, and concept detection with microlearning suggestions.

Adaptive Learning

Gamification Engine

Missions, badges, challenges, and narrative-based progression enhance engagement and motivation through game-like elements.

Missions Badges

AI Chatbot Tutor

Available 24/7 to support students with contextual help, clarification, and guidance throughout their learning journey.

24/7 Support

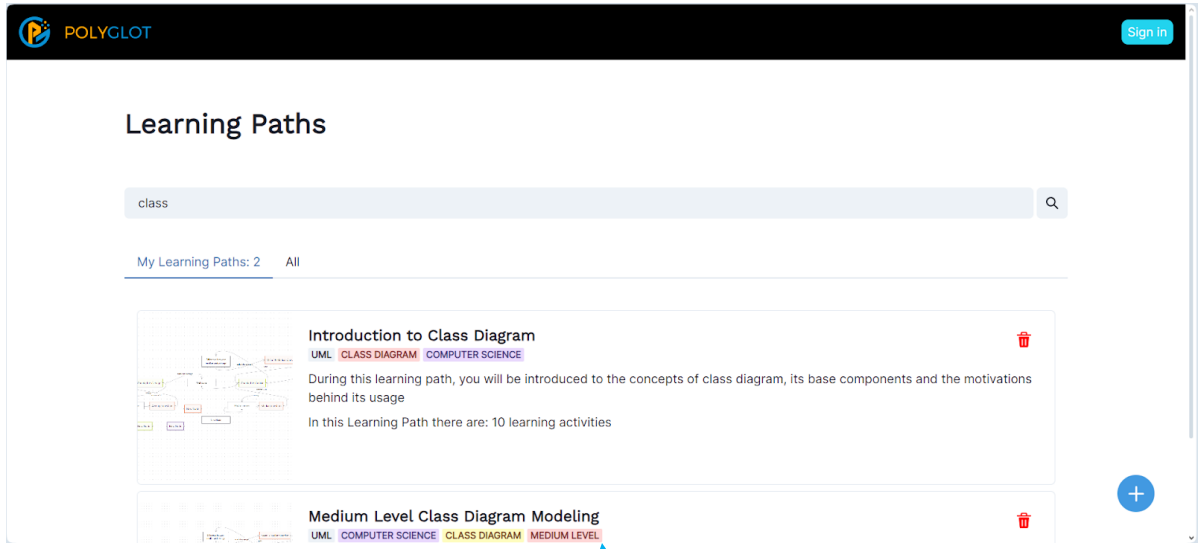
Spatial Integration

Seamless integration with platforms like WorkAdventure for immersive, spatial learning environments that engage students in virtual worlds.

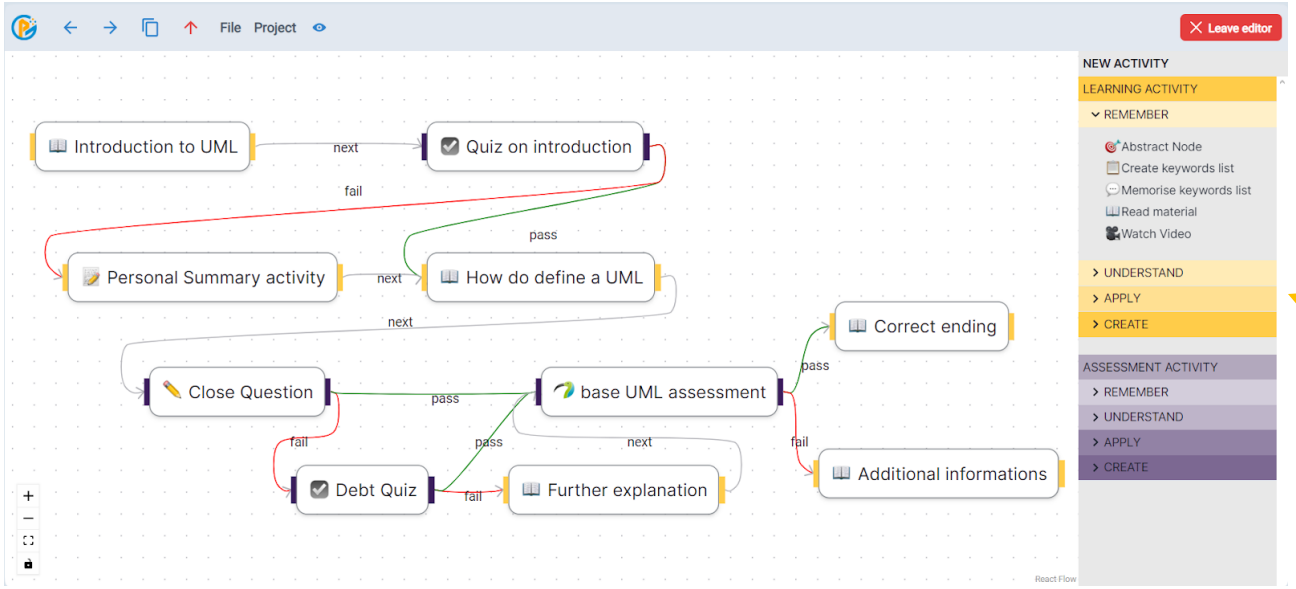
WorkAdventure

POLYGLOT

A tool developed for educators to create and personalize learning paths to adapt to students' needs.



The **Discovery Page** allows users to explore learning paths.

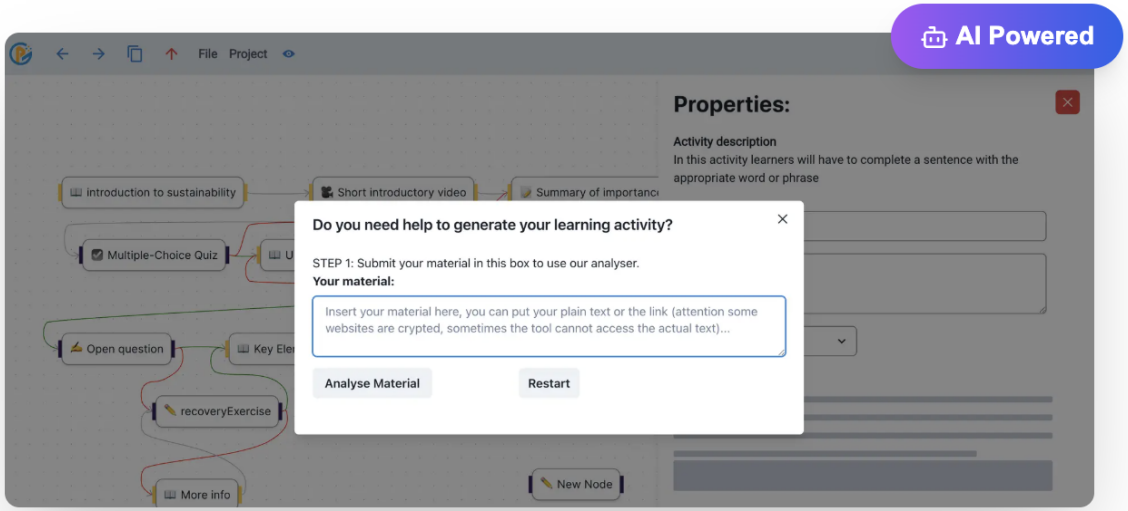


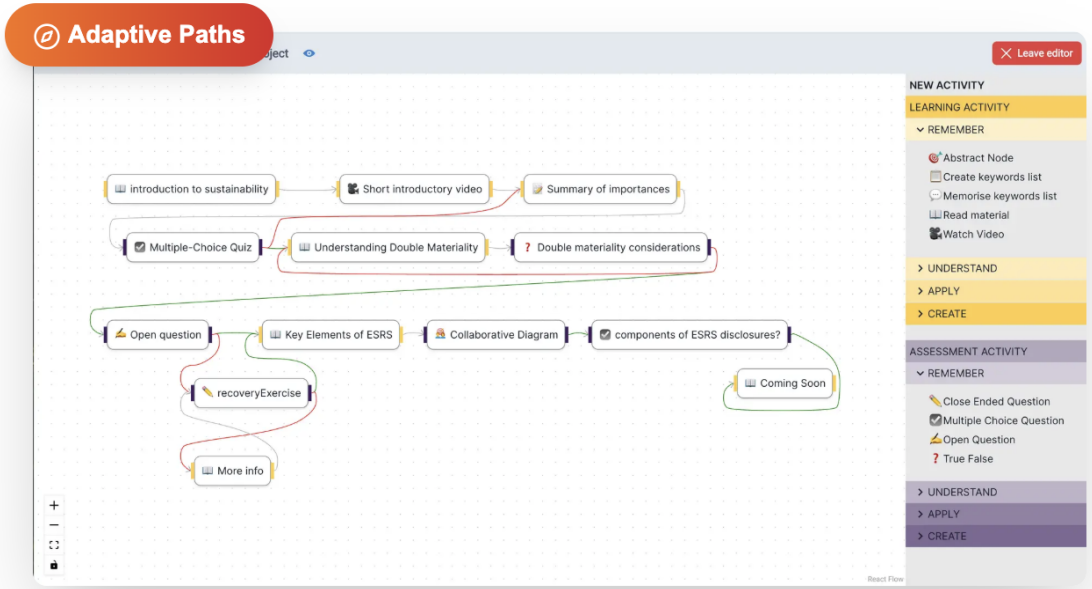
The **Editor Page** allows users to develop the learning path

AI-Powered Content Generation

Our intelligent system analyzes your educational materials and suggests relevant activities, assessments, and learning paths. The AI companion understands pedagogical principles and helps create engaging learning experiences automatically.

- Automatic activity generation from text materials
- Smart content analysis and categorization
- Adaptive difficulty adjustment based on student performance
- Pedagogical framework alignment (Bloom's Taxonomy)





Visual Learning Path Design

Create sophisticated learning journeys with our intuitive flowchart-based editor. Design branching paths, conditional activities, and personalized learning experiences that adapt to each student's progress, learning style, and performance.

- Drag-and-drop activity creation with visual metaphors
- Conditional branching and intelligent prerequisites
- Real-time collaboration tools for educators
- Tree and map-based learning path visualization

Built on Solid Pedagogical Foundations

Bloom's Taxonomy Integration

Our execution engine orchestrates learning activities according to Bloom's Taxonomy, ensuring students progress through all cognitive levels from remembering basic facts to creating new knowledge.

- **Remember** - Recall facts and basic concepts
- **Understand** - Explain ideas and concepts
- **Apply** - Use information in new situations
- **Analyze** - Draw connections among ideas
- **Evaluate** - Justify decisions and opinions
- **Create** - Produce new or original work

Adaptive Learning Framework

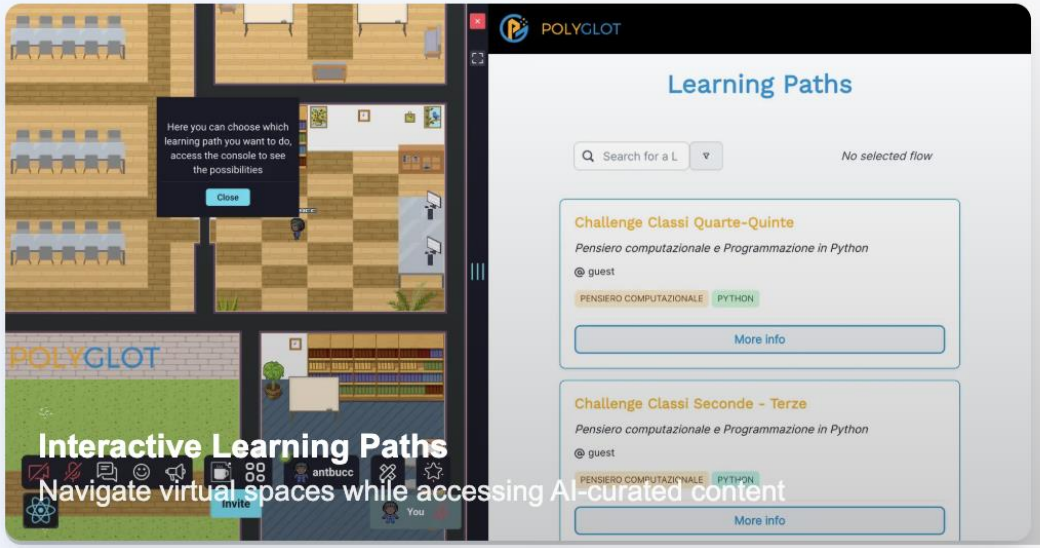
- Multiple Learning Styles
- Differentiated Instruction
- Constructivist Learning
- Social Learning Theory

POLYGLOT

WorkAdventure

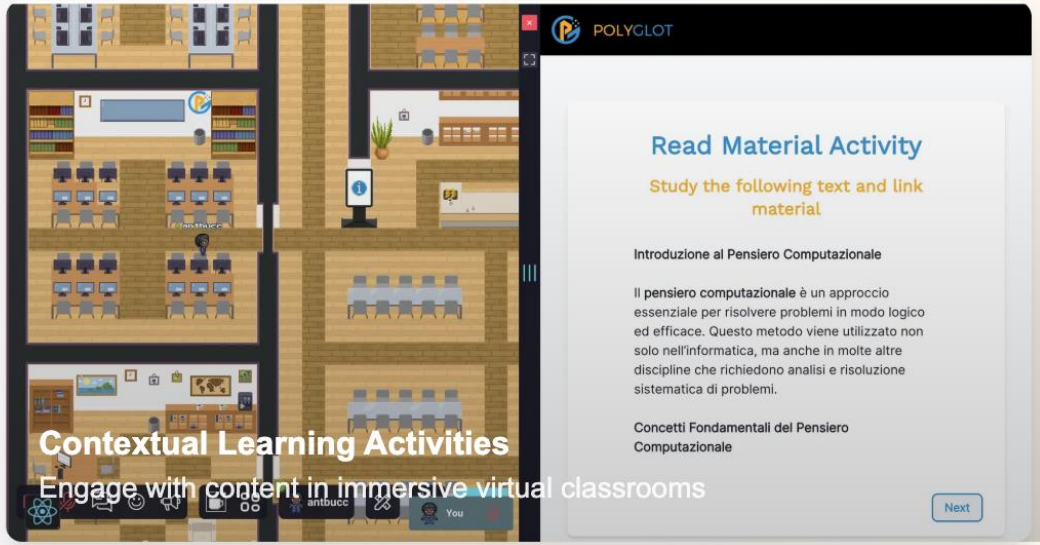
Immersive Spatial Learning with WorkAdventure

Experience the revolutionary integration of PolyGloT with WorkAdventure platform, creating immersive, gamified learning environments where students navigate virtual worlds while accessing personalized learning paths and AI-powered assistance.



Interactive Learning Paths

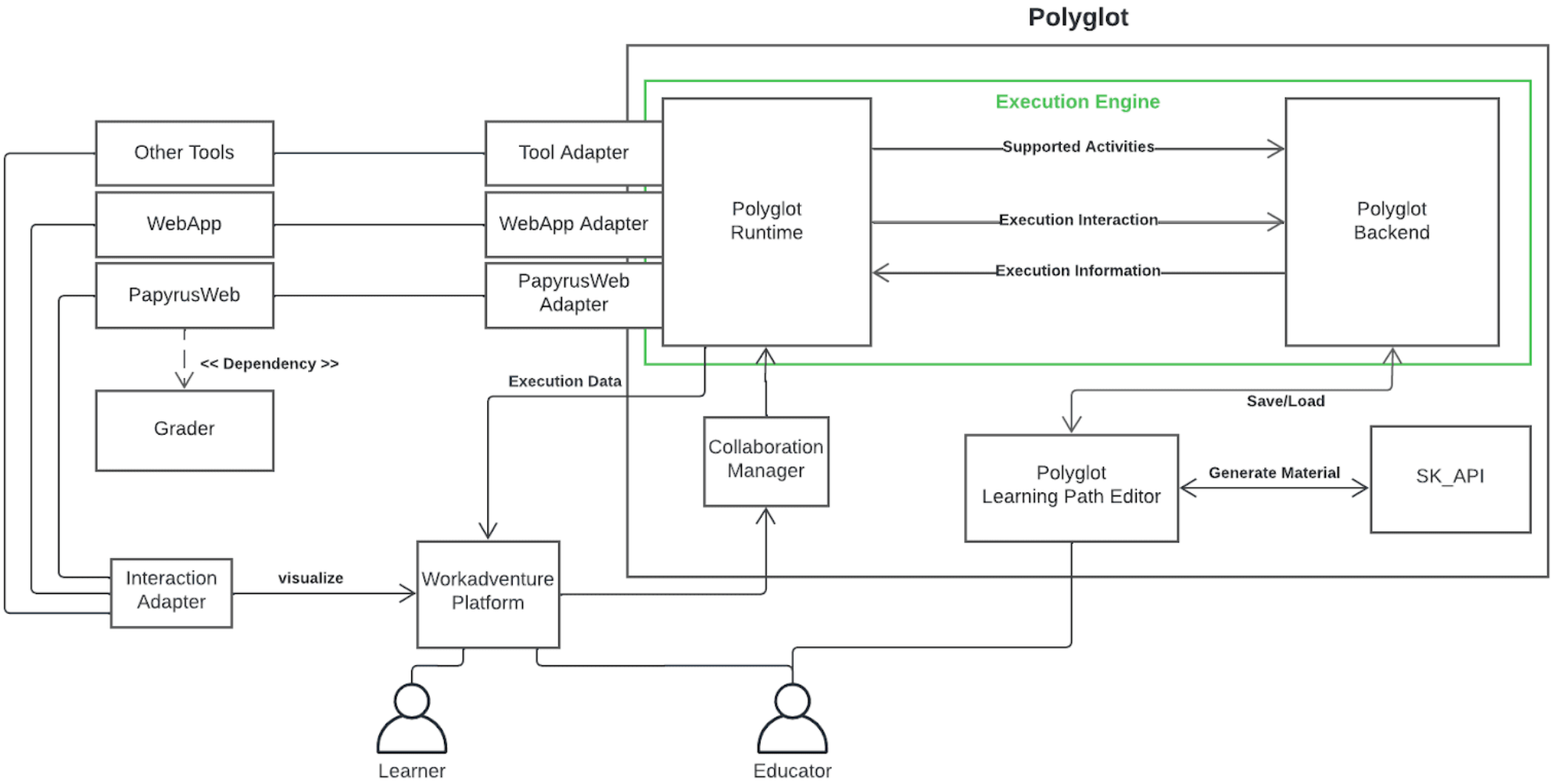
Navigate virtual spaces while accessing AI-curated content



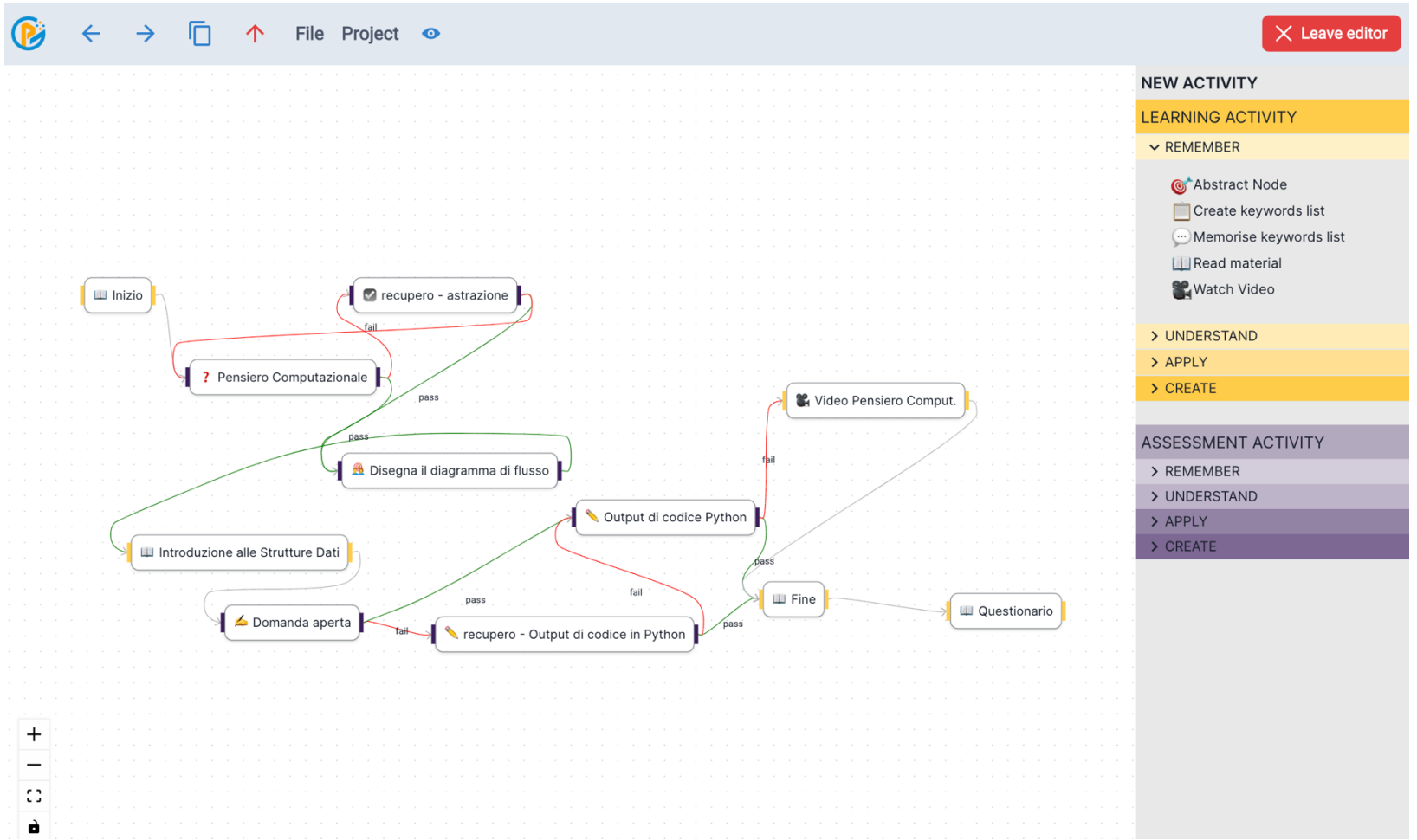
Contextual Learning Activities

Engage with content in immersive virtual classrooms

Open Architecture for various Learning Activities



Challenges in “Computational Thinking”

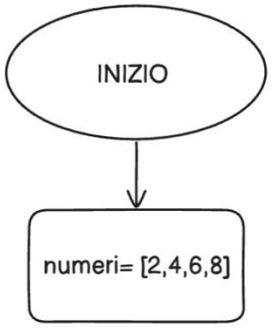


100%

Disegnate un flow chart corretto ed inviatelo al vostro docente di Informatica :)

il vostro amico :)

creiamo un diagramma



paxo

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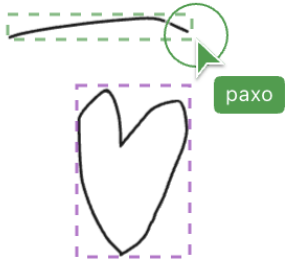
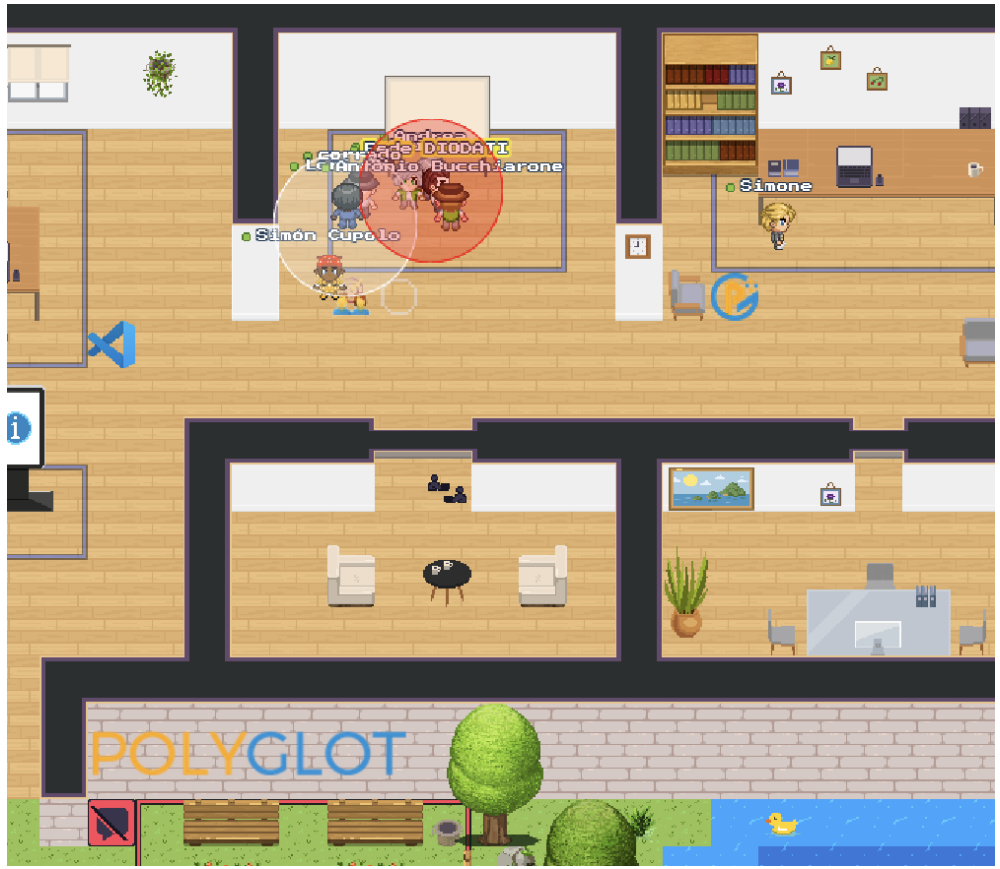
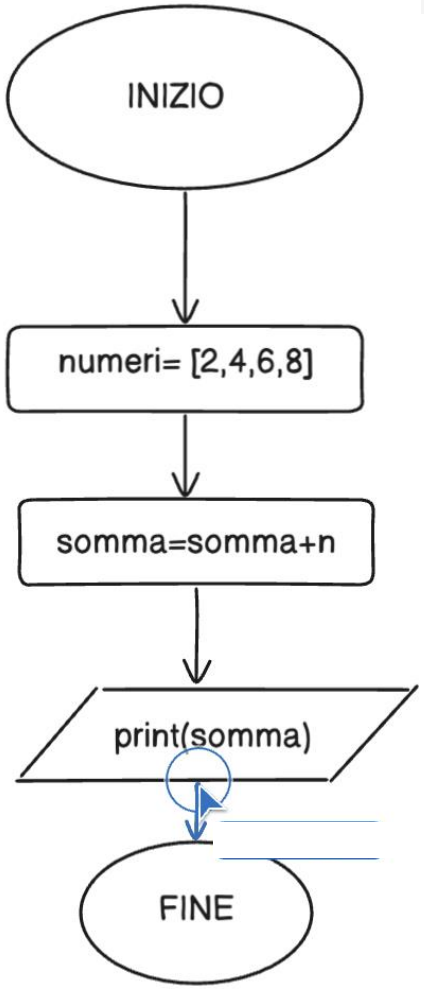


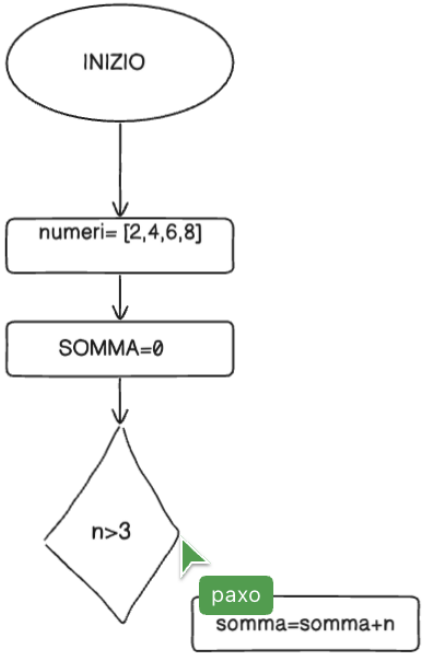


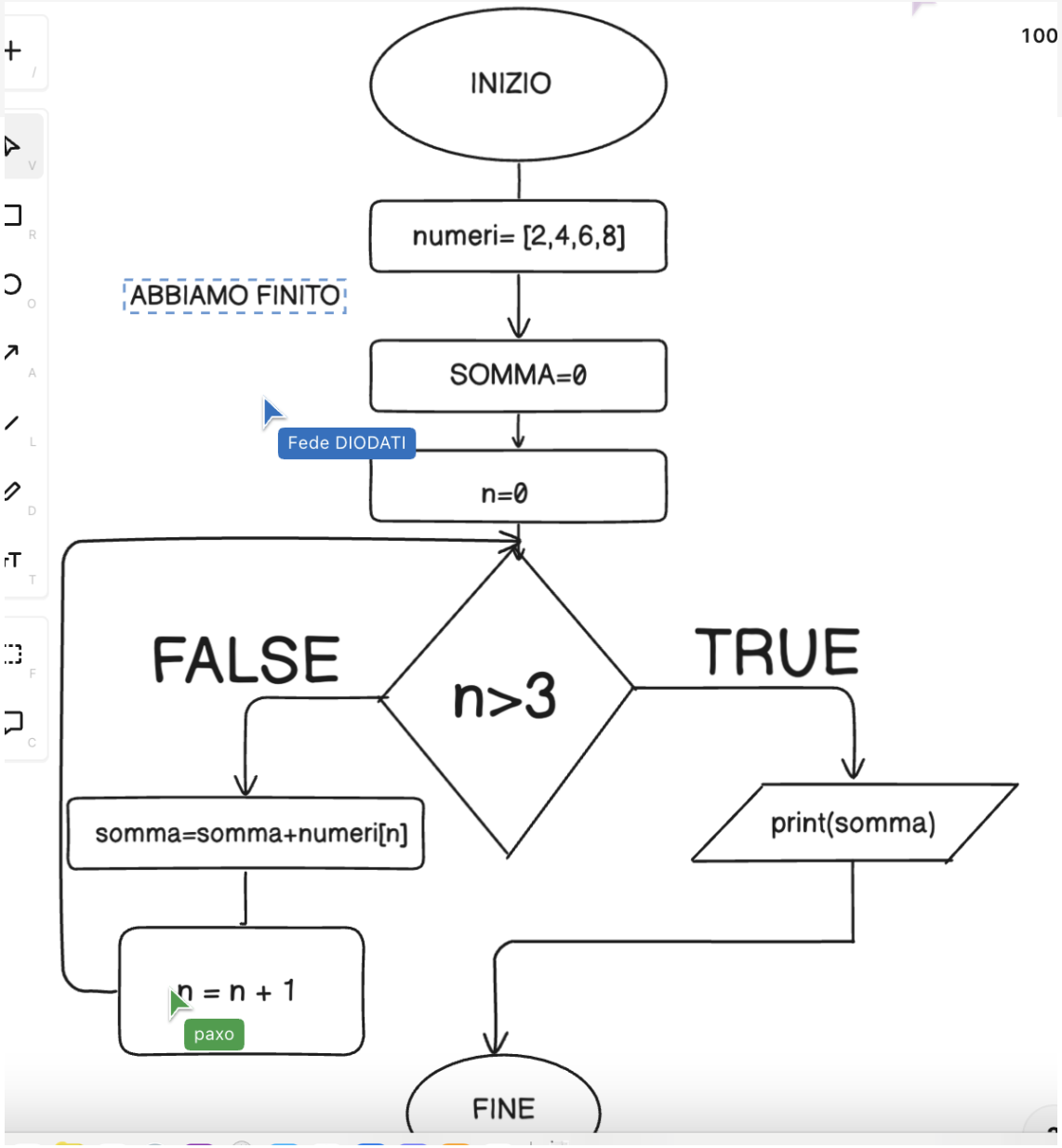
Andrea

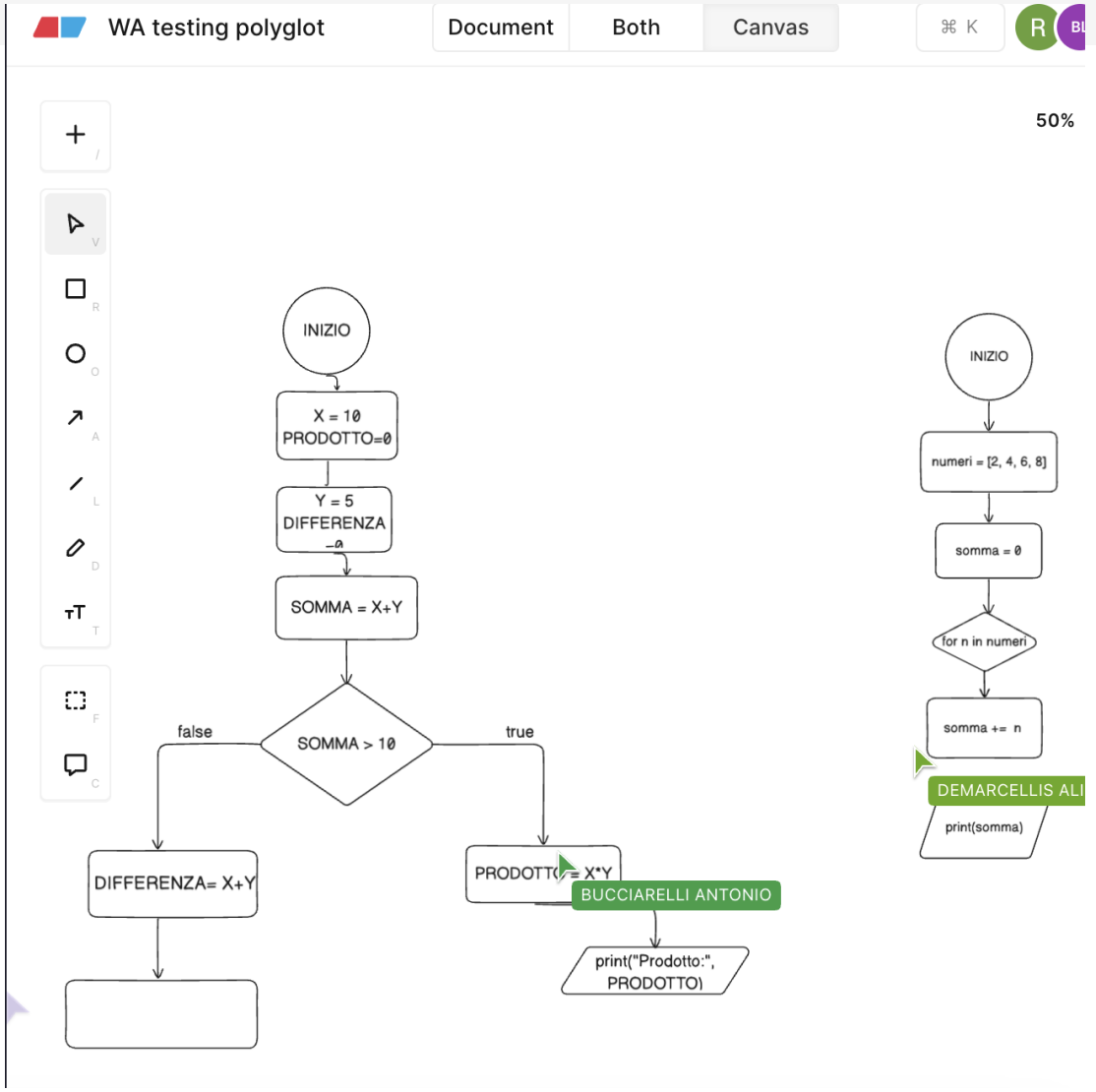
```
for n in numeri:
```



z280106!

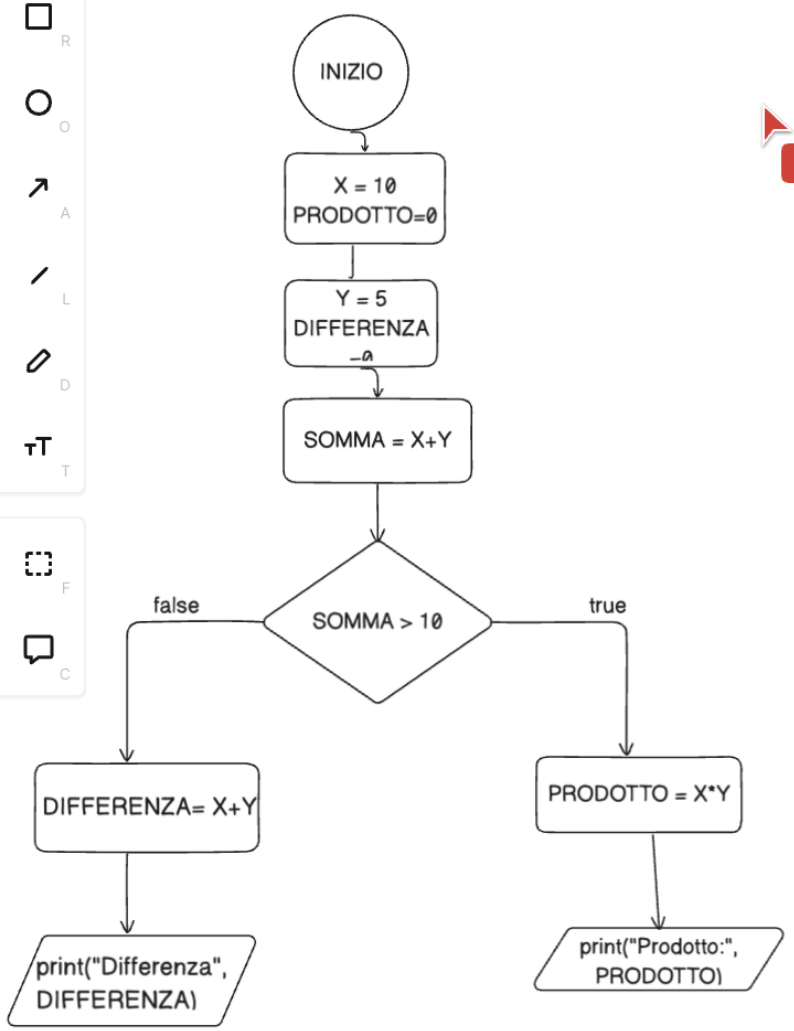



INIZIO
numeri= [2,4,6,8]
ABBIAMO FINITO
SOMMA=0
Fede DIODATI
n=0
FALSE
n>3
TRUE
somma=somma+numeri[n]
print(somma)
n = n + 1
paxo
FINE


WA testing polyglot
Document
Both
Canvas
50%
INIZIO
X = 10
PRODOTTO=0
Y = 5
DIFFERENZA
SOMMA = X+Y
SOMMA > 10
false
true
DIFFERENZA= X+Y
BUCCIARELLI ANTONIO
print("Prodotto:",
PRODOTTO)
INIZIO
numeri = [2, 4, 6, 8]
somma = 0
for n in numeri
somma += n
DEMARCELLIS ALI
print(somma)

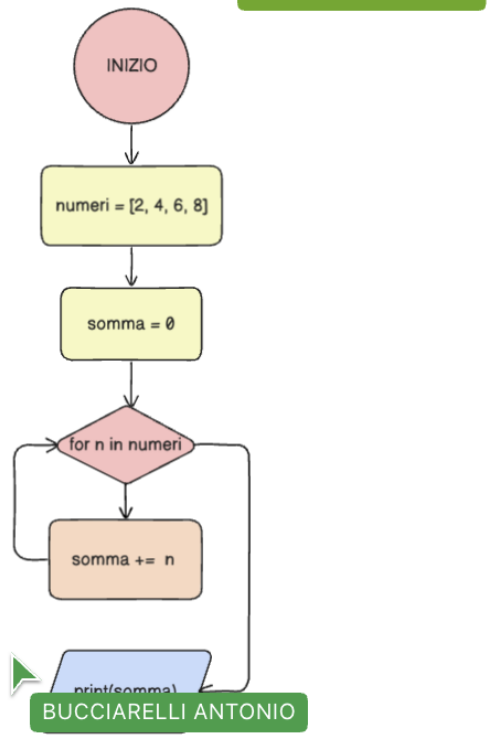
50%

BRAVI :)

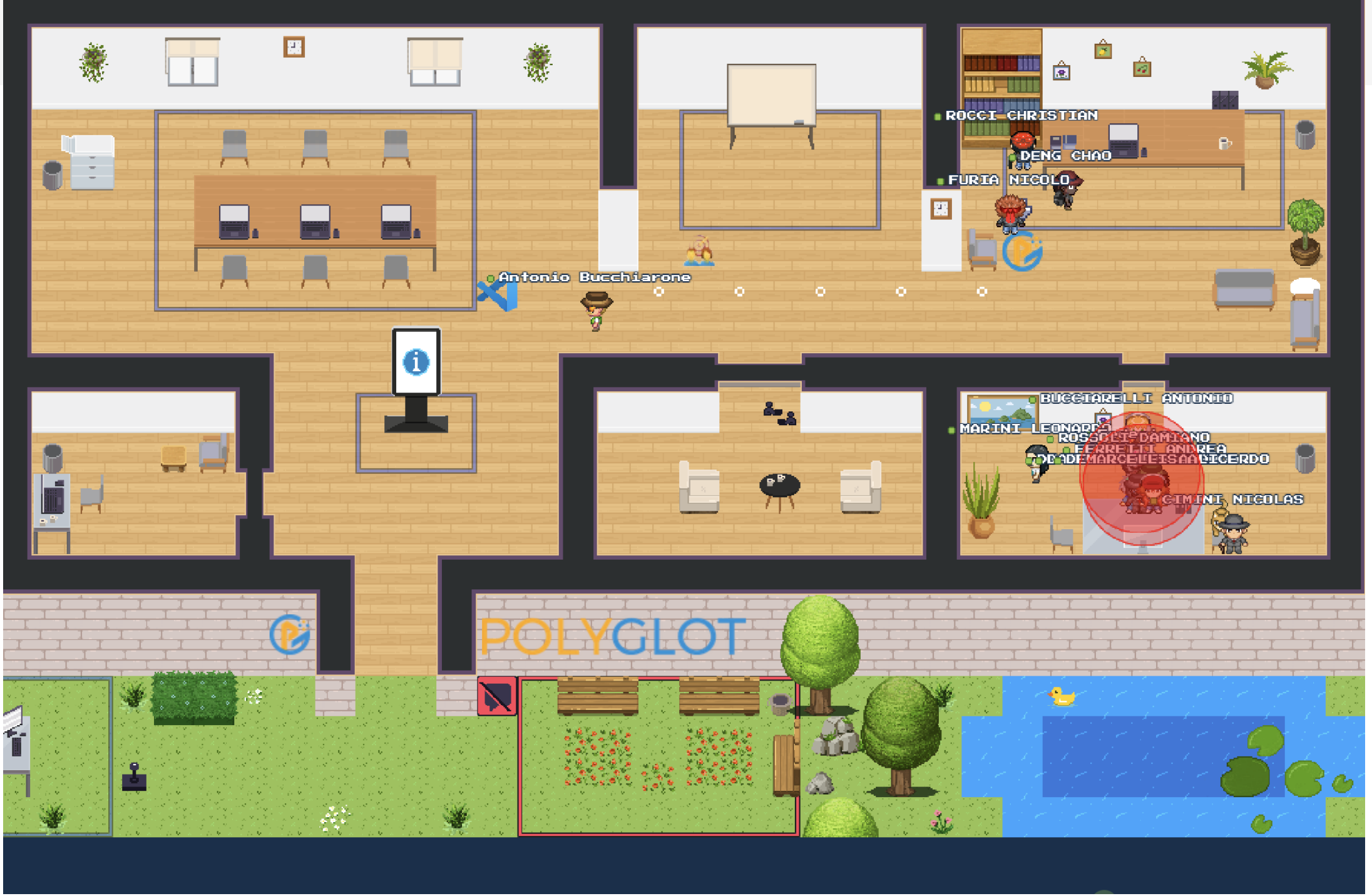


DANIELE ALESSANDRO

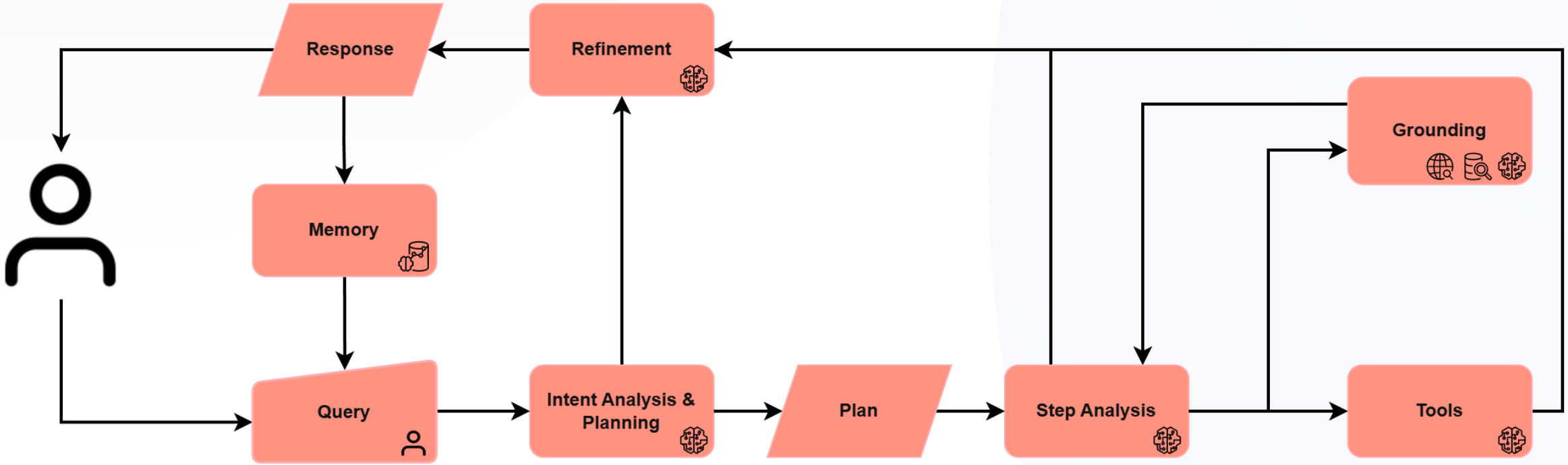
DEMARCELLIS ALICE

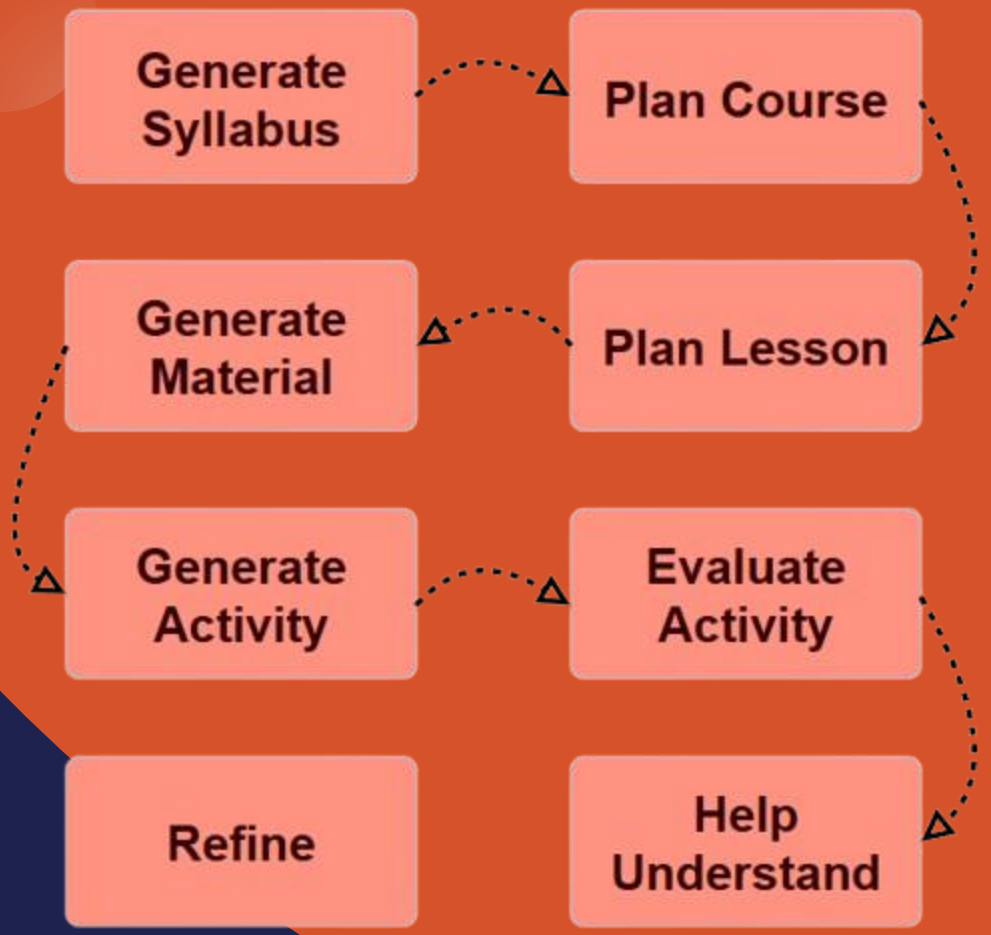


BUCCIARELLI ANTONIO


ROCCI CHRISTIAN
DENG CHAO
FURIA NICOLO
Antonio Bucchiarone
BUGGIARELLI ANTONIO
MARINI LEONARDO
ROSSOLI DAMIANO
FERRELLI ANDREA
CIMINI NICOLAS
POLYGLOT

Into the Agentic Workflow





Tools for every need

Each tool is based on a pre-engineered prompt template to guarantee high quality results for atomic tasks

Dynamic Grounding for reliable responses

- The LLM automatically checks if it has enough knowledge to answer each user query.
- If more information is needed, the system decides whether and where to ground the answer
- The LLM also generates the appropriate queries for the selected grounding source.

- **User Docs:** For highly personalized or context-specific queries

- **OERs:** For standard curriculum topics and academic concepts

- **Web Search:** For recent, or out of OERs scope, information

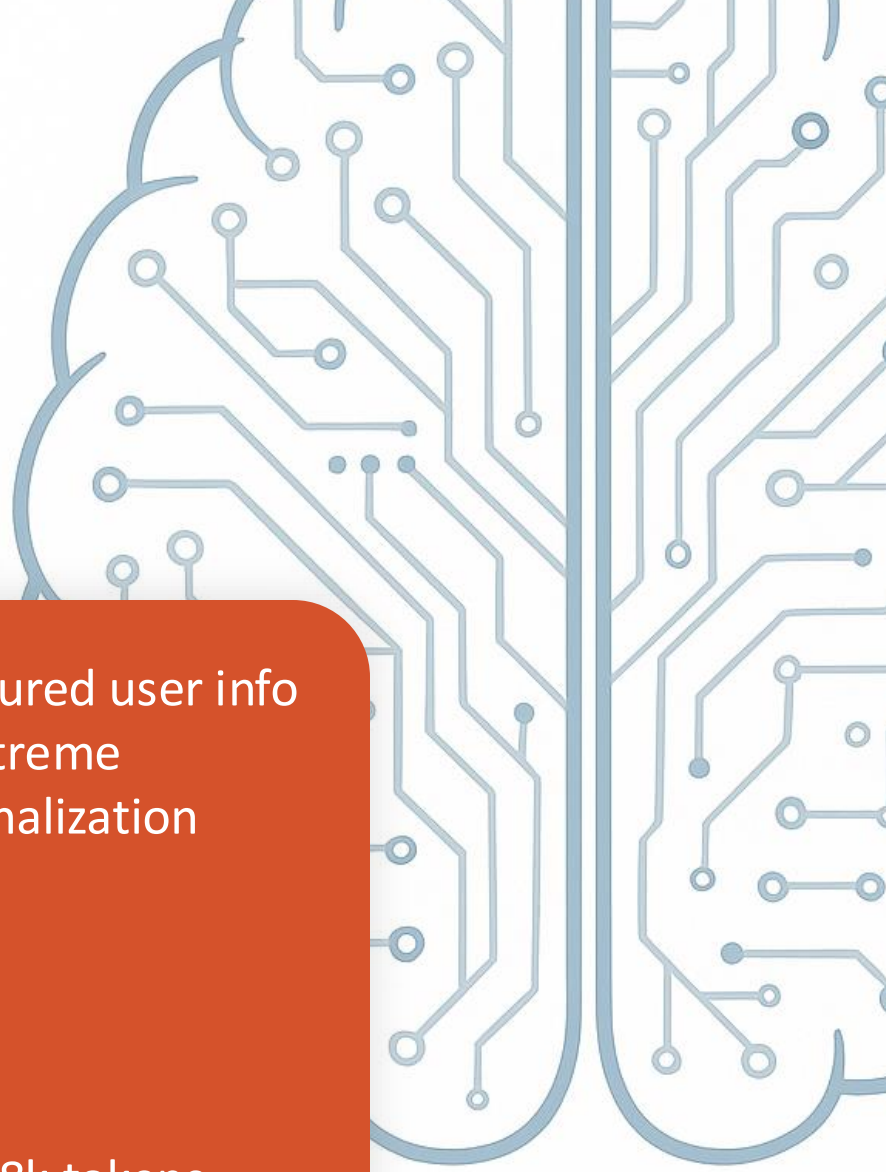
OERs knowledge foundation

- The system relies on a continuously growing database of Open Educational Resources

- **High Quality:** Upload restricted to certified users
- **Fast:** Smart indexing and vector search inside documents
- **Multilingual:** Automatic language detection and translation

Smart Memory for long conversations

- Memory is optimized to sustain long conversations without forgetting useful information while maintaining a limited token count to spare time and resources and improve quality



- Memory Buffer for recent message exchange
- Up to 4k tokens

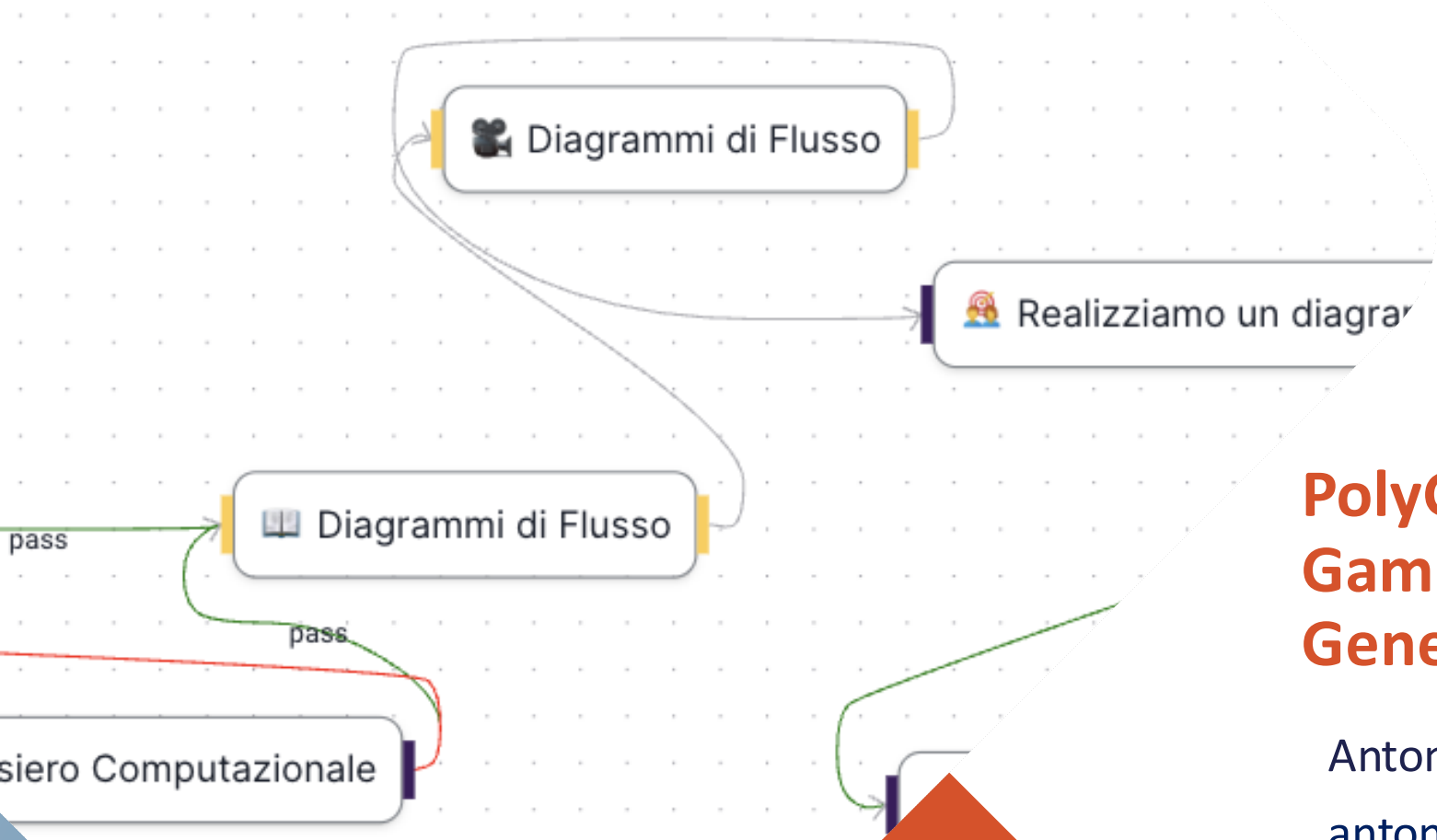
- Summarization plus structured memory for long term contextualization
- Up to 18k tokens

- Structured user info for extreme personalization
- Up to 8k tokens

State to keep on track

- The agent tracks both the current intent and the overall goal.
- It stores detailed, relevant information about previous steps within the goal for accurate and precise referencing.
- The agent continuously re-evaluates the user’s intent, allowing it to update its plan and actions dynamically as the conversation evolves.

> Adaptive Learning is the delivery of personalized learning experiences that address an individual's unique needs



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global AI community