How AI Learns and Solves Problems

SMaiLE Project

> **Key Information**
>
> **Target Group:** 13 - 16 y.o.
>
> **Duration:** 135 min
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> **Key Learning Goals:**
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> 1. **Fundamentals:** Introduce concepts of AI, Machine Learning, and Neural Networks.
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> 2. **Learning Methods:** Explore Supervised Learning and Reinforcement Learning through simulation.
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> 3. **Application:** Match AI technologies to real-world problems (ecology, sustainability).
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> 4. **Innovation:** Design a conceptual AI solution to a specific challenge.

Learning Outcomes

By the end of the project, students will be able to:

KNOWLEDGE & UNDERSTANDING:

- Define Artificial Intelligence and articulate how it learns from data.
- Identify key paradigms: Supervised Learning, LLMs, Computer Vision.
- Recognize various AI types and match them to appropriate problems.

SKILLS & ABILITIES:

- Develop critical thinking to differentiate human vs. AI content.
- Use tools like Teachable Machine to train basic models.
- Design conceptual AI solutions for sustainability issues.

ATTITUDES & VALUES:

- Understand AI as a tool for innovation, not just automation.
- Reflect on ethical considerations: privacy, bias, and accountability.

European Dimension / Erasmus+ Connection

- **Digital Transformation:** Developing essential digital competences for future citizens.

- **Sustainability:** Exploring how AI can solve ecological problems (Green Deal).

- **Ethics:** Promoting responsible AI use and understanding algorithmic bias.

1. Resources and Tools

- **Simulations:** Teachable Machine, Quick, Draw!.

- **AI Tools:** ChatGPT, Gemini (for research/prompts).

- **Materials:** Matching Game Cards, Projector, Computers.

- **Collaboration:** Padlet, PowerPoint.

Activity Overview

Activity	Time	Description
Intro	15 min	**What is AI?** Defining AI vs. Human Intelligence. Debunking myths.
1	40 min	**The "Black Box":** Training models with Teachable Machine. Playing "Quick, Draw!" to see neural nets in action.
2	30 min	**Real World:** Matching Game (AI Types vs. Problems). Case studies in ecology/health.
3	35 min	**Solve a Problem:** Design challenge. Teams propose an AI solution for sustainability.
Reflect	15 min	**Evaluation:** Self-assessment rubric and class discussion on ethics.

2. Introduction: What is AI?

Goal: Establish a clear definition.

- **Discussion:** "What tasks are easy for you but hard for a robot?"

- **Concept:** AI is not magic; it is a system that learns patterns from data.

3. Activity 1: The "Black Box" of Machine Learning

Goal: Experiential learning.

- **Teachable Machine:** Students train a model to recognize specific gestures or sounds. They see how "more data" improves accuracy.

- **Quick, Draw!:** Students interact with a neural network that guesses their drawings.

- **Key Takeaway:** Machines learn from examples (training data).

4. Activity 2: AI in the Real World

Goal: Application of knowledge.

- **Matching Game:** Match the AI Technology (e.g., Computer Vision) to the Use Case (e.g., Sorting recycling).

- **Discussion:** How does Netflix know what you want to watch? (Recommender Systems).

5.   Activity 3: Solve a Problem with AI

Goal: Innovation and design.

- **Challenge:** Choose a sustainability problem (e.g., plastic waste, energy usage).

- **Solution:** Design an AI concept to solve it.

- **Pitch:** "We will use [AI Type] to [Action] in order to [Goal]."

- **Ethics Check:** Identify potential risks (privacy, cost).

6.   Reflection and Evaluation

Goal: Critical reflection.

- **Self-Assessment:** Complete the provided rubric.

- **Discussion:** "Do we trust AI to make important decisions?"

- **Future:** How will AI change the careers students are interested in?