HCI 2024

Themes and Projects Overview

Human Computer Interaction

Luigi De Russis

Academic Year 2024/2025

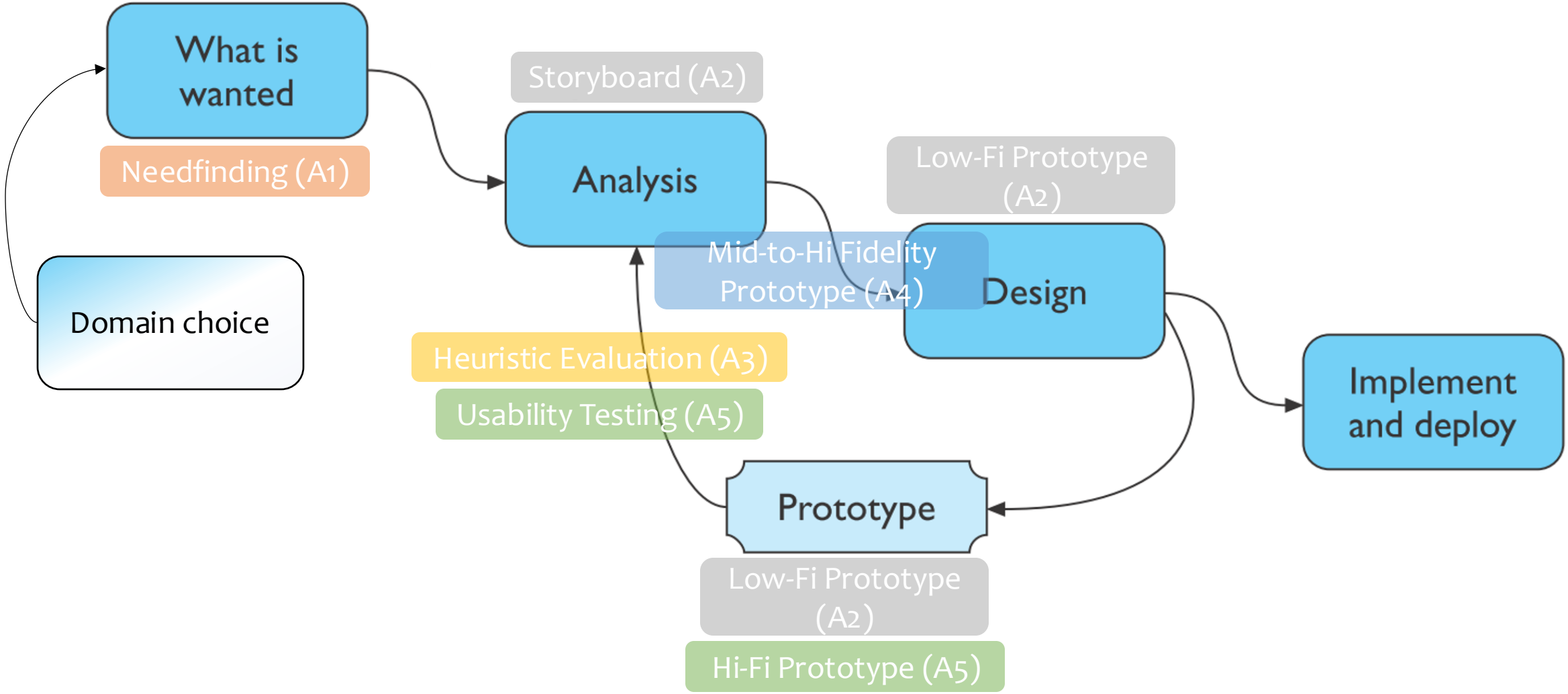
Project Development – Recap

- **Goal:**
  - to give hands-on experience with the modern human-centered design process described during the course
- Projects will be built **step-by-step** and mostly carried on *during* labs
- Project's topic proposed by each group
  - Within the chosen theme
  - Based on *needfinding*
- *Group assignments* represent the various process steps
  - Start during a lab
  - Are often followed by *checks* with teachers (in one of the following labs)
  - Evaluated at the exam through reports and discussion

(Planned) Assignments – Recap

- Assignment 1 [group]
  - *Needfinding*
- Assignment 2 [group]
  - *Storyboard and Low-fidelity prototype*
- Assignment 3 [individual]
  - *Heuristic evaluation on another group's low-fidelity prototype*
  - Results passed to the other group
- Assignment 4 [group]
  - *Medium-to-high fidelity prototype*
- Assignment 5 [group]
  - *High-fidelity prototype and usability evaluation*

Human-Centered Process vs. Assignments



Projects Completion Level (I)

- The realized final prototype *must* be a **high-fidelity interactive prototype**
  - in code, with any technology you like/know
  - not a final "product"
  - simulating a realistic experience on a specific device

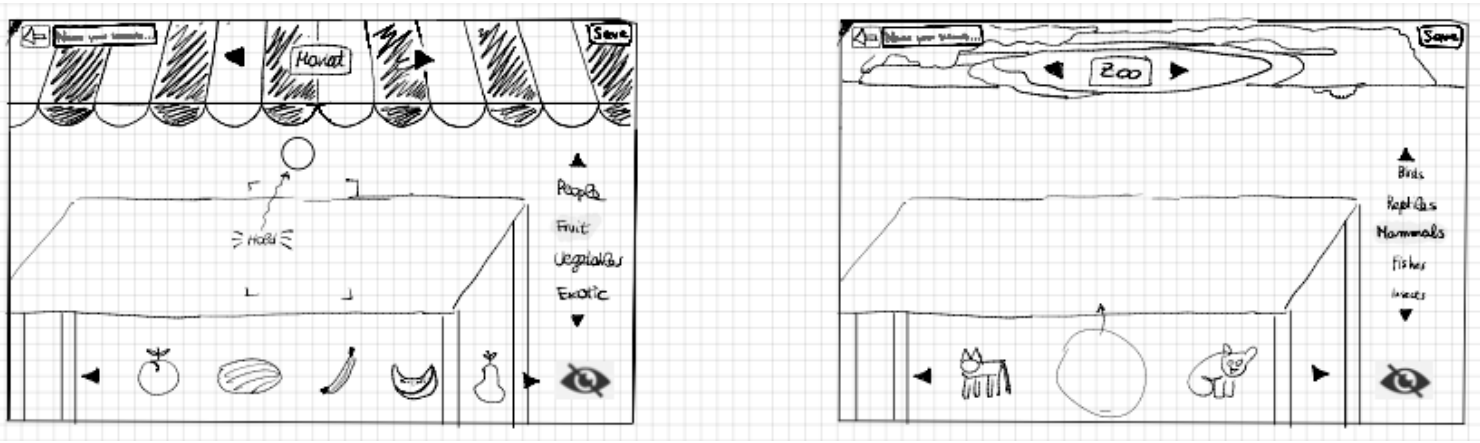
- For example, you can use web technology to built a prototype that *looks like* and *behave as* a mobile application

Projects Completion Level (II)

- The prototype will make some assumptions and won't implement standard or very complex features (even if technically important)
  - Which will be *faked*, *limited* in number, or *hard coded*
  - Your users will be already registered, signed in, and ready to "work" (no sign up, sign in, … mechanism)
  - Any particular behavior will work in a small number of pre-defined cases
  - …

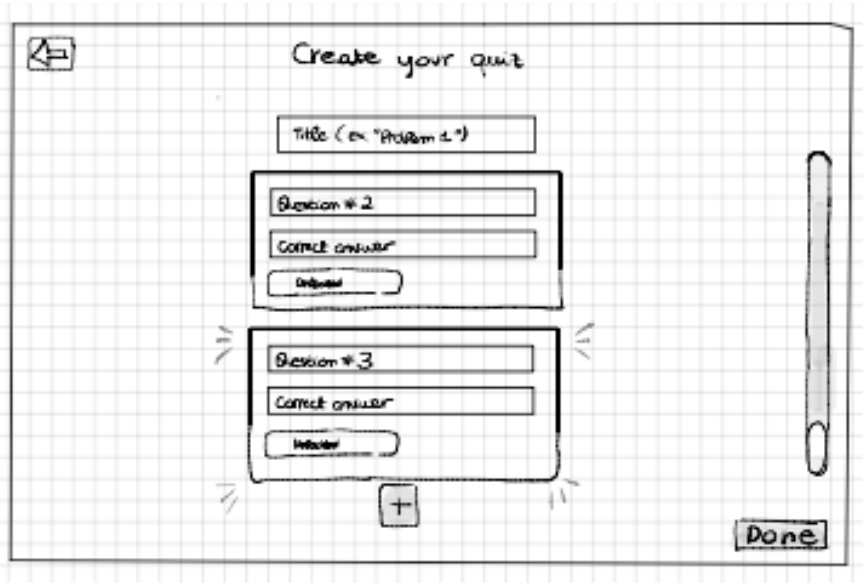
Example (2022) – Theme: ‘AR/VR for Education’

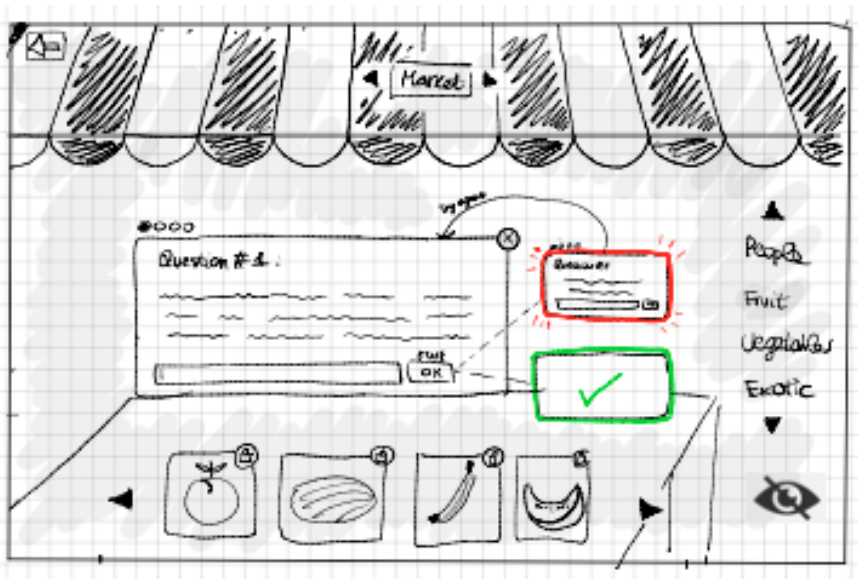
- Chosen domain: supporting elementary school teachers teaching math
- Picked solution (at the end of Assignment 1): “Allow teachers to create more engaging and better explaining scenarios to represent the [math] problem and the logic behind.”
- Excerpt from the 1st low-fi prototype:



Example (2022) – Theme: ‘AR/VR for Education’

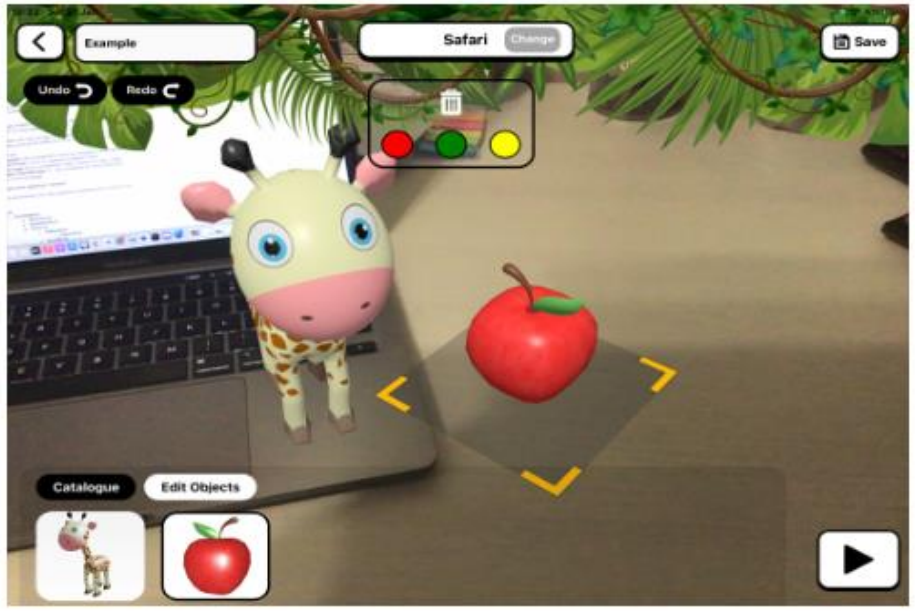
- Excerpt from the 2nd low-fi prototype:





Example (2022) – Theme: ‘AR/VR for Education’

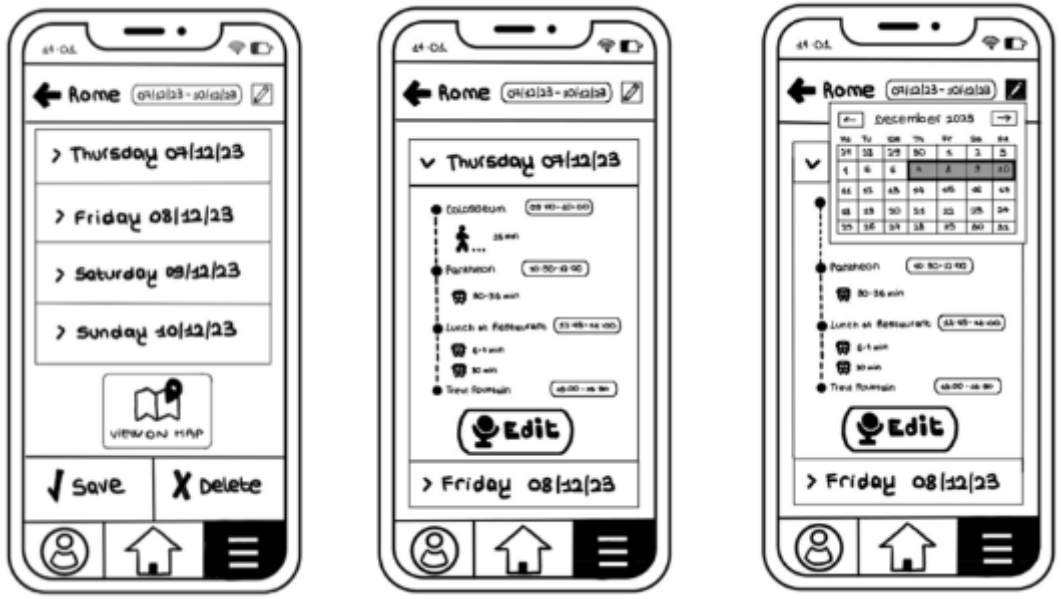
- Excerpts from the hi-fi prototype:



- Main limitations: no pitch-to-zoom, objects are put at the center of the scene, objects don’t respond to the law of physics, objects are hard-coded in a JS file.

Example (2023) – Theme: ‘Human-AI Interaction’

- Chosen domain: urban tourism (national and international)
- Picked solution (at the end of Assignment 1): “Survey to understand user preferences and create the itinerary accordingly”
- Excerpt from the 1st low-fi prototype:

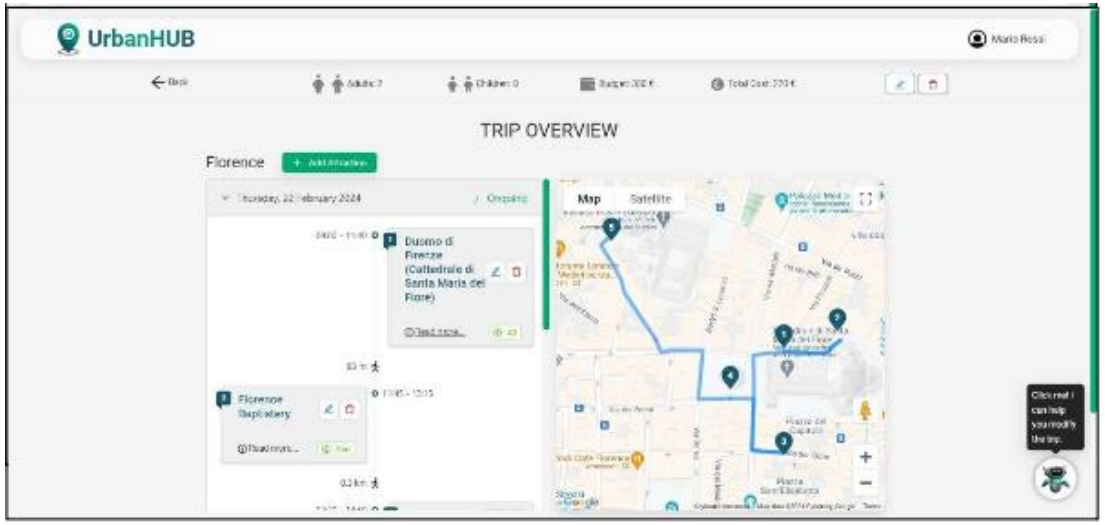


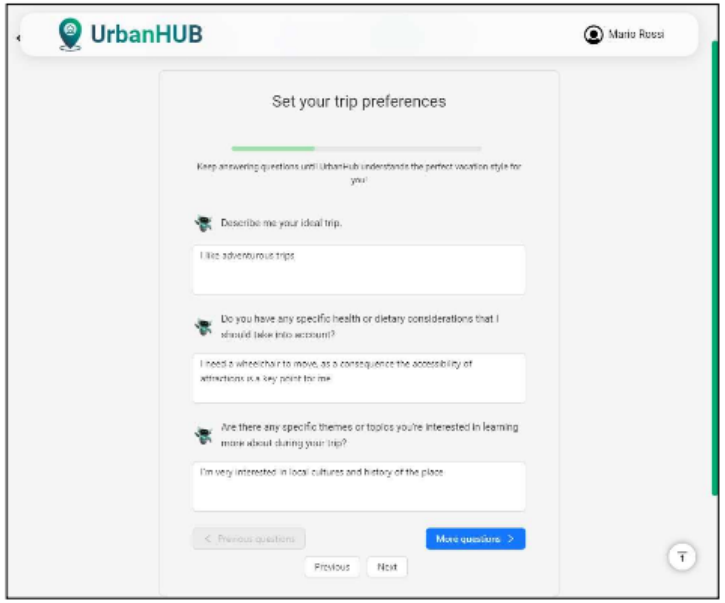
Example (2023) – Theme: ‘Human-AI Interaction’

- Excerpt from the 2nd low-fi prototype:

Example (2023) – Theme: ‘Human-AI Interaction’

- Excerpts from the hi-fi prototype:





- Main limitation: absence of a sophisticated AI driving the trip generation and reliance on a chatbot for edits. The chatbot is limited, as it only accepts a few specific input sentences for trip modifications, discarding other inputs.

This Year's Themes

Theme 1 – Health and Wellbeing

- **Teacher:** Alberto Monge Roffarello (alberto.monge@polito.it)
- **When:** Wednesday 13:00-14:30
- **Description:** Health and wellbeing are fundamental aspects of our daily existence. They encompass physical, mental, and emotional dimensions that can be significantly influenced by our interactions with technology. Within this theme, we will explore innovative ways to create applications and interfaces that empower individuals to lead healthier lives.

Theme 1: Perspectives

- In thinking at the theme, you can ask yourselves:
  - Which health or wellbeing related topics we want to explore?
  - For whom?
  - Are we able to reach out to these people?
- Creativity and originality are *criteria* for the evaluation!
  - Helping students attending a local gym on their own is less original/creative than supporting them in using their smartphones mindfully and effectively managing their digital habits

Theme 2 – Playful Exploration of the World

- **Teacher:** Luigi De Russis (luigi.derussis@polito.it)
- **When:** Wednesday 14:30-16:00
- **Description:** We are constantly "exploring the world": we visit new places, we move to a new city or country to study, we get around our neighbors, we discover new monuments or museums, etc. Within this theme, we will focus on better supporting people exploring a bit of their world in any scale and environment (building, city, park, country, …) by building playful applications for specific users.

Theme 2: Perspectives

- In thinking at the theme, you can ask yourselves:
  - Which aspects of "exploring the world" do we want to focus on? At which scale?
  - For whom? For which activities?
  - Are we able to reach out to these people?
- Playfulness (see later) needs to be included from Assignment 2, not before
  - Right now, just keep it in the back of your mind
- Creativity and originality are *criteria* for the evaluation!
  - Helping students exploring Politecnico alone is less original/creative than supporting visitors to navigate through the history of various monuments in the city

Games and Gamification (in brief)

- Three central elements to play and games:
  1. **Dynamics**. General elements that define the patterns of how the game and the players will evolve over some time. The most popular game dynamics are narrative (good and engaging storyline), progression, and relationship.
  2. **Mechanics**. Action that moves the game forward, things that "makes the game an exciting and engaging one" like challenges, discoveries, collecting items, and rewards.
  3. **Game components**. Specific features that represent the intended mechanics and dynamics, like points, badges, and leaderboard.
- *Gamification*: the application of certain game mechanics to provide extrinsic motivation by offering intangible rewards, without other dynamics, to create user engagement.

What About Playfulness?

- Playfulness: an attitude of mind
  - according to John Dewey, a philosopher
- Gamification and games are *manifestations* of playfulness, but they not always create a playful mindset or experience on their own
- Playfulness is more about *dynamics*, the spontaneous, creative experience, and less on mechanics (which can be still present)
  - E.g., it can be found in humor, roaming around in a virtual environment or periodic reflection challenges
  - It increase effectiveness, motivation, and creativity
- In this theme, we want our users to manifest this mindset as much as possible

Theme 3 – Education with AI

- **Teacher:** Tommaso Calò (tommaso.calo@polito.it)
- **When:** Wednesday 16:00-17:30
- **Description:** Education, either formal or informal, plays a pivotal role in many aspects of our life: you can learn at school, you can educate on how to better play sports, you can support your class' learning activities, etc. Within this theme, we will explore how we might create educational experiences for helping people learn or teach better, thanks to AI. The focus is on identifying and addressing challenges to foster more engaging, effective, and inclusive learning experiences.

Theme 3: Perspectives

- In thinking at the theme, you can ask yourselves:
  - Which kind of education and learning do we want to focus on? At which scale (class, school, individuals, …)? For formal or non-formal education?
  - For whom?
  - Are we able to reach out to these people?
- AI (see later) needs to be included from Assignment 2, <u>not</u> before
  - Right now, just keep it in the back of your mind
- Creativity and originality are *criteria* for the evaluation!
  - Helping university students to study with an intelligent chat is less original/creative than supporting high-school teachers co-creating in-class activities with AI

Human-AI Interaction vs Human-Computer Interaction?

- What is different when AI is in an interactive system?
- AI-based systems are typically performed under **uncertainty**
  - often producing false positives and false negatives
- Many AI components are inherently **inconsistent**
  - they may respond differently to the same text input over time (e.g., autocompletion systems suggesting different words after language model updates)
  - or behave differently from one user to the next (e.g., search engines returning different results due to personalization)

How Can We Design Interactivity with AI?

- In brief, case by case, feature by feature:
  - Decide when "to AI" and when "not to AI"
  - Understand when to automate (i.e., replace the user) and when to augment users' capabilities
  - Balance the uncertainty of AI systems with proper expectations and feedback
- In general, the more **critical** a functionality is, the more people *need* accurate and reliable results
- On the other hand, if a **complementary** feature delivers results that are not always of the highest quality, people *may* be more forgiving

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