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Innovative educational technologies and design for e-learning

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Innovative Educational Technologies for E-Learning

- Adopting innovative educational technologies in the framework of didactic models and strategies able to improve the quality of e-learning.

- Integrated approach: matching models, strategies, technologies and media design.

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[MODELS] EXPERIENTIAL LEARNING

OPEN LEARNING ENVIRONMENT (Hannafin, Land, Oliver)

Use of simulation environments that allow students to manipulate variables and view results in contexts with no risk.

- Visualization tools to facilitate exploration.
- Authentic contexts (connection between formal knowledge and everyday experience).
- Environments rich in resources to support the students' work.
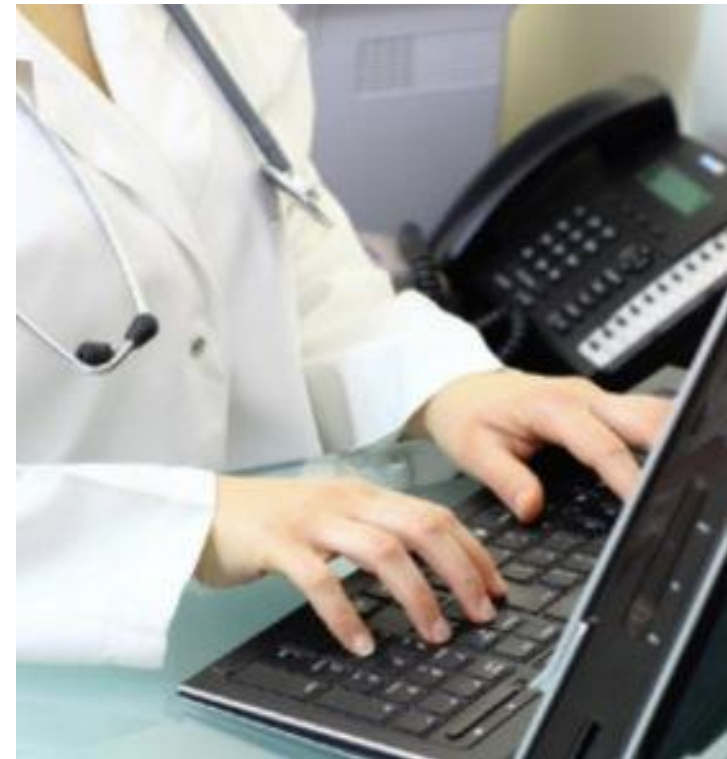
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[MODELS] EXPERIENTIAL LEARNING

GOAL BASED SCENARIO (Schank, Berman, Macpherson)

The learning objectives are placed in the context of a narrative that motivates students to learn.

- students practice skills and knowledge to achieve a goal.

- "learning by doing": to promote the development of skills in their context of use ("know how").
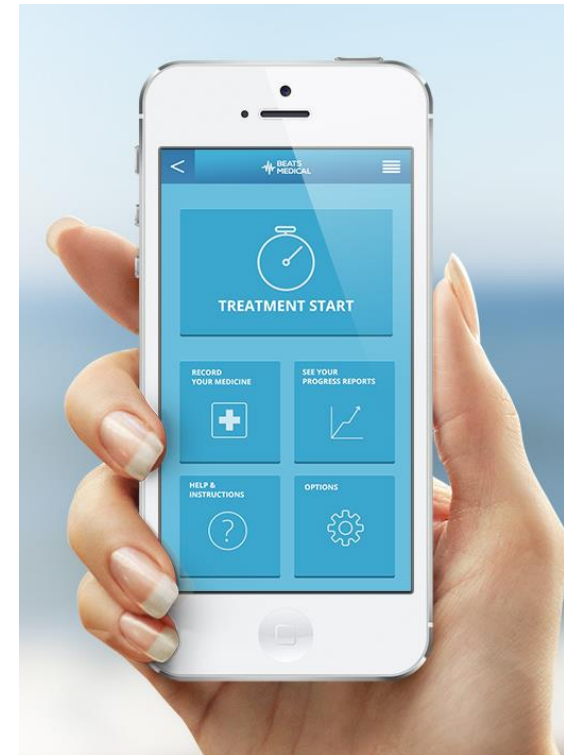
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[ARCHITECTURES] GUIDED DISCOVERY

- Problem-based approach, situated learning, use of experiential simulations, error analysis, coaching and experts models.

- Suitable to develop problem solving skills and promote the acquisition of skills in complex cognitive domains.

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[STRATEGIES] MODELING

Student observation and imitation of an exemplary performance executed by an expert.

Collins (1991) distinguishes between:

- Modeling of observable processes: the student is offered an example of the performance.

- Modeling of not observable cognitive processes: it shows the underlying reasoning.

DEMONSTRATION + EXPLANATION

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[STRATEGIES] CASE STUDY

To submit a problem/real situation plausible to the students to analyze

- formulate hypotheses

- to take the appropriate decisions.

Reynolds (1980):

- Case study oriented to the decision

- Case study oriented to the identification and analysis of problems

- Case histories

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[STRATEGIES] CASE STUDY

CASE STUDY ORIENTED TO DECISION

Decision or dilemma cases:

o   problems that need to be addressed

o   decisions to be taken by the protagonists of a story

The case consists in:

✓   Presentation of the problem and the protagonists.

✓   Background information.

✓   Narrative section: towards the crisis to be resolved.

✓   Appendices with tables, graphics and documents.

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[STRATEGIES] CASE STUDY

CASE STUDY ORIENTED TO THE IDENTIFICATION AND ANALYSIS OF PROBLEMS

Material is presented to participants

"What happened?"

"What's going on?"

Usually a central element is missing and participants are asked to analyze and evaluate the problems and weaknesses of the proposed case.
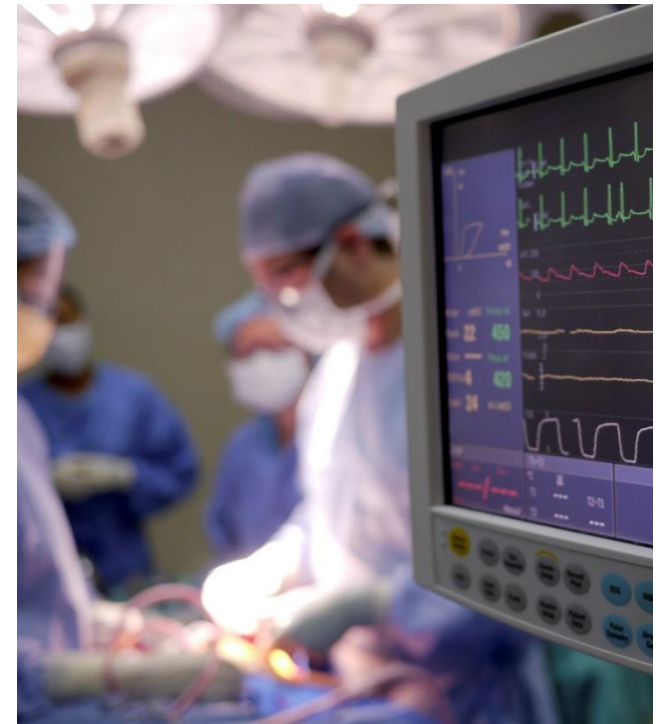
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[STRATEGIES] CASE STUDY

CASE HISTORIES

- Ended stories, positive identification, less interactive.

- Examples/models to refer to.

- Storytelling of events and scientific discoveries…

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[STRATEGIES] CASE STUDY

Goal: to generate SITUATED LEARNING. Scenarios have to be very similar to those that can be found in reality.

- LEARNING TO ANALYZE THE SCENARIO

- LEARNING HOW TO HANDLE SITUATIONS THAT WILL PROBABLY BE FACED IN REAL SETTINGS.

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[STRATEGIES] CASE STUDY

ONLINE CASE STUDY:

- Introduction and personal records
- Analysis of problematic points (i.e. multiple-choice questionnaire)
- Evaluation of hypothesis and choice (i.e. form provided with different solutions)
- Points of view comparison (recorded opinion of the characters involved);
- Meta-reflection (registered expert opinion)

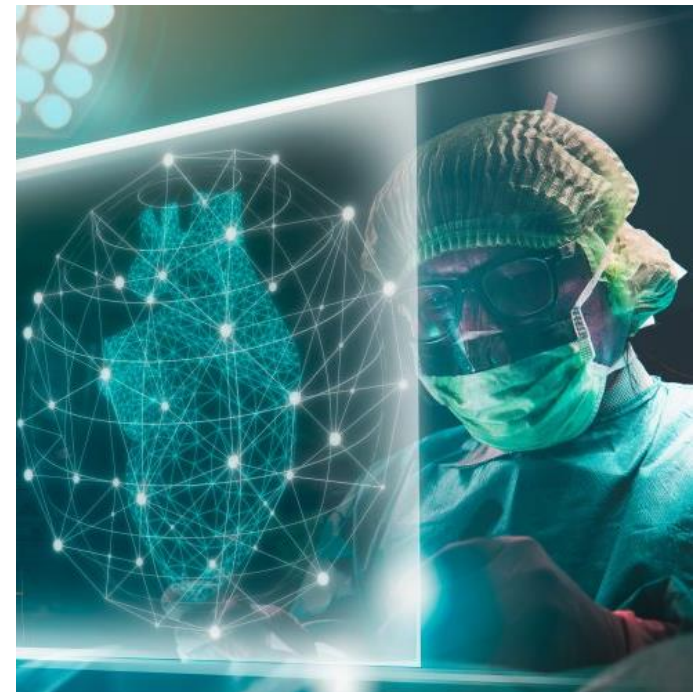# Innovative Educational Technologies for E-Learning

[STRATEGIES] SIMULATION

To reproduce, in protected situations, problems and events similar to those of the real world

Students work in a controlled environment and learn from the consequences of their actions.

Experiential learning:

- Experimentation

- Analysis

- Conceptualization.

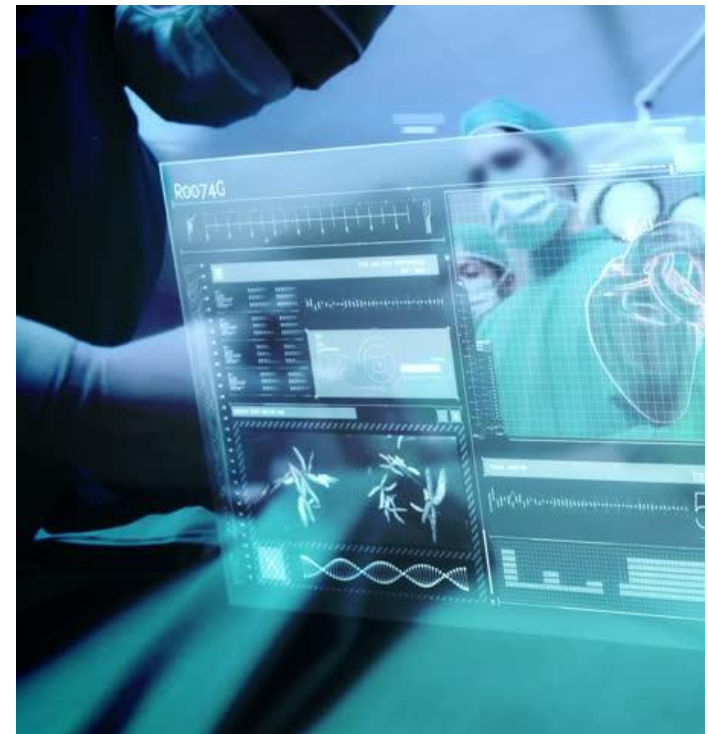# Innovative Educational Technologies for E-Learning

[STRATEGIES] SIMULATION

Experiential simulations

The student is

- placed in a simulated environment
- given a real task to be performed
- provided with a high level of control in decision-making.

Situated learning (by doing).

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- The framework:
  - e-learning based on
    - digital storytelling
      - re-create a narrative context online, to enhance learning process
    - multi-platform online media mix
      - Each medium does what it can do best

        (Video lessons, immersive explorations, social augmented game, online discussions)

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- Transmedia: digital storytelling which uses multiple media in a complementary and coordinated way to support an educational objective (Jenkins 2006, Scolari 2009)

Why transmedia education?

- – [motivation] diegetic – storycentered
- – [meaningful learning] social decoding
- – [media empowered] media mix based on learning objectives

Innovative Educational Technologies for E-Learning

- Gamification: game design in non-game contexts. A strategy to foster meaningful learning

- Why gamified education?
  - [motivation] playful / social (badges, charts, levels)
  - [meaningful learning] Simulations - learning in semiotic domains (J.P.Gee)
  - [media empowered] Serious game / augmented reality game

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Teaching and Learning Technologies:

- Competence pedagogy - *spontaneous mobilization of a set of resources in order to apprehend a situation and respond to it in a relevant way*

- SUSTAINABLE AND EASY TO DESIGN INNOVATIVE TECHNOLOGIES:

- IMMERSIVE VIDEO – 360
  - Case studies immersive analysis
  - Point of view simulations

- AUGMENTED REALITY
  - Cooperative augmentation of knowledge bases (cocreation of AR contents)
  - Multimedia mapping on physical supports

- The term transmedia can be described by four criteria:

1. Transmedia involves more than one medium, ranging from analogue and digital media or digital media only, which all support each other with their specific strengths;

("Cross-media", E-Content Report 8, by EU project ACTeN)

2. Transmedia aims at an integrated production.

("Cross-media", E-Content Report 8, by EU project ACTeN)

DIGITAL STORYTELLING / TRANSMEDIA

3. Transmedia content is delivered/accessible on a range of devices.

("Cross-media", E-Content Report 8, by EU project ACTeN)
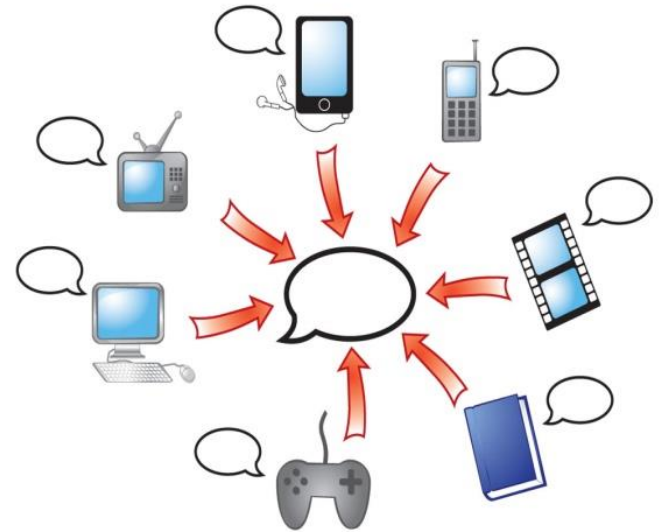
DIGITAL STORYTELLING / TRANSMEDIA

4. The use of more than one medium needs to support one theme.

("Cross-media", E-Content Report 8, by EU project ACTeN)

TRANSMEDIA EDUCATION

re-create a narrative context online

- THE BEGINNING OF THE STORY
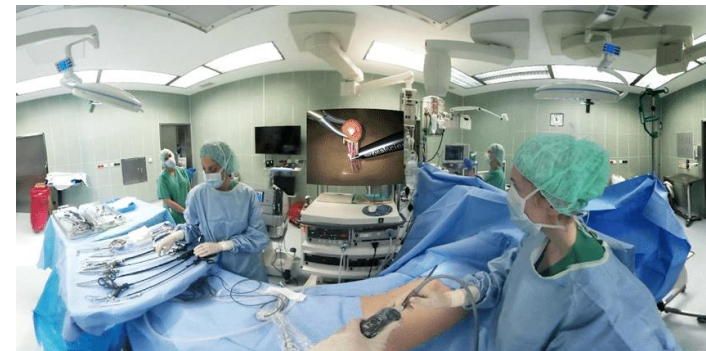- PLOT POINTS, TESTS, ALLIES
- BACK TO THE ORDINARY WORLD

DIGITAL STORYTELLING / TRANSMEDIA

TRANSMEDIA EDUCATION

- **THE BEGINNING OF THE STORY:**
  - IMMERSIVE VIDEO for NARRATIVE CASE STUDIES

 A story of a student in his/her first medical internship program, the first night at the emergency room

TRANSMEDIA EDUCATION

- **PLOT POINTS, TESTS, ALLIES:**
  - AUGMENTED REALITY TESTS for INTERACTIVE EVALUATION

    The story goes on: the notes taken by the protagonist of the story are provided to students: physical artifacts on paper. Notes can be explored through mobile phones: questions and tests pop-up – students have to decide what to do – multiple choices' tests.
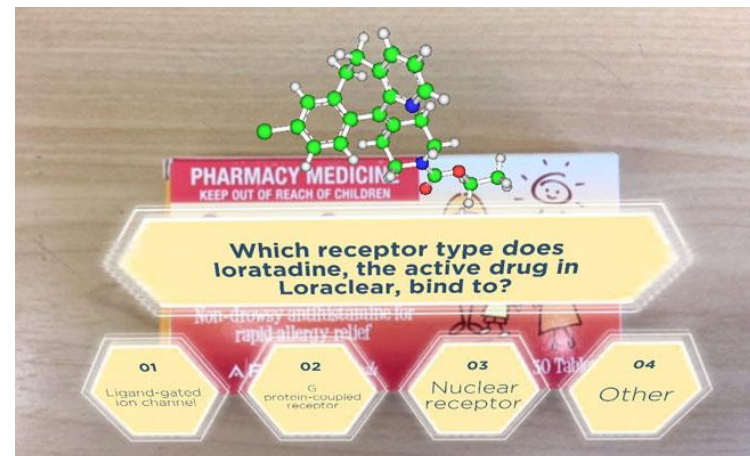
DIGITAL STORYTELLING / TRANSMEDIA

TRANSMEDIA EDUCATION

- **BACK TO THE ORDINARY WORLD**

WEB FORUM – DISCUSSIONS

The end of the story. Users meet at the cafeteria at the end of their night shift, talking and discussing about their experiences
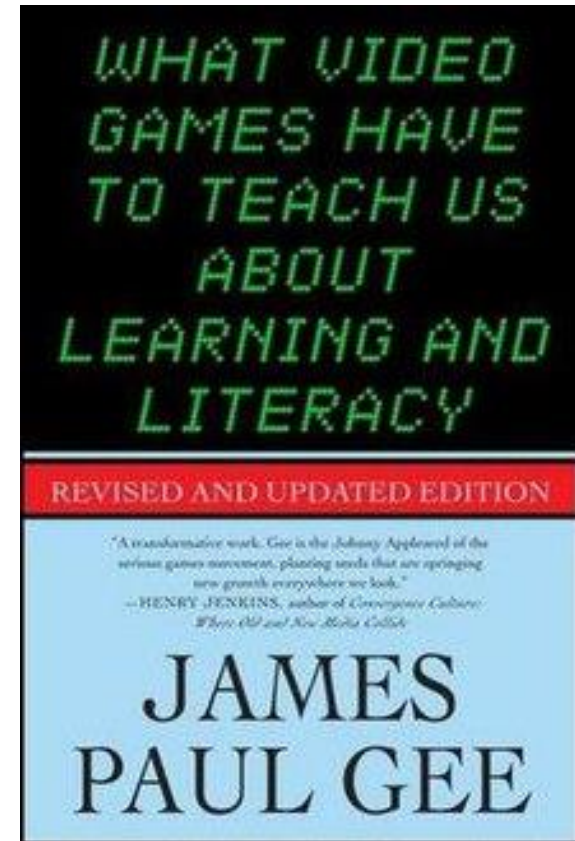
GAMIFICATION

James Paul Gee - What (Video)
Games Have to Teach Us
About Learning and Literacy

1. Learning and identity
2. Situated meaning and learning
3. Transfer of knowledge
4. Learning as a social activity

GAMIFICATION

LEARNING AND IDENTITY

Committed Learning Principle

Players project their real identity on their virtual identities: they are engaged and think as if they really were the protagonist of their game.

GAMIFICATION

SITUATED MEANING AND LEARNING

Practice Principle:

learners make practice in a context where they are engaged with the material, not bored by it.

"Regime of Competence" Principle:

the learner can function at the outer edge of his/her understanding to make concepts looking challenging, but not impossible.

Situated Meaning Principle:

all of the meanings of signs are situated, embodied in the learner's experiences.

GAMIFICATION

SITUATED MEANING AND LEARNING

Text / Material intelligence:

Texts are understood through experience. The environment holds information that a player can access through interaction.

Multimodal Principle:

Meaning is learned through multiple modalities besides words.

GAMIFICATION

TRANSFER OF KNOWLEDGE

Explicit Information On-Demand and Just-In-Time Principle: information is provided at crucial times to maximize proper responses.

Discovery Principle: the learner is told very little explicitly and is instead allowed to explore and discover on his/her own.

GAMIFICATION

LEARNING AS A SOCIAL ACTIVITY

Distributed Principle: texts, tools, people and technology are networked so that information is distributed among them.

Affinity Group Principle: learners form groups with shared identities, goals and practices.

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO
AUGMENTED REALITY

- Affordable
- Easy to design
- Experiential learning, guided discovery
- Modeling, case study, simulation
- Transmedia and gamification
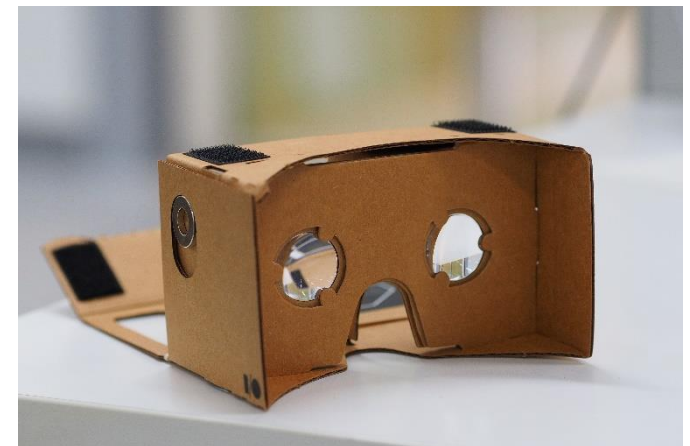 - (interaction / integrations with the real world)

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO

360-degree videos (immersive videos) are video recordings where a view in every direction is recorded at the same time.

They can be watched on VR viewers such as Google cardboard or Oculus Go.

The viewer has control of the viewing direction.

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO in education compared to traditional video and CGI VR

- Video: the frame and the editing limit the free exploration of a situation.

- CGI VR: the scenarios are not realistic as in 360-degree video, gaps between the virtual context and the real world.
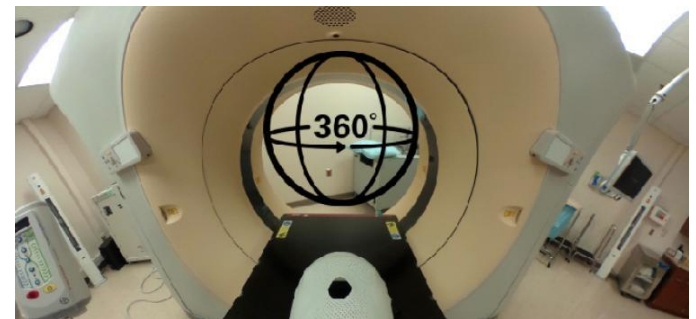
TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO

- **Immersive analysis of case studies**: the learner is immersed in a situation and can explore it freely with his eyes.

- Absence of traditional audiovisual language (shots and transitions) represents a formative opportunity: **exploration and identification of relevant elements is delegated to the competence of the learner.**

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO

- The 360 degree video favors a situated training: secondary factors can come into play and students have to decide what is relevant and what is not.

- Immersive competence assessment tests

- Heatmaps (what students are looking to)

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO. IMMERSIVE CASE STUDY: "Psychotherapeutic sessions"

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

360 IMMERSIVE VIDEO

- Medical training and training for caregivers: subjective point of view. To experience the point of view of a subject with a disability.

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

AUGMENTED REALITY

- A technique enabling to add digital information to a real scene.

- Devices that allow to see the real scene through a screen, on which multimedia elements are also shown, contextual to the real framed elements.
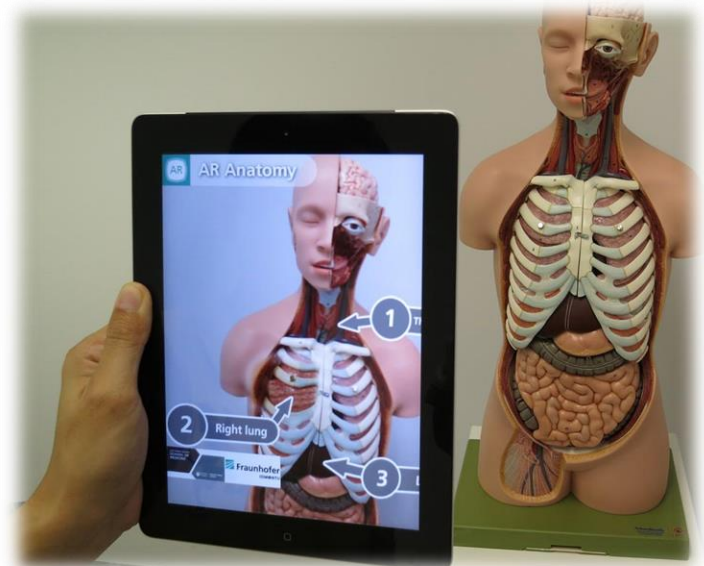
TECHNOLOGIES FOR EXPERIENTIAL LEARNING

AUGMENTED REALITY
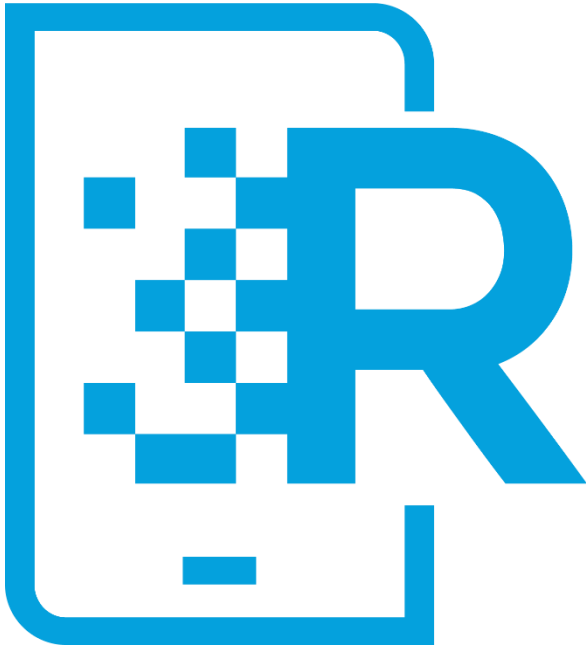
Educational opportunities:

- Adding multimedia to already available physical objects;

- Exploring physical objects using the tablet as a magnifying glass;

- Social fruition (AR versus VR);

- Collaborative creation of "augmented" objects.

TECHNOLOGIES FOR EXPERIENTIAL LEARNING

AUGMENTED REALITY. Augmenting courses.

Download the HP REVEAL app on your smartphone and create an account → follow the Unimarconi channel →
frame the pictures with your smartphone and look at the multimedia contents associated with the pictures

Thank you!

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