

Intelligent User Experience Engineering

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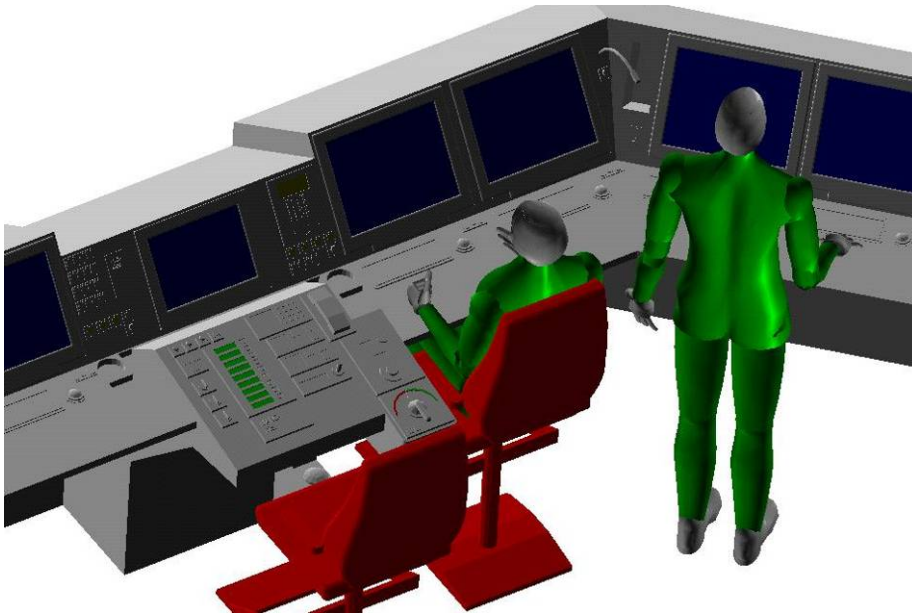


TNO Human Factors, Soesterberg



Research topics in Human Factors

- Human Interfaces
- Human in Command
- Human Performance
- Training and Instruction



Domains

- Defence
- Security and Safety
- Transport
- ICT
- Care

IUXE Course

UX: User Experience?

- Rational and emotional aspects of HCI

E: Engineering?

- Theories, models and methods for design and evaluation.

I: Intelligent?

- Attuning the interaction to person, tasks and contexts.

Application Domains?

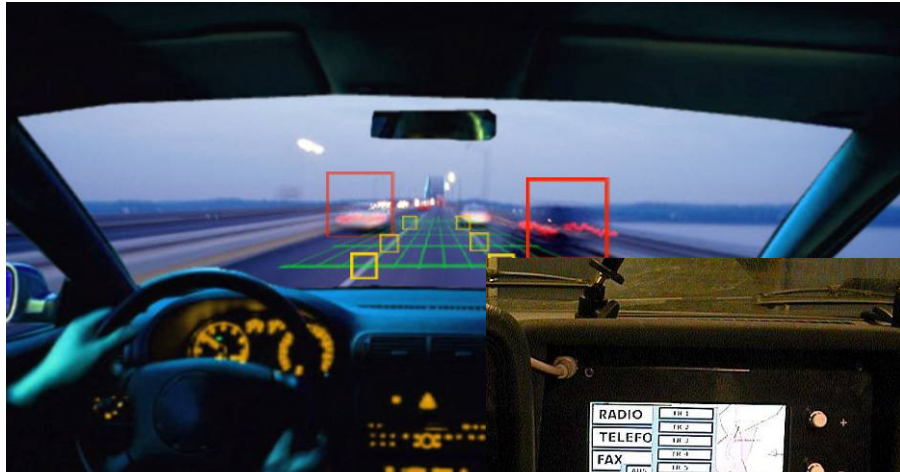
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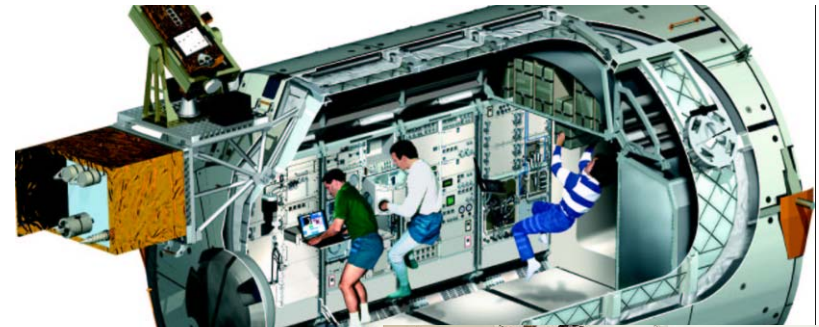
Home



Street



Car



Space

Interactive “Lectures” (2x7=14)

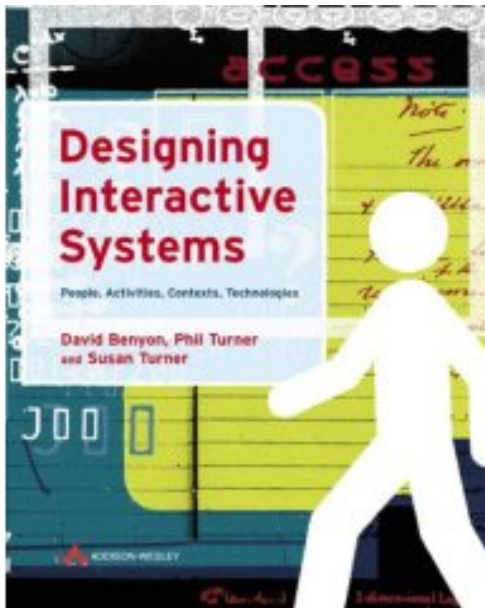
- “Face-to-face lecture”:
 - Papers (and reference book)
 - Example research projects
- Presentations of students’ project work (“milestones”)
- Visit TNO-lab

Reference Book

“Designing Interactive Systems”

People, Activities, Contexts, Technologies

David Benyon, Phil Turner & Susan Turner



- Rather complete overview of HCI research area
- Different perspectives on HCI
- Both introductory and more advanced content

Project: IVA for Health of Older Adults

- Groups of 4 persons: design and test
- Setting:
 - Intelligent Virtual Agent (IVA) as a kind of health coach
 - Improving the fitness of older adults
 - Rich, interactive dialogue (instruction, feedback, ...)
- Vizard is available:
 - Virtual Reality Toolkit for interactive 3D environment.
 - At EWI computers with predefined avatars & avatar animations.
 - Python as scripting language.
- Prototype should allow for human-in-the-loop evaluations (but simulation and 'Wizard of Oz' techniques can be used).

So, We Need Student Groups!

- Names, student numbers, email addresses, small (passport) photo
- Interim, joint results will be presented. Each student has to do one, jointly prepared, presentation:
 1. Paper
 2. Poster
 3. Prototype
 4. Pilot
 5. Final presentation

Introduction

User-centered...

Who are the users?



What would they do?



What is the context?



Which technologies
can support them?

Introduction

Designing *interactive systems*

- is more than just designing the input, output and content
- It is about designing the whole human-computer interaction
- It is about designing the human-human interaction that is often enabled *through* devices
- It is about designing whole environments of interlinked devices and objects
- It is about *human-machine collaboration*

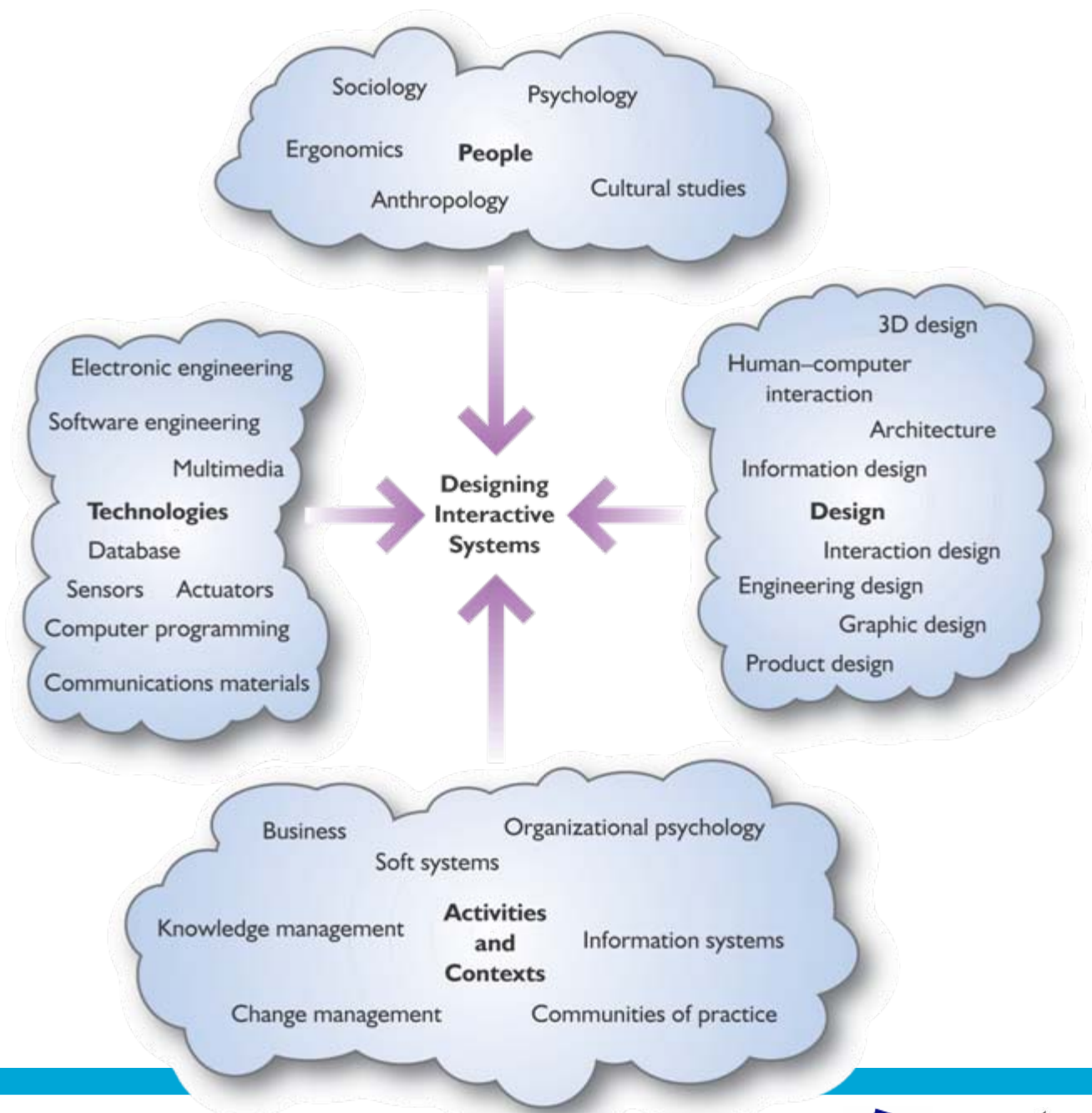
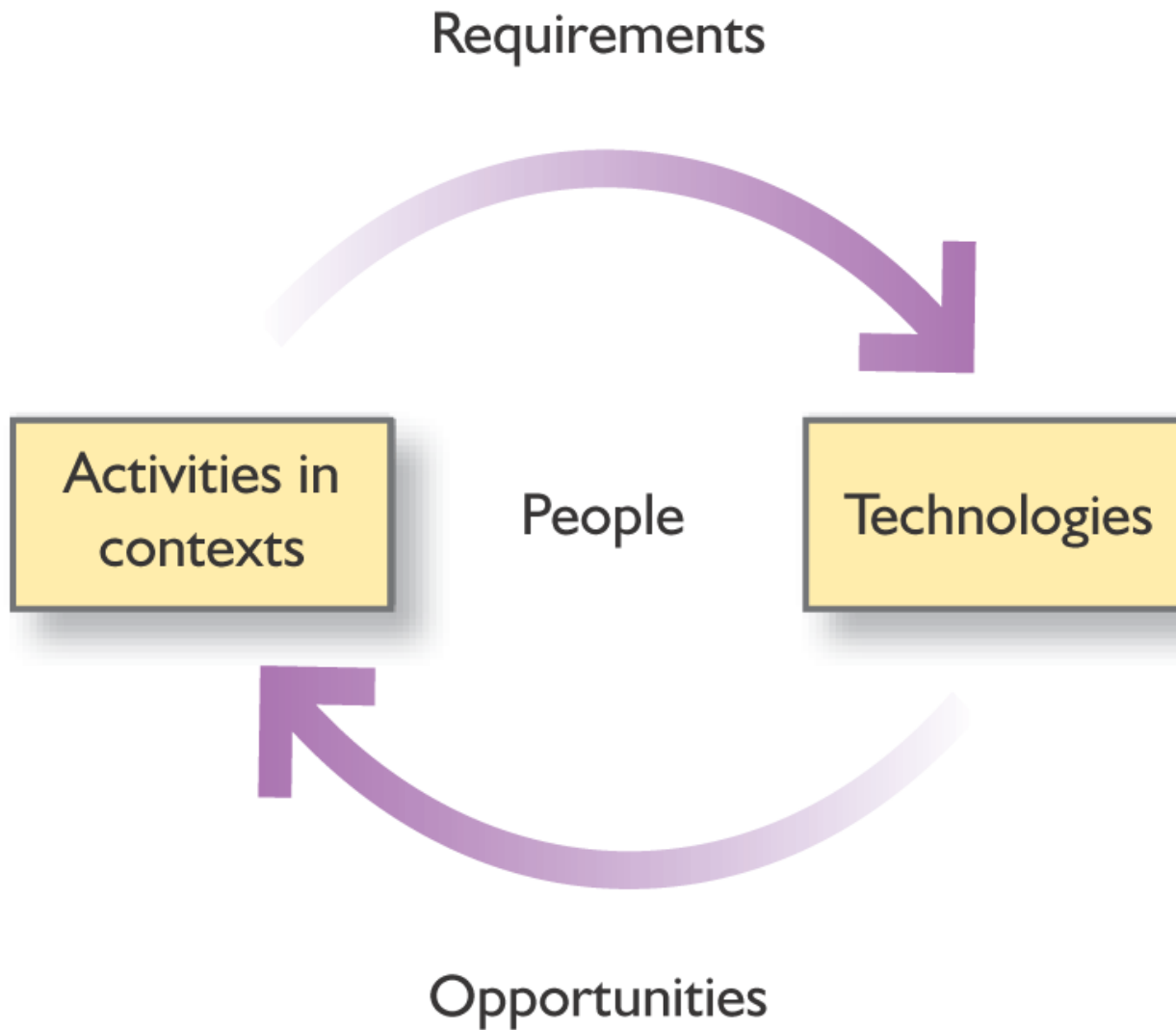


Figure 1.9 Disciplines contributing to interactive systems design



PACT

- People
- Activities
- Contexts
- Technologies

Figure 2.1 Activities and technologies.

Source: after Carroll (2002), Figure 3.1, p. 68.

Dynamics of PACT elements: Accessibility and Personalization

People

- Physical
- Psychological
- Usages

Activities

- Temporal aspects
- Co-operation & Complexity
- Safety critical
- Content

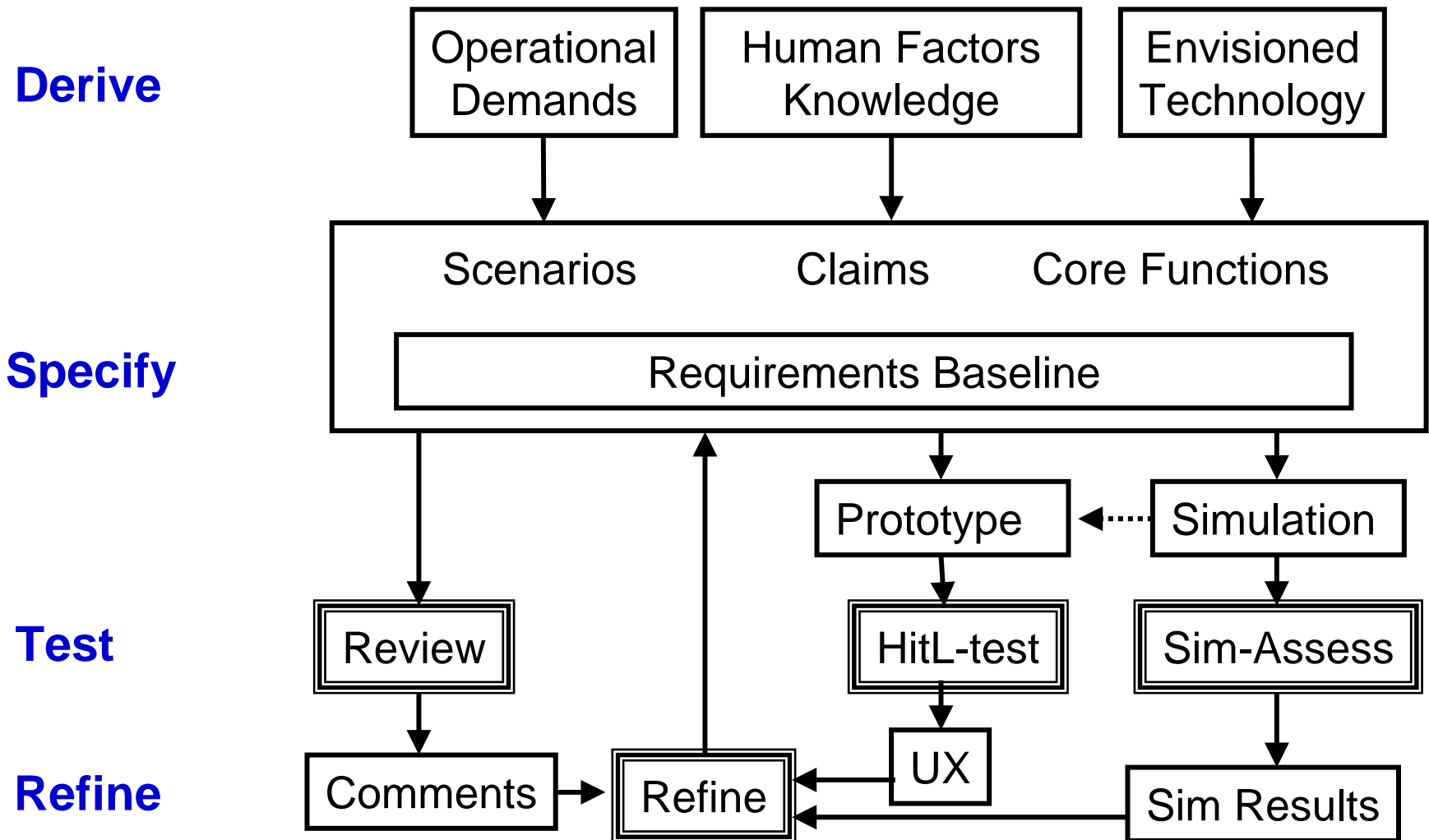
Context

- Physical
- Social
- Organizational

Technologies

- Hard/ software to consider
- Input
- Output
- Communication
- Content

Situated Cognitive Engineering



Situated Cognitive Theories...

- ...help to establish sound support systems by accounting adequately for how context and actions are coupled and mutually dependent.
- ...apply to the specific domain or environmental description that is part of it.
- ...include accepted features of cognition such as limited processing capacity, are validated in the context of a specific domain and possibly group of task performers, and provide predictions of the task performance within this domain.

Theories for Project: Paper presentation

Papers on Blackboard:

- Politeness
- Engagement
- Persuasion
- Long-term usage
- Elderly and avatars
- Non-verbal communication

Project milestones

3rd Quarter

1. Paper presentation
2. Poster of concept
3. Presentation of 1st version of prototype & test plan

4th Quarter

4. Short presentation of pilot-test results
5. Final report (*continuous activity!*)
6. Final presentation

Final Report

A concise and coherent description of the design and evaluation results:

- Summary
- Introduction
- Design
 - Work Domain and Support analysis
 - Design rationale and (high-level) requirements
 - Prototype
- Evaluation
 - Method
 - Results
 - Conclusions
- General discussion
- References

Doing a first analysis

- Identify the range of PACT elements in a domain
- *And identify relevant theories!*
- Write up as *scenarios*
 - Scenarios are stories about people undertaking activities using technologies in contexts
- Include *Personas*
 - A persona is a profile of an archetypical person in the domain
 - Personas are synthesized from knowledge of real people in the domain
 - Personas need to have goals
 - Like scenarios, personas are abstract types - students, lecturers, etc.
 - For design it is best to develop a few concrete personas who have (hard) characteristics such as age, interests, a name, etc.
 - Try to bring the character alive - perhaps include a picture or two

IUXE process

- The process of design is highly iterative
- Designers move rapidly between
 - Requirements, design, evaluation, prototyping & envisioning
- Specify the design rationale
- Evaluation is central to the process
- Prototyping and envisioning ideas is crucial to understanding requirements and design ideas (e.g., to get user feedback)

UX Design & Test

- Performance & knowledge
 - Effectiveness
 - Efficiency
 - Situation awareness
 - Learning
- Judgment & feelings
 - Satisfaction
 - Trust
 - Emotion



Experience Design Lessons from Gaming

- Identity (e.g., avatar)
- Adaptivity (e.g., levels)
- Narrative (e.g., hide information)
- Immersion (e.g., vision and sound)
- Flow (e.g., gentle shifts between scenes)

Do not forget “classical” principles for human-centred design

1. Visibility
2. Consistency
3. Familiarity
4. Affordance
5. Navigation
6. Control
7. Feedback
8. Recovery
9. Constraints
10. Flexibility
11. Style
12. Conviviality (“polite software”)

So, good IUXE?

- Consider accessibility issues
- Identify PACT elements and relevant theories
- Make use of “best practices” & state-of-the-art, multi-disciplinary HCI knowledge
- Define user experience (UX) parameters
- Perform a systematic, iterative process of design-test-refine..., showing which UX *claims* prove to be correct

Literature

Current Lecture:

- Neerincx, M.A. Bos, A., Olmedo-Soler, A. Brauer, U. Breebaart, L., Smets, N., Lindenberg, J., Grant, T., Wolff, M. (2008). The Mission Execution Crew Assistant: Improving Human-Machine Team Resilience for Long Duration Missions. *Proceedings of the 59th International Astronautical Congress (IAC2008)*. Paris, France: IAF. DVD: ISSN 1995-6258.

Next Lecture:

- Rosson, M.B. and Carroll, J.M. (2002). Scenario-Based Design. In: J. Jacko & A. Sears (Eds.), *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*. Chapter 53, pp. 1032-1050. Lawrence Erlbaum Associates.