Designing sustainable interactive technologies for smart learning environments

Modestos Stavrakis
Lecturer in Interaction Design
University of the Aegean - School of Engineering
Sustainable Future
Interactivity

Information

Knowledge
Learning & Interactive Technologies

Sustainable Interaction Design
Learning

Learning is a process of knowledge internalisation based on meaning production and the development of new skills that can be expressed in terms of self-organisation and be presented and evaluated by the actor’s performance and behaviour.
Types of Education

formal
non-formal
informal
Knowledge society

Social Development → Social Connections

Education becomes the ground for the development of social order

- Adapt to multiple Contexts
- Live with Complexity
- Adopt Responsible Innovation
Types of Knowledge

Representational

Descriptive

Operational
Knowledge & Software

Information Processing & Knowledge

Knowledge - Knowledge Representation

Software is a form of:

‘operational knowledge representation’

Often badly designed, with defects both in processing data and in user interaction
What if, **Software** is conceived as **Art**
The three-schema approach

Or the Three Schema Concept, in software and system engineering:

- External schemas are representing user
- Conceptual schemas integrate external schemas in a logical structure
- Internal schemas define physical storage structures for knowledge and data.
Learning has changed
Education is changing
Technology can be a way of connecting Informal and Formal learning
Technology Enhanced Learning

ICT → Teaching and Learning

Pedagogies are becoming Dynamic
TEL Tools and Platforms

- Massive Open Online Courses (MOOC)
- Learning Management Systems (LMS)
- Virtual Environments
- Physical Computing
- Interactive Technologies (e.g. whiteboards)
- Games (Serious)
The process of designing
Sensory Design (visual, audible, tangible)

Information, Interface Navigation Design

Interaction Design & Information Architecture

Requirements

Objectives & User Needs
User Experience (UX)
“Design Experiences”
User experience

Design
"Interaction Design (IxD) defines the structure and behavior of interactive systems. Interaction Designers strive to create meaningful relationships between people and the products and services that they use, from computers to mobile devices to appliances and beyond."

(IxDA: ixda.org)
Usability & Technology Enhanced Learning
Interaction

Before

During

After

Learning

Usability
Sustainability

Products → Services

Experiences → Sustainable development
Sustainable Interaction Design
Designerly perspective
Values
Renovation and / or Reuse

Products and services should be pleasant and meaningful

Human Values → Meaning production → Long term use

Human Values → Prioritisation → Achieve Goals
Focus on Values

Problem of Usability → Does not consider values

- Great Usability but not ethical
- Great Usability but Socially Rejected
- Privacy
- Data Manipulation and Safety
- Societal Values
- Ecological values
- Cultural Values
Focus on Values

- Contextual Values
  - Society e.g. equality, justice etc
  - Era, Period, Time
  - Physical Environment
  - Organisation
  - Politics and Economy
  - Science, Philosophy, Religion
Sustainable Interaction Design in Education
Conclusions

- Sustainability informed Interaction Design is not only about Environmental Sustainability
- Sustainability values shared in design teams
- Identify stakeholders
- Methods used (e.g. persuasive technologies)
- Evaluation (long term projects, too broad)
Contact

modestos@aegean.gr
www.syros.aegean.gr/users/modestos