
User Experience Design for Pervasive Computing

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Overview

- About experience
- About User Experience Design
- From usability to experience
- Conclusions

Experience definition (Merriam-Webster dictionary)

- **direct observation** of, or **participation** in events as a basis of knowledge
- the fact or state of having been affected by or **gained knowledge** through direct observation or participation
- practical knowledge, skill, or practice derived from direct observation of or participation in **events** or in a **particular activity**
- the act or process of **directly perceiving** events or reality

Experience in Philosophy

*“the nature of human experience is based
in **engaged participation in the world**”*

(Martin Heidegger, 1889 -1976)

- we learn the basic physical laws by experience
- we act on the features of the physical world by experience (affordances)
- we use “networked” senses to interpret of the context

Experience in Education

- The value of the experience is to be judged by the effect that experience has on the **individual's present, their future**, and the extent to which the individual is able to **contribute to society**.

(John Dewey, 1938)

- **Cognitive development** is facilitated by providing activities or situations that engage learners and require adaptation (i.e., assimilation and accomodation).

Use teaching methods that **actively involve students and present challenges**.

(Piaget, J. & Inhelder, B. 1969).

Experience in Education

- **Experiential learning** addresses the needs and wants of the learner.
Qualities of experiential learning:
 - personal involvement;
 - learner-initiated;
 - evaluated by learner;
 - pervasive effects on learner.
- experiential learning is equivalent to personal change and growth

(Rogers, C.R. 1969)

Characteristics of Experience

- **'flow'**, a state of deep focus that occurs when people engage in challenging tasks that demand intense concentration and commitment.
- Flow occurs when a person's skill level is perfectly balanced to **the challenge level of a task** that has clear **goals** and provides immediate **feedback**

(Mr. Csikszentmihalyi, 1990)

Characteristics of Experience

- Personal Involvement
- Holistic engagement with a product across a span of time
- Evolution (cognitive, emotional, cultural, skills)
- Subjectivity, implies values

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Experience in Design

- Experience Design is an approach to creating successful experiences for people in any medium. This approach includes consideration and design
 - in all 3 **spatial** dimensions,
 - over **time**,
 - all 5 common **senses**,
 - and **interactivity**, as well as customer value, personal meaning, and emotional context

(Nathan Shedroff, 2000)

User Experience Design

- The **rational and emotional interaction** with an artifact in a given context of use that allows human beings to acquire knowledge and changes the way they think in/about that context.
- Designing for experience is not only about creating usable, useful and desirable products but it is about changing the way people perceive reality and relate to it. To **change their mental models**.

User Experience Design

- It is focused on the **interaction** between **people** and **products** and the experience that results.
- It includes all aspects of experiencing a product:
 - Physical
 - Sensual
 - Cognitive
 - Emotional
 - Aesthetic

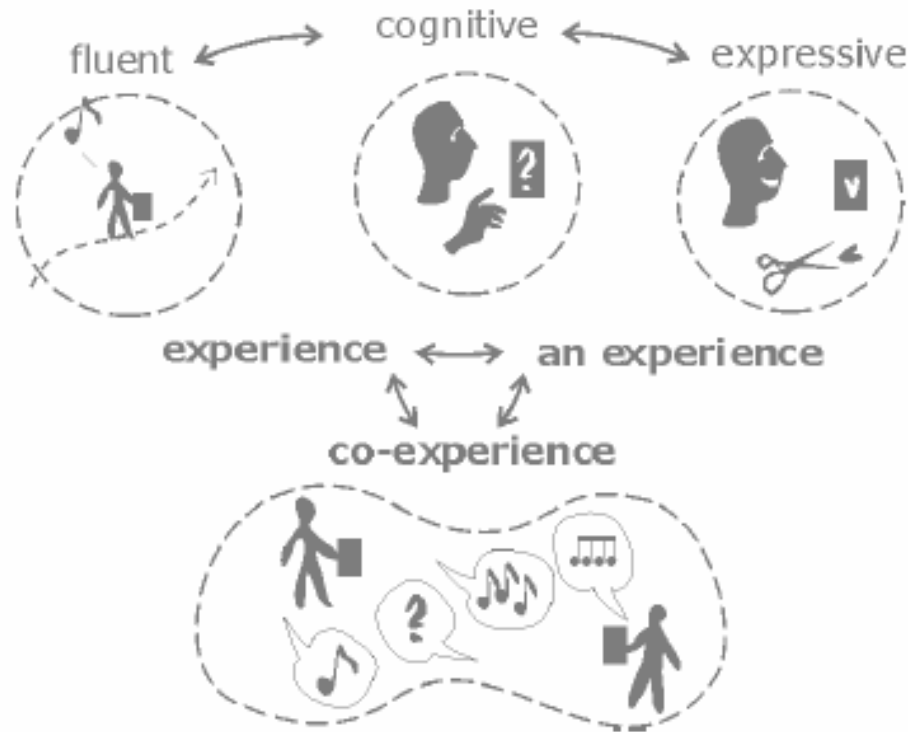
(Jodi Forlizzi, 2004)

Framework of interaction and experiences

Types of User-Product Interactions	Description	Example
Fluent	Automatic and skilled interactions with products	<ul style="list-style-type: none">• riding a bicycle• making the morning coffee• checking the calendar by glancing at the PDA
Cognitive	Interactions that focus on the product at hand; result in knowledge or confusion and error	<ul style="list-style-type: none">• trying to identify the flushing mechanism of a toilet in a foreign country• using online algebra tutor to solve a math problem
Expressive	Interactions that help the user form a relationship to the product	<ul style="list-style-type: none">• restoring a chair and painting it a different color• setting background images for mobile phones• creating workarounds in complex software
Types of Experience	Description	Example
Experience	Constant stream of “self-talk” that happens when we interact with products	<ul style="list-style-type: none">• walking in a park• doing light housekeeping• using instant messaging systems
An Experience	Can be articulated or named; has a beginning and end; inspires behavioral and emotional change	<ul style="list-style-type: none">• going on a roller coaster ride• watching a movie• discovering an online community of interest
Co-Experience	Creating meaning and emotion together through product use	<ul style="list-style-type: none">• interacting with others with a museum exhibit• commenting on a friend’s remodeled kitchen• playing a mobile messaging game with friends

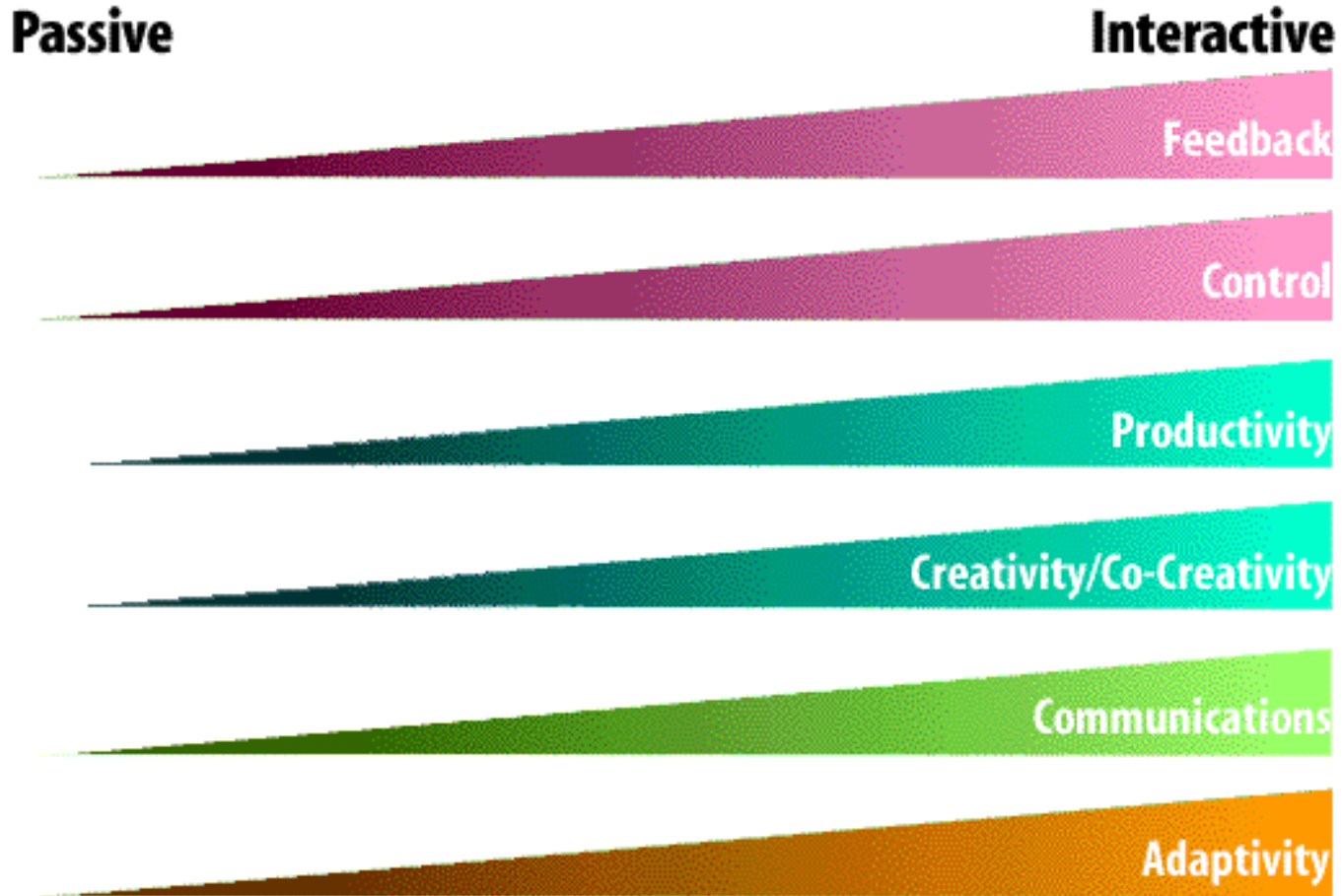
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Framework of interaction and experiences



(Jodi Forlizzi, 2004)

Attributes of interactivity



(Nathan Shedroff, 2000)

Criteria for Effective Experience Design

- Understanding of users
- Manageable
- Learnable, usable
- Needed
- Mutable
- Effective Design Process
- Appropriate
- Aesthetic experience

(Alben 1994, assessing criteria for qualities of experience, in an ACM Design contest)

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What is different in pervasive experiences?

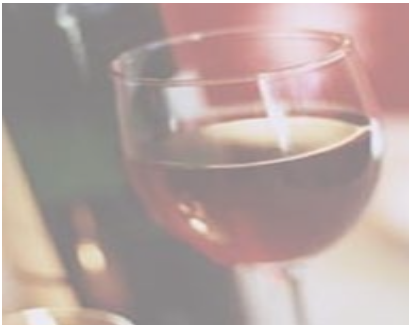


- From localized to distributed computing, from task to activities
- No clear beginning or end, fluid evolution
- Continuous interaction, intermittent activities
- Multiple activities concurrently operating
- Information reusable from different perspectives.

Broader usage scenarios

- Wide context
 - more than merely the task at hand
- Wide timeline
 - to account for a wider context
- Wider scope
 - the entire experience
- Opportunities for psychographic events

Emerging Challenges: technological experiences vs real-world experiences



- How can technology augment the human everyday life experiences, and/or create new ones beyond the traditional experiences that we associate with human-computer interaction?
- How can experiences with pervasive technology be assessed?

A more holistic approach

- „look at the forest, not at the tree“
- know what makes a good experience
- "know your users" in a very specific context
 - the needs and expectations of future users
 - the human factors and the personality
 - the emotional, cognitive, social state
 - the behavior
 - user's limitations
 - the technologies involved
 - the environment in which the interaction takes place

Usability definition

- **Usability** is the effectiveness, efficiency, and satisfaction with which specified users achieve specified goals in particular environments.

(ISO 9241-11, Ergonomic requirements for office work with visual display, Guidance on the specification and measures)

- **Usability engineering** involves specifying quantifiable measures of product performance documenting them in a usability specification and assessing the product against them

Usability goals

- Effectiveness
- Efficiency
- Safety
- Utility
- Learnability
- Memorability

User experience goals

- Fun
- Enjoyable
- Entertaining
- Helpful
- Motivating
- Rewarding
- Engaging
- Supporting creativity

Design for openness vs efficiency

- From problem solving to opening possibilities
- Users as creative actors
- Engage with people as inspiration
- Address persistent human values and emotions

The role of designers

- skilled theatre play-writers/directors who write the plot and "design" everything that is needed for the piece to take place but know they cannot control what the actors will really say or do on stage.

Interacting with the virtual world in the physical world: is it new?

- Rituals, creative and symbolic activities in the physical world affect the virtual world
- Design needs to invoke and create an environment that connects on an emotional or value level
- Designing interfaces for computer experiences we can rely on a wealth of knowledge, history, and meaning to draw on for inspiration, technique, and process

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Summary

- Definitions of experiences and its features
- Relationship between experience and interaction
- Challenges and possibilities raised by pervasive technology
- Shift of perspective, from efficiency to openness

Opens issues

- Design for social experiences in time and space
- Subjectivity of experiences: assessment issues
- Need for a culture of inetradisciplinary collaboration
- Need for methods of inquiry of user needs
- Need for frameworks of evaluation

Thank you

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