User-centered Product Definition

Siemens Audiological Engineering Group
Siemens Medical Solutions

Nina Sandweg
User Interface Design
Product Management
SAT APM
Siemens Audiological Engineering Group
Hearing Impairment 2005

500 million hearing impaired individuals worldwide

15 million in Germany

3.5 million Germans are wearing hearing instruments

January 26th, 2006
Nina Sandweg
Siemens Hearing Solutions
Hearing Instruments World Market 2005

About 6.5 mio. Pieces

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Global Player

Worldwide Presence and Strategic Alliances

- Siemens Audiologische Technik
  - Headquarter

- SHI USA
  - Competence Center
  - In-the-Ear Hearing Instruments

- SMI Singapore
  - Competence Center
  - Behind-the-Ear Hearing Instruments
Global Player

Worldwide Presence and Strategic Alliances

Siemens Audiologische Technik, D
Audio Service, D
AudioSAT, PL
Siemens Audiologická Technika, CZ
SHI, J
Rexton, R.C.
SMI, SGP
SMI, R.I.
SMI, IND
SMI, NZ
SHI, AUS
SHI, RSA
SHI, USA
Rexton, USA
SHI, CDN
Siemens Audiologie Techniek, NL
Siemens Audiologie, F
Siemens Audiologie, CH

SHI = Siemens Hearing Instruments
SMI = Siemens Medical Instruments
Understanding Our Users

How do we find out what our users want?
Product Development Process at Siemens MED

Ideas → Product definition → Product development → Support

Market Requirement Specification → Acceptance Test

Requirement Specification → System Test

Design Specification → Integration Test

Module Implementation → Module Test
Understanding our users

User requirements describe the users’ perspective / expectations on the product:

- features and attributes a product should have and
- how the product should perform.

How can user requirements be gathered and analyzed?
How can user requirements be validated?
User Requirements Analysis

“Our users don’t know what they want!”

- User requirements analysis is not about asking users what system they want

- User requirements analysis is about understanding users' current practices and problems they encounter
UCD in Product Definition

- Context of use Analysis
- Design & Prototype
- Usability Evaluation
- User Interface Specification

MRS: Market Requirement Specification
SRS: Software Requirement Specification
SDS UI: Software Design Specification User Interface
Project example: iScan

- 3D Scanner for digitizing ear impressions
- Transferring 1st production step from the manufacturer to the hearing care professional
- Enabling electronic ordering of In-the-Ear Instruments
User Centered Design

Analysis
Context of use:
- users
- tasks
- physical and social environment

Concept
features, interaction, visual appearance

Evaluation
gather user feedback

Prototyping
product mock-ups to make concept visible and tangible
Applied Approach

International Analysis
interviews, focus groups in key markets (Germany, USA)
best practice (3D software)

Evaluation
2 rounds of user testing sessions in Germany and USA

Concept
initial concept
continuous concept refinement based on user feedback

Prototyping
highly interactive prototype
The use concept

Method
- Focus groups and face-to-face interviews in Germany and the United States

Users
- Hearing Care Professionals
- Craftsman’s skills for cutting the ear impression
  - influence on shell quality
- No experience concerning electronic manipulation of 3D data

Task analysis
- part of ordering process
- Marking and annotating the ear impression
- Sometimes manipulating of impression e.g. cutting of canal
UI Concept & Interactive Prototype

UI Concept & Design
- Visual Style defined by existing software applications at SAT (Hearing instrument fitting software, electronic ordering module)
- Intuitive interaction with 3D data, no special input devices
- Original scan data reproducible at all times

UI Prototype
- high-level, interactive
AttrakDiff™: Pragmatic and hedonic attributes

Pragmatic product attributes
fulfillment of individuals’ behavioral goals
E.g. “supporting”, “useful”, and “controllable”

Hedonic product attributes
individuals’ psychological well-being
E.g. “outstanding”, “impressive”, “exciting”, and “interesting”

A product may be perceived as pragmatic because it provides effective and efficient means to manipulate the environment.

A product may be perceived as hedonic because it provides stimulation, identification or provokes memories.

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AttrakDiff™ Evaluation

iScan is perceived as **practical, innovative, presentable** and good.
Success factors

- User Centered Design activities are **integrated in product definition phase** of the product development process.
- Strong cooperation of product management and software development leads to mutual understanding and improvement of results.
- **Prototypes** are not only valuable for feedback sessions with users. They also simplify communications among all project participants.
- Very detailed requirements gathering phase; resulting in an **actual benefit for the customer**.
- User centered design methods sometime prolong definition phase; but actual **development phase is usually shortened**.
Problems we face...

- Cost-justifying design efforts for software that is not sold
  -> no direct impact on hearing instruments sales
- Very short software release cycles lead to little or no time for “fit and finish” the user interface