Human-Computer Interaction and usability in health care

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http://www.it.uu.se/research/hci
IT is useful !?!!?
ISO 9241:

Definition of usability:

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use"
Humans in interaction with technology (HCI)

We must understand the nature of such interactions.

How can work processes and the design of the technology be based on such knowledge?
Human cognition

• Human cognition
  – Memory and short term memory (working memory)
  – Pattern recognition
  – Automated processes

• Human cognitive strengths and weaknesses must be considered when designing user interfaces.
Human memory

• Short term (working) memory
  – 5-8 ”chunks”
  – Declining time c:a 15 sec.
  – Sensitive to cognitive disturbances.

• Long term memory
  – Active “learning”
  – No information loss (“for life”)
  – Difficult to retrieve information (find “triggers”)
Automated (cognitive) processes

• On a high cognitive level
  – Advanced performance (skills)
  – One thing at a time

• On a low cognitive level
  – High parallel capacity
  – ”Automatic” processing
  – Requires much training
Pattern recognition
Example

Reading of a lab report
What does this report contain?

How can it be perceived and analysed by a professional user?
And this?
Different types of users in different contexts

• Different professionals
  – Physicians, nurses, assistants, secretaries, physiotherapists etc.
  – Technicians etc.
  – Administrative personal

• Different work contexts
  – Read/write patient records
  – Order lab investigations and receive answers
  – Patient administration
  – Medical technology…..
  – Laboratory work
  – Primary care units
  – Home care
ISO 9241:

Definition of usability:

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use"
Human-Computer Interaction is especially important in health care

Design of user interfaces must be based on analysis of e.g.:

• Which information?
• Used by who?
• In which way and form?
• Where?
• When?
• In which context?
• Of which purpose?
• Communication and collaboration?
User interface design

• Design metaphor: Room and workspaces
• Use e.g. design heuristics to design usable interfaces

• See course in basic HCI for more about interface design!!!!
Design heuristics (main parts)

- Design for skilled users
- Let humans ”be in full control”
- Support the user’s understanding of the process, reduce complexity and support efficient visualisation of information
- Do the design ”complete”
- Management by awareness vs. Management by exception
- Disposition of the screen area
  - Show overview and details simultaneously
  - Fixed and logic spatial visualisation
- Use colours in an efficient way
- Avoid scrolling of text.
- Etc. (See course in HCI and user interface design)
An example of interface design

- One task – one work space
- The interface should be ready for immediate use
- See details and overview simultaneously
- Emphasize important information
- Simple and obvious navigation
- Support identification of important relations
- Support pattern recognition
- Support speed for skilled users
- Allow users to jump between tasks
- Etc.
Example

Select “record room” and patient ID
Epikris

92-05-22  Rygkgirurgiska klin, avd 1, Dr Tord Stjernberger/se

Vårdtid  92-05-18 - 92-05-22

Diagnos  Lumbalt diskbräck
Dekompression + extirpation av vänstersidigt diskbräck nivå LV - SI  722BB

Ur anamnes
Inkommer nu med accentuerade besvär för operation.

Ur status
Vid inkomsten noteras uttalad högerkvinna smärtseglos. Nedsatt rörlighet framförallt vid bakutbörning och böjning åt sidan som ger smärtor ut i vänster ben.
På nedre utomjötes noteras nedsatt sensibilitet S I dermatomet vänster. Akillstrifen borta vänster. Lesseque positiv från 45° vänster.

Förlopp
Operation 92-05-20 / Stjernberger
Dekompression och bortagande av hårt mediolateralt diskbräck av äldre datum samt en fri sequester  6341
V g se operationsberättelse.