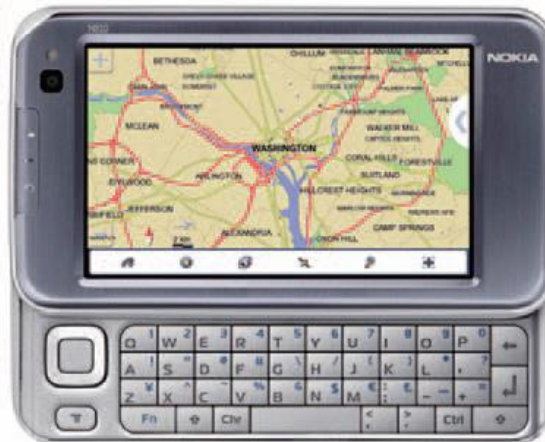


Interaction Devices

Keyboard

- **Keyboard Style**
- **Available Keys**
- **Keyboard and keypads for small devices**
 - Built In
 - Attachments
 - Virtual
 - Handwrite (Stylus pen,



Pointing Devices

Direct control devices
(easy to learn and use,
but hand may obscure display)

- Lightpen
- Touchscreen
- Stylus

Indirect control devices
(take time to learn)

- Mouse
- Trackball
- Joystick
- Trackpoint
- Touchpad
- Graphics tablet

Non-standard devices and strategies
(for special purposes)

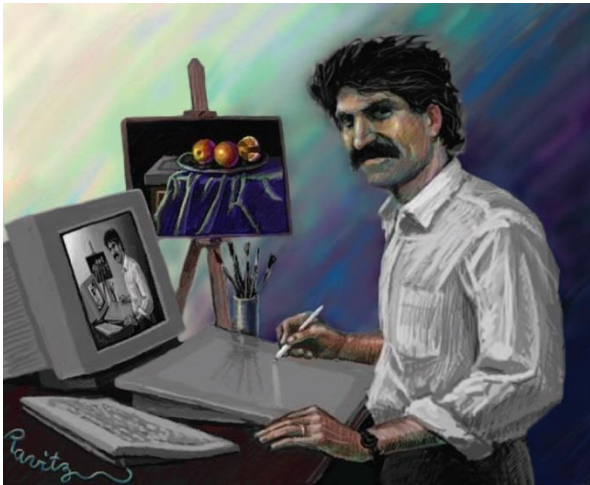
- Multitouch tablets and displays
- Bimanual input
- Eye-trackers
- Sensors
- 3D trackers
- DataGloves
- Boom Chameleon
- Haptic feedback
- Foot controls
- Tangible user interfaces
- Digital paper

Criteria for success

- Speed and accuracy
- Efficacy for task
- Learning time
- Cost and reliability
- Size and weight

Novel/New devices

1. Specialized Tablet
2. Table top touch screens
3. Game controllers



Speech and auditory interfaces

Opportunities

- When users have vision impairments
- When the speaker's hands are busy
- When mobility is required
- When the speaker's eyes are occupied
- When harsh or cramped conditions preclude use of a keyboard

Technologies

- Speech store and forward
- Discrete-word recognition
- Continuous-speech recognition
- Voice information systems
- Speech generation

Obstacles to speech recognition

- Increased cognitive load compared to pointing
- Interference from noisy environments
- Unstable recognition across changing users, environments, and time

Obstacles to speech output

- Slow pace of speech output when compared to visual displays
- Ephemeral nature of speech
- Difficulty in scanning/searching

Displays – Small and Large

- **The display has become the primary source of feedback to the user from the computer**
- **The display has many important features, including:**
 - **Physical dimensions (usually the diagonal dimension and depth)**
 - **Resolution (the number of pixels available)**
 - **Number of available colors, color correctness**
 - **Luminance, contrast, and glare**
 - **Power consumption**
 - **Refresh rates (sufficient to allow animation and video)**
 - **Cost**
 - **Reliability**

Displays – Large and Small (cont.)

- **Large displays**
 - Informational wall displays
 - Interactive wall displays
 - Multiple desktop displays
- Mobile device displays



Displays – Large and Small (cont.)

- **Heads-up and helmet mounted displays**
 - A heads-up display can, for instance, project information on a partially silvered widescreen of an airplane or car
 - A helmet/head mounted display (HMD) moves the image with the user
 - Displaying 3D images

Collaboration and Social Media Participation

Characteristics and examples of collaboration and social media participation

Collaboration	Crossover	Social Media Participation
E-mail, phone calls, audio- and videoconferences, shared documents, collaboratories	Wikis, blogs, chat rooms, instant messages, short messages, listservers, Yahoo!/Google groups	Chat rooms, blogs, user-generated content sites, tagging, rating, reviewing
GoToMeeting [®] , LiveMeeting [®] , WebEx [®] , Skype [®] , Google Docs [™] , GeneBank [™]	Wikipedia, Wikia [™] , LinkedIn, Second Life, Blogger [®]	YouTube, Flickr, Picasa, Netflix, Technorati [™] , MySpace, Facebook, Digg, del.icio.us [™]
Want recognition for contributions May Aspire to Leadership		
Typically 2 to 2000 people	Typically 20 to 200,000,000 people	
Work-related, goal-directed	Playful, process-oriented	
Time-limited, milestones	Open-ended	
Selected identified partners	Open unknown partners	
Assign tasks and review each other's work	Act independently	

Collaboration

- **Goals of Cooperation**
 - Focused partnerships
 - Lecture or demo
 - Conference
 - Structured work processes
 - Meeting and decision support
 - Electronic commerce
 - Tele-democracy
 - On-line communities
 - Collaboratories
 - Telepresence

Asynchronous distributed interfaces: Different place, different time

- **Electronic mail**
- **Newsgroups**
- **Listservers**
- **Discussion boards**
- **Conferences**
- **Social media participation web sites**
- **Blogs**
- **Wikis**

Synchronous distributed interfaces:

Different place, same time

- **Synchronous distributed applications**
 - group editing
 - shared screens for customer assistance
 - simultaneous demonstrations at multiple sites
 - allow sharing of information for various applications
 - interactive games
- **Chat, instant messaging, and texting**
- **Audio and video conferencing**

Face-to-face interfaces: Same place, same time

- **Innovative approaches to work and learning**
 - Shared display from lecturer workstation
 - Audience response units
 - Text-submission workstations
 - Brainstorming, voting, and ranking.
 - File sharing
 - Shared workspace
 - Group activities
 - SMART Board
 - Public spaces facilitate sharing
 - Sharing photos is very popular
 - Notification systems
 - Electronic classrooms
 - Small teams and large teams

Questions for consideration

Computer-supported cooperative work questions

- How would facilitating communication improve or harm teamwork?
- Where does the community of users stand on centralization versus decentralization?
- What pressures exist for conformity versus individuality?
- How is privacy compromised or protected?
- What are the sources of friction among participants?
- Is there protection from hostile, aggressive, or malicious behavior?
- Will there be sufficient equipment to support convenient access for all participants?
- What network delays are expected and tolerable?
- What is the user's level of technological sophistication or resistance?
- Who is most likely to be threatened by computer-supported cooperative work?
- How will high-level management participate?
- Which jobs may have to be redefined?
- Whose status will rise or fall?
- What are the additional costs or projected savings?
- Is there an adequate phase-in plan with sufficient training?
- Will there be consultants and adequate assistance in the early phases?
- Is there enough flexibility to handle exceptional cases and special needs (users with disabilities)?
- What international, national, and organizational standards must be considered?
- How will success be evaluated?

Discussion Questions:

1. How collaborative interfaces can improve or harm teamwork?
2. Name a few characteristics and examples of collaboration and social media participation.
3. Why collaborative interfaces, such as email, are much more popular than others, such as video-conferencing.