Unwrapping the Gift: Benefits of Computer Technology

"Accentuate the positive...."

Ubiquity

- Have you used computer technology today?
    - ATM
    - CD-player, DVD-ROM, Blue-Ray
    - cell-phone
    - modern appliances
    - music player (iPod)
- Direct vs. indirect use?
- Rapid pace of change

The Pace of Change

- 1940s: First computer was built.

- 1956: First hard-drive disk weighed a ton and stored five megabytes.

- 1991: Space shuttle had a one-megahertz computer. Ten years later, some automobiles had 100-megahertz computers.

- Speeds of several gigahertz are now common.

Some general benefits

- Some positive impacts of new technology
  - Convenience
    - Time-saving
    - Cost-saving
    - Less effort than with older technologies
  - New kinds/classes of jobs
  - Entertainment / fun
    - Development of better sound quality
    - Creation of computer-generated art and special effects
  - More options for transactions
  - Improvements in crime-fighting
  - Smaller error rates
    - Improved accuracy
  - Improved customer service/satisfaction

Some general issues

- Negative impacts of new technology
  - Unemployment
  - Alienation
  - Poor customer service
  - Crime
  - Loss of privacy
  - Errors

Dealing with the issues

- Ways of providing solutions that address the stated problems
  - Technology
  - Management
  - Law
  - Education
  - The market

Appreciating the Benefits

1. Benefits computers bring to <u>communication</u>, specifically small business.
2. Benefits computers bring to <u>transportation</u>, especially within our communities.
3. Benefits computers bring to <u>education and training</u> as they aid local schools.
4. Benefits of computers in <u>fighting crime</u> in our communities.
5. Benefits computers bring to <u>medicine</u>, especially as used by our own doctors.
6. Benefits computers bring to the <u>disabled</u> in schools and the workplace.
7. Benefits computers bring to <u>automation</u> in the workplace
8. Benefits computers bring to <u>identification</u>, as in personal identification

1. Benefits Computers Bring to Communication

- Non-invasive; read at recipients' convenience
- Time-saving
- Access to immense (often timely) amounts of information
- Text, graphics, and sound can be combined
- Much information on the web is "free"
- Public forums not limited to geographic boundaries
- More independence
- Remote access available
- Traditional boundaries are no obstacle

2. Benefits Computers Bring to Transportation

- Navigation
- Trip planning
- Diagnostics
- Safety
- Hybrid engines
- Efficient burning of fuel(s)
- Traffic pattern studies

3. Benefits Computers Bring to Education and Training

- Language acquisition

- Spelling

- Literacy

- Distance learning

- Modeling

- Simulations

- Speech recognition

- Speech synthesis

4. Benefits of Computers in Fighting Crime

- Improved crime reporting
- Faster search of arrest records and fingerprint files
- Remote access to records and reports (e.g., from patrol cars)
- Enhancement of records (fingerprints and photos)
- Access to numerous databases
- Improved sensoring, monitoring, and surveillance equipment
- New & sophisticated analyses of range of materials

5. Benefits Computers Bring to Medicine

- Sophisticated medical imaging
- Reduced surgery time
- Patient monitoring
- Early ambulation
- Improved treatments
- Fewer errors
- 3D Printers

5. Benefits brought to Medicine: Patient Records

- More legible

- Better organized

- Accessible by many sites, simultaneously

- Available immediately

- Improved statistical research

5. Benefits brought to Medicine

- Diagnosing
  - Streamlined diagnosis
  - Improved accuracy
  - Reduced need for biopsy
  - Improved screening and predictions
- Telemedicine
  - Broad access to medical help
  - Less expensive
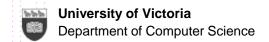 - Expands consultations to rural/remote sites

6. Benefits Computers Bring to the Disabled

- Disability-specific computer applications (e.g., a braille printer)
- Control of household and workplace appliances
- Mobility
- Control of artificial limbs
  - Neuroprosthetics
- Improved vision
- Access to adaptive educational equipment
- Improved communication
- Opportunity to return to work

7. Benefits Computers Bring to Automation

- Organize and access large inventories

- Improved customer satisfaction

- Cost-saving

- Time-saving

- Tedious, monotonous work done by machines

- Improved workplace safety

8. Benefits Computers Bring to Identification

- Time-saving

- Accuracy

- Ease-of-use

- Cost-saving

- More secure

- Customizable

- Reliable

More Benefits

- Computers Monitor Environment and Materials
  - Temperature
  - Acceleration
  - Stress in materials
  - Emissions
  - Dangerous substances in the air
  - Moisture
  - Acidity

More Benefits

- Applications of Computers in Tracking
  - Rare plants and animals
  - Migration habits
  - Stolen goods
  - Lost pets or people

- Benefits of Computers in Reducing Paper Use and Trash
  - Send/receive digital documents instead of hardcopy
  - Read, write, and edit digitally/online
  - Cost-saving; smaller storage needed
  - Creation of toxic wastes at papermills reduced

Summary

- Many and varied benefits

- Not just the result of improved automation

- Some cautionary notes, though:
  - Do improvements for crime fighting affect personal privacy?
  - Is faster necessarily better?
  - How do we identify, articulate, and decide upon the various tradeoffs?

- This is, in essence, the remainder of the course.