A Gift of Fire

Fourth edition

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Chapter 7:
Evaluating and Controlling Technology

What We Will Cover

- Evaluating Information

- The "Digital Divide"

- Neo-Luddite Views of Computers, Technology, and Quality of Life

- Making Decisions About Technology

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Evaluating Information

The Need for Responsible Judgment

- Expert information or 'wisdom of the crowd'?
  - Daunting amount of information on the web, much of this information is not correct
  - Search engines are replacing librarians, but Web sites are ranked by popularity, not by expert evaluation
  - Wisdom of the crowd - ratings by public of Web site
  - If millions participate, the results will be useful

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Evaluating Information

The Need for Responsible Judgment

- Wikipedia
    - Written by volunteers, some posts are biased and not accurate
    - Although anyone can write, most people do not
    - Those that do typically are educated and experts

Evaluating Information

The Need for Responsible Judgment

- Wisdom of the crowd
  - Problems of unreliable information are not new
  - The Web magnifies the problems
  - Rating systems are easy to manipulate
- Vulnerable viewers
  - Less educated individuals
  - Children

Evaluating Information

The Need for Responsible Judgment

- Narrowing the information stream

Evaluating Information

The Need for Responsible Judgment

- Abdicating responsibility
  - People willing to let computers do their thinking
  - Reliance on computer systems over human judgment may become institutionalized
  - Fear of having to defend your own judgment if something goes wrong

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Evaluating Information

Computer Models

- Evaluating Models
  - How well do the modelers understand the underlying science or theory?
  - Models necessarily involve assumptions and simplifications of reality.
  - How closely do the results or predictions correspond with the results from physical experiments or real experience?

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Evaluating Information

Computer Models

- Why models may not be accurate

    - We might not have complete knowledge of the system we are modeling.

    - The data describing current conditions or characteristics may be incomplete or inaccurate.

    - Computing power may be inadequate for the complexity of the model.

    - It is difficult, if not impossible, to numerically quantify variables that represent human values and choices.

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The "Digital Divide"

Trends in Computer Access

- New technologies only available to the wealthy
- The time it takes for new technology to make its way into common use is decreasing
- Cost is not the only factor; ease of use plays a role
- Entrepreneurs provide low cost options for people who cannot otherwise afford something
- Government funds technology in schools
- As technology becomes more prevalent, the issues shift from the haves and have-nots to level of service

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The "Digital Divide"

The Global Divide and the Next Billion Users

- Approximately two billion people worldwide have access to the Web, a fivefold increase over roughly a decade. Approximately five billion do not use the Internet.

- Non-profit organizations and huge computer companies are spreading computer access to people in developing countries.

- Bringing new technology to poor countries is not just a matter of money to buy equipment; PCs and laptops must work in extreme environments.

- Some people actively working to shrink the digital divide emphasize the need to provide access in ways appropriate to the local culture.

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Criticisms of Computing Technologies

- Computers cause massive unemployment and de-skilling of jobs.
- Computers "manufacture needs"; we use them because they are there, not because they satisfy real needs.
- Computers cause social inequity
- Computers cause social disintegration; they are dehumanizing. They weaken communities and lead to isolation of people from each other.

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Criticisms of Computing Technologies (cont.)

- Computers separate humans from nature and destroy the environment.
- Computers benefit big business and big government the most.
- Use of computers in schools thwarts development of social skills, human values, and intellectual skills in children.
- Computers do little or nothing to solve real problems.

Neo-Luddite Views of Computers, Technology, and Quality of Life

Views of Economics, Nature, and Human Needs

- Difference in perspective between Luddites and non-Luddites
- What is the purpose of technology?
    - To Luddites, it is to eliminate jobs to reduce cost of production
    - To non-Luddites, it is to reduce effort needed to produce goods and services.
    - While both statements say nearly the same thing, the first suggests massive unemployment, profits for capitalists, and a poorer life for most workers. The second suggests improvements in wealth and standard of living.

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Does the technology create a need for itself?

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Nature and human life styles

- Luddites argue that technology has made no important improvements in life.

- Many debates set up a humans-versus-nature dichotomy.

- Whether a computing device is "good," by a human-centered standard, depends on whether it meets our needs, how well it does so, at what cost, and how well it compares to alternatives.

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Accomplishments of technology

- Increased life expectancy
- Elimination or reduction of many diseases
- Increased standard of living
- Assistive technologies for those with disabilities

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Neo-Luddite Views of Computers, Technology, and Quality of Life

Discussion Questions

- *To what extent are Neo-Luddite criticisms (on slides 12 and 13) valid?*

- *Can a society choose to have certain specific desirable modern inventions while prohibiting undesirable ones?*

Making Decisions About Technology

The Difficulty of Prediction

- Each new technology finds new and unexpected uses
- The history of technology is full of wildly wrong predictions
- Weizenbaum argued against developing speech recognition technology
  - Mistaken expectations of costs and benefits
  - Should we decline a technology because of potential abuse and ignore the benefits?
  - New technologies are often expensive, but costs drop as the technology advances and the demand increases

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Making Decisions About Technology

Intelligent Machines and Superintelligent Humans - Or the End of the Human Race?

- Technological Singularity - point at which artificial intelligence or some combined human-machine intelligence advances so far that we cannot comprehend what lies on the other side

- We cannot prepare for aftermath, but prepare for more gradual developments

- Select a decision making process most likely to produce what people want

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Making Decisions About Technology

A Few Observations

- Limit the scope of decisions about development of new technology

- Decentralize the decision-making process and make it noncoercive, to reduce the impact of mistakes, avoid manipulation by entrenched companies who fear competition, and prevent violations of liberty

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Making Decisions About Technology

Discussion Questions

- *How well can we predict the consequences of a new technology or application?*
- *Who would make the decisions?*

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