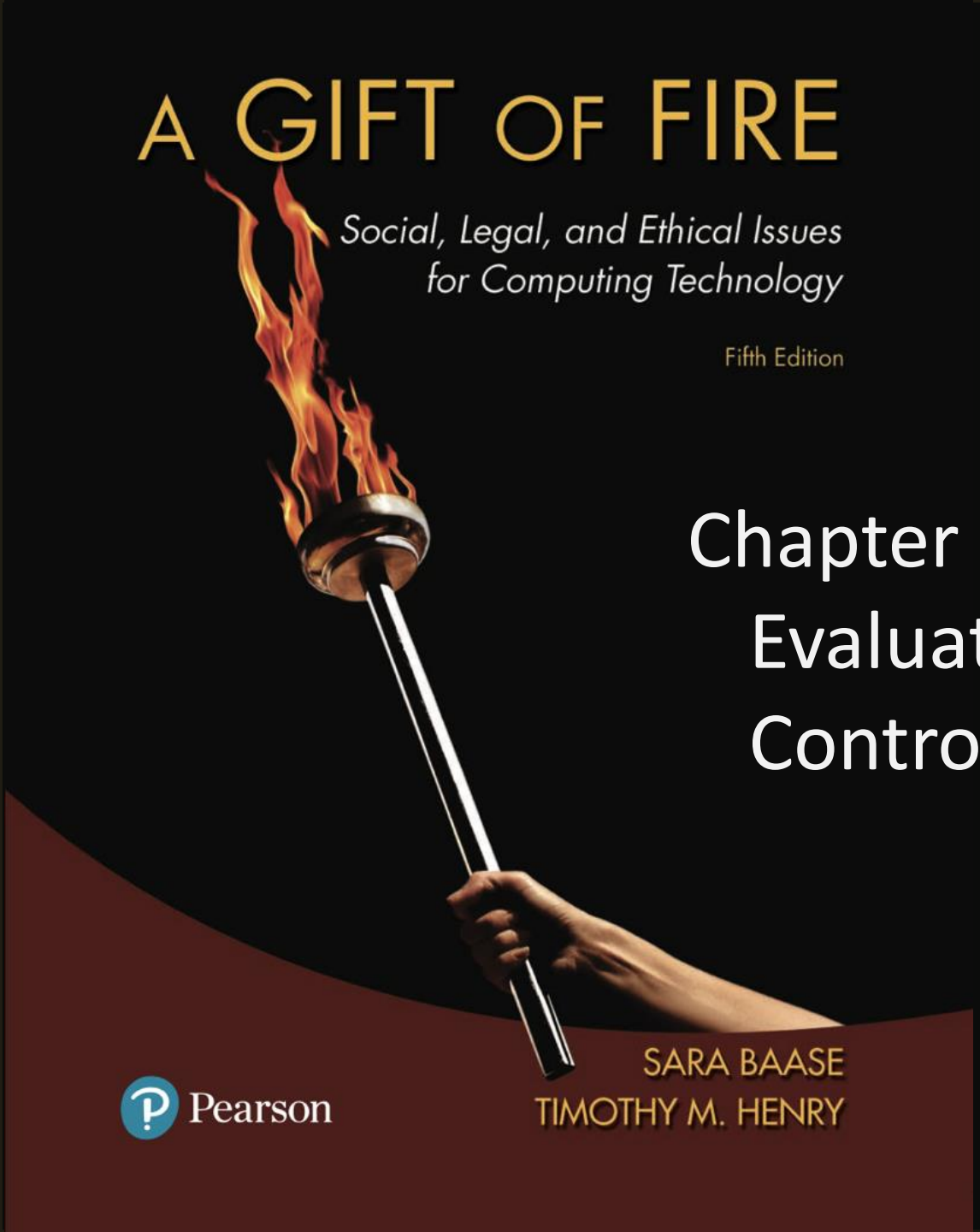

Chapter 7: Evaluating and Controlling Technology

Based on slides prepared by Cyndi Chie, Sarah Frye and Sharon Gray.
Fifth edition updated by Timothy Henry

What We Will Cover

- Evaluating Information
- The “Digital Divide”
- Neo-Luddite Views of Computers, Technology, and Quality of Life
- Making Decisions About Technology

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

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

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?

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.

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

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.

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

Criticisms of Computing Technologies

- 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.

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

Does the technology create a need for itself?

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.

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

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

Making Decisions About Technology

Discussion Questions

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