Technology Shapes Society

Foundations of Technology,
eLearning, Montgomery County Public Schools

Objectives

In this presentation, you will learn..

- Changes caused by the use of technology can range from gradual to rapid and from subtle to obvious. (ITEA 4-H)
- Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects. (ITEA 4-I)
- Ethical considerations are important in the development, selection, and use of technologies. (ITEA 4-J)
- The transfer of a technology from one society to another can cause cultural, social, economic and political changes affecting both societies to varying degrees. (ITEA 4-K)

Cause, Effects, and Trade-offs

In this lesson you are going to learn about cause, effects, and trade-offs in dealing with products and systems as it relates to the use of technology in society.

A *cause* is something that makes something else happen. Out of two events, it is the event that happens first. To determine the cause, ask the question "Why Did it Happen?"

An *effect* is what happens as a result of the cause. Of two related events, it's the one that happens second or last. To determine the effect, ask the question "What Happened?"

A *trade-off* is an exchange of one thing in return for another; especially relinquishment of one benefit or advantage for another regarded as more desirable. It implies a decision to be made with full understanding of both the upside and downside of a particular choice.

Technology effects your life

Technology causes cultural, social, economical, and political changes in society. For example, look how technology used in education has changed your learning environments.

Your safety and comfort are enhanced by new products and systems in buildings and classrooms. You are taking this course using a computer from the comfort of your home. Technology affects the choices we have in how we learn both inside and outside of school.

Unintended Effects

Technology, by itself, is neither good or bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. For example, fossil fuels have both desired and undesired consequences. While these fuels provide a good source of energy, their use may damage the environment.

When technologies work as intended, the consequences can be desirable, such as providing comfort from the elements, mitigating diseases, and using natural resources more efficiently. Sometimes, however, the consequences are undesirable, such as loss of jobs, the loss of resources, or the misuse of time.

Air Pollution from Factories

Automobile Emissions

These effects and changes can be quick and obvious, as may be the case with an oil spill. They can be slow and harder to notice as may be the case with global warming.

Example: Technology Impacts economy

The development of motion pictures led to the creation of the movie industry, which in turn has affected the economy, particularly in southern California. The growth of the video game industry, recently passing the motion picture industry in revenue, is changing the economy of southern California and other regions, as it has changed the lifestyle of today's gamer.

Understanding the effect that the use of technology has on cultural, social, economical, political, and ethical issues is another important concept. Exploring such issues will give you the opportunity to consider principle concerns, employ critical questioning, and determine the benefits and changes in society caused by the different use of technologies.

Attitudes and choice about technology

The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use. People's attitudes toward and knowledge about a product or system, along with their subsequent actions, vary greatly and are influenced by their moral, social, or political beliefs.

For example, some might support the construction of a high-voltage electric transmission line because it would provide electricity to people in remote areas, while others who live near the path of the power line might not support it because of potential effects on their health and safety.

Sometimes people are well informed about a product or system, while at other times they have limited information to make their choices about whether a technology should be developed or used.

Weighing Trade-offs to Make Decisions

Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects. These decisions can have lasting impacts, sometimes affecting living habits and cultural patterns on a global scale.

The construction and use of the interstate system require considering the benefits of providing a safe and quick mode of transportation, as well as the effects on the economy and society.

Decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment. For example, the implementation of advanced transportation technologies, such as shuttles and metro rails, has had enormous impact on the ability to travel.

At the same time, roadways, urban sprawl, and automobile emissions have directly affected the environment. Indirect effects include such as pollution caused by manufacturing and junked cars.

New Technologies Impact Others

When new technologies are developed to reduce the use of resources, considerations of trade-offs are important. Examples include the cost and limited output of photovoltaic cells to produce electricity mainly in remote areas and the potential long-term side effects of new drugs.

You can determine how to evaluate your own needs or wants for a product or system versus the effect that it will have on the environment. Understanding the trade-offs that must be made and then making decisions accordingly will help you to recognize the positive and negative effects that can result from technological solutions.

Ethics and Ethical Considerations

Ethics is a body of principles or standards of human conduct that govern the behavior of individuals and groups. Ethics is concerned with what is right or wrong, good or bad, fair or unfair, responsible or irresponsible, obligatory or permissible, praiseworthy or blameworthy.

Poor ethics can be extremely damaging to organizational performance (Enron). When ethical behavior is poor it taxes operational performance in many visible, and sometimes invisible ways. The tax can be on yield or productivity, which is easily measured. The tax can impose itself on group dynamics, suppressing openness and communication, which is hard to measure but easily felt.

Good ethics on the other hand have a surprisingly positive effect on organizational activities and results. Productivity improves. Group dynamics and communication improve, and risk is reduced. One reason for this is ethics becomes an additional form of logical reasoning, increasing the flow of information, and adding an additional set of eyes and antennae to give the organization needed feedback regarding how it is doing.

Socrates argued that the determination of good or bad behavior depended entirely on the integrity of the rational process. Plato argued that to know good was to do good, that doing good was more useful and rational than doing bad, and that one who behaved immorally did so largely out of ignorance. Aristotle argued that ethics was a purely logical outcome of human nature and it was useful because it was logical.

Example: Ethical Decisions and Technology

The development and use of technology poses ethical issues. People often wonder whether the use of some technologies is ethically acceptable. For example, should we allow everyone to purchase a gun?

Ethical considerations are important in the development, selection, and use of technologies. For example, medical advances for prolonging life and treating illness have triggered concerns about health care providers giving more attention to the best technological solution than to human values or needs.

Questions about how medical technologies should be used to sustain life and the related costs must be considered. High tech medicine has transformed the philosophy of doing everything possible to prolong life into a consideration that living longer may not necessarily mean living better.

Technology Transfer between Technologies

When intellectual property or technology from one organization or industry is discovered by a party in a different field and used or applied in a novel or unintended way, the phenomenon is called technology transfer. Technology transfer also occurs when a technology moves from one society or culture, to another.

The success of technology transfer can be measured in different ways. On the very simple end, this may involve the improvement or enhancement of something that already exists, such as a product, system, or manufacturing process. Reduced costs and improved organizational efficiency are other measurable benefits.

However, initiatives resulting in new markets, products, or services frequently are the most lucrative and receive the most attention. These initiatives can be measured in terms of market share percentages or in monetary terms.

Technology Transfer between Societies

The transfer of technology from one society or country to another is among other things, an ethical decision. The transfer of a technology from one society to another can cause cultural, social, economic and political changes affecting both societies to varying degrees.

The opening of the global market has changed the thinking of organizations and made product development teams consider how a technology will fare when transferred to another country or organization.

With this transfer comes a new set of matters that corporations were previously not concerned with. One such issue is how the technology will succeed in a culture different from the culture in which it was created.

This consideration was noted early, and even now researchers are trying to understand the relationship between a technology and the forces exerted by a culture. The primary problem such an understanding tries to address is whether or not global products are possible.

Globalization

Technology transfer is a well established process involving the transfer of knowledge, know-how and skills, and often hardware, through licensing and partnership agreements. This process enables a recipient company/country to design and build a facility without going through the stages of invention, conceptual design, research, development, and the design, building and testing of a prototype.

The cost of technology transfer to the recipient country will depend upon the ability of the country to efficiently and effectively absorb and safely utilize the technology. This ability will depend upon the educated and trained manpower available, and therefore on the educational system and the industrial tradition of the recipient country.

The technological shrinking of the world's boundaries and distances, bringing diverse societies into a partnership in a shared, global economy — known commonly as globalization — has had a profound impact on the ways we design, market, and use technology.

Summary

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- A *trade-off* is an exchange of one thing in return for another; especially relinquishment of one benefit or advantage for another regarded as more desirable. It implies a decision to be made with full comprehension of both the upside and downside of a particular choice.
- Technology causes cultural, social, economical, and political changes in society
- Technology, by itself, is neither good or bad, but decisions about the use of products and systems can result in desirable or undesirable consequences
- The use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use
- Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects
- When new technologies are developed to reduce the use of resources, considerations of trade-offs are important
- Ethics is a body of principles or standards of human conduct that govern the behavior of individuals and groups concerned with what is right or wrong
- Ethical considerations are important in the development, selection, and use of technologies, as well as the transfer of technology to other societies