Technological Literacy: A New Basic for Inclusion in the University's CORE Curriculum

Introduction

Recent discussions in Ball State's Core Curriculum Committee have lead to the following question, "Should the study of technology be included in a new core curriculum?" However, without establishing agreement on what technology and technological literacy are, the question may be difficult to answer. Using a term and truly understanding its meaning are really two different kinds of human behavior.

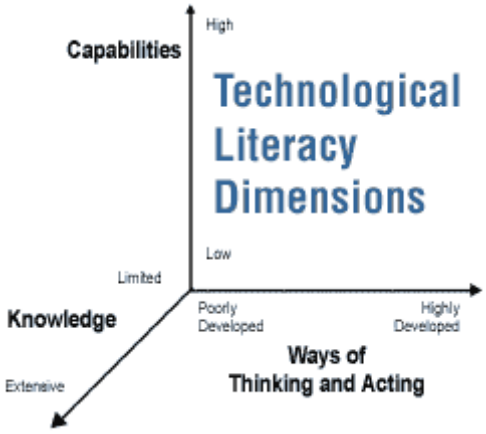
As a product of human experiences, judgments and actions, technology impacts almost every aspect of society. Despite this, people seldom have the opportunity to study or develop an understanding of the concepts, systems, or consequences of technology (Gallup Poll, 2004). Far too many people see technology as technological artifacts such as computers, cell phones, or the space shuttle – "rather than a human endeavor to adapt to or change the natural world" (ITEA, 1991). Thus, to clarify what it is and why it should be included in Ball State University's CORE curriculum, the following will provide a definition of technology and technological literacy, and establish a rationale for its inclusion in a CORE and the characteristics of a technologically literate person.

Technology and Technological Literacy Defined

While terms such as technology and literacy have been linked to certain phrases or slogans (e.g., adult literacy, computer literacy, etc.), current thought describes technology and technological literacy as:

> ***Technology*** is the generation or use of knowledge and processes to solve problems and extend human capabilities (Technology for All Americans Project, 1996) . . . "anything people do to modify the natural world to meet human needs" (Gallup Poll, 2005, p. 1).

"Technological Literacy is the ability to use, manage, assess, and understand technology" (Gallop Poll, 2004, p. 1). "Technological literacy encompasses three interdependent dimensions: (1) knowledge, (2) ways of thinking and acting; and (3) capabilities" (Technically Speaking, 2006, p.1).



Characteristics of a Technologically Literate Person

According to the National Academy of Engineering, the National Research Council, and the International Technology Education Association, technological literacy (e.g., a broad understanding of the human-designed world and our place in it, and the major concepts behind current fundamental technological developments and impacts) is an essential quality for all people living in the increasingly technology-driven world (Technically Speaking, 2006 & Executive Summary, 2003). Experts in the fields of technology, engineering, and science believe that technological literacy is an essential quality for all people. Based upon their works, it is possible to derive the characteristics of a technologically literate person or the potential outcomes of a CORE curriculum that includes a technological literacy component. These characteristics (i.e., knowledge, ways of thinking and acting, and capabilities) include but are not limited to:

Knowledge:

- Technologically literate persons understand that technology involves systems, which are groups of interrelated components designed to collectively achieve a desired goal or goals (Technology for All Americans, 1996).
- Technologically literate persons understand technology involves more than facts and information, but also the ability to synthesize information into new insights (Technology for All Americans, 1996).
- Technologically literate persons recognize the pervasiveness of technology in everyday life, and its risks and benefits (Characteristics of a Technologically Literate Person, 2006).
- Technologically literate persons are familiar with the nature and limitations of the design process (Characteristics of a Technologically Literate Person, 2006).
- Technologically literate persons are familiar the core concepts and scope of technology (Standards for Technological Literacy, 2000).
- Technologically literate persons understand that technology reflects the values and culture of society (Characteristics of a Technologically Literate Person, 2006).
- Technologically literate persons understand that technology is the result of human activity or innovation (Executive Summary, 2003).
- Technologically literate persons understand technology results in both planned and unplanned consequences, acknowledge that solutions often involve tradeoffs, and may accept less of one quality in order to gain more or another (Executive Summary, 2006).

Ways of Thinking and Acting:

- Technologically literate persons are problem solvers who consider technological issues from different points of view and relate them to a variety of contexts, and ask pertinent questions, of themselves and others regarding the benefits and risks of technology (Executive Summary, 2003 & Characteristics of a Technologically Literate Person, 2006).
- Technologically literate persons appreciate the interrelationships between technology and individuals, society, and the environment (Technology for All Americans, 1996 & Executive Summary, 2003).
- Technologically literate persons incorporate various characteristics from engineers, artists, designers, craftspersons, technicians, sociologists, etc. that are interwoven and act synergistically (Technology for All Americans, 1996).
- Technologically literate persons understand and appreciate the importance of fundamental technological developments (Technology for All Americans, 1996).

- Technologically literate persons participate knowledgably in decisions about the development and use of technology (Characteristics of a Technologically Literate Person, 2006).

Capabilities:

- Technologically literate persons use concepts from science, mathematics, social studies, language arts, and other content areas as tools for understanding and managing technological systems (Executive Summary, 2003).
- Technologically literate persons can identify appropriate solutions, and assess and forecast the results of implementing the chosen solution; and make informed judgments about technological risks and benefits (Technology for All Americans, 1996 & Characteristics of a Technologically Literate Person, 2006).
- Technologically literate persons have the ability to use and manage technological processes and systems to improve their efficiency and appropriateness (Technology for All Americans, 1996).
- Technologically literate persons use a strong, systems oriented, creative, and productive approach to thinking about and solving technological problems (Executive Summary, 2006 & Standards for Technological Literacy, 2000).

Why is Technological Literacy Important?

Humans have always lived in a largely technological world. Based upon changes in technology, society has even named major periods of time based upon it (e.g., Bronze Age, Iron Age, Industrial Revolution, and Information Age). Because people live in an ever advancing technological world and their actions/decisions have global consequences, living and learning in the Twenty-First Century requires much more than what students can glean from traditional core subject areas.

Technology affects almost every phase of our current and future lives. It enables people to perform their daily tasks and supports their ability to make informed, responsible decisions that affect them as individuals, society as a whole, and the environment. "Citizens of today must have a basic understanding of how technology affects their world and how they exist both within and around technology" (Executive Summary, 2003, p. 4). In the past, society could afford to let its citizens develop their technological literacy through their daily lives. However, the demands of our current society and educational system can no longer leave this to happenstance. It is neither desirable nor effective (Executive Summary, 2003). Technological literacy is a new basic and should become an integral portion of a new CORE curriculum.

Summary

Ball State's Preamble: Core Goals for Undergraduate Education (2006), the 2004 Gallop Poll on what Americans think about technology, the National Academy of Engineering (Person & Young, 2002), the National Research Council (Person & Young, 2002), and the International Technology Education Association (1996 & 2003) all stress the importance of technological skills or literacy. As educators, we realize that what a literate person knows will vary from culture to culture and from era to era. Thus, there is no absolute definition of literacy in any field. However, the record indicates that cultural literacy must have a large technological

component (Defining Technological Literacy, 2006). It is a component that supports the development of technological knowledge, ways of thinking and acting, and capabilities to improve decision making, increase citizen participation, enhance social well-being, and narrow the digital divide in a rapidly changing culture that is impacted on a daily basis by technology (Benefits of Technological Literacy, 2006).

Faculty and students alike have stressed the need for the inclusion of the study of technology in a new CORE. It is up to UCC to propose how this important task should be best accomplished.

References

Benefits of technological literacy. (2006). Retrieved January 3, 2007, from the National Academies: National Academy of Engineering Web site Technically Speaking: http://www.nae.edu/nae/techlithome.nsf/weblinks/CTON-557R5V?OpenDocument

Characteristics of a technologically literate person. (2006). Retrieved January 3, 2007, from the National Academies: National Academy of Engineering Web site Technically Speaking: http://www.nae.edu/nae/techlithome.nsf/weblinks/KGRG-55SQ37?OpenDocument

Defining technological literacy. (2006) Retrieved January 3, 2007, from the National Academies: National Academy of Engineering Web site Technically Speaking: http://www.nae.edu/nae/techlithome.nsf/weblinks/CTON-557R5G?OpenDocument

Dimension of technological literacy? (2006) Retrieved January 3, 2007, from the National Academies: National Academy of Engineering Web site Technically Speaking: http://www.nae.edu/nae/techlithome.nsf/weblinks/CTON-557R5G?OpenDocument

Executive summary. (2003). Advancing excellence in technological literacy: Student Assessment, professional development, and program standards. International Technology Education Association, Reston, VA.

Pearson, G. & Young, A. (Eds). (2002). Technically speaking: Why all Americans need to know more about technology. National Academy Press, DC

Rose, L., Gallup, A., Dugger, W., & Starkweather, K. (2004, September). The second installment of the ITEA/Gallup Poll and what it reveals as to how Americans think about technology. Retrieved January 2, 2007 from http://www.iteaconnect.org/TAA/PDFs/GallupPoll2004.pdf

Technically Speaking. (2006). Retrieved January 3, 2007, from the National Academies: National Academy of Engineering Web site: http://www.nae.edu/nae/techlithome.nsft

Technological literacy. (1991). Video, International Technology Education Association, Reston, VA.

Technology for All Americans Project. (1996). Technology for all Americans: A rationale and structure for the study of technology. International Technology Education Association, Reston, VA.