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Technological Literacy – Not Just You and Your Computer

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Technological Literacy – Not Just You and Your Computer

Abstract
One might argue that the word technology is one of the most misunderstood and misused terms in common usage today. Many believe technology to be synonymous with computers, the internet and other high-tech media. This is limited and short sighted view indeed! Technology encompasses both simple and complex artifacts used daily. Pencils, toothbrushes, zippers and toothpicks – not to mention Velcro (!) – for instance, are all examples of what might be considered relatively modern examples of technology. Often, the wonder of “everyday” invention is lost in our current notions of technology. Yet, it is an investigative inquiry into the making, design and utilization of all that encompasses technology that yields great insights into human invention and creativity.

Keywords
technology, literacy, curriculum, technology education, STEM education

Author Statement
Dr Joseph Scarcella and Dr Susan Daniels are both professors in the College of Education, California State University San Bernardino.
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If a human made it, it is technology. According to the National Academy of Engineering (NAE), “technology comprises the entire system of people, organizations, knowledge, processes, and devices that go into creating and operating technological artifacts, as well as the artifacts themselves: the processes by which humans modify nature to meet their needs and wants”. One conclusion then is that generally speaking the average person holds a limited view of all that might encompass technology, especially considering how things work and their relationship to inquiry, discovery, innovation and design.

Therefore, if our 21st century students are to truly develop technological literacy with appropriate breadth, depth and understanding of culture and context, a broader view of technology must be understood and embraced. A critical inquiry into the design, applications and development of technology – especially over time and across cultures - opens the possibility of interdisciplinary inquiry that overlaps multiple disciplines and content areas.

The following excerpts, taken from the Standards for Technological Literacy: Content for the Study of Technology (Technology for All Americans Project, 2000), serve to both expand and support this premise.

Humans have been called the animals that make things, and at no time in history has that been so apparent as the present… Technology has been developing since humans first formed a blade from a piece of flint, harnessed fire or dragged a sharp stick across the ground to create a furrow for planting seeds, but today it exists to a degree unprecedented in history…(p.1)

People who are unfamiliar with technology tend to think of it purely in terms of artifacts: computers, cars, televisions, toasters, pesticides, flu shots, solar cells, genetically engineered tomatoes and the rest. But to its practitioners and to the people who study it, technology is more accurately thought of in terms of the knowledge and the processes that create these products…(p.9)
We are a nation increasingly dependent on technology. Yet, in spite of this dependence, U.S. society is largely ignorant of the history and fundamental nature of the technology that sustains it. The result is a public that is disengaged from the decisions that help shape its technological future. In a country founded on democratic principles, this is a dangerous situation…(p.v)

To further explore technology and related concepts of technological literacy, the following definitions may prove helpful:

Technology, in its broadest sense then, “is the process by which humans modify nature to meet their needs and wants.” (Technology for All Americans Project, 2000, p.9).

Technology education, in the K-12 school program is concerned with developing technological literacy in all students regardless of socio-economic status, gender, career aspirations, or post-secondary education plans.

Further, Technology education is a comprehensive curriculum area of the Kindergarten through college educational system. At the elementary and middle school levels, technology education is best situated as a part of the core education for all students (general education), providing a context or application for knowledge from multiple disciplines and connecting school with life through career explorations. A program approach that naturally links school subjects with a real world context holds greater relevance and meaning for students and also provides excellent opportunities for integrated thematic instruction in authentic contexts.

To continue, at the high school and undergraduate levels, technology education suggests three broad goals:

General technological literacy. A well-educated citizenry in the 21st century must be capable of making responsible and informed decisions regarding the control and appropriate use of technology on the job, in society and in their personal lives.

Pre-engineering/engineering-technology or other professional education. Students interested in pursuing careers such as engineering, architecture, or as a technologist in such fields, would benefit from a foundation and thorough understanding of technology; including how humans modify and control the natural world, and the consequences of their actions.

Pre-technical education. Technology education may support advanced career and technical education. All technical programs apply technology in increasingly sophisticated ways. Thus, students pursuing technical fields would naturally benefit from a broad based understanding of technology as essential preparation prior to specialized applications in a specific domain or professional setting.

Educational technology, on the other hand, is not concerned with studying technology as a discipline, but rather is concerned with the use of various technologies to enhance the teaching/learning process in all subjects, including technology education. Whether it was the introduction of “slates” for students to cipher on, pencils to replace quill pens, videotape to replace...
audio tape and slides, or searching the Internet instead of the encyclopedia, all such technological advances share a similar underpinning: Using newer technologies in an effort to improve the learning process.

Clearly, the computer is the most powerful tool ever designed by humankind. Therefore, it IS the dominant tool employed in technology education. But it is just that: a tool. Many other tools are utilized in a comprehensive study and use of technology. While computers may play a vital role in educational programs, it would be a great disservice to perceive “tech ed” as just a computer class. The tools and subject matter essential to the broadest view of technological literacy are limited only by our viewpoint; just have a look around!

Editor’s Note: Significant portions of this article originally appeared as a clarification and response to an article in the March issue of Techniques in which an educational technology program was mistakenly labeled as technology education.)