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Technology Lenses: Ways of Seeing the World

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Technology Lenses: Ways of Seeing the World

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Abstract

The question we attempt to ask and answer with this research is, "Does society construct technology or technology construct society?" The technological sublime posits that how technology is *portrayed* shapes society (Marx, 1964; Nye, 1994). Correspondingly, this means that the *representation* of various technologies (in our research, as presented in American history textbooks, 1920-1960) influence those who read such texts to respond in a particular manner. A case in point: "*Huge* factories turned out *thousands* of fighters and bombers, while *great numbers* of young men were trained for the air forces." [italics are ours.] (Goebel, et al, 1955, 437) Here, superlative phrases stacked on top of one another construct a cumulative effect of growing power and might; i.e., patriotic citizen/nation-building. Therefore, considering the technological sublime, society constructs technology. In contrast, technological determinism postulates that technology *shapes* society (Chandler, 1996) and as such, is the foundation of all human activity (Croteau and Hoymes, 2003). For example, Marshall McLuhan (1999) suggests that print was the catalyst for the nation state, which moved society from an oral culture to a literate culture through the invention of the perfect binding system. In this example, glue was used instead of sewing, which led to the mass production of print, accordingly reaching wider audiences. Thus, mass literacy is dependent upon mass production. While often disregarded by technology historians, popular media continues to support this philosophy ('Does technology drive history?' n.d.). This study is not meant to be a debate but rather an understanding of ways of perceiving technology, both historically and in our current world.

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Introduction

"Does society construct technology or technology construct society?" This is the question that we attempt to answer with our research. The technological sublime posits that how technology is *portrayed* shapes society (Marx, 1964; Nye, 1994). Correspondingly, this means that the *representation* of various technologies (in our research, as presented in American history, geography, and social studies textbooks, 1920-1960) influence those who read such texts to respond in a particular manner (in our case worshipful, patriotic, and awestruck). Considering the technological sublime, society, thus, constructs technology. In contrast, technological determinism postulates that technology *shapes* society (Chandler, 1996) and as such, is the foundation of all human activity (Croteau and Hoymes, 2003). While often disregarded by technology historians, popular media continues to support this second philosophy ('Does technology drive history?' n.d.). Our study is not meant to be a debate of these two theories but rather an understanding of ways of perceiving technology, both historically and in our current world. Below, we discuss these two concepts.

Technological Sublime

The idea of the sublime 'impressing the mind with a sense of grandeur or power; inspiring awe, veneration' ('Sublime,' 2012) can be found as early as the third century A.D. in the writings of Longinus, attaching itself, over the centuries to the present onto such varied subjects as writing, nature, advertising, and technology (Edgerton, 2007; Grube, 1975; Key, 1973; Marx, 1964; and Nye, 1999). For example, one might consider Shakespeare's works as examples of the writing sublime or the Great Smokey Mountains in the United States as an example of sublimity in nature. For our research, we focused on the technological sublime.

Thesis

According to David E. Nye (1999), the technological sublime concentrates '…on the triumph of machines…over space and time.' (57). Examples of this particular type of sublimity range from railroads, bridges, electricity, and the cotton gin to semiautomatic rifles and airplanes (Edgerton, 2007; Goebel, et al, 1955; Marx, 1964; and Nye, 1999). Our thesis is that American junior high/middle school and high school American history, geography, and social studies textbooks, 1920-1960, influenced American students to believe that the U.S. is the first, best, the elite in terms of world technology. We contend that such a portrayal has influenced American curriculum for generations, producing hegemonic citizens who quasi-worship technology.

Methodology, Theoretical Framework, and Data Sources

Our methodology is both rhetorical and discursive, relying on Foucault (1972) for conceptual support and borrowing his position that governmental and social institutions encourage normative behavior in citizens and disperse power through networks. For our study, this means that we see schools, both public and private, the institutions and textbooks, as networks. Accordingly, we applied more rhetorical and discursive analytical means than those available from Foucault by sampling American junior high/middle school and high school American history, geography, and social studies textbooks, 1920-1960, and studying these textbook narratives in terms of sublime technology and inventions. We also looked to Edwin Black's (1978) critical approach, classifying and criticizing rhetorical artifacts according to situation (in this case as textbooks).

Questions asked of each studied textbook (We were looking for rhetoric about technology and narratives about inventions and inventors) were both structural and post-structural. Structural questions included the following: What is represented (the technology/invention)? How is the technology or invention represented? If the narrative contains people, how are they represented? What discourses inform the technology or invention narratives? What technologies/inventions are excluded from the book? Which individuals are excluded? Post-structural questions asked of the studied textbook narratives were: Who speaks and with what authority? How do these individuals/technologies speak? Who is spoken to? How do the narratives construct their readers? What discourses about technologies and inventions are included? What discourses about technologies and inventions are excluded?

Textbooks examined were obtained from two historical textbook collections, the Blackwell Education Museum at Northern Illinois University in DeKalb, Illinois, and the John A. Nietz Old Textbook Collection at the University of Pittsburgh, Pittsburgh, Pennsylvania.

Findings

We found separate chapters in several of the textbooks that focused on the sublime of technological inventions in America. For example, in *A History of the United States,* the following quotation from a chapter on aviation and World War II demonstrates the use of superlative phrases heaped one on top of another, in order to construct a cumulative effect of growing power and might. (Underlined items used to demonstrate this are ours.)

> *Huge factories turned out thousands of fighters and bombers, while great numbers of young men were trained for the air forces. New types of planes were constantly developed and the speed of fighters increased to more than 400 miles an hour. Enormous bombers were built with a range of 3000 miles. Their bomb loads were doubled, then tripled. Huge transports flew thousands of men and tons of material to far-flung battle fronts in all parts of the world. Air attacks involving hundreds of long range bombers became common.* (Goebel, et al, 1955, 437-8)

This chapter is not an anomaly. Others, for instance, focus on transportation, e.g., cars and trains and communication e.g., telephone and radio. (Bodley and Thurston, 1940; *The Earth and Its People,* n.d.; Goebel, 1955; *Lands and People,* 1929; Wilder, 1950)

Another way to support the promotion of the technological sublime in the studied textbooks is through the authors' use of grammar. For example, a standard composition book of the 1950s had this to say about the exclamation point: (it) '…is to be used at the end of a sentence or phrase to signify the extra stress that would be given to an "emphatic spoken exclamation" such as "man overboard" or help!"' (DeVaney and Butler, 2001, 103; Wooley, et al, 1958, 238). Given this definition, the following sentences from Goebel (1955) demonstrate the use of the exclamation point to create a sense of awe about the technology and invite the reader to join in the greatness that is America: 'But the first telephones were poor instruments compared with those of today!' (Goebel, et al, 1955, 432) and 'By the late 1940s, enough cable had been laid to encircle the world many times!' (Goebel, et al, 1955, 431) This unusual use of the exclamation point reinforces the concept that textbooks are ideological and that the discourse of indoctrination is constructed.

Narratives of inventions (such as the cotton gin, the telephone and the transatlantic cable), would often change only slightly from textbook to textbook and decade to decade (Bodley and Thurston, 1940; The Earth and Its People, n.d.; Goebel, 1955; Lands and People, 1929; Wilder, 1950). The almost myth-like rhetoric used in

such texts reinforced U.S. technology as a driving force in the country's economy and history and promoted another aspect typical of the technological sublime – the worship of the engineer or inventor.

Stories of inventors, those who created new sublime technology, were often written in a parable-like fashion in the studied textbooks. Inventor stories tended to follow the same sort of outline, from humble beginnings to overcoming great odds to persistence to achieving success. This was true, no matter their invention. Thus, we see similar stories for such American inventors as Thomas Edison (electric light), Robert Fulton (steamboat), Henry Ford (automobile), and Andrew Carnegie (steel master). (The Earth and Its People, n.d.; Goebel, 1955) An example of such an allegorically-written story is that of Robert Fulton, inventor of the steamboat. Please note that we have identified each paragraph (in underlining) with that section of the parable with which it corresponds.

> Humble Beginnings
>
> *Born into a humble family in Pennsylvania, he had little education. He became an artist and earned his living by selling pictures. At the age of twenty-one he went to Europe where he soon became more interested in machines and invention than in art.*
>
> Overcoming Great Odds
>
> *…After patient planning and much hard work, Fulton at last launched a steamboat in 1802. The vessel sank immediately. Undiscouraged, Fulton built another. Although this one floated and could move under its own power, it was very slow. Fulton was sure he could build a better one.*
>
> Persistence
>
> *…Early in 1807, Fulton's new steamboat was nearly completed…Those who had watched it being built had laughed at the inventor and had called his boat 'Fulton's Folly.' But Fulton kept on with his work. On a day in August, the Clermont, as the boat was called, was ready for a trial trip up the Hudson. What a queer sight she was to the people who lined the river banks!*
>
> Success
>
> *…No longer was the steamboat Fulton's Folly. It was a success and soon proved its usefulness. New and improved steamboats laden with goods and passengers were puffing up and down all the principal rivers.* (*The Earth and Its People*, n.d., 273-4)

What do these findings mean?

Conclusion

U.S. history, geography, and social studies' textbooks, 1920-1960, through their technology/invention/inventors' discourse, constructed students to believe in the power and might of the United States; thus creating a patriotic worship of American technology; i.e., the technological sublime.

Next, we turn to technological determinism.

Technological Determinism

"Human nature is not a machine to be built after a model, and set to do exactly the work prescribed for it, but a tree, which requires to grow and develop itself on all sides, according to the tendency of the inward forces which make it a living thing." (Mill, 1859, 71)

Thesis

Technological determinism and technology sublime share similar theoretical underpinnings, however, there are subtle nuances that differentiate the two lenses. Technological determinism posits that technology is the sole catalyst that drives

societal activities and norms whereas the technological sublime contends that society dictates the direction and evolution of technology. This is the preverbal chicken and egg debate. As previously stated, technological determinism postulates that technology shapes society (Chandler, 1996) and as such, is the foundation of all human activity (Croteau and Hoymes, 2003). The technology determinist view is a technology-focused theory of social change that depicts technology as the prime change agent in history. For technological determinists, technology such as literary, linguistic, media, communications, and industrial technological advances, transform society on every level.

The notion of technological determinism was first conceived by American socialist and economist, Thorstein Veblen (1857-1929), who suggested that technology is an independent power that transforms society. For example, technological determinists view technology such as textbooks as a vehicle that changes society on every level including individuals, institutions and social interaction. Educator, philosopher, and scholar Marshall McLuhan, was also a technological determinist. He posited the notion that print aided in the construction of the nation state, which moved society from an oral culture to a literate culture. His position was that technology is the extension of human abilities. "Tools and implements are extensions of manual skills and the computer is the extension of the brain." (Murphrie & Potts, 2003, 13) McLuhan believed that media extends human perception and defines history by technological change. For example, the advent of the printing press in the 15th century created a shift in the way society viewed the world.

What is the relationship of technology and society?

Throughout history there are examples of disruptive technologies that cause a shift in societal norms. For example, the literary context experienced one of the first disruptions in society due to the invention of the printing press, which altered the process of creating and manufacturing books and documents in Europe. In the 7th to 13th century, the age of religious 'manuscript' book production, books were produced and constructed by hand, which consisted mainly of religious texts whose creation is meant as an act of worship. Clergymen hand wrote the scriptures into books, taking many years to complete volumes. These manuscripts were unique in that there were only a very few produced and only the wealthy and clergy could read them. During the 13th century a transition occurred to the secularization of book production. Books were no longer looked upon as objecst of worship but rather to provide an explanation of the world. This transition was dueto the return of the crusaders, who brought back texts from Byzantium which focused on political and world issues (secular issues). (Brown, 2012, 1)

What are the factors of technological change?

Secularization of books was a factor that led to the creation of universities and the demand for non-religious texts. Instead of monks writing the manuscripts, stationers and book copiers printed books for the masses. Printing books by hand was obviously very tedious work, resulting in inaccuracies that occurred due to boredom, tiredness, or errors not caught in previous copies. The mistakes were compounded as new books were made from prior copies, which frustrated educators. (Brown, 2012, 1)

How far does technology impact social change?

Technological determinists would argue that the technology of the printing press in 1547 was responsible for the shift in the social organization of learning in Europe. This era of the first printed books produced printed versions of religious works such as the Bible, prayer books and religious calendars.

Gutenberg was attributed to the invention of the moveable type. He combined previous independent technologies of paper making, ink, and the wine press to print books. These technologies were known for centuries before the invention of the printing press. Many technologies end up being used in ways never foreseen by their inventors and as a result, the aggregation of all of these technologies in one place impacted society with the mass production of books. (Brown, 2012, 1) In this way, technological determinism defines history by technological change. Marshall McLuhan's premise was that all technologies are extensions of human capacities. In our example, the independent technological inventions of paper making, oil based ink, and the wine press were the catalysts of the technological development of the printing press that altered the way books were produced, resulting in the change of societal norms and the way people thought and learned. Thus the advent of the printing press propelled society forward to a more literate society. Linguistic determinism posits that our thinking is determined by language, which connects to technological determinism. In our research, this implies that printed textbooks, in generations past, helped form the United States political legitimacy as a sovereign entity by the relationship of technology and society; therefore the belief that technology is the sole catalyst for societal evolution: past, present and future.

In support of this, we turn to Ong (2002) who in his text, *Orality and Literacy* suggested that the technology of writing changed the human thought process. For Ong (2002), oral and literate societies are distinctly separated resulting in the "Great Divide."

> *...functionally literate human beings really are: beings whose thought processes do not grow out of simply natural powers but out of these powers as structured, directly or indirectly, by the technology of writing. Without writing, the literate mind would not and could not think as it does…More than any other single invention, writing has transformed human consciousness. (Ong, 2002, 77).*

Current Manifestations of Technological Determinism

Technological determinism considers technology as an independent factor, with its own properties, its own course of development and its own consequences. In the Victorian era, technology was linked to social progress which created a social mind-set regarding the industrialization of goods and production. Currently in the post-industrial era, information is prized and is linked to social progress. "Technological determinism usually refers to the present, projected into the future, as expressed in claims that 'we have no choice but to adopt this technology.'"(Murphrie & Potts, 2003, 12)

Technological determinists believe that successful wide scale technical innovation will have a profound impact on society. A modern day example is the Internet which has impacted 'the information age' or the 'computer age.' Many technologies evolve and are being used and combined in ways never foreseen by their inventors. For example, the United States Department of Defense invented the Internet as means of communication. (Chapman, 1998, 1; eNotes, 2012, 1)Over the past 20 years, the Internet has been used by the government, private and public

organizations, as well as individuals, young and old alike. Currently, the Internet is used for diverse purposes such as intelligence gathering by the military, entertainment, diffusion of information, capitalism, religious, educational, and political activities and more. Today the technology of the Internet has quenched societies' thirst for real-time information, which confirms the notion of technological determinism; i.e.,the Internet is an agent of social change. McLuhan's notion of the global village foretells the Internet in the 1960's. (Marshall McLuhan…, 2012, 1) He suggested that media extends human perception, just as the Internet has provided society a vehicle to expand previously narrow perceptions to a global level.

Conclusion: Does Society Construct Technology or Technology Construct Society?

Our study is not meant to be a debate between the technological sublime and technological determinism but rather an understanding of ways of perceiving technology, both historically and in our current world. If viewed through a technological sublime lens, using our research with its portrayal of technology and inventors/inventions in American junior high/middle school and high school American history, geography, and social studies textbooks, 1920-1960, society shapes technology. Given the technological sublime, questions to consider in today's world include, what is today's new sublime status? (Could it be the computer, the iPad, digital information existing only in the cloud?) Are we still influencing our students through history, social studies and geography textbook patriotic/worshipful rhetoric in terms of technology? In terms of inventions and inventors?

If viewed from the technological determinism lens, then society is impacted by technological advances providing new potential for learning and thought. Indeed, as McLuhan (1967, 205) posits "Instead of asking which came first, the chicken or the egg, it suddenly seemed that a chicken was the eggs idea of getting more eggs."

Certainly, there may be legitimacy with both points of view. Perhaps a middle-of-the-road approach holds sway as we travel further into the twenty-first century. In a complex world, where technological systems are becoming more common than individual technologies, which does come first – society or technology?

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