［論文］

Studies in Communication and Information : Can Media Technologies ‘Bite Back’?

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This paper looks at the study of communication and information. The joint discipline often includes information media technologies. The paper attempts to show that when students study communication and information technology, they also need to be engaged in courses that allow them to understand the ways media impact on society. That is, they need to consider the possibilities that media technology can ‘bite back’. One rationale for this premise is explicated in a theory of communication termed, *Technological Determinism*, the impact of technology on human behavior. First, communication, information and information technology are defined. Second, the views of Marshall McLuhan and other media observers highlight the discussion on technological determinism. The concept of media ecology is presented to accommodate the limitations of technological determinism. Third, engagement-based activities are presented as learning tasks that enable students to become engaged in the process of understanding the fuller implications of media technologies.

Key Words：Communication, Information, Information Technology, Technological Determinism, Media Ecology

1. Introduction

In the university, the joining of two disciplines--the study of communication and the study of information are becoming well established in many academic institutions in the world. The coupling of these two disciplines is rapidly expanding in Japanese universities as well. In academia, the study of information is often a synecdochic term that largely implies information technology（IT）. Then, what is the relationship between communication and information technology? Why should they be joined in faculties, such as letters and science that are grounded in the study

of humanities? This study attempts to look at these questions by first explaining what the conceptually broad terms *communication*, *information* and *information technology* denote, and how they relate to each other. Then, a communication theory known as *Technological Determinism*, the impact of technology on human behavior and its past and present influences on shaping our social realities, is discussed. In other words, the discussion will look at the possibilities that media technology can 'bite back'. The views of media observers and especially Marshall McLuhan, who proclaimed, 'the medium is the message' are used to frame the discussion. The aim of the discussion is to project an argument that curriculums that involve students in the study of information technology, especially media, should include courses that explore the impact of technologies on human behaviors. This is an appropriate role of faculties of letters and sciences that are grounded in the study of humanities. Examples of engagement-based activities are presented as learning tasks that enable students to become engaged in the process of understanding the fuller implications of media technologies.

2. Communication, Information, Information Technology: Defining the Terms

The broadly conceived terms *communication*, *information* and *information technology* are often used but difficult to define. What does one say when suddenly pressed to define them? How are the terms different? One particular difficulty is that the terms, in academia, are subsets of a larger concept called communications, "the discipline that studies the principles of transmitting information and the methods by which it is delivered (e.g. print, radio or television etc.)" wordnet. princeton. edu/perl/webwn. The terms are juxtaposed. However, for purposes of clarity, the concepts will be teased apart and defined. Common descriptions of the terms were collected from a search of their uses on the Internet.

2.1 What is communication?

Communication is especially layered with myriad meanings. For example, a quick search on the Internet offered a long list of definitions of 'communication' on the

Web. After analyzing the list, the definitions were categorized into two areas: 'communication as an interpersonal concept' and 'communication as an electronic/ technological (impersonal) concept'. A selection of definitions are conceptualized as follows:

Communication as an interpersonal concept is:

* when someone 1) has good listening skills and is able to write clearly, including writing a good memo; 2) is able to speak to single individuals or large groups, in order to teach, inform, or persuade. conference.workforcewv.org/pdfs/competencies/CWDPCompetencies.htm
* the exchange of ideas, opinions and information through written or spoken words, symbols or actions. wps.prenhall.com/wps/media/objects/213/218150/glossary.html
* the fundamental component of social behavior; the transmission of information (messages) between a sender and a receiver using any of the five senses. Language is a form of communication specific to humans. www.csa.com/ hottopics/ebonics/ gloss.php

Communication as an electronic/technological (impersonal) concept is:

* the movement of data from one part of a system to another. Local communication is the movement of data between the processor and memory; global communication is the movement of data from one node to another. books.nap.edu/html/up_to_speed/appD.html
* when communication is a movement of matter or energy between two parts of the universe. This matter or energy can be a carrier of information. www.intelligent-systems.com.ar/intsyst/glossary.htm
* the transmission and reception of data among data processing equipment and related peripherals. www.weedinstrument.com/info_central/c.html

In the above definitions, *communication as an interpersonal concept* involves

exchanges of thoughts, messages etc. through speech, signals or writing. Thus, communication is a humanistic concept that is fundamental to social activity. On the other hand, *communication as an electronic/technological concept* has extended and reshaped the role of agency to include both human and technological senders and receivers of exchanges or movement of information (data) through electronic media. Therefore, *communication* encompasses both "the art [human side] and technology of communicating" (*American Heritage Dictionary*) -- and what is being communicated is information.

2.2. What is information?

* A collection of facts from which conclusions may be drawn; "statistical data" wordnet.princeton.edu/perl/webw
* Information is the result of processing, manipulating and organizing data in a way that [hopefully] adds to the knowledge of the person receiving it. www.orafaq.com/glossary/faqglosi.htm

Information is the data or messages that are 'treated' or mediated through the communication process. Hopefully, information provides meaningful input to the recipient i.e. knowledge. From a technological perspective "Information is the output of information systems" dssresources.com/glossary/dssglossary1999.html. In turn, *information systems* are underpinned by the media/information technologies that shape and move information.

2.3. What is information technology?

* A term that encompasses all forms of technology used to create, store, exchange and utilize information in its various forms including business data, conversations, still images, motion pictures and multimedia presentations. www.sciencecoalition.org/glossary/glossary_main.htm
* Information Technology applies modern technologies to the creation, management and use of information. IT includes video recorders, CD-ROM, telephones,

calculators, and electronic cash tills as well as computers.
www.warwick.ac.uk/EAP/correcting_your_work/glossary.htm

* Computer and communications hardware and software used to automate and augment clerical, administrative, and management tasks in organizations.
www.christlinks.com/glossary2.html

In short, information technology refers to the technological tools (mostly electronic and media related) that manage and mediate exchanges of information. Technology denotes an application of science to achieve an objective. In anthropology, the concept of technology as a 'tool' is clearly defined in the *American Heritage Dictionary* as, "Broadly, the body of knowledge available to a civilization that is of use in fashioning implements, practicing manual arts and skill and extracting or collecting materials". In the realm of communication and information, we shape implements i.e. 'tools' to assist us in expediting and managing the exchange of information. This statement suggests that humans are in control of the technology we produce.

However, is it possible that tools grounded in technology affect our belief systems and values, and influence our thought-worlds? Neil Postman a cultural media critic and former Chair of New York University's Department of Culture and Communication, believes that 'tools bite back'. That is, we have become a "*Technopoly*, his term for a culture whose thought-world is monopolized by technology. In technoply, tools attack the very foundation of culture and bid to take it over" (Postman, 1992, p.71). Under this scenario, Postman further writes, "The culture seeks its authorization in technology, finds its satisfactions in technology, and takes its orders from technology" (p.71). Although Postman's assessment of the impact of technology on our culture and our thinking may be a bit extreme, it does lay the groundwork for an educational initiative: If students are engaged in the study of IT, they must also be engaged in courses grounded in the humanities. The following furthers the argument by addressing the ways technology impact on our

culture and thought-worlds.

3. A look at Technological Determinism and Marshall McLuhan

We shape our tools and they in turn shape us

Marshall McLuhan

Edgar Allan Poe wrote, “Those who dream by day are cognizant of many things which escape those who dream only by night”. This quote aptly describes Marshall McLuhan（1911-1980）, a Canadian literature professor who to some extent prophetically wrote and talked about the ways technology（especially media technology）impact on our culture. McLuhan wanted us to be cognizant of how media technology shapes our cultures, thoughts and behaviors. McLuhan posited that the technology of media is affecting us in ways we may not be aware of. For example, he felt television as a medium has more influence on our psyche than its explicit messages or content. In short, what is important is not, for instance, what people watch on television, but rather that they watch it. Thus, when McLuhan proclaimed the *medium is the message* in the early 1960s, at the dawn of the age of media, such as television, he challenged those in media studies to look at media technology in a wider and different light. Perhaps, Marshall McLuhan's most insightful contribution to media studies is his vision of the ways in which history, culture, society and individuals are modified, and to some extent, determined by technology-a view which others have labeled, *technological determinism*.

3.1 Determinism as a narrative to define social conditions

Marx's Economism is related to technological determinism. Karl Marx stimulated the debate on determinism with his provoking remark that *the hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist*（*Poverty of Philosophy*, 1847）. In Economism, the economic base of society is seen as determining everything else in the superstructure, including social, political and intellectual consciousness. For example, news organizations would be the media superstructures whose actions, values and beliefs are largely formed or influenced

by their economic base, the corporations that either own or sponsor them. According to this view, "the contents of the media and the meanings carried by their messages are... primarily determined by the economic base of the organizations in which they are produced" (Curran, Gurevitch & Woollacott, 1982, p.18). Therefore, media organizations would have to cater to the interests of the organizations, advertisers or governments, that they serve. Determinism also appears in *nature vs. nurture* debates, the former being a form of genetic determinism and the latter environmental determinism. Linguistic determinism (e.g.Whorf-Sapir hypothesis) suggests that our language determines our thinking. Chandler (2005) writes, "Just like these other deterministic theories, technological determinism seeks to explain social and historical phenomena in terms of one principal or determining factor. It is a doctrine of historical or causal primacy" (p.1). However, some researchers argue that deterministic theories are too narrow and subjective. Griffin writes, "Si nce deterministic theories maintain everything in life is connected to a single factor-economics (Marx), sex (Freud), media (McLuhan) -there's no way to stand objectively outside the theory to support or discredit its claims" (2003, p.352). Therefore, it should be said that a criticism of deterministic theories is *reductionism*, the stating of a singular cause and effect view of a phenomenon under study.

Nonetheless, McLuhan's lasting contribution to the area of communication studies was his view that technological development has a seminal impact on our cultures. He posited that this impact can be best understood by viewing our historical past in periods that are demarcated by technological change. However, McLuhan was not so much interested in the history of Western technology as much as he was in the ways technological change shaped the individual both cognitively and affectively. Next, McCluhan's historical analysis of major technological changes and their impact on society are summarized.

3.2 A media analysis of human history

McLuhan's media analysis of human history is divided into four periods-a tribal

age, a literate age, a print age and an electronic age. McLuhan posited that transitions between periods were not evolutionary, but revolutionary. In each case, one era was suddenly replaced by the next era because of new developments in communication technology. The chart in figure 1 represents McLuhan's view of history. Since McLuhan also liked to speak of media technology organically as extensions of our body and mind, he also included the dominant senses, *eye, ears*, and *touch* that became prominent with each technological development. In the chart, according to McLuhan we are at the cusp of history-at the end of the print age and at the beginning of the electronic age.

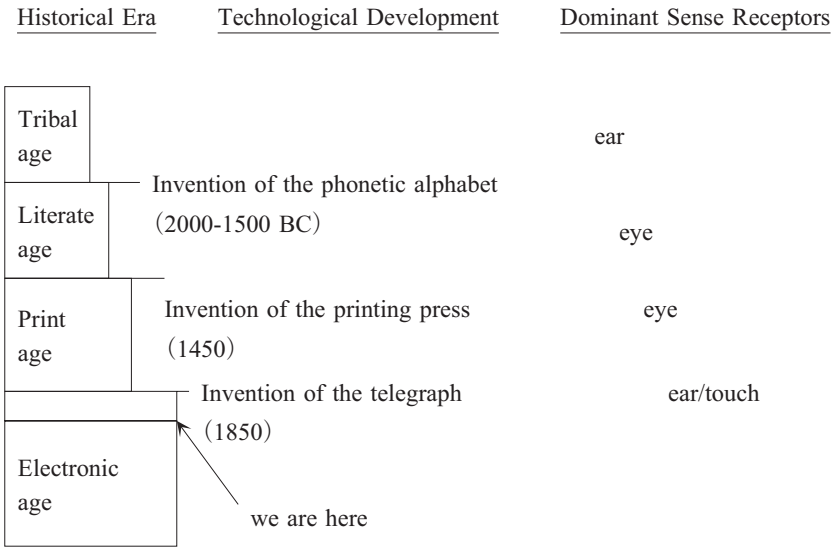

Figure 1. McLuhan's Media Map of Human History (Adapted from Griffin 2003, p.342)

The Tribal age represented an oral culture. In our culture you know poetry when you have read it. In an oral culture, where the ear was king, you knew poetry when you could recite it（Andrews, 1995）. Also in an oral culture hearing is believing. People gathered and conformed to the community. McLuhan wrote, "By their dependence on the spoken word for information, people were drawn together into a tribal mesh"（Cited in Griffin, p.346）. That is, until the alphabet was invented.

The Literate age saw the introduction of the alphabet, which meant that the eye replaced the ear, and in turn the oral tradition disappeared. McLuhan also posited that the writing of letters in words in a logical step-by-step fashion furthered the development of logical thinking. He believed the invention of the alphabet in Greece accounted for the sudden appearance of mathematics, science and philosophy.

The Print age caused visual dependence to further extend dramatically on a mass scale with the invention of the printing press. McLuhan observed that the printing press in its ability to mass-produce identical products was the predecessor of the industrial revolution. Moreover, the printed word also trumpeted individualism. However, McLuhan also saw a side effect of the printing press. "Printing a ditto device, confirmed and extended the new visual stress. It created the portable book, which men could read in privacy and in isolation form others"（McLuhan & Fiore, 1967, p.50）. No wonder McLuhan was optimistic about the electronic age, a new era forced by inventions in electronic technology that reunited man with village life albeit on a much grander global scale.

Next McLuhan's view of electronic age, the period on which he spent much of his historical media research analysis will be given more attention.

4. The Electronic Age and the Global Village

McLuhan believed that the invention of the telegraph wrenched the world from the print age to electronic age. The telegraph was the first electrical engineering

technology. The invention of the telegraph produced “a sharp distinction between forms of engineering, such a civil engineering, grounded in a handicraft and guild tradition... and electrical which［was］science based from the start”（Carey, 1992, p.202）. In view of McLuhan’s historical analysis of media technology and how it has influenced society, the eruption of the electronic age with the invention of the telegraph had a profound revolutionary impact on the human psyche. The telegraph revolutionized communications. It was effective in the separation of communication from transportation. Before the telegraph, “communication” referred to transportation as well the transmission of messages. Messages no longer had to be sent by horseback, boat or train. Carey writes, “The telegraph freed communication from the constraints of geography.（p.204）. It replaced a thought-world grounded in the principles of mechanism to a new thought-world underpinned by the sphere of electromagnetism. McLuhan wrote,

> The peculiarity about electric form, that it ends the mechanical age of individual steps and specialist function, has a direct explanation. Whereas all previous technology has, in effect extended some part of our bodies, electricity may be said to have outered the central nervous system itself, including the brain. Our central nervous system is a unified field without segments（p.247）.

McLuhan saw electric energy as an organic extension of ways in which the brain interacts. He wrote, “Electricity offers means of getting in touch with every facet of being at once, like the brain itself”（p.249）. The properties of the brain interrelate and stimulate each other. “It is this provision of interacting places or mixing places that allows us to react to the world *as whole* to a much greater degree than most other animals can do”（Young, 1960 cited in McLuhan, p.248）. McLuhan believed that in the print age, a mechanized thought-world existed where parts move in a step by step or linear ways. “And the mechanization of a task is done by segmentation of each part of an action in a series of uniform, moveable and repeatable parts”（p.248）. However, in the electronic age, McLuhan states,

> The exact opposite characterizes cybernation（or automation）, which has been described as way of thinking, as much as way of doing. Instead of being concerned with separate machines, cybernation looks at the production problem as an integrated system of information handling--like the inner workings of the brain. It is this same provision of interacting places in the electric media that now compels us to react to the world as a whole（p.248）.

Equivocating the speed and interaction of each part of the brain as it processes information（with integral outcomes）to similar processes of electrical forms, such as electric media underpinned the concept of McLuhan's famous "Global Village" slogan. He wrote, "the simultaneity of the electric communication, also characteristic of our nervous system makes each of us present and assessable to every other person in the world"（p.248）. Thus, McLuhan proclaimed in the early 1960s that "We live today in today in the age of information and of communication because electric media instantly and constantly create a total field of interacting events in which all men participate"（p.248）. McLuhan's observations seem even more remarkable today because they were made in the 1960s long before advances in computer technology and network systems, such as the Internet.

As a humanist, McLuhan optimistically believed that the electronic age would bring people back to the community, a sort of retribalization. Like other futurists, such as John Dewey（1859-1952）from the Chicago school, McLuhan saw electronic technology as a means to reawaken the public voice. The Chicago school scholars saw communication as more than exchanging information. They thought of communication as the entire process "whereby a culture is brought into existence, maintained in time, and sedimented into institutions"（Carey, 1992）. For example, the public is something that is brought into existence because of the printing press in mass media, such as newspapers and magazines. In Dewey's view, developing communications technologies was a cohesive force in society. They created a horizontal network（e.g. his day news media, telephone and radio）of "...large

numbers of people physically separated in space, but tied by connection to extra-local centers of culture, politics, and power" (Carey, p.162). The Chicago School group felt that horizontal networks supported by advances in technology would bring local communities together into a unified nation with "...a great public of common understanding and knowledge (Carey, p.143)". In short, through technological advances, the public would be allowed to participate in the *Great Debate*, a great conversation about democracy (see Dewey, *Democracy and Education*, 1916). Whereas Dewey saw media technology as way to empower the voices of local communities within a unified nation, McLuhan thought about a "global village". He thought about social progress on a global scale brought about by integrated networks of electronic communication. McLuhan (1964) wrote,

> If the work of a city is the remaking or translating of man into a more suitable form than his nomadic ancestors achieved, then might not our current translation of our entire lives into the spiritual form of information seem to make of the entire globe, and of the human family, a single consciousness? (p.61).

Both Dewey and McLuhan viewed the role of technology on society in a positive light. Their views reflect a soft version of technological determinism. That is, advances in mass media technology were seen positively as a means to decentralize the power structures of traditional institutions that controlled information for their special interests. In their optimism, they believed that developing communications technology would bypass centralized controls of information (e.g. the monopoly that Western Union had over telegraph communications soon after it was invented). In doing so, new technologies would provide the means for the public to be highly informed and to have its voices equally heard. In their view, the history of communications technology becomes a story of the spread of human knowledge, the ongoing democratization of society, culture and politics, the growth of freedom and the breaking of up of monopolies (Carey, 1992). However, Harold Innis saw a

different pattern.

4.1 Electronic technology : a pattern of decentralization and recentralization

Harold Innis（1894-1952）, a Canadian, was also a Chicago School scholar who had succeeded Dewey. Later as a professor at University of Toronto he had largely influenced the young McLuhan who was also teaching there. Like McLuhan, Innis saw that technological change had an ecological impact. The emergence of a new technology can totally alter its environment, and in doing so there are winners and losers. In his book aptly called *The Bias of Communication*, Innis observed a pattern in which the benefits of a new technology are unevenly distributed. Innis observed that when a new powerful technology emerges it busts up a traditional knowledge monopoly and creates a new one under the control of a different consortium. At first the telegraph strengthened the local and regional press, but eventually wire services and chain papers centralized the control of information. Newspaper monopolies emerged and they were located in communications hubs that empowered certain urban centers. Thus, Innis saw a pattern where new technology decentralizes and then recentralizes. He worried that local media would be the losers. Although new communications technology helped to form a unified culture, Innis would argue with Dewey over whether or not it led to the empowerment of the common public. Carey（1992）writes,

> This development undercut local and regional culture. Although it aided in forming a national culture, it disguised how local-even provincial-this national culture was: a national and even international culture was defined increasingly by how the world was seen from a couple of distinctively local places（p.154）.

Thus, Innis believed that communication technology is spatially biased. That, is new media technologies eventfully become centralized. They also unfairly distribute power. For example, playing on nationally exposed teams such as the New York Yankees or Yomiuri Giants will give players national and even international

recognition that enables them to sign a lucrative contract sponsoring a product. At least, they could attain more lucrative contracts than other star players with less name recognition because the latter play for teams located outside of the main communication hubs. Moreover, the unfair distribution of power is continually underpinned by the control of new emerging monopolies that contribute to centralization. Innis saw communication as an ongoing process of centralization and recentralization. He observed that this iterative process was particularly biased as it eventually clustered back into certain urban centers under the control of new groups. Again we turn to Carey, who reflects Innis's thoughts in the following,

> There would be no transformation of a great community by way of disinterested technology, but only in terms of the ways in which knowledge and culture were monopolized by particular groups（p.152）

Thus, in contrast to the optimism of Dewy and McLuhan, Innis took a hard-line stance toward technological determinism. However, both Innis and McLuhan as media historians did try to awaken the public to think about whether particular media environments influenced by technology were beneficial or destructive for the better good of society. Another media observer, Neil Postman, believed that the primary function of understanding media is to make moral judgments about developing technologies and their influences on cultures. Postman proclaimed, "To be quite honest about it, I don't see any point in studying media unless one does so with a moral or ethical context"（Cited in Griffin, p.21, 2005）. Next, the views of Postman are discussed.

5. Technopoly as a Wake -up Call for the Humanities

Neil Postman（1992）presented a hardline version of technology. He believed our existing *meta-narratives* --moral superstructures or ideologies historically grounded in theology, philosophy and mythology, are losing their influences, and are in danger of being replaced. Postman claimed that the meta-narratives that have

traditionally provided moral and spiritual guidance-- and an ordered meaning of existence for mankind-- are under attack by technology. According to Postman, our cultures are now being ordered by a new controlling superstructure or thought-world, which he termed *technopoly* (also see section 2.3), "the deification of technology in a world where it is possible for technics to subordinate people to its own needs" (1992, p.71). Postman adds, "Those who feel most comfortable in technopoly are those who are convinced that technological progress is humanities supreme achievement and the instrument by which our most profound dilemmas may be resolved" (p.71). Thus, Postman believed that we have entered into an era where our thought-world is ordered by a belief that technological innovation is sublime at any cost.

Like McLuhan and Innis, Postman constructs his view of technoply by offering an historical analysis of the ways technology has impacted our cultures. He posits that technological inventions have gone from tools that have historically served mankind to tools that are now in a position to not only shape, but also control our cultures, and therefore determine our thoughts and behaviors. Postman classifies cultures into three areas that depict mankind's relationship with technology "indicating what dangers lie ahead" (1992, p.22). He classifies the cultures as *tool using, technocracies* and *technopolies* and points out that all three cultures can be found on the planet although the first is rapidly disappearing.

Tool-using cultures (early in our history) use tools to solve specific and urgent problems dealing with physical life. Tools for use in waterpower, windmills, and heavy-wheeled plows are given as examples. Postman reminds us that tools during this era were capable enough to build mechanical clocks, castles and cathedrals. The crux of Postman's thesis can be found in the way he views mankind's relationship with tools or vice versa in tool using cultures,

In either case, tools did not attack (or, more precisely, were not intended to

> attack）the dignity and integrity of the culture into which it was introduced. With some exceptions, tools did not prevent people from believing in their traditions, in their God, in their politics, in their method of education, or in their legitimacy of their social organizations（p.23）.

Postman（p.24）further posits that in tool using cultures, societies beliefs and values remained in tack as a controlling force over each tool invention,

> Even in the case of military technology, spiritual ideas and social customs acted as controlling forces. ...the uses of the sword by the samurai warriors were meticulously governed by a set of ideals known as *Bushido*, the Way of the Warrior

However, somewhere along the way during the eighteenth and nineteenth centuries according to Postman, the development of technologies became mankind's quest. In turn, the concept of technocracy entered into our thought-world. Postman writes,

> Alfred Lord Whitehead summed it up the best when he said the greatest invention of the nineteenth century was the invention itself. We learned *how* to invent things, and the question *why* we invent things receded in importance（p.43）.

For Postman, technocracy gave the world progress and a faith in machinery. It also broke our bonds with traditions. Consequently, he believed that technocracies began to displace our controlling ideologies-whether spiritual, social or political. In this scenario, "tools are not integrated into the culture, they *become* the culture"（p.28）. Finally, Postman posits that as technology takes control of our thought-world, then Technoply emerges, the submission of all forms of culture life to the sovereignty of technics and technology（1992）.

In *technopoly*--a version of a postmodern world that rejects any sense of enlightenment or a faith in science, Postman presents an extremely hard view of technological determinism. Humans are no longer motivated to do something because it is universally good. Jean Francois Lyotard who popularized the term *postmodernism* writes, "I define postmodernism as incredulity towards meta-narratives" (1984, p.xxiv). Without meta-narratives to provide spiritual and moral guidance, a great void emerges. Postman would add that this can also be a state of technoply--a world controlled by technology and without a moral center, where our beliefs and values are no longer supported by traditional moral superstructures. However, Postman also makes it clear that he is not a neo-luddite proclaiming that technology is malevolent and its development should be stopped. His position is that as technology has entered our thought-world, there is even more of need to balance its effects by promoting the role of humanities in schooling. Postman writes (1992, pp.185-86),

> In considering the disintegrative power of technopoly, perhaps the most important contribution schools can make to the education of our youth is to give them a sense of coherence in their studies, a sense of purpose, meaning and interconnectedness in what they learn.

In short, Postman calls for educators to provide broader, coherent understandings of how media shapes our cultures.

6. Technological Determinism to Media Ecology Education.

Scholars have criticized technological determinism as mentioned (see section 3.1) because of reductionism i.e. deterministic approaches to research are too narrow in scope and are subjective. However, Griffin (2005) posits, 'Technological Determinism' is a label that McLuhan's detractors use to unfairly caricature his ideas. Scholars who see wisdom in the McLuhan's description of media's effect on culture refer to his work as "Media Ecology". The term *media ecology* suggests a

holistic understanding of the ways media impact on our environments. In ecology a small change makes a difference; it alters the environment. For example, if you eliminate caterpillars from a given environment, change will occur. You are not left with the same environment. Similarly, the same thing will happen if you add caterpillars to an environment that previously had none--change will occur. Postman suggests that the ecology of media works in a similar fashion. “A new technology does not add or subtract something. It changes everything” (p.18). Thus, one might argue as Griffin does above that McLuhan is not preaching technological determinism; he is challenging us to be awakened, to be engaged and to face the media environments that are imposed on us. Postman adds, “We need students who will understand the relationships between our technics and our social and psychic worlds, so that they can begin informed conversations about where technology is taking us and how” (1992, p.198). Postman’s call to educators further establishes a premise for why media studies (communication and information) should be linked to the studies in humanities. Thus, media critics, such as Innis, McLuhan and Postman have challenged us to look critically at media environments. Their views have also provided an impetus for educators to introduce courses at universities that are grounded in media ecology.

Next, examples of activities that try to engage students to look critically at media environments are presented.

6.1 Engagement-based activities to advance a media ecology perspective.

There are a plethora of engagement-based activities that a media ecology course could introduce to students. The following example activities below (grounded in the views of Dewey, Innis, McLuhan and Postman) are aimed at getting students involved in a constructive learning process that helps them to become aware of and to discuss the ways media impact on our environments.

Engagement-based activity #1 --McLuhans' Tetrad

During the last years of his life, McLuhan along with his son Eric attempted to establish frameworks for analyzing media environments. Perhaps pressured to be more scientific, they created a framework known as a tetrad（a group or set of four）to establish that there are four laws that apply to every type of media. The laws are presented as analytical questions:

* *What does it enhance or intensify?* McLuhan asks this question because he believed that technology is an extension of the human body or mind. For example, the car enhances how far and fast our feet can take us. A car also intensifies individuality.
* *What does it render obsolete or displace?* With every technological gain there is a loss. Cars made the horse and buggy obsolete. Also leg muscles weakened as people walked shorter distances and rode their bicycle less.
* *What does it retrieve that was previously obsolesced?* According to McLuhan retrieval of something long forgotten occurs with the emergence of a new technology. For example, electricity created the global village and in turn retribalization. The driver of a car becomes a modern knight in shining armor, an empowered king of the road.
* *What does it produce or become when pressed to an extreme?* The McLuhans posited that if something is pushed to it limits, its enhancement qualities will reverse. For example, too many cars produce stalled or slow moving traffic jams, which have become a norm in drivers' lives.

These questions can be presented to students as an activity in the following grid to develop awareness about media environments e.g. Computers. Students would be given a blank grid with only the four questions abbreviated as categories. Then they would either be given a media technology（e.g. Computer）to analyze（see figure 2.）and then choose their own and fill in their observations（e.g. the cell phone）.

Computer

Enhances	Reverses into
* Speed of calculation and retrieval of information * Personalized choice of information	* Anarchy * Loss of Privacy * Time bandit (Time consuming)
Retrieves	Obsolesces
* Perfect memory * Total and exact	* Library * Language Laboratories

Figure 2. Tetrad for Computer (adapted from McLuhan and McLuhan, Laws of Media, 1988, p.172)

Engagement-based activity #2 --Postman's 3 questions

Like McLuhan, Postman preferred engagement by asking questions to forecast the environmental effects of media technology. Students could be asked to explore media environments by the three guiding questions proposed by Postman (1992)

1. What is the problem to which this technology is a solution?
2. Whose problem is it actually?
3. If there is a legitimate problem to be solved, what other problems will be created by my using this technology?

Students could be given assignments to write essays and then report on their perceptions of how technologies such as television, computer, e-mail, the Internet, cell phone and instant messaging (texting on cell phones) impact on society. The students would be asked to use the above three questions as an analytical framework,

Engagement-based activity #3-An ethnographic approach to understanding media

Ethnography is the study of culture and the ways people are influenced by and

shape the cultures in which they live. Funayama (2005) writes, "The significance of ethnography is deeply interrelated with how we conceptualize culture and the relationship between the social world and people" (p.136). In this discussion we might add, "... and the relationship between [technology], the social world and people". Thus, students in a media ecology class could be introduced to approaches in ethnography as a means for understanding media. For example, ethnography is grounded in the view that interpretations of cultures emerge in a bottom-up manner. That is, voices from the people in terms of how each person perceives his or her culture is relevant. Students could set out to explore how people interpret the influence of media on their lives through several traditional introspective methods used in ethnography, such as surveys, interviews and observations. These methods could be employed by students to explore several areas pertaining to media technology, such as:

* E-mail and the Internet and cell phones- social-cultural, economical issues
--How have e-mail, the Internet and cell phones changed the way we stay in touch with our friends and colleagues?
--How have the cellular phone, the fax machine, the beeper, the answering machine, and the modem altered the way we do business?
--How have E-mail and the Internet altered the ways students study or teachers teach?

* Television -social-cultural, political, educational issues
--How has popular music changed since the rise of the video and MTV?
--Has television turned the news into entertainment?
--Has television helped voters to make better choices?
--Is television really rotting the minds of children?

In exploring the issues above through using surveys, interviews and observations, students can present an ethnographic understanding of the ways media impact on our

lives. Funayama refers to Maanen（1995）when she writes, “The accomplishment of ethnographic understanding is related to the process in which the ethnographer makes the strange setting familiar and makes the familiar setting strange”（2005, p.143）. By conducting ethnographic research, students begin to see that technology does indeed impact on our lives in ways that we were previously not aware of.

The above engagement-based activities are mere examples of a number of activities that could be introduced to students. The activities are fundamentally based in the area of humanities. In each of the activities, students are given opportunities to be engaged in explorations that encourage them to participate in “informed conversations” about media environments and the ways they impact on our lives.

7. Conclusion

This paper has looked at the study of communication and technology, and especially media technology. The study constructed the argument that students involved in media technology studies should be aware of the impact technological development has on our society and culture. First, the terms, communication, information and information technology were defined. The terms are interrelated. Communication is information and the spread of information is expedited by information technology. However, the interrelationship between communication and information spread by technology is not a static one. Technology once shaped by man does not remain totally under his control as a tool. Tools bite back. Marshall McLuhan’s historical media analysis, initially labeled as technological determinism, and eventually conceptualized in broader terms as media ecology was introduced to show the ways technology has impacted on our society, culture and behavior. The impact of technology was thought to be both positive and negative. Dewey believed that the printing press by ‘horizontally’ spreading the written word in a kind of network that linked local communities together would also spread democracy. The decentralizizatiion of power would occur. Ideally, newspapers create an informed

public that would participate in the 'great conversation' about democracy. McLuhan believed that the electronic age-- as it reduced space and time to immediacy-- would revitalize the spirit of the community on a broader scale to create a global village. On the other hand, Harold Innis saw a pattern of decentralization to recentralization. Technological innovations would eventually be under the control of varying special interest groups. These groups would use the media to control us in their quest to preserve their special interests. Postman further emphasized the controlling forces of technological determinism in his thesis that through the years technology has eroded our moral superstructures. He envisioned a technopoly--A thought-world where our belief and trust in humanity has been replaced by a complete faith in technological advances.

Although the above media observers had differing viewpoints in regard to the influences of technology on society, their views cohered in their quest to enlighten the public. As philosophers, they foresaw the ways technological innovation impact on the public domain. As educators they proclaimed that the public should be awakened and actively engaged in the ways technology impacts society. Following their views, media ecology courses should be included in school curricula. Dewey believed that "speech is the agency of creative thought" (Carey, 1992, p.166). It is hoped that engagement-based activities in media ecology related courses will stimulate students in their study of communication and information to take part in the 'great conversation' about the benefits and pitfalls of technology through their analyses of the ways it impacts on society.

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