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If It's Neutral, It's Not Technology

Lance Strate

Taking a media ecology perspective, this article argues that technology cannot be neutral, because it is a form of change, and it has an inherent bias based on the properties of its materials and methods. Additionally, the application of a technology is an intrinsic part of the technology itself, as is technique, instructions, software, or *knowhow*. Moreover, the bias of technology cannot be reduced to the designer's intent, as innovations always have unanticipated, unwanted, undesirable effects.

What Is Technology?

In considering the debate over whether or not technology is neutral, I think it important to remember that both key terms, *technology* and *neutrality*, are relatively abstract, and disagreements may have as much to do with the ways that we define these terms, or leave them undefined, as they have to do with any substantial differences about the world we live in. As Neil Postman (1995) has argued, the definitions that we employ, the metaphors that often accompany them, and the questions that underlie them, are themselves powerful technologies, and proceeding from this media ecology perspective (see Strate, 2006, 2011), we can view technology as more than just gadgets and machines, more than just tools and implements.

Technology encompasses our techniques, systems, and skills, our languages and symbol systems, our codes and modes of communication, and our media for sharing messages with each other and interacting with our environment. For example, an assembly line is a technique that is not wedded to any single material object or situation but can be applied in a wide variety of contexts, and the alphabet is a symbol system that can be employed with any number of different materials and devices, typewriter or computer keyboard, pen and paper, paint and canvas, chisel and stone, stick and sand, or simply a finger tracing letters through the air. Technology, then, is best understood as a *means*, a *method*, a *way*, as *how* actions are performed, *how* things happen, *how* change occurs.

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We often place technology in opposition to biology, as artificial in contrast to the natural, but Marshall McLuhan (1964) explained that technologies are extensions of our biological being, mediations between the body and the environment. Moreover, although technology is often thought to be a distinctively human affair, it has become abundantly clear that animals employ technology as well, as, for example, chimpanzees use sticks to collect and eat ants, dolphins use sponges to gather food on the ocean floor, otters have been observed using rocks to break open shellfish, and some birds are able to use pieces of wood as tools and even alter their shape to make them more effective, and all of this pales in comparison to the sophistication of the nests that birds and other animals build, or the systems of dams, lodges, and canals that beavers construct, or the hives and mounds and similar dwellings that ants, termites, bees, and other insects manufacture. Artifice is a part of nature, and while animal behavior is said to be instinctive, the same might be said of the human impulse to reach for a stick or rock when threatened. Human beings have a language instinct, and I think it can be said that we also have a technology instinct, given that our use of technology is intrinsic to our survival as a species (and the two may not be entirely separate phenomena).

Technology and Change

Change is intrinsic to technology and biology alike. The phenomenon of life is distinguished by characteristics such as growth, development, metabolism, reproduction, and responsiveness to the environment. All living things are characterized by internal change, and all living things function in some way to bring about external change, modifying their surroundings by taking in energy and elements and expelling waste products (think, for example, of the effect of vegetation on the atmosphere), by replicating and populating the environment, by the space that they occupy and grow into and move through, etc. Technology, as an extension and continuation of biological processes, is an extension of the processes by which living things modify their environments, and themselves.

If technology leads to change, and change is not neutral, then technology is not neutral. This assumes that neutrality is defined as stasis, but it is also possible to define technology in terms of value. Consider, for example, the question, *Is technology good or evil?* At such a high level of abstraction, the question can seem almost meaningless, and suggests the response, *Neither!* But what if we reframe the question as, *Can a particular technology be subject to evaluation within a given moral or ethical system?* Clearly, the answer is yes, we can draw specific conclusions if we understand that we are working according to a specific system of criteria. For example, if we were to hold life to be the highest value of all, and violence of any kind to be abhorrent, then it is easy enough to judge that weapons and the technologies of warfare are evil. If we believe that only God has the power to heal the sicknesses that plague

us, would it not follow that medicine and medical technologies are sinful? If we followed the strict admonition against the creation of any kind of graven image, how can we avoid the conclusion that the visual arts are blasphemous? I am not advocating any of these positions, mind you, I merely wish to remind you that such determinations are possible as long as you accept the premises of the particular moral or ethical system. And if you take the position of moral or ethical relativism, then the neutrality lies in that position, not in the phenomenon of technology.

But holding aside moral and ethical considerations, we can still evaluate the value of technological change by considering its functionality. Does the change contribute to survival, of the individual? Of our species? Of our ecosystem? Does it help us to create a sustainable economy? Does it improve our living conditions? Does it lead to evolution towards greater complexity? In short, is the change functional or dysfunctional? Admittedly, such evaluation may be difficult to perform, answers may be incomplete and tentative, but that does not prevent us from making the attempt. And even if we can never be certain of the answer, it would not change the underlying reality in which technological change has altered our world in positive and negative ways.

The Bias of Technology

In defining change in terms of value, it is not necessary to reduce matters down to a two-valued orientation. Apart from considerations of good vs. evil, harmful vs. beneficial, or functional vs. dysfunctional, we can also analyze the inherent bias of a given technology as a qualitative rather than quantitative phenomenon. Consider, for example, a stone that is lying on the ground. The stone has certain physical characteristics that distinguish it from other parts of the environment, such as weight and density, but lying there it cannot be considered a technology, and can in fact be considered entirely neutral. Now, I come along, pick up the stone, and throw it. In doing so, I have transformed the stone into a form of technology, call it the technology (or technique) of stone-throwing. And as a technology, the stone now has a bias, which is to hit something with significant force, with the potential to cause significant damage. It may be that I threw the stone into an open field, where it landed on the ground and caused no harm, but this would not alter the inherent bias of stone-throwing. The technology's bias would remain the same whether the stone landed in the ocean, broke a window, killed a bird in flight, or fractured another person's skull. The bias would not be altered according to my intentions, whether I tried to hit you and missed, or if I hit you entirely by accident. The bias is inherent in the properties of the stone coupled with the act of throwing it, in the technique of stone-throwing, and could be contrasted to the bias that is inherent in throwing eggs, for example (e.g., damage vs. mess, harm vs. insult, etc.).

The technology of firearms can be considered in a similar light, their bias being towards violent action,

whether they are used for warfare, hunting, murder, target practice, to threaten others, or to deter threats. The technology of firearms facilitates violence, which is why the gun has been dubbed *the great equalizer*, and in doing so, firearms have reduced or eliminated the importance of physical strength, size and weight, and fighting skill, as well as rendering obsolete older defensive measures, such as shields and suits of armor, and the mode of combat associated with them. The presence of a gun does not dictate that it will be used, but statistics show that when you bring firearms into a home, the chances of accidental death, suicide, and homicide all increase significantly. Of course, in the United States, the National Rifle Association insists that *guns don't kill people, people do*. That is to say that the NRA is the most outspoken of exponents of the position that technologies have no inherent bias and are entirely neutral. Theirs is a political as well as philosophical position, in their support of the Second Amendment, and opposition to gun control—indeed, the question of whether technologies are neutral has a profound relevance for public policy and legislation. But the important point for our purposes is that the bias of violence is present within firearms no matter how they are used, and that is the basis of legislation to license, register, and otherwise control and limit the use of guns. Even if you put a gun on display, the bias remains, unless you disable the device, say by filling the barrel with cement, at which point it becomes necessary to ask if the object in question is still the same technology, or has been transformed into something else (e.g., an ornament or decoration).

Take nuclear weapons as a further example. Is there any question of what the inherent bias of this technology might be? Is that bias altered in any significant way by individual intentions or cultural specificities? Is the bomb best described as neutral, or does its mere presence so raise the stakes of human activity that we are confronted with a choice between, in the words of Buckminster Fuller (1969), *utopia or oblivion*?

Application as Technology

Technological artifacts may be used in different ways, but the range of possible uses are limited by the material characteristics of the device. You cannot use a microwave oven for physical transportation. You cannot use a stethoscope to watch a movie. You cannot use a typewriter to do open heart surgery. Further, some of the uses that are within the realm of possibility are so extreme as to essentially negate the technology. If I use my computer as a doorstop, is it still computer technology? If I throw my television set out of the window, does that still count as a use of television technology? When clocks were given to tribal peoples who knew nothing of telling time, were they still a form of timekeeping technology, or were they in this context mere ornaments? When a technological artifact is put to a significantly divergent use, that process is referred as *reinvention*, because the object has been

transformed into an essentially new innovation. The evolution of technology is largely a history of reinvention, as for example textiles were reinvented as paper, the wine press was reinvented as the printing press, and the incandescent light bulb was reinvented as the vacuum tube.

To say that a technology is neutral and all that matters is the way in which it is used makes no sense, because *how* something is used is part of what makes it a technology. Call it technique, or instructions, or software, or *knowhow*, but a tool or machine is just an inert object until it is *applied*. The *application* is an intrinsic part of a technology—indeed you can have applications without devices in the form of pure technique, but you cannot have devices without applications (excepting when they are reduced to ornaments).

As an aspect of technology, applications are not neutral, they have biases. Mark Twain humorously quipped that when you have a hammer in your hand, everything else in the world looks like a nail. The hammer is made for hitting things, or as McLuhan (1964) would put it, it is an extension of the human fist, the physical characteristics of the tool lean in that direction, and that is its common application. In short, the bias of the hammer is towards pounding. This is what McLuhan meant in stating that *the medium is the message*. For example, the electric light may be used for reading, or to illuminate streets at night, or to light up windowless offices, or to spell out words on signs, or to project a moving image onto a screen, or to shine light into the mouth during a dental examination, or as a form of decoration. But all of these different uses pale in significance to the impact of the electric light itself, as a medium and technology, as it has totally altered our way of life, the ways in which we work and play, our architecture and city planning. The bias of the electric light has been towards the negation of the distinctions between night and day, leading us more and more into what we now call a 24/7 or 24/7/365 society.

Along the same lines, whether television is used to transmit news, sporting events, or situation comedies is less significant than the fact that television is used for all of these purposes and more, creating a shared information environment and culture to a degree unprecedented in human history, and placing an emphasis on the dissemination of visual images that we likewise have never experienced before. When McLuhan first suggested that the biases of media alter the human nervous system, in the 1960s and 1970s, there was no scientific evidence to back up his insights, but in recent years it has been amply demonstrated that reading on the one hand, and attending to electronic devices on the other, independent of any content, have significant and long-lasting effects on the ways in which the brain functions. Can there be any better support for the argument that technology is not neutral?

Human Freedom and Control Are Limited

In western cultures, freedom is a value of the highest order, and the suggestion that there are limits on our freedom of action is often met with denial and hostility. So

we find ourselves asserting that we are in control of our technologies, much like the alcoholic to be able to stop drinking at any time. So we say, in regard to television, that if you do not like what you are seeing, change the channel. Or turn it off. And it is true that I have those options, and I can even choose to get rid of my TV set, or not own one in the first place. I have a measure of control, no one is disputing that. But I cannot choose to live in a world without television. I can never set foot on an airplane, but I cannot choose to live in a world without airplanes flying overhead. I cannot choose to live in a world without oil refineries, or nuclear power plants, or weapons of mass destruction. I can go against the grain, I can row against the current, and I can spit into the wind, with varying results. But no matter where I go and no matter what I do, my individual freedom is severely limited by the technological environment that I live in, that includes and encompasses the entire planet.

The ways in which technology can be used is in large part a function of its design, so a measure of control rests with the designers, the innovators, the manufacturers of technology. But inventors and scientists are typically sleepwalkers, as Arthur Koestler (1968) put it, not really understanding the significance or impact of their discoveries. And whatever the intended effects of a new technology, they are always accompanied by unintended effects. The automobile was invented to get from one place to another with increased speed and efficiency, but no one anticipated that this would lead individuals to move farther away from their places of business, and spend their time on the road commuting back and forth between work and home, and that this would result in the massive growth of suburbs, the decay of the inner city, and urban sprawl. No one anticipated that the new technology would empower women, or African-Americans, or youth, and that it would change our mating rituals. No one anticipated the effect of the internal combustion engine on air quality, or the fact that we would pave over so much of the landscape, and reconfigure our streets and roads to accommodate the new technology, or how it would alter our economy and become a major factor in our dependency on foreign oil. No one anticipated that tens of thousands of American citizens would lose their lives every year in automobile-related fatalities.

In medicine, we speak of unanticipated or unwanted effects euphemistically as *side effects*, but we all know that if the side effects kill you or make you sicker than you were before, then they are the only effects that matter, and even if they are not so severe, the side effects still are real effects (Eastham, 2009). We cannot separate the desirable effects from the undesirable; there is always a price to be paid for our technology, a price to be paid for whatever advantages might be obtained, and there are always some who stand to gain and others who have more to lose from an innovation. True, we can perform some sort of cost-benefit analysis, but the problem is that the effects of a technology in turn lead to secondary effects, and these to tertiary

effects, and so on, in a series of indirect effects. Introduce a new technology into a complex, interdependent social system, and the effects are ecological in nature, potentially altering the system in its entirety. For this reason, there are always unanticipated effects to go with the effects that are anticipated, which is to say that we are never entirely certain of the consequences of our innovations. And this means that inventors, designers, and manufacturers are not in control of technologies either. They are not aware of what the bias of a new technology may be when that technology is introduced, and not aware of what changes will ensue on account of its introduction. This is certainly reason for exercising caution when it comes to the adoption of innovations, but of course that presupposes that we can exert some form of control over our technology.

True, collectively we have greater power than we do as individuals, and some decisions about technology are made as a collective choice, albeit not necessarily in democratic fashion. So, one nation may decide not to use nuclear power, but of course others may not make the same decision, and any nuclear disasters that occur, such as we have recently witnessed in Japan, will not be confined within that nation's borders. Every nation may agree to ban nuclear weapons, but we all know that that genie is out of the bottle. President George W. Bush tried to put limits on stem cell research, to widespread protest and derision, and the understanding that even if the United States were to ban such technology, other nations such as France would continue their development.

Competition makes it difficult to reject technologies, and so does complexity. We all know that burning fossil fuels is damaging the environment, and could potentially render the earth unfit for human habitation, but their use is implicated in so many facets of our vast, interdependent technological system that we cannot just eliminate that one strand of technology without unraveling our entire way of life, with disastrous results. Nor do we ever seem to think in those terms. Rather, as Jacques Ellul (1964) indicates, in dealing with the problems that a given technology inevitably introduces, we endeavor to solve the problem by the creation and application of still more technologies, so that our technological systems expand geometrically, and become essentially autonomous in their growth. It is not that we are incapable of controlling our technologies, it is that we have ceded our control to technology, and the technological imperative.

The Straw Man of Technological Determinism

Ellul explains that technology is not about machines, it is about finding the most efficient means to a given end. In surrendering human agency to technology, efficiency becomes the only generally agreed upon value so that, for example, if you want to save the rain forest, you cannot argue that preserving that ecosystem is a good in its own right, or that it should be kept safe because it is

God's creation; instead, we argue that it is an efficient factory for the production of oxygen, and an efficient laboratory for the creation of new medicines. Efficiency is the underlying bias of all technology, of technology taken as a whole. From Ellul's perspective, it is difficult to imagine a way out of our current technological society or technopoly, to use Postman's (1992) term, excepting some catastrophe in which the entire system breaks down.

Those who argue that technology is neutral typically invoke the straw man of technological determinism. But no one is arguing that technology is in charge, except to the extent that we willingly surrender control to the technological imperative, and find ourselves in a trap of our own making. And it is hubris to imagine that we are entirely in control of our circumstances, whether individually or collectively. We introduce new technologies into our social systems, and we cannot fully predict or anticipate the effects that the changes will bring about. We exist in a dynamic relationship with our technologies, and they feed back into us, and altering us. As John Culkin (1967) put it, "we shape our tools and thereafter they shape us" (p. 52).

We are neither fully in control nor fully out of control; we function in the gray area in-between. And if there is to be any hope of improving our locus of control over our technology, it requires the cultivation of a reflective and critical approach to human invention and innovation, a willingness to question the necessity of a given innovation, to ask what the cost might be and whether it might outweigh the benefit, and to keep in mind that we will not be able to anticipate all of the effects stemming from its introduction. And we need to begin with an understanding of the nature of technology, to being with the understanding that, *if it's neutral, it's not technology*. □

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