



Embedded Ideology of Technical Media: Rethinking Subjectivities Within a Second- Order Cybernetics

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Abstract

This paper explores the second-order cybernetic relationship that emerges between technical systems employed within digital cultural production and the potentials for cultural shifts through exploring the architecture and interfaces of information and knowledge sharing systems.

This work makes new contributions to understanding not only the role of digital technologies in cultural production but also the role of digital technologies in the formation of the modern digital subject. Through this exploration this contribution argues that these technologies are turning the subject against legal and cultural norms and toward sharing cultures as the experience with digital technology undermines legal and cultural mandates.

Keywords

Cybernetics · Media theory · Cultural studies · Intellectual property · Copyright

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Introduction

In Harvard Law Professor Lawrence Lessig's keynote at EDUCAUSE in 2009, a conference for using technology in higher education, he suggested that we are "turning our children into pirates" through our inadequate understanding of creative process and the limitations of current copyright laws. It is simple enough to acknowledge that digital technologies have become ubiquitous within modern society; smart phones, laptops, and a near-constant connection to the Internet is, for many, simply part of modern existence. What Lessig was referring in regard to digital technology not only suggests to digital technology's ubiquity but also begins to turn toward the next question at hand: how are these technologies shaping our culture? Within this simple statement, he observed that not only is digital cultural production an important and ubiquitous part of creative expression but also that, because of our current legal climate, many forms of creative expression (and culture creation) function within a legally complex (and sometimes suspicious) arena.

Digital cultural production in general is not just "simply" a cultural concern, comprising of intertwining determinations from market, legal, and social forces, but also an issue of media – not simply regarding media messages, but the medium of expression itself. This concern over "turning children into pirates" is more than just a battle between legal and cultural forces, but, as he suggests, it emerges from a limited understanding of creativity in the digital age. The purpose of this essay is to unpack the "embedded ideology" of technical media involved in digital cultural production, orienting a way of investigating subjectivities that encourages better accounting of the influence of technical media systems.

Cybernetic Media Theory

The framework of this media theory can be bookended by two incredibly short assertions. First, Friedrich Nietzsche remarked briefly that, regarding the use of a typewriter, "our writing tools are also working on our thoughts" (quoted in Kittler 1999, XXIX). The second is the deceptively simple statement by Marshall McLuhan that "the medium is the message" (McLuhan 1994). In combination with McLuhan's other famous statement, "the medium is the message" (McLuhan and Fiore 2001), a more accurate description of media starts to form: media are both the systems through which messages flow, as well as determinant of the message itself. Taken this way we could read McLuhan's statements together as "the message of the medium is the manner of its message." Combined with Nietzsche's statement, we can start to think about how the tools with which we create, recombine, and circulate messages are implements of inscription and re-inscription and follow this principle. Rather than taking McLuhan's famous subtitle that media are "extensions of man," at face value, it is better to assess these extensions as cybernetic (a closed feedback system) that mediate the messages circulated through them, affecting not only the message itself but the consciousness of those engaged within these mediations.

When Norbert Wiener employed the term “cybernetics” in *Cybernetics: Or Control and Communication in the Animal and the Machine*, he began by linking the notion of control to communication and technology. Wiener summarizes the name choice: “We have decided to call the entire field of control and communication theory, whether in the machine or the animal, by the same name cybernetics” (Wiener 1965, 11). Although originally conceptualized in engineering, the framework still holds for understanding systems of communication and control across a variety of disciplines.

Claude Shannon’s communication model published in *A Mathematical Theory of Communication* is a helpful starting point for thinking about cybernetic determination. This “transmission model” of communication incorporates a series of communication systems elements within its rather simple design – information source, transmitter, channel, noise, reception, destination, and feedback (and more, depending on which discipline it is used by). On a basic level, this model approaches communication as something that happens between two or more independent systems, which interact through transmitting and receiving messages. These systems either “understand” each other or, due to some noise within the process of transmission, misunderstand each other. Commonplace understandings of this model assume that misunderstanding or distortion of meaning emerges from the “channel” through “noise.” This is the first (or at least the most famous within the study of communication) model that presupposes that the channel, or as Shannon (and later co-author Weaver) explains, “the medium used to transmit the signal from transmitter to receiver” (Shannon and Weaver 1949, 33), is of utmost importance to message transmission and is particularly important when considering message mutation or other interference.

Marshal McLuhan, whether meaning to or not, echoed Shannon’s model into his own theory of communication, most notably with his famous statements that book-end this framework, “the medium is the message” and “the medium is the message.” Nicholas Gane notes that “McLuhan drops Shannon and Weaver’s focus on the mathematics of information, but at the same time follows the basic line of their argument by prioritizing analysis of the technology of message transmission over interpretation of its content... In this way, McLuhan’s famous declaration that the ‘medium is the message’ develops the thinking of Shannon and Weaver... by asserting the role of the channel (which Weaver also calls a medium) in shaping the content of what is transmitted (rather than vice versa)” (2005, 25). For McLuhan, the power of the medium to transform messages became the object of analysis rather than the messages themselves. The “medium” carried all the same aspects of Shannon and Weaver’s “noise” and more. McLuhan writes: “What they call ‘NOISE,’ I call the medium—that is, all the side-effects, all the unintended patterns and changes” (quoted in Cavell 1999, 350).

Shannon and Weaver additionally argued that “any limitations discovered in the theory at level A necessarily apply to levels B and C,” noting that the medium was not only primary importance to all other levels of abstraction, but as “the theory of level A is, at least to a significant degree, a theory of levels B and C,” each level of message mutation theory in communication was, at the very least, intertwined in

medium theory (Shannon and Weaver 1949, 6), echoing McLuhan when he noted “the content of a new medium is always that of an old medium” (McLuhan 1994, 8).

Although Wiener, Shannon and Weaver, and McLuhan were all investigating the *channels* of communication, it was evident even in these early models that there was more going on than simply transmission. Their transmission models included a feedback loop, recognizing the interaction between sender and receiver, influencing the messages the sender generates.

The Cybernetic Subject

More recently, Donna Haraway refers to the cyborg as “text, machine, body, and metaphor—all theorized and engaged in practice in terms of communication” (Haraway 1991, 212). Considered this way, communication is not merely an operation of the cyborg, but the operation that is constitutive of “cyborg.” For Haraway, without communication there cannot be cyborg, and through communication the cyborg emerges as itself through communication within a feedback system. The feedback systems here do not need to be purely technological in the strictest sense but that which the subject communicates with or through and receives feedback from. These systems could be purely architectural or “natural,” determining paths of travel, not only those which we attempt to send proper “messages” to other subjects. In the simplest sense, the cyborg is a subject that is engaged in communicative feedback exchanges. Haraway moved beyond the popularized *Terminator* concept, noting that “we are [already] cyborgs” (1991). Cyborgs are not just “technologically enhanced” human beings but instead a way of thinking about humanity by eroding the artificially imposed boundaries between the natural and artificial and noting that all humans engage in this communicative feedback loop that is both supplementary and both internal and external. Cybernetic systems and therefore any discussion of control and the cyborg are composed of more than just a binary biological and mechanical/technical. This feedback system can be linked with the notion of determination and overdetermination and involves a variety of economic, biological, social, architectural, and technical relays and feedback systems. These determinations, though, as seen through the framework of the cyborg, become transformed into a larger system of feedback where the cyborg subject begins to affect that which has an effect on itself.

David Gunkel’s “We are Borg: Cyborgs and the Subject of Communication” also makes this observation explicit in a tip of the hat to Star Trek: “We are already Borg” (Gunkel 2000, 340). If we are already cyborgs, then it is not that we are not (usually) zombie slaves to a collective, but instead that we are complex subjects that rely on a vast array of organic and inorganic feedback systems, technologies, and mediums that shift horizons of possibility and participate in controlling (and determining) our existence. It is not that we need to destroy the concept of subjectivity in general, but rather delimit a “postmodern subjectivity that deconstructs the presumptuous, sovereign individual of modernity” (Ibid., 344), transforming “simple” subjectivity into something more complex and nuanced and recognizing the impact that various

determinants have on culture, communities, and individuals. Although the idea of the cyborg subject opens up a new way to consider feedback loops in the constitution of subjectivity, it still does not highlight the primacy of the media within this complex feedback loop system, one that, in consideration of this, is constitutive of the entire process.

Despite the theoretical frameworks pointing in a similar direction, there exists an underlying concern that “we live in communication while theorizing about it” (Krippendorff 1996, 312), so we must be careful when attempting to isolate and understand the individual subject in communication research. Krippendorff explains:

Neither can we understand a You as an isolated individual and from a detached observer’s position nor can we compose a You from known parts the way engineers design systems from existing components, precisely because I and You as well as the particular relation between them evolve in processes of mutual adjustment. (Ibid., 319)

Krippendorff’s “second-order cybernetics” is helpful here with considering the greater impact of the cybernetic feedback system, as each component is understood as connected, not just humans in communication, but different components of each communication system, as well as “the particular relations between them.” There must be a “second order” to the cybernetic understanding of the subject as always already in the cybernetic system. These systems that are in conversation were and are influencing their current and future states. The cybernetic system is mobile and connected, with each piece influencing the potential futures of each other piece. The “simple” notion of assessing a cybernetic system no longer functions when the system itself becomes influenced by the consideration of itself. These are a series of relationships that co-constitute each element within the system.

Conceptions of You and I are always complementary. A mother does not exist without a child. There can be no buyer without a seller. Actors and audiences require each Other... Complementarity must not be confused with equality, however... It simply suggests that roles somehow fit like hand in glove (not like hand in hand) and the difference between them is constitutive of a particular relationship. (Ibid., 318)

Digital technologies help to complicate the understanding of these cybernetic relays, effecting and mutating the media due to their architectural makeup – interacting and determining subjects through their deliveries. Rather than examining individual or mass communication in traditional frameworks, thinking with cybernetics to examine complex feedback systems helps to lay out a better framework of how technical-human communication systems circulate and mutate messages and meaning an always connected society. The conceptualization of the human-as-cyborg moves beyond the “simple” cybernetic notion of feedback loops and influences among those lines and starts to highlight the more technical and more “robotic” aspects of the cyborg through understanding how technical media assists in constituting a horizon of possibilities through these technically mediated relationships.

This framework helps to think about what digital media represent for that horizon: dividing, collecting, distributing, and multiplying digital snippets of culture against the prevailing economic and legal norms. Understanding these components as a massively entangled and co-constitutive constellation of relationships frames the basis for understanding a more complex study of culture and cultural production in a digitally mediated world.

The Interface Effect of Technical Media

There are at least two points of possible mutation when it comes to technical media. The first being in the media itself, within its architecture, but the second lies with its interface. The notion of “interface” can be understood in multiple ways. At its most basic level, an interface is the point at which two (or more) systems meet, whether it be subjects, technological systems, organizations, or a mix between them. There are human/technology interfaces, as well as interfaces between two or more technical systems. As the point at which these systems meet, this interface is a medium, a mediator, between the systems. This interface is not merely a direct translation from one system to another, but an interpretation that has limitations, requires specific types of input, and, as a medium, actively interacts with the systems that it engages with. Although often more concerned about human/technology interface, there is often an entire “stack” of technical media (such as a Web “stack,” the collection of hardware and software which powers Internet servers, in which components pass messages to each other without human interaction) and how each technical media components interface with each other can relate back to the human subject.

Heidegger’s hammer (see Heidegger 1962) is a type of “simple” human/technology interface, where the two “systems” meet – the self and the hammer – co-constituting and transforming each other. There is a physical requirement to pick up and operate the hammer, one that depends on an ability to hold the hammer in a particular way, which constitutes the physical attributes and architecture of the interface, and there is a way in which the hammer allows and encourages a particular type of action, which is a particular “effect” of the interface, which allows this transformation and co-constitution (for the hammer is only hammer when it performs its task, otherwise it might be a paperweight). The media system itself can transform messages, but the interface of systems requires a particular type of interaction; to engage with these systems, subjects must bend to the interface.

The hammer seems simple enough, but others (e.g., Facebook’s interface) require more specialized knowledge and particular contexts for engagement. Often the messages that are allowed through the interface are limited, requiring message construction to bend to the interface. A keyboard, for example, is required to input data into a field, and possibly that field, for example, on Twitter, has character limitations. Due to

this contortion, systems not only change the messages but also force the subjects sending those messages to change. Interfaces are, then, boundaries and places of crisis – where shifts and compartment take place, restricting, limiting, and effecting both message and subject. Alexander Galloway asserts that interface should not be conceived as “thing” but instead as an “effect” which contains an ethic (Galloway 2013, 23). It is an effect only insofar as this is the only way we might notice it – because interface is meant to be inconspicuous, or, as in the case of Twitter’s character limitation, the acknowledged parameters of the form become normalized. This effect has a particular ethic; an ethic that is not “good or bad” but also is not “neutral,” as its effect makes or causes change. An intrusive interface is, by design standards, a bad interface, so most interfaces go unnoticed, as do their effects. Interface is usually only visible to those who are frustrated by it, unable to understand or interact with it – unable to negotiate the multiple communicative elements of the interface. Thinking about the “ethic” of the media and how the subject’s interaction with the media changes both the subject and the horizon of possibilities for the subject’s media transmission, interaction, and creation reframes the way that each media system and interface can be approached to understand the intricacies of the media itself.

An Archaeology of Technical Media

The premise of archaeology, in Foucault’s terminology, is that discursive formations are governed by rules, beyond those of grammar and logic, and they operate beneath the consciousness of individual subjects, defining a system of conceptual possibilities that determine the boundaries of thought in a given domain and period (see Foucault 1982). These are “hidden” systems of conditions and relations, secretly influencing discursive practices. These systems need to be excavated, so to speak, to both understand how they operate and to enlighten those affected by the systems. As already discussed, the architecture of media operates in a similar, hidden way, as they function through naturalized interactions and interfaces, encouraging and limiting conceptual possibilities.

Kittler helps rethink Foucault’s noble investigative process along these technical media lines, reminding us that “Even writing itself, before it ends up in libraries, is a communication medium, the technology which the archeologist [Foucault] simply forgot” (Kittler 1999, 5). Kittler’s predilection for bombastic rhetoric aside helps to shift a conceptualization of Foucault’s process of archaeology toward an engagement with a different and arguably more primary piece of the historical puzzle, technical media.

Kittler begins his theorization of media in *Gramophone, Film, Typewriter* with the nebulous line “Media determine our situation” (Ibid., xxxix). Kittler’s translator, Geoffrey Winthrop-Young, in his introduction to the same book, elaborates a bit more on Kittler’s opening words:

If media do indeed ‘determine our situation,’ then they no doubt also determine, and hence configure, our intellectual operations. One could easily re-appropriate Derrida’s much-deferred pronouncement [there is no outside of the text] and suggest that the fundamental premise of media discourse analysis is [there is no outside of media]. (Ibid., XX)

Rather than stopping, or even beginning at discourse, it is best to conceptualize that all discursive practices are dependent on media, and therefore media is the place to investigate first. Kittler notes that media “are (at) the end of theory because in practice they were already there to begin with.” If we follow the same logic of Hall’s determination (see Hall 1996), media are also at the beginning of theory (Kittler 1999, XX). Putting these together, this particular goal of “media archaeology” is to uncover the hidden ways in which mediums influence the messages that are circulated through and by them by placing media in “the first instance.”

An investigation of these “natural” media systems that circulate and disseminate messages allows us to ask questions not only about what is going on but how these systems have become naturalized, allowing for a better assessment of the current situation. Parikka notes that “archaeology is always, implicitly or explicitly, about the present: what is our present moment in its objects, discourses and practices, and how did it become to be perceived as reality” (Parikka 2012, 10) and that media archaeology is an important focus because media “are the new architectures of power,” and “power becomes hardwired to technology” (Ibid., 82), even though this power remains hidden.

Unlike Foucault’s archaeology, media archaeological investigations are not as concerned with particular “spatial places and institutions” or “practices of languages” but instead on “switches and relays, software and hardware, protocols and circuits of which our technical media systems are made” (Ibid., 70). These are hidden not only due to their naturalization but physically hidden either in deep within the circuitry of a handheld device or in the literal “black box” of a computer, whether it exists in a desktop or in the “cloud” of large, hidden, server racks in the belly of warehouses spread across the world.

Thinking along these lines, media archaeology orients an investigation that begins with the “materiality of the informatics machines... commands, addresses, and data,” which participate in a different type of ontology, a different type of “nature” which the subject is also “thrown” into. The influence of random access memory, of microprocessors, of the “stack” of intersecting technologies that form each node within the vast networked construction we call “the Internet” is not simply just another aspect of determination but constitutive of “the worldhood of the world,” of the natural experience of the technical cybernetic subject.

An archaeology of the digital media, then, is a reorientation of how to think about the embedded ethic of sharing in a way that forefronts the influences of modern technical media. It is a constellation of media systems and as a form that emerged under particular legal, social, and economic conditions begins to illuminate not only the hidden determinants in the form but the determinants hidden within components of digitally mediated cultural production. Understanding the cybernetic subject through this framework illuminates more about current digitally

mediated cultural production and enlightens potential futures that are hidden within these architectures of power.

Turning Us All into Pirates

The “turning into pirates” that Lessig expresses concern over is twofold: the turning that seems to come from *law*, and the turning that comes from technical media. The turning that comes from law is both determination in Hall’s (1996) notion of determination and also in a nomological sense. It names the pirate. However, the turning that comes from technical media is not *simply* determinant in the traditional sense. The turning that comes from technical media is a cybernetic one that is in conversation and discourse with the determinant media. Digital media turn us into cyborgs, yes, but to paraphrase both Haraway and Gunkel, “we have always been [cy]borg,” so this cybernetic metaphor is not a new framework (Gunkel 2000, 340). Cyborgs, of course, are in conversation, and these conversations can mutate the pieces within this larger cybernetic postal system. Different types of feedback loops that come from technical media change, evolve, and have different *effects* as they themselves evolve. As discussed before, Heidegger’s hammer changes the consciousness of what is possible for the subject, which also informs the subject about the future of possible tools. The rock might have begat the hammer through its relationship with the subject and, eventually through a long history of relationships, begat the nail-gun. Technical media work in a similar way, where those creating our tools are also functioning within this larger postal system of mediating messages.

This turning from law is also one that functions in its own relationship with technical media. These messages work against each other and also in combination, the law seeking to prevent an action through this pirate determination and naming and the technical media working against it through the normalization of actions and cultural practices that are now referred to as *piracy*. Despite the supposed intent of preventing a series of actions, the power of the technical media is one that identifies this legal determination as suspicious and unnatural to the cybernetic subject.

These cyborg *pirates* are not only determined and named by the force of the law, but the pirate-ization of the (always already) cyborg also comes from the continuing cyborg-ization of the subject, evolving its horizon of opportunities through the interaction with digital media sharing, creation, and ingestion. Of course, these two “turnings” happen at the same time and are continuously in flux and in cycle within this cybernetic exchange. Each interaction changes the cybernetic subject’s various components that form the cybernetic relationships constitutive of the cyborg, as well as its pirate indoctrination. These exchanges of messages happen through at least two modes of interaction:

First of all, the cyborg interacts with the simplicity of digital circulation. Whether through a click of the mouse or finger on a share, send, download, or upload button, this requires the subject to comport themselves to a particular interface. This interface requires an assumption that the message is something that can be circulated and does not violate (or at least that the subject does not believe they will be located

as a recipient of punishment) laws or social norms. The ease of circulation of messages, of passing along pieces of perfectly copied data, sends its own message to the subject, one that helps to inform the subject about the further circulation of messages: access to this circulation is free and easy and should remain so to continue this circulation for others.

Secondly, through participation in a variety of digitally mediated communities, whether as a “lurker” or an active conspirator, the subject becomes the recipient of the circulating message addressing the subject as participant and in that addressing carries with them narratives of agency. Whether agency manifests as the ability to learn new interfaces and remix new messages, or, as with Wikipedia, in the collaborative effort to produce a knowledge, the narratives insist that many determinations of culture are often just spectral presences that can be easily dismissed. This cyborg pirate has a different outlook on the possibilities at hand, encouraged to participate in a variety of forms on a variety of projects.

Participation, Access, and Agency

As the original utopian promises of equal access for all met the reality of walled gardens and high barriers for participation, many individuals and organizations have turned their attention toward access. This has a long history within computing, even personal computing – simply comparing the interface for the 1977 Apple II and the first Macintosh in 1984 showed a quantum leap in accessibility and attention to the user experience. The Apple II itself was a quantum leap over many of the computing systems available at the time, not only costing a fraction of what others cost but also in comparison to previous generations it was incredibly accessible. The interface of the 1974 Altair 8800, for example, much like many of the computers at the time, was a series of toggle switches and LED lights. On top of this strange interface, the Altair 8800 was sold as a kit-of-parts, relying on the ability of users to assemble complicated electronics. The 1976 Apple I was also quite inaccessible from a modern perspective, sold simply as a circuit board, requiring users to assemble the case and keyboard. Despite feeling old and dated, the ability for a user to purchase a fully functioning Apple II computer in 1977 was groundbreaking, and 1984's introduction of a monochrome graphical user interface (GUI) and mouse was nothing short of revolutionary.

Fast-forward to more contemporary computers where Apple's *GarageBand* is pre-installed on every Macintosh computer, these software and hardware combinations continuously lower the bar for these “laptop musicians” to create music using either the prepackaged samples or their own sampled loops and clips. Accessibility has become a key feature of these new technical media systems, promoting ease of use with each new hardware model and software upgrade striving to erase the aggravation of previous interfaces while simultaneously increasing the power of the digital manipulation tools. Modern tablet computing is a prime example of this

interface simplification, bringing the screen and input together into one device, allowing the user to “touch” digital media.

Invitations to participating in various forms of digital culture are numerous, where simple forms and clicks can create new memes, share or fork (split off to create a new version based off the previous) entire software packages, or manipulate video or musical tracks in various manners from the comfort of your favorite browser. There are active discussions in numerous groups about how to increase participation levels through redesigning interfaces and rules and how to combat systemic biases in participation levels. Whether or not participants are active creators has little effect on the fact that these participants continue to receive and circulate these same messages of access, agency, and the invitation to participate.

This turn (the cyborg pirate turn) is more than just a turn that just spreads messages. This turn has multiple interlocking parts, a second-order cybernetic relationship where this turn toward access, agency, and participation also influences the future of the proverbial glove it continues to influence the proverbial hand. This mutation is one that not only just circulates messages but circulates messages to those who create and upgrade the circulation machines, instructing the new machines to circulate messages better, more efficiently, and more openly inviting to the next wave of cyborg pirates. This is ongoing, continuous, and potentially exponential in growth and influence. When Nietzsche said, “our writing tools are also working on our thoughts” (Quoted in Kittler 1999, XXIX), the implication was always there: the machines that we made, that are working on our thoughts, are influencing the thoughts we have when we are making the next writing machines.

Those who are already worked on will design the next machines, and those machines will be working on our already-worked-on thoughts. Of course, McLuhan hinted at this when he discussed how “the content of a new medium is always that of an old medium” (McLuhan 1994, 8), as each new technological tool that has worked on our thoughts continues to perpetuate the “whatever” of this technologic. These new machines, however, are more than just mechanical systems of gears and levers, and digital media packages remain constituted by this digital enclosure – they all are constituted by ones and zeros and, of course, by code.

Steven Levy’s 2001 *Hackers: Heroes of the computer revolution* offers an interesting insight into some of the early years of computer programmers and manufacturers and how this ethos has been reinscribed over the years of the digital revolution. Levy points out that these “hackers,” such as Bill Gates, founder of Microsoft, Steve Jobs and Steve Wozniak, cofounders of Apple Computers, as well as others like Richard Stallman, creator of GNU and EMACS, were concerned (at the time) with how computing had been stifled by not making it accessible (not in a “learn to code” way but literally locked down with security, expensive hardware, and code that was filled with problematic “bugs” but could not be fixed). These “hackers” figured out how to create their own computing systems, wrote their own computing languages, and subvert the status quo to help spread computing accessibility. Regardless of the later actions of Gates or Jobs, they all helped to increase

access to computers by making them universal, affordable, and accessible (by some). This ethic of access, participation, and agency arose from early MIT hacking and continued to spread through these digital systems, each new creations informed by the previous ethic.

The spread of Free/Libre “Open Source” (FLOSS) software movement sparked partially by Richard Stallman, and part of this “hacker ethic” has rapidly overtaken much of the coding ethic. In most commercial software, the “source” code is under literal erasure as it has been translated to machine code by “compiler” software that takes the human readable and writeable code and translates it into something for computers to process. In FLOSS software, the “source” code is shared freely for those who understand that particular “language” to download, modify, or contribute to a software project. Some of the most widely used software packages are based off of or completely “open source,” such as the Android operating system, the Firefox browser, and a variety of digital media manipulation tools, like Blender (an 3D animation software package), Ardour (a music mixing and editing package), and HandBrake (a digital encoding/transcoding software package). Often referred to as a LAMP stack, the software package that runs a majority of the Internet’s servers is comprised of Linux, Apache, MySQL, and PHP. One of Stallman’s own major FLOSS contributions, GNU, is a major component of Linux, often referred to as GNU/Linux.

Participants in FLOSS projects often share their projects with SourceForge or more recently using Git, the latter a version control software created by Linus Torvalds, the creator and namesake of Linux (Linus and UNIX, the inspiring operating system for Linux). Git allows users to not only upload and share their FLOSS projects but also to “fork” (create different trajectories for software development while still retaining parental associations) and collaborate on software development. Originally just a version control system for Linux development, the ethic has passed through into Git, which has been continuously been advanced to increase participation and access among software developers in order to promote additional FLOSS projects.

The barrier to access continued to crumble with digital media, and this ethic eventually informed a concern for barriers for participating in coding. Today not only is there a “National Day of Civic Hacking,” as well as numerous other “Hackathons,” but there are calls at the national level to increase coding skills in public schools. Online services such as Codecademy offer free courses on multiple programming languages, and, of course, MIT’s sponsored “open courseware” offers free college-level introductions to computer science and programming. Coding software, for some, is a component in key digital literacy, no longer just for the few software developers but participation is openly encouraged from everyone.

Of course, as Kittler notes “there is no software,” (1995) as every piece of code is regulated by hardware, embodying its own ethic, its own set of determinations encoded within the medium. Even microprocessors require other microprocessors to design a cybernetic postal exchange that exists within every mode of “writing”:

The last historical act of writing may well have been the moment when, in the early seventies, the Intel engineers laid out some dozen square meters of blueprint paper in order to design the hardware architecture of their first integrated microprocessor. (Ibid., 147)

Parikka illuminates Kittler's premise by explaining that we no longer have "direct" access to writing because "texts do not exist any more in time and space that we human beings can perceive, only in computer memory" (2012, 80). This computerized ethic is totalizing, as it infects each and every medium with these digital tools, processing all messages, even those we believe are still simply "writing." This is helpful to understand as even these coding systems are participating within an array of mediation. Not only is the software we write to create other software mediated through these hardware components, but additional hardware components are designed using this nearly un-packable history of software-designed-through-hardware and hardware-designed-through-software. In short, there is no escaping the digital mediation within contemporary society as these determinations run deep within our computerized systems.

Each new technology continues to carry the messages, which in turn "work on our thoughts" and, as McLuhan notes, "work us over completely" (2001, 26), transforming not only who we are but what we continue to produce in each new media form. Writing, transformed by the ones and zeros of microprocessors, and then further by microprocessors designing their own successors, continues to carry each mutated message. These technologies, cybernetically engaging us, continue to determine the boundaries and possibilities.

Despite positivity toward the future evolution of the cybernetic subject against cultural control systems, the numerous downsides to architectural determination cannot be ignored. Digital media technologies may have opened up a way for the subject to "retake" the orientation toward cultural sharing from legal and social pressures, but they also have become the space for archiving and accumulation of the subject's personal and information. The digital subject is one that can not only share perfectly but also move and function within a perfectly surveilled world. The "analog world" (or "meatspace" as it has often been called by online communities) may be slower to share, disseminate, and remix culture, but each bit of data and every trace of the subject's online "footprint" are passed openly.

This orientation does not "fix" the issues relating to access, participation, and advocacy, but it does provide a set of possible futures, particularly one of potentially increased inclusion. Through continued cybernetic evolution, each piece within this larger media system is slowly reshaped and reformulated via the embedded ethic of digital technical media. This ethic is more of a promise than anything, a promise that continues to echo through multiple media channels. Even traditional print, radio, and television advertising for computer systems and software offer promises of ease of use, promise of creative avenues, and empowering systems. Legal systems change too, as cybernetic subjects looking to ensure future proliferation of these messages lobby new laws or changes to existing laws. These messages continue to participate within this larger constellation of message circulation, slowly changing the face of everything around them.

The question is not “what to do about it” but simply to trace out the different components operating within this particular phenomena and leave a door open to how to assess the possible futures of these message circulations. Understanding the method which messages are mutated and transformed, considering the effects of the interface, and considering how these fit in a cybernetic relationship, opens up a new way to think about technical media as mutating and in a constantly changing and evolving relationship with the (always-already) cybernetic subject. Utilizing this way of assessing technical media can reorient a way to understand a myriad of cultural phenomena, from privacy and security to cultural production and digital labor.

In short, Lessig was right – we *are* turning our children into pirates. We are *all* turning into pirates. However, it is not because digital culture is actually piracy. We are turning into pirates because there are competing legal, social, economic, and architectural determinations that are pulling us in multiple directions, and the influence of digital media is really there “in the first instance,” before any other conscious or unconscious determinants take hold. We are turning into pirates because we are told through many manners that what we believe to be proper is someone else’s property, but we are determined beforehand else wise. The medium is both affecting our messages, and it is *defining the system of conceptual possibilities that determine the boundaries of thought*. This embedded ideology of technical media suggests a reorientation, a reconsideration of the importance of media in the formation of subjectivities, opening up a different perspective and layer in the complex system by which we understand the communicative subject.

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