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Cyborg Pedagogy:
Performing Resistance In The Digital Age

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The authors of this article argue that cyborg myth serves as a critical metaphor by which to expose, examine, and critique the social, political, and aesthetic impact of information technology on the *posthuman* body and its identity. The works of performance artists Stelarc, Eduardo Kac, Orlan, and Guillermo Gómez-Peña and Roberto Sifuentes are characterized as "cyborg pedagogies" that critique the inscriptions of digital culture on their bodies and identities. Drawing upon the work of these performance artists, and the "poor curriculum" of Pinar and Grumet, De Certeau's subversive "tactics," and Ross's "hacking" metaphors, the authors conceptualize five attributes of cyborg pedagogy for art education in the digital age.

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> The use of computers in art practice is not a convergence but a battleground. Art working becomes ephemeralized [through computers] and the connection to bodily action is broken.
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> Simon Penny (1997, p. 37)

In this article we argue for the importance of situating information technology within a larger cultural context in order to identify its social, political, and aesthetic impact on human identity. Just as identity is not created within a cultural vacuum, neither is art or information technology. Wanting to challenge the idea that identity is merely inscribed by information technology, we must create strategies of resistance that enable us to re-think the construction of identity and technology. Understanding that we perform inscription just as we do resistance, a critical process such as this compels us to re-form our epistemological understanding of art, technology, and the body. In doing so, this process represents a practice of critical citizenship within a radical democratic society that is undergoing rapid transformations through information technologies. We argue that the performance of the cyborg metaphor, as discussed by Donna Haraway, N. Katherine Hayles, and other critical theorists, enables us to expose, examine, and critique the ways in which the body is implicated and bound up in our understandings of art, technology, and identity. The performance of this metaphor within the context of art creates a conceptual space within which we can imagine and perform an embodied pedagogy of resistance.

Discussing the cultural work of performance artists such as Stelarc, Eduardo Kac, Orlan, and Guillermo Gómez-Peña and Roberto Sifuentes we examine the pedagogical characteristics of their performances and the ways that they challenge the effects of information technologies on their

bodies and identities, a critique that we refer to as "cyborg pedagogy." A euphemism for "cybernetic organism," Haraway (1991) defines the cyborg as "a hybrid of machine and organism, a creature of social reality as well as a creature of fiction" (p. 149). Thus, "cyborg pedagogy" serves as a complex metaphor that represents the body/technology hybrid while it exposes the cyborg's dialectical pedagogy of inscription and resistance. As cyborg pedagogues, these artists perform informational technologies to examine and critique their pedagogical machinations on the body.

Performance Art/Technology History

The cyborg myth is historically situated within modern, postmodern, and most recently *posthuman* performance art. Over the past 100 years, performance art has emerged as a site of contestation, an aesthetic space wherein artists have exposed, examined, and critiqued the impact of emerging technologies on the body in order to gain political and creative agency within contemporary culture. The industrial revolution and the advent of mechanization transformed the sedentary practices of agricultural society into one that emulated the segmentation and dynamism of machine technology. As Walter Benjamin (1968) has so effectively argued, the mechanized aesthetic of industrial culture raised questions about the autonomy of the artist and the originality and uniqueness of the artwork as they compared with the traditional production of art. The machine was a force to contend with and the Futurists, Dadaists, Surrealists, and artists of the Bauhaus in the early part of the century used the dynamic machinations of cabaret, circus, and variety theater to challenge that force in order to imagine collage, montage, and assemblage metaphors befitting the new age of machines.

In mid-century, artists like composers John Cage, David Tudor, and dancer/choreographer Merce Cunningham began experimenting with the analog sounds and movements of machine culture, namely the circuitry of electronic media. The discreet disjunctive characteristics of automobile traffic, radio, television, and other industrial noises and movements provided the material from which aleatory forms of music and dance were created. Unlike the metaphors of the early century that mimicked the mechanized forms of industrial culture, Cage, Tudor, and Cunningham exposed and examined the discreet properties of mechanized sounds and movements to represent their psychological impact on the body, namely the ways in which they materialized *in* the body. Their performance investigations later inspired the body/video performances of Nam June Paik, Bruce Nauman's holograms of his body, and Vito Acconci's body performances of psychologist Kurt Lewin's "power field" theory.

Coincidentally, the mid-century also saw the development of cybernetics as the means by which intelligence could be separated from the body and installed in machines. The Macy Conferences on Cybernetics, which were held from 1943 to 1954, developed the notion that, "humans were to be

seen primarily as information-processing entities who are essentially similar to intelligent machines" (Hayles, 1999, p. 7). What Cage, Tudor, and Cunningham set in motion was a trajectory of critique that paralleled the cybernetic conflation of the body with information. By challenging the manifestations of technology in the body through music and dance, these artists enabled the identity politics of the next generation of performance artists.

The anti-war, Civil Rights, and Feminist movements of the 1960s and 1970s found performance artists like Carolee Schneemann and Rachel Rosenthal using their bodies to challenge the body politic of patriarchy and capitalism, namely the multiple oppressions of the body's interstices of race, ethnicity, gender, sexual orientation, and class. The identity politics of their performances further inspired performance artists like Guillermo Gómez-Peña, Tim Miller, and Robbie McCauley in the 1980s. These artists' performances of subjectivity assumed that the body functioned as a cultural instrument, one that was constructed through inscription. Performance art provided them with a public arena within which to re-claim and re-present their bodies. Through their work, these artists perform subjectivity, resulting in a critique of what Judith Butler has termed the culturally intelligible body (Butler, 1990). Their struggle to resist and emancipate the body's identity from the dominant cultural machine has paved the way for the next generation of posthuman performance artists like Stelarc, Eduardo Kac, Orlan, Guillermo Gómez-Peña and Roberto Sifuentes, and others who in the 1980s and 1990s have worked to re-claim the abandoned body of cyberculture.

Cyborg as Posthuman Identity

The body in cyberculture is a body that combines the virtual and the real, the avatar and the actual. In this sense we move away from a definition that establishes the limits of the body as those that are created "by nature." Rather, we now have the possibility for the cyborg body to exist within the same framework as the "natural" physical body. For example, in her book *How We Became Posthuman* (1999), Hayles estimates that approximately 10% of the U.S. population are, technically speaking, cyborgs (p. 115). If we consider the increasingly everyday use of implanted technologies such as pacemakers, as well as devices such as hearing aids and prosthetic limbs, it becomes evident that such manifestations of embodied technology, such joining of machine and human, are not seen as frightening but as beneficial.

Alternatively, the prevalence, and indeed the embrace, of the figure of the cyborg in popular culture can lead us to think of the cyborg merely as a creature of fiction, a fiction that might be realized in some not too distant time, but one that nonetheless does not yet exist. These cyborgs that the narrative of science fiction presents us with are human-like but ultimately, we are told, cyborgs are non-human machines. Modeled primarily

on human beings, cyborgs can look like *us* and try to act like *us*, but they can never be *us*, instead existing as enhanced, sophisticated machines. However, the cyborg is different in that it is a hybrid of the "only machine" and human since it is modeled on human abilities and intelligences. It is the machine that replicates us, causing what Katherine Hayles (1999) describes as, "terror and exciting pleasures" (p. 285).

This reverberation between pleasure and terror can be easily established if we consider, once again, the seemingly benign medical devices mentioned above. Within a medicalized discourse these prosthetics are seen as necessary, and even kind, in the face of illness. Using them seeks to restore human potential. We have a much different reaction if we consider implanting or attaching such devices to a "healthy" physical body. In the healthy body such prosthetics become the marker of abjection, the non-human. This difference in the value that we assign to such devices is of critical importance for it renders the cyborg body as harmless when its purpose is to restore the semblance of lost humanity, but as monstrous when the body is healthy. This construction of the normal/natural body locates the cyborg as terror and establishes for us the fear we have of the non-human, when the non-human is not delimited by the restrictions that the rest of us operate under. Performance artists such as those that we discuss here use technology to create a cyber body/identity that challenges the stereotypes associated with abjection.

This oscillation between terror and pleasure can also be seen in Haraway's work. She writes that the, "cyborg world is about the final imposition of a grid of control on the planet, about the final abstraction embodied in a Star Wars apocalypse waged in the name of defense… From another perspective, a cyborg world might be about lived social and bodily realities in which people are not afraid of the joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints"(1991, p. 154). As Haraway indicates, the myth of the cyborg blurs several of the intermediary boundaries between the human and the non-human. The first of these leakages occurs as we make indistinct the boundaries between human and animal. The second shift takes place when the differentiations between human/animal and machine are considered. The third, which Haraway positions as an outgrowth of the second, consists of the imprecise nature of the boundary between the physical and the non-physical. The blurring of these boundaries allows for Haraway's declaration, "so my cyborg myth is about transgressed boundaries, potent fusions, and dangerous possibilities which progressive people might explore as one part of needed political work" (Haraway, 1991, p. 154).

Hayles has noted that Haraway's identification of the figure of the cyborg locates a space in which traditional boundaries between human and machine are blurred and leakages occur in both directions. Haraway's

argument is even more compelling in that she recognizes that, "cyborgs are simultaneously entities and metaphors, living being and narrative constructions" (Hayles, 114). In other words, there is both a materiality, an embodied presence to the myth of the cyborg, and a metaphorical space that is created by the narratives that produce the myth. In this sense, the metaphor of the cyborg creates a conceptual space for performing embodied subjectivity (Haraway, 1991; Hayles, 1999). Performance art enables us to use the cyborg metaphor to create personal narratives of identity as both a strategy of resistance and as a means through which to construct new ideas, images, and myths about ourselves living in a technological world. In doing so, the performance of the self as cyborg represents an overt political act of resistance in the digital age.

Unlike Haraway and Hayles, who struggle to define a posthuman politics of resistance, other apocalyptic prophets of the digital age are foretelling the future possibility of downloading human consciousness into a computer. The idea that the mind and therefore identity represent disembodied forms of information discounts the corporeal presence of the body and renders it obsolete. The cyborg myth represents a new paradigm in the history of embodiment. Whereas prevailing Western European ontology defines the body's presence as the awareness of its own corporeal existence, its absence is conceived as the receding of the body, a process of abandonment while being absorbed in the world outside of itself. Merleau-Ponty argues against this mind/body split when he claims that presence and absence are intertwined through enfleshment, a process where the world is perceived in the body as flesh.

Allucquère Rosanne Stone (1996) writes that, "the physical/virtual distinction is *not* a mind/body distinction. The concept of the mind is not part of virtual systems theory, and the virtual component of the socially apprehensible citizen is not a disembodied thinking thing, but rather a different way of conceptualizing a *relationship* to the human body"(p. 40). For Stone, the body is mediated through discourse from a variety of texts, producing a legible body that is separate from the physical body to which it is attached. However, as she goes on to explain, the legible body is connected to a *specific* physical body, and this fusion forms the socially apprehensible citizen. This separates the mind and body in very different ways than that typically presented through the Cartesian dualism. Instead of presenting the mind at the expense of the body, we are confronted with the differing legibilities of the mind and the body, but we do not attempt to escape their coexistence in order to produce a comprehensible being.

This inversion of the Cartesian dichotomy presents the possibility that inscription and embodiment are also interconnected. If we consider inscription as the world's imposition on the body, then embodiment represents the assimilation of inscription. In defending the functionality of the body under the circumstances of information technology, Hayles

(1999) distinguishes between inscription and embodiment: "Incorporating practices [embodiment] perform the bodily content; inscribing practices correct and modulate the performance" (p. 200). She clearly differentiates between, yet interconnects the body's performance of cultural incorporation and the culture's performance of inscription. She states, "culture not only flows from the [cultural] environment into the body but also emanates from the body into the [cultural] environment. The body produces culture at the same time that culture produces the body" (p. 200). With the body and the culture interconnected in this reflexive loop, the cyborg no longer signifies a disembodied ontology, but embodiment that is in a continual state of liminality, contingency, and ephemerality, what critical theorist Peter Lunenfeld (1999) refers to as an "unfinished" aesthetic (p. 7). Hayles distinction between the performativity of the body and that of the culture enables us to theorize a pedagogy of resistance. As she exposes and examines these differences, she opens a space of possibility where embodiment, although tied to inscription, can determine its own fate, to produce its own cultural identity.

Hayles's concept of cybernetic signification serves as a compelling metaphor for a critical pedagogy. Compared with Lacan's concept of a "floating signifier," where identity is contingent upon the presence and absence of the actual body, Hayles characterizes the body's absorption in virtual culture as a "flickering signifier." She argues that, "information technologies… fundamentally alter the relation of signified to signifier. Carrying the instabilities implicit in Lacanian floating signifiers one step further, information technologies create… *flickering signifiers*, characterized by their tendency toward unexpected metamorphosis, attenuations, and dispersions" (p. 30). The actual body's presence and absence transformed as "pattern and randomness" signify Hayles's concept of the "virtual body." Flickering between the randomness of digital information and its patterning, the body's identity is continually negotiated and re-negotiated, a play of resistance between the disjunctive attributes of cyberspace and the conjunctions that occur as the subject coalesces meaning and interpretation.

Hayles's flickering signifier corresponds to Deleuze and Guattari's (1987) random ontological system of the rhizome and its patterning as nomadology. A rhizome consists of a reticulated system in which an infinite number of connections are possible. Unlike binary systems that are limited to dualistic configurations, those of the rhizome are multicentric. Like an assemblage, it provides multiple lines of flight from one conceptual plateau to another to the point that, "a rhizome or multiplicity never allows itself to be overcoded" (p. 9). Another characteristic of the rhizome is "asignifying rupture," its ability to disconnect in one location within the system, yet reconvene through the other of its multiple routes of connectivity. Thus, the rhizome functions as a mapping system that provides multiple trajectories that are continually drawn and redrawn as its terrain

is being negotiated. Movement through these trajectories constitutes nomadology, a process whereby the multicentric system of the rhizome yields an ephemeral pattern, one that must be continually renegotiated. "With the nomad... it is deterritorialization that constitutes the relation to the earth, to such a degree that the nomad reterritorializes on deterritorialization itself" (Deleuze & Guattari, p. 381). Like the nomad, the cyborg travels through multiple metaphorical spaces as it negotiates meaning between embodied and inscribed subjectivities. As noted earlier, these metaphorical spaces encourage movements of transgression across fluid boundaries within which performance artists can find the potential to enact the cyborg as an art of political resistance.

Performing The Cyborg

What is the performative impulse of the cyborg? The performance of cyborg identity can be identified in at least two ways. First, assuming the metanarratives of digital culture, the subject submits to the virtual realm where identity is constructed purely as information. In doing so, the prophecy of downloading subjectivity onto the computer is fulfilled, the subject's body is abandoned, and desire is caught in a web of digital reproduction, a late 20th-century reworking of Walter Benjamin's ideas of mechanical reproduction. With identity defined as an "avatar," the performance of subjectivity is relinquished to the digital signification system of cyberspace and the body is rendered virtual. Limiting the dialectic of the actual/virtual body to a binary of "0's" and "1's" restricts identity to a "on" or "off" position where the only choices are to switch "on" the virtual self of information technology or switch "off" the actual self, thus eliminating the body's identity.

Second, cyborg identity can be performed as the metanarratives of information technologies are exposed, examined, and critiqued through the performance of subjectivity, an intervention comprised of the narratives of personal memory, cultural history, and desire. The introduction of such content enables the subject's agency within digital culture. It re-positions the subject to critique digital reproduction in order to imagine and produce new images, ideas, identities, and utopias based on their personal cultural perspectives and desires. Such intervention enables the subject to subvert the presupposed conditions of cyberspace by assuming the hybridized identity of the cyborg, a condition that Hayles (1999) refers to as "posthuman." Hayles goes on to identify four characteristics of the posthuman condition.

> First, the posthuman view privileges information pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life. Second, the posthuman view considers consciousness, regarded as the seat of human identity in Western tradition long before Descartes thought he was a mind thinking, as an epiphenomenon,

as an evolutionary upstart trying to claim that it is the whole show when in actuality it is only a minor sideshow. Third, the posthman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born. Fourth, and most important, by these and other means, the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. (pp. 2-3)

Hayles's posthuman condition corresponds with the pedagogical project of posthuman performance art where information patterns construct identity, where identity and consciousness are in continual flux, where the body/technology metaphors are conflated, and where a posthuman identity is only possible through human/machine discourse. Hayles defines these complex relations as *informatics*, the "technologies of information as well as the biological, social, linguistic, and cultural changes that initiate, accompany, and complicate their development" (1999, p. 29). Thus, posthuman performance artists such as Stelarc, Kac, Orlan, and Guillermo Gómez-Peña and Roberto Sifuentes, whose performances we describe below problematize the conjunctions found in informatics and, in doing so, function as cyborg pedagogy.

Stelarc

Australian performance artist Stelarc raises the issue of the history of our cyborg identity. In his performance work, he argues that humans have always been cyborgs through their connections to technological devices and that a reconceptualization of technology in contemporary culture suggests that we interiorize technology rather than locate technology outside the body. His current projects, the *Extra Ear* and *Exoskeleton*, focus our attention on the use of technology to enhance the functioning of the body and, and in doing so, blur the boundaries between "natural" and "unnatural" technologies of the body. Within the aesthetic conditions created by Stelarc, the concept of the prosthetic becomes artificial and both the body and technology are intertwined, each being necessary to support the function of the other.

In his performance of *ParaSite*, Stelarc writes of the body as one node within a virtual nervous system defined by the Internet.

In the *ParaSite* performances the cyborged body enters a symbiotic/ parasitic relationship with information. Images gathered from the Internet are mapped onto the body and, driven by a muscle stimulation system, the body becomes a reactive node in an extended virtual nervous system (VNS). This system electronically extends the body's optical and operational parameters beyond its cyborg augmentation of third arm, muscle stimulators and computerised audiovisual elements.

A customized search engine gathers, analyses, and randomly scales incoming jpeg images. In real time the digital data are simultaneously displayed on the body and its immediate environment and, to the characteristics of this data, muscle movement is involuntarily actuated. The resulting motion is mirrored in a vrml space at the performance site, and also uploaded to a website as potential (and recursive) source images for body actuation.

The body's physicality provides feedback loops of interactive neurons, nerves, muscles and third hand mechanism with digital video and software code reverberating through the Internet. The body, consuming and consumed by the information stream, becomes enmeshed within an extended symbolic and cyborg system mapped and moved by its search prosthetics. (Stelarc, 1999)

As Stelarc describes it, the body becomes conjoined with information. A twinning of the "virtual" and the "real" body occurs in which it is no longer meaningful to speak of either in isolation from the other. The Internet, which can be seen to represent the detached, downloaded intelligence discussed earlier, is combined in Stelarc's performance work with the physicality of the body. Both rely upon the other and the relationship between the two can be seen as an example of informatics, the location of information within a complex web of the social and political. Stelarc's body, and the constructed nature of our understandings of his body, is questioned just as this questioning also addresses the "pure intelligence" of the Internet. In doing so, the body and technology expose each other.

Within the metaphorical space of cyborg identity, Stelarc creates an ongoing dialectic between the node of technology/intelligence and the physicality/materiality of the body. His performance of this dialectic serves to resist the unthinking inscription of codes from one to the other, instead calling into question the interdependent relationship between the two.

Eduardo Kac

Performance artist Eduardo Kac uses a process he calls "teleporting" to expose, examine, and transmit cultural memory inscribed on his body over the Internet. For his performance *Time Capsule* (1997) in São Paulo, Brazil, Kac implanted a microchip programmed with nine digits in his ankle, "an area of the body that has been traditionally chained or branded" (Kac, 1998, p. 49). Surrounded by photographs from the 1930s of his grandmother's family who were annihilated in Poland during World War II, he then scanned his body to register it with a databank in the United States via the Internet (p. 51). Through this performative act, he constructs a cyborg identity as a vehicle for cultural memory and a critique of inscription.

Kac blurs the boundaries of subjectivity by relinquishing the idea that inscription is solely imposed on our bodies from the outside. Instead of this agency-less, even robotic, performance of inscription, Kac inserts the

microchip containing the data into the fold of flesh that his fingers have raised from his ankle. Through this act he literally inserts the question of inscription into that of embodied subjectivity. The information on the chip speaks of loss, desire, mourning, and locates these within the context of the body politic. The scanned information that we are reading from inside Kac's body, inscribes that loss, that desire, that mourning upon his identity. Kac is not trying to separate his inscription of identity from a larger body politic, but is irrevocably linking the two.

His work also blurs the boundaries between the exterior (inscription) and the interior (embodiment) of the body as the information, the data leaks from one to the other. Accustomed as we are to surface readings of the body, we are confronted by having to read the meanings, the inscriptions, that are coming to us from the inside of Kac's body. Through the depth of his flesh, identity is ironically scanned, read, and constructed, calling into question all those constructions that do not allow for this speaking between the flesh of the body and the surfaces upon which we are in the habit of writing.

Orlan

French performance artist Orlan uses medical technology on her own body (through plastic surgery) to present a "body" that serves as both vehicle and medium, simultaneously questioning and inscribing cultural codes that function to determine our understandings of corporeality. The rigorous documentation of her surgeries and her performances of canonical "beauty" function technologically to enable us to question the various ways in which the body makes and carries meanings. Her most recent work focuses on digital re-workings of her features to perform the "grotesque" configurations of the feminine found in pre-Columbian goddess figures. Cosmetic surgery, for example, moves the body toward a physical/cultural ideal; then the discourse surrounding the surgery normalizes the procedure. If, however, the enactment of the surgery creates a body that defies those stereotypes, the act is seen as crossing the threshold of the abject into the monstrous. Through the surgical performance of medical technologies, Orlan is able to reclaim her body from gendered cultural stereotypes. The subsequent cyborg body that she creates transgresses the boundaries between the normalized discourse of plastic surgery and the abject.

Guillermo Gómez-Peña and Roberto Sifuentes

Long known for deploying stereotypes of the Chicano to question the influence of mass media technology on the construction of identity, Gómez-Peña's and Sifuentes's "cybervato" performances have taken their pedagogy of resistance to the Internet. Touting themselves as "information superhighway bandidos," their desire is,

> to 'politicize' the debate; to 'brownify' virtual space; to 'spanglishize the Net' to 'infect' the lingua franca; to exchange a different sort of

information—mythical, poetical, political, performative, imagistic; and on top of that to find grassroots applications to new technologies and hopefully to do all this with humor and intelligence. The ultimate goals are perhaps to help the Latino youth exchange their guns for computers and video cameras, and to link the community centers through the Net. (Gómez-Peña, 1996, p. 179).

In their work Gómez-Peña and Sifuentes challenge our conceptualization of technology as a late 20th-century invention. Through performances such as *Aztechnology*, they intermix cultural stereotypes ranging from representations of Hispanic machismo to that of the White, cultural ethnographer. As the boundaries between these identities blur, we are confronted by the uneasiness of the categorization of identity and of definition. Their performances raise questions about the nature of technology such as, "why do we only use the term technology when we use machines?" and "What is the technology of culture that produces identity?"

Thus, the performances of Stelarc, Kac, Orlan, and Gómez-Peña and Sifuentes serve as cyborg pedagogy as they challenge the stereotypes of cyberculture and enable the creation of new cyborg myths, identities, and utopias. Through the complex and contradictory appropriations, juxtapositions, and assemblages performed by these artists, the multiple narratives of information technology collide with those of the body. In doing so, their performances permit them, "to explore representation and signification by contrasting... the real and the virtual, [a "hypertextual" process that enables them] both to represent (to be part of an image) and to present (to be themselves)" (Landow, 1999, p. 157).

Cyborg Pedagogy and the Performance of Resistance

As cyborg pedagogy, this reflexive interplay between the actual and the virtual commences as the body abandons awareness of its corporeal reality by being aesthetically absorbed in cyberspace. As information foregrounds materiality, the body's identity is predicated on the contingent circumstances of virtuality, its patterning and randomness. "Located within the dialectic of pattern/randomness and grounded in embodied actuality rather than disembodied information, the posthuman offers resources for rethinking the articulation of humans and intelligent machines" (Hayles, 1999, p. 287). Thus, the completion of a posthuman performance of subjectivity requires aesthetic absorption to complete. To do so, awareness must once again take a reflexive turn back to the body where its flickering signifier becomes an embodied experience. To neglect this return to the body would be to deny the impact of information technology on the body's identity and to limit the oppositional dialectic of the cyborg to pure information thus preventing the existence of any discourse within body. Artist/writer Nell Tenhaaf (1996) argues that this reflexive turn is a "way to self-knowledge, the body read back to itself through its bioapparatus loop. But this cannot come about without an integration of representation

and signifying systems with the enhanced perceptual and information field of cybertechnologies" (p. 65). As cyborg pedagogy, Tenhaaf's bioapparatus loop, enables a critical dialogue to occur between the narratives of the body and those of cyberculture.

To substantiate cyborg narratives as critical pedagogy, we can look to Pinar and Grumet's (1976) concept of a "poor curriculum," DeCerteau's (1984) "tactics of everyday life," and Ross's (1991) metaphor of the "hacker." A poor curriculum, according to Pinar and Grumet, represents a critical grass-roots approach to education whereby students' performances of autobiographical content disrupt the so called "rich" metanarratives of schooling. The authors refer to the performance of autobiography as *currere*, a process whereby "curriculum development and innovation do not require a revamping and reorganization of the schools, of instructional methodologies, or of the academic disciplines, but a transfer of our attention from these forms themselves to the ways in which a student uses them and moves through them" (1976, p. 68). When students identify their own ways of performing what they have learned in school, they transform the curriculum from a reified construct to one that is dynamic, fluid, and diverse in its interpretations. What *currere* offers cyborg pedagogy is the possibility to expose, examine, and critique the oppressive conditions of digital media, its ability to reproduce identity, and to eradicate the body's cultural and historical differences.

This transformation of everyday life, according to Michel De Certeau, is predicated upon the use of "tactics," individual performances that subvert the inertia of cultural metanarratives. Within the context of *currere*, tactics represent the particular ways in which the metanarratives are ruptured and critiqued. "A tactic is an art of the weak," it serves to overcome oppression (1984, p. 37). De Certeau argues that we use tactics to personalize cultural work, to make it our own, to overcome its domination of our lives. Critical theorist Deborah J. Haynes (1997) refers to artists who work in this mode as, "pragmatic radical technologists [who use] technology, 'before it is used on you,' as the cyberpunk dictum puts it. Often marked by attitudes of resistance, radical technologists might combine acts of sabotage in the workplace with establishing alternative media institutions that work for democratic ideals" (p. 78).

Within cyberspace such tactics correspond with "hacking," a subversive metaphor that Andrew Ross (1991) uses to suggest countercultural performance in the digital realm. Ross identifies five ways in which the tactic of hacking functions as a defense against prevailing myths about cyberculture:

- Hacking performs a benign industrial service of uncovering security deficiencies and design flaws.
- Hacking, as an experimental, free-form research activity, has been responsible for many of the most progressive developments in software development.

- Hacking, when not purely recreational, is an elite educational practice that reflects the ways in which the development of high technology has outpaced orthodox forms of institutional education.
- Hacking is an important form of watchdog counterresponse to the use of surveillance technology and data gathering by the state, and to the increasingly monolithic communications power of giant corporations.
- Hacking, as guerrilla know-how, is essential to the task of maintaining fronts of cultural resistance and stocks of oppositional knowledge as a hedge against a technofascist future. (1991, pp. 113-114)

Ross's tactics of hacking can be interpreted as five attributes of cyborg pedagogy. His first tactic deconstructs the cyborg myth in order to "uncover" its limiting pedagogical assumptions. Improvisation, a "free-form" play between the actual and virtual body and the creation of its identity/s, represents Ross's second tactic. His third suggests the ways in which information technologies demonstrate an irreverence toward the traditional and historical assumptions of "institutional education." Ross's fourth tactic suggests remaining vigilant and "counterresponding" to institutionalized and corporate assumptions of education. Finally, his fifth tactic "maintains fronts of cultural resistance" as it applies to future possibility of educational oppression. Each of these tactics corresponds with the radical practices of posthuman performance artists who struggle to attain political and creative agency in the digital age.

The performance of a personal narrative based on the cyborg metaphor is a tactic that functions in a similar fashion to Ross's five attributes of hacking. As a political act of resistance, Gómez-Peña and Sifuentes *uncover* and challenge the oppressive cultural stereotypes of digital culture. For example, their work questions notions of the "primitive" as a social and historical technology that serves to exclude the personal narratives of those who exist outside of digital technology. Furthermore, their work forces us to acknowledge all constructions of identity as predicated. Eduardo Kac's conflation of personal memory with digital memory provides a space within which to *improvise* and construct hybrid identities that are outside the metanarratives presented through traditional systems of technology. The *irreverence* presented toward the "sanctity of the body" by Orlan constitutes a form of political and cultural resistance as she renders the insignificance of our institutional understandings of the body through her surgical procedures. Stelarc's insertion of technology on and in his body represents a *counterresponse* to the ways in which the body is conceived and inscribed by technological culture. For example, by establishing himself as a node on the Internet, Stelarc uses his body to disrupt institutionalized sources of information whose exclusionary pedagogies are otherwise hidden. Finally, all of these artists perform what Ross refers

to as "guerrilla know-how" through the oppositional discourse and practice of performance art. Moreover, the critical pragmatism which they perform through their cultural work serves as cyborg pedagogy to expose, examine, and critique the informatics of posthuman culture, a practice of critical citizenship that is essential to attaining cultural democracy in the digital age.

Summary

In her discussion of the virtual world, Allucquère Rosanne Stone (1996) argues that, "technology has no force outside a system of social practices" (p. 170). If we accept the transference of existing social practices onto the ways in which we think about and use technology we have no room for resistance, for the political engagement that Haraway calls for (1991, p. 154). Just as the struggle over meaning has permeated all traditional areas of the curriculum, so too will we find it within our attempts to read and teach technology. As Stone states, "it's important to consider how we make meaning, and the battles we fight over who gets to own the meanings of our technologies" (p. 169). Technology is not the source of our salvation—it is one more contested ground upon which we can resist.

The poor curriculum, subversive tactics, and hacking concepts of cyborg pedagogy discussed here are found in the performance works of Stelarc, Kac, Orlan, and Gómez-Peña and Sifuentes. The cyborg myth represents the theoretical, experiential, and pedagogical implications of these and other performance artists' works that use mechanical and electronic technologies to challenge the assumptions of information technologies as shaped by the dominant culture. Recognizing that we live in a culture that is increasingly dependent on technology, we need to begin to understand technology as performative and embodied. Cyborg pedagogy explores the varied means that artists, educators, and cultural theorists use to expose, critique, and intervene in the ways that technology is conceived.

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