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The Digital Humanities and Technocultural Innovation

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TECHNOHUMANISM AND THE RISE OF DIGITAL HUMANITIES

The emergence of the "digital humanities" as a new research domain is an exciting development in the ongoing evolution of a scholarly enterprise. But it is important to remember that the engagement between the humanities and technology is not a new conversation. For example, in tracing the development of the "philosophy of technology" as a specific enterprise within the sub-disciplines of that field, Carl Mitchem (1994) identifies Lewis Mumford, Jose Ortega y Gasset, Martin Heidegger, and Jacques El-lul as the four founding figures of a specifically *humanistic philosophy* of technology. Mitchem reminds us that it was Mumford, in his book *Technics and Civilization* (1934), who was one of the first to call for humanists to pay attention to the "human values" in machinery, and to the "spiritual contributions" of the machine to culture. Consider also the history of the field of cultural studies that itself builds on the work of an entire tradition of (humanistic) critical theory. Many of the key thinkers in cultural and critical studies—especially those associated with the Frankfurt School—explicitly theorized the cultural dimensions of science and technology. Foundational theoretical terms such as "ideology," "the public sphere," and "capitalism," were debated and clarified specifically in reference to the practices of technologists and the expropriation of a scientific worldview in the development of industrial and postindustrial societies. And of course, those literary scholars who study the history of the book and the emergence of new literary forms over time must also be understood as engaging with

questions of the technological within humanistic frameworks. They are not only *literary* historians but also *historians of technology* as well.[1]

Out of this historical engagement between the humanities and technology, we can discern the emergence of a particular framework of critical analysis that could be identified as *technohumanism*. I use this term to name a field of intellectual work that has as its aim the philosophical investigation of 1) the relationship between the humanities and technology; and 2) the relationship between the human being and the technological. As a critical approach, this framework embraces the traditional methods of the humanities—such as the exegesis of text for the purposes of creating comparative historical analyses—for the purposes of understanding the way in which these relationships take shape in different historical moments, in different geo-political contexts, and at different levels of abstraction.

In this essay, I discuss the emergence of the digital humanities within this context for the purpose of elaborating how this emergent domain of humanistic research manifests important technological innovations. As will be familiar to some readers, the historical development of the digital humanities includes key moments in the formation of the field of humanities computing, such as the discussions about the cyber-architecture of the digital library, the creation of electronic texts and textual databases, and the design of computational tools for textual analysis. Among other things, these efforts focused on digitizing the human record, rethinking the work and possibilities of the archive, and developing the tools, standards, and protocols of interoperability to support visionary and broad cyber-infrastructural projects.[2] Digital media scholar Tara McPherson also reminds us that any account of the historical emergence of the digital humanities must also include reference to efforts that focused more specifically on aesthetic and expressive experimentation with digital media, including the creation of electronic literature, multimedia documentaries, and multimodal publication venues.[3]

In contrast to the philosophical work that I identify as technohumanism, the work in the digital humanities took on a slightly different inflection. Rather than focus analytical efforts exclusively on the critique of the relationships among human beings and the technologies we spawn, the digital humanities (considered most broadly) embraced an instrumental, creative, and *transformative* set of commitments to *influence the shape of these relationships in the future*. This established for the digital humanities an unusual, but vitally important, historical project: to engage in the work of technological innovation in the service of culture.

RETHINKING THE AIMS OF INNOVATION

The common understanding of innovation focuses almost exclusively on its technological dimension. The *value* of innovation rests solely on the basis

of economic payoff (or costs). Where the term "invention" is used to refer to a novel idea or thing, innovation implies the creation of unique arrangements that will provide the basis for the reorganization of the way things *will be* in the future. Innovation, in this sense, is about the shape of things to come. And although it is rarely explicitly recognized in the popular literature on innovation theory, it is abundantly clear to technohumanists that *all innovations literally rearrange culture.*

In practice, the recognition of this fact often doesn't happen until well after the innovation has propagated throughout various contexts. While it is true that unintended consequences of new technologies are always difficult to predict before they unfold, people are still surprised by the fact that technological innovations have cultural consequences. This persistent blind spot is symptomatic of an impoverished understanding about the relationship between technology and culture. As cultural theorists Jennifer Slack and Greg Wise (2005) explain, the dominant perception—what they refer to as the "received view of the relationship between culture and technology"—is that culture and technology are separate domains of human life. Holding tight to the "received view" significantly impacts what is imagined during the process of technological innovation. Like blinders on racehorses, it literally limits the view of the track ahead. As a consequence, the range of possibilities for a technology-underdevelopment are narrowed, which sets up the conditions whereby technological failures are attributed (in a most unsatisfactory manner) to "unintended consequences" and "unforeseen circumstances." Continuing to bifurcate the "technological" from the "cultural" not only makes probable consequences unthinkable, but also severely limits the imaginative space of innovation in the first place.

And yet, even the most cursory review of the major innovations to emerge over the past two decades provides ample evidence that the significant impact isn't tied simply to its technological dimensions or economic payoff but rather is measured by the breadth of its social and cultural repercussions. The invention of new devices, applications, and tools—the infrastructure of the digital age—subtly but surely influence the improvisation of new forms of human practice that manifest as new linguistic expressions, new body-based habits, new modes of interactivity, new forms of sociality, new forms of agency, new ways of living . . . and of dying. In so doing, these "innovations" have not simply rearranged the *technological* infrastructure of human life; they have reconfigured what it means to be human by virtue of reconfiguring the *spaces of possibility* of human existence.

Digital media, as one of several newly emergent domains of technological innovation, have influenced a range of dynamic human processes such as the fabrication and performance of identity, the formation of social relationships, the production of new ways of knowing, the invention of new modes of expression, and the formulation of new visions of the future.[4] This is the domain of the digital humanities. This work extends the

traditional questions, methods, and analytics of the humanities not only to investigate how human life unfolds in these new spaces of possibility but also to intervene in the creation of the possibilities of life in the future. Unlike other disciplines that focus on technological innovation, the digital humanities take *culture seriously* in the production and performance of technological innovation.[5] Innovations that emerges from digital humanities projects don't simply result in the production of unique consumer products and digital applications; they also, and most importantly, explicitly contribute to the *design of technocultures of the future.*

INNOVATION WITHIN THE ACADEMY

Technological innovation happens in many kinds of contexts: formally, it is the business of the industrial research center and the start-up company. Informally, it happens on neighborhood streets, in kitchens, in garages, in clubhouses, and in workshops. Tragically, it is provoked spontaneously at the site of disasters. Triumphantly, it is the result of persistent and methodical enthusiasms. The academy provides yet another context for thinking about the processes and outcomes of technological innovation. The academy represents a concentration of resources in the form of creative and critical intellectuals, physical structures, and broader institutional affiliations. As a particular kind of cultural institution, the research university provides the infrastructure for the creation of new knowledge. This infrastructure includes not only the material and technological substrate, such as brick-and-mortar buildings, digital network connectivity, and computing resources, but also the immaterial forms of infrastructure, such as standards and conventions of knowledge verification, formation, dissemination, and reproduction. These immaterial forms of "infrastructuring" the production of knowledge take shape as protocols and practices of teaching, of research, and of administration. Given that research universities are also embedded within other networks, such as the ones formed by government-mandated schooling and professional credentialing, we might think about the university itself as a *cultural technology* that produces literate citizens, authorizes the reproduction of culture, and incubates innovation of new technologies.[6]

In some research universities such as at the one where I teach, the University of Southern California the focus on technological innovation is transcoded as an emphasis on "applied research." The following describes the typical stages of applied research as it takes place within university research units:

Applied Research: Technological innovation often happens as a consequence of research that has an applied focus. Applied research addresses questions that have an instrumental value and a "real-world" impact. It is

often defined in opposition to the kind of research that is focuses on theoretical or "pure" science questions.

Technology Prototyping: Technological innovation always involves the creation of prototypes of devices, applications, or systems. These objects may be material, digital or hybrid assemblages of disparate elements. Prototyping results in the creation of boundary objects that function to define the technology as "innovative" and novel.

Publications and Outreach: The traditional methods of technology and knowledge transfer from the university into other knowledge networks involves the circulation of research results in written form that is disseminated through academic journals, professional conference proceedings, and formal research reports.

New Research Questions: The ideal outcome of applied research results not only in the innovation of new technologies, but also in the formulation of new research questions. In some cases, the original researchers realize that they need to involve scholars from other disciplines who can provide additional perspectives about the social, policy, environmental, and economic implications of the innovation.

As far as it goes, this list of the stages of technological innovation is hardly controversial. But as the scope of research changes, so too does the need to think more complexly about the process of innovation. For example, in the University of Southern California strategic plan (first published in 2004), the strategic objective to focus on "applied research" explicitly encouraged the development of research programs that address societal problems.[7] In this institutional context, the notion of applied research is expanded to promote efforts that move beyond the consideration of instrumental questions that yield new patents for technologies and applications—the typical focus of technological innovation—to a take up issues of pressing global importance. With this move, the need to involve researchers from multiple disciplines becomes more pressing.

All too often, though, the research projects that seek to be "interdisciplinary" have actually only engaged a narrow range of disciplines: computer scientists in collaboration with engineers in robotics programs; business professors and engineers in social entrepreneurship programs; medical researchers and social work scholars in the creation of public health outreach programs. Recall when C. P. Snow (1950) first described the gulf between the sciences and the humanities as a "two culture" problem. He implored educators to find ways to bridge the divide. He took pains not to blame one side or the other for their failure to communicate, because he believed that neither "the scientists" nor the "literary intellectuals" had an adequate framework for addressing significant world problems. Although there have been noteworthy attempts in the intervening fifty years since the publication of Snow's manifesto to bridge this divide, the perception prevails that

the "literary intellectuals"—who we would now more commonly refer to as "humanists"—have little of value to say about significant world problems. As techno-humanists Cathy Davidson and David Goldberg (2004) point out in their "Manifesto for the Humanities in a Technological Age," those who call for interdisciplinary collaboration focused on global social problems frequently disregard the necessary participation of humanists in these discussions.[8] Because contemporary social problems are often defined from the beginning as requiring technological solutions, the failure to include humanists in these calls for interdisciplinarity betrays an all-too-common belief that the humanities have nothing useful to contribute to projects requiring technology development.[9]

This couldn't be further from the truth, though. And with the emergence of the domain of digital humanities, the role of humanists in the process of technological innovation can be greatly expanded. Given that one of the critical foci of applied research is the prototyping of new technologies, and because all technologies realign previous social and cultural arrangements, this research will be, by definition, *transformative* of previous socio-cultural patterns. The digital humanities—based on the philosophical foundation of technohumanism—incorporate frameworks for apprehending and assessing the changing value and significance of human-technology relationships. These relationships are expressed through the practices by which social life is reproduced: communication, ritual, language, symbolic production, and tool-use. As Davidson and Goldberg (2006) elaborate:

> The humanities engage three broad sets of questions: those of meaning, value and significance. *Meaning* concerns interpretation of data, evidence, and texts. *Value* ranges over the entire field of cultural, aesthetic, social and scientific investments. *Significance*, implicating both the former two, raises questions of representation, in the sense of accounting for (explanation) and of capturing, in the sense both of offering a faithful rendition (description) and of making broad claims (generalization). (2006: B7)

Equipped with these analytical frameworks and a set of critical methods, humanists are poised to contribute important insights to the applied research questions guiding the work of engineers and computer scientists, as well as those who seek to innovate in new areas of social significance such as digitally enabled health communication and the visualization of large datasets. While it is the case that technologies (gadgets, devices, applications) may be part of a proposed intervention within a complex social situation, humanists understand, drawing on the theories of technohumanism, that any technological "solution" must always be designed as a hybrid social-cultural-technical intervention. Thus they are theoretically and disciplinarily equipped to broaden the horizon of applied research programs.

But there is a way in which the work of the digital humanities in and of itself already demonstrates the *culturally* transformative power of applied research. Consider the following model (Figure 9.1) that describes the way in which the digital humanities participate in the creation of innovative technologies.

This model schematizes an academic *circuit of technocultural innovation*.[10] The guiding strategy for research within the digital humanities is that it takes *culture seriously*, both as the context for the formulation of the research question in the first place and as the domain within which significant technological developments will unfold. At a base level, this work maintains a commitment to the deep analysis of the ideological effects of technocultural arrangements. This involves more than simply analyzing the cultural values manifest in technology; it investigates the way in which technologies are implicated in maintaining a dominant social order, perpetuating conditions of oppression, and reconfiguring the conditions of human existence. The best of this work also seeks ways to intervene in the technological reproduction of structures and relations of power, and to transform technology to be more democratic and empowering. Although this work draws deeply on a full range of cultural criticism, it recognizes that the process of doing things differently with technology must engage theory as well as practice.

Let me elaborate these additional stages of innovation by referencing examples of digital humanities research going on at the University of Southern
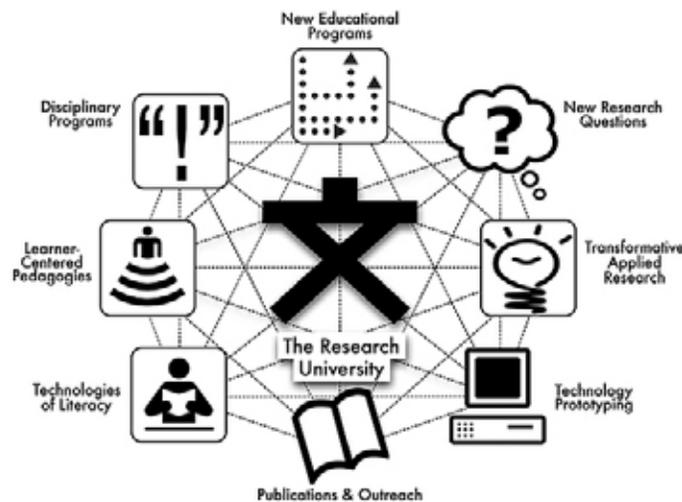
Digital Humanities and Technocultural Innovation

Figure 9.1.   Digital humanities and technocultural innovation.

California. While these are only a few of the noteworthy projects that signal the emergence of the digital humanities, considered together within this particular institutional context, these efforts demonstrate how the humanities produces technocultural innovations.

Technologies of Literacies: This category of technology concerns the creation of *meaning making* applications, contexts, tools, and devices and the dynamic processes of the circulation of meaning. As such these technologies are implicated in the development of new literacies.

Sophie 2.0 Authoring Tool: Originally conceptualized by Bob Stein, one of the pioneers in digital media, *Sophie* is software for writing and reading rich media documents in a networked environment. Sophie users can create "media rich" digital documents that incorporate text, image, sound, and video, as well as reader feedback and conversation (http://www.sophieproject.org/).[11]

Learner-Centered Pedagogies: These pedagogies are designed to engage students in the active process of knowledge creation. Learner-centered pedagogies abandon the "sage on the stage" model of education—that defines education as something delivered from the teacher to the student—to focus instead on practices of collaborative knowledge construction and project-based learning.

Open Play: *OpenPlay*, a project of the USC School of Cinematic Arts Learning Games Initiative led by Juan Devis, brought together students from the Los Angeles Leadership Academy, artists, and academics for a three-year collaboration to write and develop media-rich stories. During the program's first year, participants wrote and developed stories, then learned Flash in order to animate their narratives. The animations ranged from a fantastical allegory about global politics to an action adventure set on a fast food counter to an epic adaptation of the Star Wars saga set in South Central Los Angeles. In making their own media, the group discovered a fantasy "grammar" and shared storytelling framework, while also realizing the significance of place (http://iml.usc.edu/index.php/projects-past-projects/2008/06/29/past-projects-project-5/).

Disciplinary Programs: Disciplinary curricula remain an important aspect of the intellectual infrastructure of university. These structured paths of knowledge formation enable learners to acquire experience in disciplined methods of analysis, of evidence creation, of reasoning, and of question formation. Disciplines serve as the foundation for the reproduction of cultural understandings and the dissemination of knowledge.

Multimedia across the College: A collaboration between The Institute for Multimedia Literacy (IML) and USC's College of Letters, Arts and Sciences offers a program called *Multimedia Across the College* that pairs multimedia labs with upper-division courses in the "general education" disciplines of the humanities and social sciences. These paired courses al-

low students to work on collaborative projects in a broad range of media applications such that both students and faculty push beyond the basic competencies to investigate more challenging forms of argumentation and scholarly expression. As students begin to develop a deeper understanding of the core ideas, history, and objectives of a particular discipline, they are offered the opportunity to learn how to use digital tools to integrate their own work into larger scholarly networks (http://iml.usc.edu/index.php/programs/multimedia-across-the-college/).

New Educational Programs: These grow out of the development of new questions that cannot be addressed within the context of a strictly disciplinary program of study. These programs offer new pathways for the creation of new knowledge and, equally importantly, for the creation of new research questions.

As one example of a new educational program, USC's Institute for Multimedia Literacy offers a minor in "Digital Studies" that combines theory and practice in lab-based seminars featuring hands-on tutorials to support students in producing sophisticated, media-rich work. Learning the dynamic potential of a broad array of tools and technologies, students create innovative, scholarly projects, from photo-essays to Web-based documentaries, from interactive videos to sophisticated websites, and from typography in motion to 3D visualizations. The program is multidisciplinary in that it includes elective courses in Journalism, Visual Anthropology, American Studies and Animation that explore new research questions such as the design of media for social change, the ethics of virtual worlds, and issues of transmedia culture.

These examples of digital humanities research efforts illustrate the key stages of technological innovation in that they explore applied research questions, create technological prototypes, and disseminate results in the service of generating new research questions. But this work also pushes into new contexts. One of the *opportunities* afforded by digital humanities research involves the exploration of the educational potential of technological prototypes. By engaging students in research activities, and in the design and use of new technologies, devices, and applications as the basis for new learning activities, applied research in the digital humanities brings new insights to bear on the pedagogy and content of educational programs.

This model of technocultural innovation asserts the doubled efficacy of formal educational programs: to both disseminate disciplinary knowledge (traditional literacies and established knowledge bases) as well as to evoke the creation of new knowledge and new literacies. One of the *outcomes* produced by digital humanities research is the creation of new research questions, by students, faculty, and others not directly involved in formal educational programs. Given the nature of this work—to investigate the cultural dynamics of new forms of digital expression—another outcome focuses on

the development of new forms of scholarly publication, dissemination and outreach. In this way, digital humanities research not only produces new theories, technologies, and educational materials, but also serves as the occasion for developing new ways to communicate the meaningfulness of scholarly research to broader audiences using new expressive modalities. This is to say that along with the prototyping of innovative technologies comes the experimentation with new genres of (digital) scholarship, modes of publication, and forms of outreach to audiences outside the academy. The prototypes become instances of *technologies of literacy*. As students and faculty engage these new technologies, pedagogies, and forms of digital publications, new literacies are improvised and eventually codified. These literacies eventually provoke the redesign of educational programs. These programs and projects, in turn, draw on existing technological literacies while they also inescapably shape the literacies of the future.

In this essay I elaborated the relationship between the digital humanities and innovation by reference to examples of research projects that focus on the creation and reproduction of new literacies. I could have offered another inflection of the model of technocultural innovation by referring to other digital humanities research projects that investigate (for example) the computational requirements (and affordances) of multimodal databases, the nature of scientific data visualizations, or the development of protocols of cyberinfrastructural interoperability. These projects also contribute important technocultural innovations in the way that we archive the human record and enable the collaborative production of new knowledge. I chose to discuss the literacy projects because I am particularly interested in the category of technologies of literacy and the way in which the literacies of the future are now being shaped through the design of digital educational materials and classroom activities. The polemic I offer here concerns the importance of the critical frameworks and methods that are part of the technohumanist legacy of the digital humanities. As digital humanities scholars and technologists collaborative engage in the creation of new pedagogies, learning materials, and educational programs, I look to them to find ways to incorporate critical frameworks such that we can evaluate the implications of the technocultural innovations that they incubate. This to me is one of the lasting contributions of the digital humanities to the process of innovation (within the academy or elsewhere): the imperative to critically reflect on the long-term implications of any innovation in the way it rearranges culture in the future.

NOTES

1. See for example the essays collected in the edited collection *Reading in America: Literature and Social History*, Cathy N. Davidson, ed. (1989).

2. This history is thoroughly and engagingly recounted in the publication: *A Companion to Digital Humanities*, ed. Susan Schriebman, Ray Siemens, and John Unsworth. Oxford: Blackwell, 2004. Accessed: March 1, 2010: http://www.digitalhumanities.org/companion/view?docId=blackwell/9781405103213/9781405103213.xml&chunk.id=ss1-2-12&toc.depth=1&toc.id=ss1-2-12&brand=9781405103213_brand

3. McPherson is also the editor of *Vectors: A Journal of Culture and technology in a Dynamic Vernacular* which publishes interactive, multimodal scholarly works that cannot exist in print form. www.vectorsjounral.org. In several talks about the historical antecedents of this journal, she reminds us that in addition to the research efforts identified as work within humanities computing, the digital humanities was also shaped by experimental efforts in aesthetic and expressive uses of new digital media. Here she refers to the significant contribution of those who created early experiments in hypertext and electronic literature, of digital journals such as *Kairos* and *Postmodern Culture*, and research initiatives such as Marsha Kinder's *Labryinth Project*.

4. See Balsamo (1996), Hayles (1999).

5. In my forthcoming book, I elaborate the nature of "innovation" as a performative project. This work draws inspiration from Lucy Suchman's (2007) investigation of the nature of human-machine relations.

6. See for example Paul Willis (1977), Celia Lury (1993), and Brown and Duguid (1998).

7. Obviously, USC isn't the only university to call for a focus on applied research. The strategic plan of the University of Illinois at Urbana Champaign, for example, includes a similar objective: "Recognize that our long-term ability to contribute to human progress comes through a balance between pursuing fundamental scholarship and research, and addressing the more immediate concerns of society" (*Creating a Brilliant Future for the University of Illinois*, no page).

8. The example offered by Davidson and Goldberg comes from a 2002 interview by Jeffrey D. Sachs, professor of Economics and Director of the Earth Institute at Columbia University, who is also special adviser to the United Nations secretary-general on Millennium Development Goals. Davidson and Goldberg cite a statement made by Sachs where he "insisted that interdisciplinarity was the only way to solve world problems." "The need," he said, was "to focus not on the disciplines but on the problems and to bring together five main areas in an intensive dialogue: the earth sciences, ecological sciences, engineering, public health, and the social sciences with a heavy dose of economics" (Davidson and Goldberg, 2004: B7).

9. Two decades ago, it was the social scientists (mainly sociologists and anthropologists) who confronted a similar disregard as they asserted the importance of studying human factors in the development of new information systems and networks. Over time, frequent border crossings bridged the gap, as social scientists collaborated with computer scientists, especially in the area of artificial intelligence, to investigate the social impacts of computing. Based on the work of social scientists such as Lucy Suchman, Susan Leigh Starr, Les Gasser, and early work in STS, there is wider appreciation for the social dimensions of technology development and deployment. Innovations are, in this sense, considered socio-technical achievements. Geoffrey Bowker, William Turner, Susan Leigh Starr, and Les Gasser (1997) describe

the historical development of the "border crossings" between the social sciences and the computational sciences that eventually resulted in the formation of new (inter) disciplinary fields of research such as human computer interaction (HCI), computer supported cooperate work (CSCW) and, more recently, social informatics.

10. Readers familiar with the history of cultural studies will recognize the inspiration for the creation of this diagram from Richard Johnson's (1987) article, "What is Cultural Studies Anyway?" Paul duGay, et. al. (1997) offers an elaborated model of a circuit of culture that designates the way in which different stages of production/consumption interact and feed into one another.

11. Bob Stein is a pioneer in electronic publishing technologies. In 1985 he founded the Voyager Company, which produced the first commercial multimedia CD-ROMs. He is now the director of the Institute for the Future of the Book that engages in two primary domains of innovation: 1) building high-end tools for creating complex electronic documents; and 2) exploring new forms of intellectual expression. Sophie was incorporated into educational programs at USC while Stein was a fellow at the Annenberg Research Center. Accessed March 1, 2010 from http://www.futureofthebook.org/.

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