

EDITED BY MEGAN A. WINGET
AND WILLIAM ASPRAY

DIGITAL MEDIA



TECHNOLOGICAL AND SOCIAL CHALLENGES
OF THE INTERACTIVE WORLD

Digital Media

Technological and Social Challenges of the Interactive World

Edited by
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William Aspray



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Introduction

The first decade of the 21st century has seen an explosion in the creation and use of interactive digital media. Coupling traditional media forms such as still and moving images, music, and text with computer and communication technologies, digital media not only blurs the boundaries between creators and consumers, it also introduces a dynamic and ubiquitous computing environment that demands new theory development as well as practical and practice-based methods for collection development and preservation. As the varieties of digital media multiply, scholars are beginning to think about its origins in traditional media as well as ontological challenges inherent in the medium.

On February 13–15, 2009, with generous support from the university, the editors of this volume organized an invitation-only workshop on digital media in the School of Information at the University of Texas at Austin. Participants were a select group of scholars from industry and academia, some already well established in this field and others at the beginning stages of their careers. The purpose of the workshop was to examine from multiple perspectives issues related to the history, collection development, preservation, and ontological challenges of digital media. The participants were carefully chosen to represent a variety of backgrounds and perspectives, ranging across humanities, information studies, technology, history, communication theory, and fine arts. It was an experiment to bring these people together, each of whom already worked on digital media, but who studied the topic from different perspectives. The papers included in this volume are extensively revised versions of the conference papers; each paper went through two rounds of blind reviewing before publication.

The book is organized in four parts, each representing a different perspective on digital media. The first section considers the problems of archiving digital media for long-term preservation. Digital media artifacts and spaces for interaction with these artifacts, such as games and virtual worlds, are not designed for preservation. These digital objects are readily copied but are fragile, due to dependence on a context that may not be preserved; and this particular characteristic of digital objects presents both challenges and opportunities for adapting archival practice. The second section addresses the specific issues of data and metadata that confront the scholar wanting to understand the creation, use, and retention of digital artifacts. The possibilities of creating multiple versions of digital artifacts with slightly different artifacts require the scholar of digital media to reconsider the assumptions that have been drawn from studying the traditional text document. Issues of context, collection, and arrangement of objects take on a new meaning. Following a contemporary line of scholarship, the third section looks at what one can learn about digital media and the user experience from biographical examinations and autobiographical self-reflections. These biographical examinations help one to better understand issues such as the digital divide and digital production, and go beyond questions of digital media to all of personally experienced information itself. The final section examines digital media in the context of the interaction between technology and culture, examining such issues as the role of technology in creating music, and applying humanities methods to the understanding of technological creations.

Digital media is being taught in almost every university today, sometimes in multiple departments. We anticipate the book will be of interest to scholars from departments of information studies, media studies, communication, rhetoric, literature and languages, and computer science. The book is suitable for use as a graduate textbook. Let us now consider the various chapters.

PART 1: PRESERVING DIGITAL MEDIA

The first section considers the general problems of archiving digital media for long-term preservation. Before the advent of digital media, preservation mainly consisted of identifying technical solutions to primarily technical problems. The physicality of traditional media made the problem of conservation and preservation relatively straightforward. Conservators could focus on the object itself, and by providing adequate housing and storage, along with physical and chemical interactions when necessary, they could extend the life of objects under their care for tens or even hundreds of years. This is not the case for digital media, which often consist of complex inter-

actions between technologies and users, and necessitate fundamental shifts in the way we think about preservation. Instead of providing technical solutions to primarily technical problems, digital preservationists must now consider the nature of the digital system and make much more complicated decisions based on their understanding of what makes a particular artifact of digital media important or noteworthy.

Henry Lowood's "Memento Mundi: Are Virtual Worlds History?" discusses the difficulty of reconstructing a meaningful history of interactive spaces, such as games and virtual worlds, when these virtual spaces do not accrue archaeological traces of past events and discarded artifacts in the way that real spaces do. Virtual worlds have a finite lifespan, just like real world places. Preserving the record of culture requires preservation not only of these spaces but also of the history of interactions that happen within them. As Lowood writes, "The interactive, immersive, and performative aspects of digital games and virtual worlds challenge media archivists, curators, and historians to develop new documentation and preservation strategies." In particular, this article challenges contemporary thinking in the preservation of games and other virtual worlds, arguing that the archiving of code and "perfect capture" of gameplay experiences is insufficient, and that these need to be supplemented with external documentation of in-game events such as narrative descriptions from participants. Ultimately, there are two interrelated preservation projects: the archiving of digital objects as historical artifacts, and the archiving of documentation of historical events and experiences that occur in these digital environments.

Megan Winget's "Collecting the Artifacts of Participation: Videogame Players, Fan-Boys, and Individual Models of Collection" examines the nature of collection as a social practice and the way in which collection is changing as people start collecting digital as well as material artifacts. This chapter examines the history and theory of the social practice of collection and explores it in the digital context. Winget explains what people collect, why they collect what they do, and how they evaluate their collected materials. Given this framework for understanding collection, the specific problems associated with collecting participatory, interactive digital objects is explored, specifically the collection of videogames and fan art. The analysis points to the changing nature of collection in the digital era and the practice of collection itself.

Kari Kraus, in "Prim Drift, CopyBots, and Folk Preservation: Three Copyright Parables about Art in the Digital Age," considers the tensions between copyright law and digital media practice, and their implications for preservation. Written in the spirit of other artists "who have challenged prevailing assumptions about the nature of creativity, originality, and authorship" such as William S. Burroughs, Marcel Duchamp, and Andy Warhol, Kraus selects three case studies from digital arts and new media to

question assumptions about the role of copyright in cultural preservation: the restoration of primitive elements in three-dimensional objects; folk preservation (by amateurs rather than professionals, distributed rather than centralized, unauthorized rather than authorized); and copybots (software used to clone objects in Second Life). Kraus argues that “. . . the humanist is not a dabbler or interloper in these matters; humanistic knowledge, particularly semiotics . . . has the potential to lend consistency and coherence to case law that is currently shot through with loopholes, contradictions, and dead ends.” She calls for the creation of an interdisciplinary research center employing both humanities scholars and lawyers to ascertain research-grounded solutions to intellectual property issues involving emergent art genres associated with digital media.

PART 2: DESCRIBING DOCUMENTS

While related to the lack of physicality in digital media mentioned in section one, the book’s second section focuses on defining the boundaries of works, or documents, in the digital age. While books and other traditional media have clearly defined boundaries, digital objects do not. This leads to questions regarding authorship, dissemination models, how to identify “valuable” or “authoritative” artifacts, and how to meaningfully collect these materials. Fundamentally, though, this section is a preliminary attempt by the authors to develop robust conceptual models for what constitutes a “work” in the digital age. Must there be only one authoritative copy? Must a “work” look and act like a book or some other stable physical media? We lose opportunities for growth, innovation, and continued relevance if we build our models based on traditional media. Building models based on new media, however, is difficult due to the variable and fundamentally shifting nature of the field.

Cathy Marshall’s “Digital Copies and a Distributed Notion of Truth in Personal Archives” examines thorny preservation problems that underlie personal archiving in a digital age. Most people find it easier to keep things rather than cull them, and to adopt a personal archiving strategy that is governed by benign neglect. As Marshall shows, using the case of personal digital photographs, people frequently make multiple copies of a digital photo for the purposes of displaying, sharing, annotating, or backing it up; and different copies have different attributes. One copy might have the best descriptive metadata, while another has the best photographic metadata. Sometimes it is problematic even to determine which copy is the authoritative original. Software can be used to keep careful track of the differences among copies, but most people do not want to be bothered to do so. Software itself can be the culprit, e.g., when different digital devices, or different

software programs, or even different versions of the same software render the data and metadata of a digital object in different ways. What is considered the perfect copy is often a context-dependent notion. The notion of a single original and authentic artifact has become problematic, and Marshall calls for a pragmatic taxonomy of copies in action.

Melanie Feinberg's "Organization as Expression: Classification as Digital Media" views a classification of objects as a new document that expresses a point of view on the materials being made available one that is worthy of critical appraisal in terms of its rhetorical goals, strategies, and unintended effects. Digital media, ranging from something as simple as a set of personal Web bookmarks to something as complex as a research database, offers new possibilities for increased expression and accessibility in the practice of organization and classification of information. Unlike the traditional objects of classification, books on shelves in libraries, digital media affords the instant rearrangement of digital objects, allowing for multiple organizational schemes to be explored simultaneously and side by side. This article challenges the view that organizational systems must be universal and comprehensive and instead explores the idea of organizational systems as expressions of the author's point of view. When one uses a digital library, for example, one is not only reading the individual objects in it, but also reading the author's organization of the library and its interpretive frame. The author of this digital creation must take into consideration the context in which the intended user group approaches the system if the author hopes to achieve her persuasive strategy.

PART 3: THE PERSONAL NATURE OF DIGITAL MEDIA

Digital media is both ubiquitous and fundamentally interactive. Because of this, users of digital media have fundamentally different methods of interaction from those possible with more traditionally constructed materials. Instead of being passive receptors of authoritative and somewhat static knowledge, people who use new media have a much more autonomous and collaborative attitude. People are interacting with digital media in a way that was fundamentally impossible just ten years ago. They create things, ranging from fan-fiction to applications for mobile devices; they interact with authors through forums and blogs; and their expectations as regards interacting with media demand new models for description, authorship, and community engagement. Specifically, we must develop models for allowing people, authoritative and non-authoritative, to formally and meaningfully describe their personal interactions with the media.

Abigail De Kosnik's "Personal Theory: A Method for Humanities Scholarship in a New Media Moment" argues in favor of a new style of humanities

scholarship consonant with the Internet age. With the growth of the Internet, more people than ever are reading digitally on websites, blogs, and social networks. The dominant style of writing in this medium is first-person narratives about personal experiences and perspectives. De Kosnik argues that critical academic writing should consider this shift in writing style as something to embrace. The proposed style, known as “personal theory,” is a mixture of theory and personal perspective. The style might take several forms, such as personalized critical response, using a personal frame to contextualize, or relating personal associations to theoretical material. This personalized rendering of theoretical concepts could fulfill the aspiration of cultural studies to blend the popular, personal, and political into a form that is accessible to the public, in particular to the “born digital” generation, which is accustomed to such a writing style.

William Aspray’s “Empowering U.S. Citizens through Access to IT and Digital Media: Henry Jenkins Meets Larry Snyder” examines the evolution of the concept of the “digital media divide” and explains its significance in understanding the changing social expectations for citizen engagement. He argues that the scholarship on digital citizenship must move beyond access issues and on to issues about the skillful and meaningful use of digital resources. This chapter deconstructs the idea of the digital media divide, examining it in the context of digital divide research and comparing digital divide perspectives on two different notions, IT fluency and participatory culture. Jenkins’s notion of a participation gap is contextualized as an extension of earlier work on the digital divide as the discussion adapted in response to the evolution of the computer from a business tool to a social and entertainment platform. Aspray argues that the two competing visions of what it takes to empower modern citizens, IT fluency and participatory culture, are autobiographical, i.e., explained in part by differences in the backgrounds of the principal authors of these studies.

PART 4: INTERACTIONS BETWEEN TECHNOLOGY AND CULTURE

The book’s fourth section considers the role that technology can play in specific cultural instances. The advent of digital media and the ensuing sea change in production practices have affected many fields, from academia and industry to artistic practice. While there are still painters and sculptors, and skilled musicians still work with traditional instruments, there are many more who use digital media to create and disseminate their work. These changes have an effect not only on the arts at large in terms of creation, but also in the reception of these works. In terms of humanistic scholarship, the affordances provided by digital media are changing the

landscape. The two chapters in this section speak to specific challenges and tools associated with these changes, and more generally address the ramifications of technological innovation on traditional institutions.

Bruce Pennycook's "The Impact of New Media on Musical Creativity" focuses on the role of changing technology in the way we create and listen to music. Digital production allows for new creative expression that was not possible in an analog medium. This article explores the affordances of digital production environments that enable this new sort of expression. The author investigates how improved interfaces, more immediate access to digital works, and the ability to quickly and repeatedly iterate successive versions of a work have changed the creative process. He explores how advances in music technology, from Muzak to MP3s, have changed the way we listen to music. He also examines how instrument design, software development, and powerful personal computers have contributed to the new musical genres of interactive music, installation/performance art, and generative and autonomous music.

Anne Balsamo's "The Digital Humanities and Technocultural Innovation" investigates how to apply a humanities approach to the study of innovation. Digital humanities is an emerging field, grounded in the theories and methods of humanist scholarship that provide a lens on the transformative potential of technologies to influence cultural and social practices. Balsamo challenges the traditional focus of innovation theory on technical advances and economic return, arguing that the cultural and social changes are the most profound and lasting. The digital humanities offer a useful perspective on the process of innovation, she argues, by providing a critical context for examining the value and significance of technology based on its impact on the practices of social life. In particular, Balsamo calls for the inclusion of digital humanities scholars in efforts within the academy to apply research for the purpose of technological innovation. The humanistic perspective enables one to understand the cultural values manifest in technology, the role of technologies in maintaining a dominant social order or perpetuating conditions of oppression, and its possibilities for reconfiguring the conditions of human existence. Her examples focus on the technologies of literacy, but she claims that digital humanities can be used to better attain such goals as archiving the human record or producing knowledge collaboratively.

1

PRESERVING DIGITAL MEDIA

1

Memento Mundi

Are Virtual Worlds History?

Henry Lowood

In December 2002, the world's largest digital game company, Electronic Arts (EA), launched a "massively multiplayer" game or virtual world called *The Sims Online*. It was based on EA's best-selling computer game, *The Sims*, and designed like the original game by one of the industry's most celebrated designers, Will Wright. Renamed *EA-Land*, it shut down forever at 4:35 AM PST on 1 August 2008, less than six years later. A video clip captured by Stanford University's How They Got Game (HTGG) project and preserved as part of the Archiving Virtual Worlds collection hosted by the Internet Archive documents the last hours of this virtual world. In this video, we observe the "avatars" or in-game representations of players as they circulate and chat during an end-of-the-world party (fig. 1.1).

The human players behind the avatars reminisce and exchange contact information; a player or two becomes emotional and expresses deep attachments to the community of players that gave life to this virtual space. Like the doomed passengers gathering on the deck of the *Titanic*, these *EA-Land* residents wait for the end while music plays to raise their spirits. At last, the precise moment of the shut-down arrives, represented to the last inhabitants on their monitor screens in the anticlimactic form of a network error, "lost server connection." With apologies to T. S. Eliot, the last moment of *EA-Land* can be summarized thus: This is the way the world ends / not with a bang, but with an error message.

Of course, *EA-Land* was not the first online world to close down. Game and virtual worlds such as *Habitat* (1986–1988), *Phantasy Star Online* (2000–2007), *Earth and Beyond* (2002–2004) and dozens of others to date have been terminated. Virtual world services, such as Google's Lively (2008) and Areae's Metaplace (2007–2009) have also been shut down. After the virtual



Figure 1.1. EA-Land Closing Party, 1 August 2008. Screenshot from Archiving Virtual Worlds collection.

plug has been pulled, very few virtual worlds have been turned back on. The few examples of resurrected virtual worlds include *Meridian 59* (1995–2000, 2002–) and *Uru Live/Myst Online: Uru Live* (2003–2004) (Pearce 2009), resurrected largely through the efforts of loyal programmers and players. The vast majority of closed virtual worlds are gone forever. The closing of multiplayer game worlds and other kinds of online “virtual” worlds raises important issues for curation, preservation, and historical research. (I will use the term “virtual worlds” in this chapter to encompass a variety of digital, networked environments. The use of this term is not a comment on the reality of these spaces, especially with regard to the experiences of their users or residents. It is merely a term of convenience that enjoys widespread use. Other terms used for some or all of the digital environments covered in this work are massively multiplayer online games—sometimes massively multiplayer online role-playing games or MMORPGS, persistent worlds, and synthetic worlds.) What sorts of meaning do these digital spaces have for those who log in, and how will future historians of the emergence of such spaces in the late 20th and early 21st centuries have access to both the technologies that created them and the cultures and communities that emerged from them? In order to convince ourselves of the fragility of this history, we have only to contrast the banal message of *EA-Land*’s conclusively final system message to the emotional voice and text messages broadcast by this virtual world’s last inhabitants during the last count-down to the end of their shared world. The participant who captured the final footage for the *How They Got Game* proj-

ect commented in his description of the “Final Countdown” video that “tears are shed, final good-byes are made, and lasting memories are created before the plug is pulled and the world is brought to an end” (Degtiar 2008). What kinds of digital objects and metadata associated with these online worlds will be available for future assessments of the technologies, cultures, and communities—and the memories—that they generated and supported? In short, what might participants, curators, and digital preservation practitioners do to help future historians of digital life to assess meanings associated with virtual worlds at the turn of the millennium?

VIRTUAL WORLDS ARE HISTORY

There are two ways to understand this assertion: They are worlds of historical interest, and they are going to go away. I intend in this chapter to run through some of the implications of the life-cycle and extinction of virtual worlds for thinking about their history and the preservation of that history for future scholars. The history of these worlds, of course, cannot be separated from their use by communities of users, players, or “residents.” The moment when a virtual world “is history”—when it shuts down—reminds every participant that their world had a history that they would like to tell, or at least remember. The flowing of tears and exchange of memories as *EA-Land* was about to shut down provides evidence of such responses. Histories of individual virtual worlds are inextricably bound up with the intellectual and cultural history of virtual world technologies and communities. Historically specific events take place in these worlds. Human beings (through their avatars) fill these digital environments with meaning that emerges from their activities in them as social spaces, as part of a social as well as a technical network. Regardless of whether we consider these spaces as synthetic (digital) or virtual, it is difficult not to conclude that future historians will be interested in the history that has occurred inside them, at least in terms of the impact of these events and activities on the humans behind the avatars.

An important shift in the use of computers historically was the extension from the calculating engine to more widespread applications for communication, knowledge, work, creativity, and information sharing. Another important, but perhaps less well understood, evolution in computing, and one that is closely tied to the development of game technology, is the notion of the computer as in some sense defining a space. This notion comprises two key aspects of the personal use of computers and computer networks since at least the early 1990s that are often lumped together under the notion of “immersion”: place and presence. When we log on to computer-based environments, we become convinced that we are someplace and also that we are

there with others who are likewise present to us. Immersion, of course, is an analogy; it reinforces the notion that we plunge into these environments and are completely submerged in them. The senses of place and presence reflect this absorption, and they are perhaps the most compelling characteristics of digital environments as virtual worlds. "Virtual" here means something that does not physically exist but is made by software to appear as if it did exist. Consider "virtual memory," a term that goes back to the 1950s. The avatars of synthetic, digital worlds are virtual in this sense. The typists, players, and handlers controlling and viewing the avatars are there in the sense that they accept their presence in these spaces, even if others would insist that they are not "really" there.

Immersion is clearly tied closely to how players represent themselves in virtual worlds. Moreover, these representations bring us to problems introduced by the fragility of these worlds, since every avatar as a form of data that can be deleted becomes a microcosm of the shutting down of entire virtual worlds. Even though avatars neither die nor fade away as people do in the "real world" meatspace, their deletion and disappearance are fraught with issues connected to real-life identities. Karyn was a well-known player on the LegendMUD, a historically important text-based world. A former Miss Norway, she was killed in a car crash in 1998, leading to an outpouring of online grief that included one of the most important documents in the history of early online societies, Raph Koster's "A Story about a Tree" (Koster 1998). As Koster put it, "She was from Norway. She kept coming back, and brought friends with her some of whom did not speak English very well, but for whom she served as an interpreter. She made friends. Eventually she ran a website all about that virtual world, and posted on that site pictures of herself, where all could see she had a lovely smile." Or did she? Years later, Tracy Spaight revealed to readers of *salon.com* that the tragic death and the person were both elaborate fabrications—only the avatar had been real (Spaight 2003). Yet, this interpretation of the events misses an important point. Koster insisted, "I think it's unfair to say that virtual communities aren't real with a capital R. I'm not going to let anyone tell me that that wasn't real. No one's going to say that the friendship wasn't real because I know the grief was definitely real" (quoted in Spaight 2003). In other words, real social interactions, networks, and relationships can emerge from notions of place and presence built on technologies of the virtual, even when virtual seems at first blush to mean "fake" or "made up." Historians of documented virtual worlds will want to say more about what is real in the virtual.

Everything that happens in virtual worlds ("in world") is mediated by computer, network, and game technology, even that aspect that Raph Koster insisted is the most real: the social interactions of the players. Yet, the reality of games and virtual worlds is more than what can be found in

software packages and server farms. In *The Study of Games*, their seminal work on the anthropology of games, Elliott Avedon and Brian Sutton-Smith asked, “What are games? Are they things in the sense of artifacts? Are they behavioral models, or simulations of social situations? Are they vestiges of ancient rituals, or magical rites?” (Avedon & Sutton-Smith 1971, 419). Avedon and Sutton-Smith were leading their readers to ponder structural similarities among games, but their question also leads us to a fundamental question for the history and preservation of digital game and virtual worlds: Are games artifacts or activities? Are games more like authored texts or are they built up through experiences expressed through interaction, competition, or play? Are they constructed by programmers and developers or co-constructed by a complex network of actors, including players. As we preserve interactive media, we are acutely aware that one of the most difficult tasks is to document *interactivity*, which means capturing traces of *activity* in virtual worlds, and teasing out whether they are software artifacts or expressions of human agency and creativity.

The interactive, immersive, and performative aspects of digital games and virtual worlds challenge media archivists, curators, and historians to develop new documentation and preservation strategies. Chris Crawford, the dean of American game designers, described interactivity some years ago as being central to game design; he did so in a way that resonates today as a call for new thinking about the history and preservation of digital content: “Interactivity is not about objects, it’s about actions. Yet our thought processes push us towards objects, not actions. This explains why everybody is wasting so much time talking about ‘content.’ Content is a noun! We don’t need content; we need process, relationship, action, verb” (Crawford 1996). Social and performative aspects of game and virtual worlds also lead us away from thinking about the preservation problem in terms of objects and artifacts and toward focusing our attention instead on events, actions, and activities. Future historians of virtual worlds will want to understand what people did in early virtual worlds, partly at the level of social and personal experiences, partly in terms of historical events such as political protests or artistic performances, and partly in order to understand issues of identity, law, economics, and governance that connect virtual world to real world activities. Clearly, there is a lot more to the preservation of virtual world history than software and data preservation.

PERFECT CAPTURE

The second sense of virtual worlds as being history—that they are going to go away—brings us directly to issues of historical documentation, digital preservation, and curation. What will remain of virtual worlds after they

close down, either individually or perhaps even collectively, i.e., when the technology has become *passé*?

One way to approach this problem is to think of virtual worlds as software; from this viewpoint, any event or activity that occurs in a virtual world is captured as a form of data. As we have already seen, there is a connection between online data and personal experiences or identity. It should therefore come as no surprise that software solutions have been created that address the connection between death in “real life” (or RL, as it is often called in virtual worlds) and the deletion of data associated with the person behind an online character or avatar. For example, a death switch is a computer program that alerts a trusted friend or service when it deduces that a person is no longer alive. The website of a company called Deathswitch offers a “deathswitch subscription service,” admonishing its readers not to “die with secrets that need to be free” (Deathswitch 2008). Several such services exist, with names like Slightlymorbid.com and Legacy Locker. The neuroscientist David Eagleman opened his short history of death switches with the remark that, “There is no afterlife, but a version of us lives on nonetheless” (Eagleman 2006, p. 882). Avatars do not die, and they do not fade away unless and until they are deleted or disconnected. They can even spread the word of their handler’s demise, setting off the software that will rescue data associated with that person. One problem that death switch programs solve is that of notifying RL friends when another player—such as Karyn—passes in the flesh, even if the user account and thus in some sense the avatar might survive for some time.

A notion that plays into the preservation discussion is particularly relevant here: namely, that of the potentially perfect reproduction of digital data. Recall that our digital personae, our avatars, and our player characters are ultimately all bits of data on a machine. The makers of death switches count on that. These death notifications sometimes cause surviving accounts and avatars also to be deleted, but they can also be the push that is needed to save personal data from deletion. So, one line of thinking might be that if we can only get access to these data, should it not be possible to copy them . . . forever? Does that possibility for the microcosm of the avatar suggest a solution for the bigger problem of preserving entire virtual worlds?

The logic here with respect to preservation of virtual worlds involves two steps. The first step is acceptance that everything that happens in virtual worlds as software systems is in some sense reducible to data, and the second step asserts that, as a practical matter, it should be possible to capture these data perfectly and preserve them without loss. As a paradigm of the perfect capture of activity in the form of data, examples include such recordings of in-world activity as game replay files. It might help to explore this notion of perfect data capture with reference to an actual historical case,

that of Chris Crosby, aka NoSkill. In December 1993, id Software released the first-person action game *DOOM*. It established the game genre that would dominate the development of game technology during the 1990s, the “first-person shooter” (FPS), and left its imprint on almost every aspect of computer gaming, from graphics and networking technology to styles of play, notions of authorship, and public scrutiny of content. NoSkill was among the first wave of *DOOM* players to be recognized by other players and was known as the original “Doomgod,” a moniker given to exceptionally skilled players. An active player from about 1994 to 1996, the young father was killed in a car crash in 2001. His memorial site on the web, like many others, depicts a young man in the prime of life, holding his young son, but it also offers a number of files for downloading (NoSkill Memorial Site 2004). These files are “demos” recorded from games he played between May 1995 and April 1996. A demo, also called an lmp (from its .lmp or “lump” file extension), is a replay file. It is a recording of a game session in the form of a sequence of commands that correspond to input control states during each frame of the game, or “tic.” *DOOM* players generated a demo file to record their gameplay by entering the command “-record” in the console, a command-line interface that could be called up while playing the game. In other words, they could create a script—a sequence of instructions—generated from game data and save it as a demo recording. When activated later by another player with a copy of the game, this recording takes over control of the game engine, which generates a visual replay of the game from the original player’s view (though this and other aspects of the replay can be modified). A recording in this format is much more compact than video captured from the screen. The catch is that the demo data must be run and executed inside a copy of the same game from which it was generated, and even from the exact same version of that game, if the game engine is to render the action correctly.

After a visitor downloads Chris Crosby’s demo files from his Memorial Site, and plays these files inside the correct version of this old game, originally published toward the end of 1993, he is watching historical gameplay from a now obsolete game through the eyes of a dead player. NoSkill comes back to life in the sense that the replay file instructs the game engine to carry out the exact sequence of actions enacted by the now dead player. Moreover, because we are using an essentially “dead” game to produce this replay, we are also engaging in an act of software preservation and resurrection. The result is that it is possible to see a historical *DOOM* match as played and exactly as seen through NoSkill’s eyes. The RL Doomgod is dead, but do his actions as a player live on through this act of perfect reproduction?

As a historian, I cannot help but contrast the potentially infinite repetition and perfect reproduction of NoSkill’s game-play to the fading

memories of his life . . . and death. At the same time, the reproduction of historical actions that a replay provides is not history. It is a remarkable act of software and data preservation, but I am concerned that as we begin to stage early work on preservation of games and virtual worlds we will frame these projects primarily, or even exclusively, in terms of software preservation and the perfect capture mode exemplified by game replays. This would be a barren exercise with respect to the documentation of the events and activities—the actual history—of virtual worlds.

PERFECT LOSS

Future historians and others interested in the history of early virtual worlds will be intensely curious about their inhabitants. They will want to know about the things people were doing in virtual worlds, why they were doing them, and what their activities meant to them. The possibility of perfect event capture with respect to digital data, with the game replay as a paradigm for reproducing the past, suggests that it might even be possible at any time in the future to track the activities of the earliest players and residents in virtual world. With replay as a model for event capture, it may even be possible to see exactly what they saw, with options to view events exactly as the participants saw them or to move the camera around on a “magic carpet” and see what was happening from multiple viewpoints. Yet, from a historian’s point of view, perfect capture is half of a paradox, for it must be placed alongside the equally real possibility of “perfect loss” in digital spaces. A quick glance at any computer keyboard reveals the problem in simple terms, specifically, the key marked DEL. To date, the virtual world has not yet been produced that offers vestiges or traces of the past after that key has been pressed. That is not the whole problem, however. In fact, even if we back up every bit of a virtual world, all of its software with the associated data stored on its servers, we may still have completely lost its history.

Another example may help here. In virtual worlds such as *The Sims Online* or *Second Life*, political and other kinds of protests, disputes, and disagreements have been a significant aspect of online life (Ludlow & Wallace 2007). In early 2007, after the National Front (France) moved into *Second Life*, a series of nasty protests against their presence led to an attack on the organization’s in-world buildings and turned the area around them into a virtual battleground (fig. 1.2). Most people who were not active inhabitants of *Second Life* read about this clash in a blog not long after the events had occurred (Au 2007).

Curious readers of such eye-witness accounts of the events then typically jumped into *Second Life* to see for themselves what was happening, maybe even to take screenshots or capture video to document the activity while



Figure 1.2. Anti-National Front protests in *Second Life*. Screenshot from Wagner James Au, *New World Notes* blog, 15 January 2007.

they were there. By the time that most of them arrived, however, there was absolutely nothing to see. The National Front had already abandoned its Island and deleted all of the content there, essentially stripping the area it had owned of every trace and artifact of its presence in *Second Life* and erasing evidence of the tumultuous events that had transpired there. In a post on the Terra Nova weblog about “The History of Virtual Worlds,” the historian Timothy Burke remarked on the difficulties of carrying out qualitative research on this subject, especially for scholars lacking personal experiences in these environments. His comments initiated a brief exchange on the capture of virtual world data as a basis for historical research. The legal scholar Greg Lastowka commented, “actually, it’s far easier to get the data on *everything* happening in virtual worlds and to keep it forever”—essentially, the notion of perfect capture. Burke responded by noting the limitations of data generated and stored on a server. These “proprietary” data of virtual worlds encompass what is owned, or present on the servers that support that world, but even if historians have access to every bit of data, their utility for the interpretation of specific events is quite limited. As Burke put it, “. . . I think the one thing that *isn’t* in the proprietary data is the history of unusual or defining episodes or events in the life of particular virtual worlds. . . . The narrative history, the event history, of any given virtual world, may in fact be obscured by the kinds of god’s-eye view data that developers have. After all, they often don’t know what is happening at the subjective level of experience within communities, or have to react to it after it’s happened (say when players stage a protest)” (Burke 2006). Thus,

focusing on preservation of what Burke calls proprietary data matches up poorly to the likely needs of future scholars of virtual worlds. The problem for historical research is that a complete set of software with a matching trove of all the data associated with a virtual world's server cannot be interpreted without contextual information. For a contemporary participant in this history, like Burke, personal knowledge or interviews can provide guidance in the selection of events and fill gaps in their interpretation. The essential problem is the identification and preservation of historical documentation, and these sources are rarely to be found inside virtual worlds or on the servers that support them.

Consider another example that illustrates this point in a slightly different way. In the first hours after the WTC and Pentagon attacks on 11 September 2001, player communities used online, multiplayer games and virtual worlds as a medium for responding to the attacks. In games such as *Everquest* and *Asheron's Call*, players read news alerts either via in-game text or system announcements, while outside the world but still online, others caught up via player community websites and forums. Of course, still others watched television, heard from friends, or even experienced the events up-close and personal. Within hours, players organized candlelight vigils inside the massive multiplayer game *EverQuest* for the victims of the attacks, using glowing weapons or other objects and taking screenshots to post online and document their in-world activities. They also discussed how such actions helped them to deal with the dramatic historical events unfolding around them. For a vigil held on *EverQuest's* Luclin server on 12 September in response to "yesterdays disheartening display of events," players were invited to "mourn and discuss" on the Everlore website. Players commented on the importance of this action to them; one of them, with the player name Keeter, argued that "Just because you are in a game doesn't mean the world outside doesn't effect [*sic*] you. Many people would like to mourn and share peace along side [*sic*] people they have battled long and hard side by side with. Yes, I can go to a church to mourn, but I would like to do it with my comrades around the country/world, which is impossible everywhere else. If you don't want to be a part of it, then dont [*sic*]. You can choose not to do it. But respect the people who would like to. We don't bother people that want to run naked gnomes through the country, so don't bother people that want to gather and discuss something important to us all" (re: Candlelight Vigil; Lowood 2008). How today can we document such activities that took place in virtual worlds nearly a decade ago? Part of the answer to that question is that it is impossible even to begin to reconstruct or narrate in-world events without extra-world documentation such as screenshots and forum contributions posted on the Web. Such documents are necessary both for a full description of an event and for a

rich interpretation of what activities associated with that event meant to participants, no matter what kind of world we are talking about.

There are three points to be made here with regard to virtual world preservation projects focused on software and game-produced data. First, inside *Everquest* today there is no trace of past events such as the 9/12/2001 vigil. Assume that a virtual world of historical interest has not been deleted, erased, or remade and we are able to log in, that we are on the correct server or shard of that world where an event of interest, such as this vigil, took place, and that we are standing on precisely the spot where it occurred. Even when all these conditions have been met it is not possible to dig beneath the surface, scratch underneath a poster, or find a file cabinet of documents or an old newspaper in a nearby building. These traces of past events are easily deleted in a virtual world and thus perfectly lost. There are a few exceptions to this statement. For example, a monument called the "Shard Vigil Memorial" was built in November 2000 on the Thistledown server of *Asheron's Call* to commemorate a unique achievement by its players. It was created and can be seen on only this one instance ("shard") of this game world, because the event it commemorates occurred nowhere else. Similarly, Koster's "A Story about a Tree" was inspired by the Garden of Remembrance created on LegendMUD "in memory of Karyn" (Koster 1998). These are exceptions that may be seen as proving a rule, however. They are indeed markers of unique historical events, and in that sense they provide a visible trace of the past. However, the memorial in *Asheron's Call* is a mute testimonial. All the documentation about the event that it commemorates exists outside the game world in which it occurred. The Garden of Remembrance does include texts such as poems, but as Koster notes in his essay about Karyn, the news about Karyn's death "filtered out across the bulletin boards, via e-mails, and eventually onto the welcome message when you first logged in [to LegendMUD]," and like his essay, the *Salon* article that questioned Karyn's authenticity, and other documentation are not preserved inside the game world. Examples like these suggest that even perfect capture of game and virtual world data will not yield much documentation about specific events that occurred there.

Second, this lack of in-world artifacts and documentation clearly has implications for long-term preservation that focuses on game software and server-side data. Assume now that we are able to capture every bit from a virtual world server, everything from 3D models to account information, that we are able to reverse engineer or disable authentication and log-in controls after the original server is no longer live, and that we have received permission from every rights holder ranging from game developers to third-party developers and players to copy, store, and use what they created, to show and even inhabit their avatars, or to reveal their identity and activities. The chances of all this actually happening are near zero, of course, but

let us assume that it can all be done. If we then could leap the additional hurdle of synchronizing every state or version of the software to the matching states of the server's databases, it might in fact be possible to run a simulation of the virtual world as an archival time machine, flying around on a magic carpet in spectator mode but never interacting with events run by the game engine and player data. This would be an act of perfect capture for a virtual world, much like a game replay. If we were to accomplish these tasks for *Everquest*, we then could turn the dial of our time machine to 12 September 2001 and indeed find a group of players standing around with brightly colored weapons and wands in their hands. But what were they doing, and what did this activity mean to them? The virtual world time machine will be a valuable addition to the future historian's toolkit, but in the absence of historical documentation corresponding to the replay of events, its ultimate value will be quite limited.

The third point, then, is that the documentation that is a prerequisite for future historical studies of virtual worlds is simply not located in game software or on game servers at all. The most important qualitative documentation, if it has survived, will likely be found somewhere else, on a blog or a wiki, in a player-created database or Flickr screenshots, or a YouTube video. The same may be true when a future repository attempts to fire up some ancient software. If contextual information, such as software dependencies or descriptions of relationships among objects, is not provided under whatever set of transfer protocols or specifications a project is using—and all the retired software engineers are gone—it may be impossible to get old software to run. Simply put, essential documentation about virtual worlds will generally be found outside of those worlds. This is not to say that proprietary data are useless. Game researchers have extracted and analyzed a wealth of quantitative data from virtual worlds; they have used these empirical data to explore social and economic aspects of these worlds, in some cases having to utilize supercomputers in order to analyze such vast amounts of information. Yet, even research of this sort usually does not have access to complete sets of server-side data, instead relying upon or supplementing these data with surveys, participant observation, or data harvested on the client side by using bots or automated characters (Williams et al., 2006, 2008). Again, writing the history of virtual worlds on the basis of software and of associated data alone would be a barren exercise. Installing *Everquest* in 2050 will not reveal much about the virtual world that emerged from the software, even if future writers and historians have access to everything needed to run a fully functioning version of the game. Certainly, there are still important reasons for preserving this software, whether as artistic or cultural content, for technology studies, or for forms of scholarship that treat aspects of digital games and virtual worlds as authored texts or artistic objects. Still, in thinking about virtual world history

we need to devote more attention to the kinds of events and activities that occur in these places and how to document them, much as an archivist or historian would in the real world. Refocusing how we think about the history of virtual worlds in this way will push preservation priorities beyond conserving historical software to preservation of documentation external to virtual worlds conceived as servers and software environments.

PRESERVING VIRTUAL WORLDS

In an essay I wrote nearly a decade ago on the “Hard Work of Software History,” I tried to come to grips with the some of the then-emerging difficulties that cultural repositories were beginning to face with respect to collecting software (Lowood 2001). Debates about the best methods for preserving software struck me then as being “partly stuck on different institutional and professional allegiances to the preservation of objects, data migration, archival functions, evidentiary value, and information content. . . . [T]hese issues are not likely to be sorted out before it is necessary to make serious commitments at least to the stabilization, if not the long-term preservation, of digital content and software” (p. 149). One way of characterizing the mix of software preservation and documentation activities necessary to preserve virtual world content and history is to think of the primary collections as a mix of “library” (published digital games and virtual world content) and “archives” (documentation about game/virtual worlds). This is, of course, a familiar model for cultural repositories. However, it is not at all clear that the nature of digital games and virtual worlds as software objects and the particular ways in which events and experiences in these virtual spaces are mediated and described will carry over neatly into established library or archival collecting, cataloging, and preservation activities. The important point is that historians, librarians, archivists, records managers, and museum curators continue to have different ideas about the formats and forms of digital content, the materiality of digital media, uniqueness, and custody of original media as opposed to bits, documentation, evidentiary value, and many other issues that affect long-term preservation of software and digital content.

Currently, there are only a few significant institutional library collections of historical game and virtual world software in the United States. These collections include archival documentation, hardware artifacts (such as game consoles and realia), and print collections related to digital games. The prominent examples are the Stephen M. Cabrinety Collection in the History of Microcomputing in the Stanford University Libraries (<http://www.oac.cdlib.org/findaid/ark:/13030/kt529018f2/>),

the International Center for the History of Electronic Games at the Strong National Museum of Play (<http://www.icheg.org/>), and the UT Videogame Archive at the Dolph Briscoe Center for American History, University of Texas at Austin (<http://www.cah.utexas.edu/projects/video/gamearchive>). The Cabrinety Collection was the first major institutional acquisition of a microcomputer software and digital game collection by a research library in 1998. It consisted of approximately twenty thousand software titles, roughly 85 percent of which were digital games, along with some seventy-five hardware platforms, publications, ephemera, and archival materials. The How They Got Game project was created at Stanford two years later to begin work on the history and preservation of digital games and interactive simulations and continue an established project in software history and archives carried out in the Silicon Valley Archives at Stanford.

In 2008, the How They Got Game Project, as part of the Stanford University Libraries, joined the University of Illinois, the University of Maryland, and Rochester Institute of Technology to form Preserving Virtual Worlds (PVW), a multi-institutional project funded by the U.S. Library of Congress and the first major effort to investigate a variety of problems and scenarios with respect to the preservation of virtual worlds and digital games. Both the How They Got Game Project at Stanford and the Preserving Virtual Worlds Project have focused attention on a few possible approaches to documenting activities and events in virtual worlds. In the discussion that follows, I will divide these activities into two broad areas. The first covers efforts to specify the sorts of born-digital data and metadata that will need to be captured or created in order to document the history of virtual worlds. The second topic will touch on new ways to think about access to certain categories of virtual world objects.

DATA AND METADATA

The nature of the collaboration and work of the Preserving Virtual Worlds project has highlighted solutions for problems such as identifying significant digital artifacts or developing metadata standards. The work has been carried out by a collective of participants with different perspectives on software preservation, archives, and history. Before citing a few specific examples of the types of problems, it is useful to consider a few salient characteristics of this project. The division within the Library of Congress that has funded the project is the National Digital Information Infrastructure and Preservation Program (NDIIPP). NDIIPP's missions of preserving significant collections of digital content and developing a viable technical

infrastructure of tools and services to support such activities is well known, but a third leg of the NDIIPP stool is perhaps less familiar: “Building and strengthening a network of partners” (NDIIPP Program Background, 2007). Thus, most NDIIPP projects involve multi-institutional collaborations, usually with a lead institution and multiple institutional partners. In the case of Preserving Virtual Worlds, for example, the lead institution is the University of Illinois at Urbana-Champaign. The other three institutions are funded project partners. Some of the work is also carried out by external partners, which include Linden Lab, the developers of *Second Life*, and the Internet Archive. Moreover, it should be noted that the four internal partners offer a diverse set of institutional settings and intellectual commitments for digital preservation work. The mix includes a library school and library group with expertise in digital preservation theory, repository development, and schema development (Illinois); a humanities research center with expertise in textual scholarship, electronic literature, and notation systems (Maryland); a library-based group and game research project with special expertise in history of digital games and software archives, as well as digital repository technology (Stanford); and an academic department in game design and development with expertise in game design, game engines, and emulation (RIT). Due to the complexity of issues involved and the resources—both intellectual and material—likely to be involved in their solution, the problems of digital preservation in general and the preservation of virtual world history in particular can only be solved through collaborative work. This is not only due to issues of scope and scale but primarily and precisely because solving the kinds of problems faced by an effort to preserve the history of virtual worlds demands intense negotiation among experts who are likely to see these problems differently.

It is time to review a few of the issues that have surfaced in the Preserving Virtual Worlds Project with respect to data and metadata. The first issue has already been set up in the discussion of virtual worlds as history. What exactly are we trying to preserve? Specifically, is virtual world preservation focused on the software and server-side data that in some sense defines or encompasses the “world” as a created artifact, or are we looking for materials in digital form that document the activities of players or residents of these spaces? There are at least two other ways to break down the categories of objects earmarked for preservation. The first is to separate developer-created or -managed materials from those created or managed by players. The second relies on traditional institutional models by distinguishing repositories of virtual world data as libraries or museums of created artifacts from archives of documentation about events. However, depicting virtual world preservation as a binary proposition such as developer vs. player or artifact vs. document is unnecessary and probably counterproductive.

Certainly, there is value in preserving both software artifact and event histories. The most productive approaches to virtual world preservation will be those that integrate artifact and documentation in terms of collecting focus, evaluation of digital content objects, organization of content transfer packages, metadata creation, and access strategies.

Consider a problem that might seem to be entirely a matter of treating the essential task of game preservation as software preservation, yet turns out to have crucial implications for documenting player behavior and history: software versions. Consider one of the cases studied in the Preserving Virtual Worlds project, id Software's computer game *DOOM* (1993). As noted above, *DOOM* was a multiplayer, first-person shooter; suffice it to add here that this game almost overnight transformed competitive, multiplayer gaming into the leading-edge genre for computer games through the 1990s. There are two aspects of *DOOM* that are particularly noteworthy with respect to its preservation as well as history. First, it was distributed first and throughout its historical run in shareware versions that featured a limited number of episodes of the game; the idea was that the shareware version would hook players on the game, so they would then purchase the full version. Lev Manovich has described the second important aspect of *DOOM*: "Here was a new cultural economy that transcended the usual relationship between producers and consumers. . . . The producers define the basic structure of an object, and release a few examples as well as tools to allow consumers to build their own versions, to be shared with other consumers" (Manovich 2001, 245). The developers of *DOOM* openly embraced revision of the notion of game authorship by allowing, even encouraging, modification of its software by the player community; one consequence of this stance was that it immediately destabilized the notion of a canonical version of the game. Defining a version of the game *DOOM* as a problem for a library acquiring games for a collection, describing a copy of this game that it owns, or attempting to preserve the copy it has therefore involves considerable attention not only to a sequence of patches and versions, but also to combinations of developer-produced software, third-party add-ons, and player-developed modifications, better known as mods, that were actually played and might have been significant historically.

And yet, de-stabilizing the notion of a fixed version of software is not just a problem when we attempt to determine what versions to preserve and how to account for revisions and changes. It also raises significant issues that affect the documentation of player activities in the game. A crucially important category of objects that provide this documentation are produced by players' efforts to capture their experiences through replays, screen captures, and screenshots. In the case of *DOOM*, we have already seen how NoSkill's demo files make it possible to view the games of one of this

game's earliest and best competitive players. Again, *DOOM* demos were essentially replay files, saved sequences of instructions from a previously played game that, when executed by the game software, would show the same game from the same (first-person) perspective of the original player. As one guide put it, "in the *DOOM/DOOM II* universe, the term 'demo' refers to a file that contains a recorded session of gameplay" (Ledmeister). The same is true of replay files in later games, such as Blizzard's *Warcraft III*, up to the present day. Unlike video files captured from the screen or video-card output, demos or replays allow different views and settings to the full extent permitted by the game software and the best visual quality that the software will produce. However, this all is possible only when a running version of the game engine is available in order to view these replays. Not only that, the version used to view the demo or replay nearly always must correspond exactly to the version that was played when it was created. Therefore, any decision about which version of the game will be preserved determines which replay or demo files will be viewable in the future. Likewise, any decision about which demos or replays are historically significant in terms of game culture or history will presuppose preservation of the appropriate version of the game software. Treatment of the software artifact affects the availability of documentation, and selection of documentation affects treatment of the software artifact. At least in the realm of virtual world or digital game history, separation of these treatment decisions into specialized areas of expertise or giving responsibility for these decisions to walled-off departments may lead to disastrous consequences for future archivists and historians.

A second example of virtual world data and metadata also speaks to the necessity of maintaining contact between collections and their contexts, as well as between projects of software preservation and historical documentation. This example suggests that documentation can also serve as a category of metadata for virtual world data. As part of the Preserving Virtual Worlds, the How They Got Game group at Stanford created two collections to document virtual world events using largely player-generated content. The first is the Archiving Virtual Worlds collection hosted by the Internet Archive as part of their Moving Image Collections. This collection consists in large part of video footage made with real-time screen-capture tools such as Beepa Software's Fraps. The "Final Countdown" video that documented the last minutes of *EA-Land* is an example of the content preserved in this collection. The How They Got Game project has also established a subscription with the Internet Archive's Archive-It service, through which it has been crawling game- and virtual world-related websites since the beginning of 2008. These two projects see to the preservation of collections of virtual world videos, weblogs, wikis, player-created websites, maps, and many other forms of documentation that provide information about player

activities. These activities might include modifying game software, demonstrating skills through superior game-play, commenting on events such as protests or artistic performances, or anything else that someone who has spent time in a virtual world might consider important.

An interesting quality of virtual and game worlds is that many of them can be navigated by in-world coordinate systems, much like real-world cartography. Two well-known examples are the "Second Life URL" (SLURL) in *Second Life* and the UI coordinate system in *World of Warcraft*. Just like we can mash up data by attaching GPS coordinates to real-world maps, photographs, and other media, these virtual world coordinate systems might make it possible to match documentation we have assembled in our virtual world collections not only to locations in virtual worlds, but also to each other. In the case of the video collection, the metadata scheme provided by Archive-It and based on the Dublin Core schema for metadata elements already provides a "coverage" element for individual objects. According to the Dublin Core specification, this element "describes the spatial and temporal characteristics of an object or resource." It can be applied to such objects from a wide variety of resources with geo-referenced data, for example. Moreover, the specification specifically allows "for the use of multiple classification schemes to further qualify the incoming information" such as latitude and longitude or other "native coordinate representations" (Becker et al. 1997). In the current version of its Archive-It software, the Internet Archive has made it possible to input metadata tags at the document level for web pages harvested through the use of its Heritrix Web Crawler; this tag might be a reference system from a "native coordinate system" such as those provided by online games and virtual worlds. If we can add a descriptive tag in the form of a specific SLURL to a document describing an event that occurred in *Second Life*, we can think about linking documentation and in-world locations in new and interesting ways.

For example, using virtual world coordinates might help us bridge the gap separating mute server-side software and proprietary data from event history in the form of documentation about an event, perhaps offering a solution to the problem of perfect loss. Here is a specific use scenario. A cultural historian who is interested in the use of game worlds for scholarly communication learns about the first science conference held in *World of Warcraft*, in May 2008 (fig. 1.3) (Bohannon 2008).

She finds videos documenting this event in the Archiving Virtual Worlds collection, but because they were captured at low resolution, she is unable to resolve all of her questions at the locations chosen for the event. So as part of her "fieldwork" she installs and fires up the game world from a carefully preserved snapshot of the game data from about the time that the conference was held. Next, using the coordinates conveniently provided by the collection metadata, she ports directly to the location where the confer-



Figure 1.3. Scientists gather in *World of Warcraft*, 9–11 May 2008. Screenshot by Henry Lowood.

ence was held and, using her avatar, walks the terrain depicted in the video. She is thus able to answer her remaining questions about the logistics and locations of the conference. This scenario will work better in game worlds, where developers maintain relatively stable environments with respect to content, than in virtual worlds such as *Second Life*, where residents such as the National Front are free to delete anything and everything that they create. If we are able to maintain packages of inter-related software, data, and content associated with a virtual world, the problem of perfect loss will be alleviated, if not entirely solved. However, it is important to insist that, as in the case of *DOOM* demos, useful connections linking proprietary software objects to “enunciative” texts (Fiske 1992) and other forms of historical documentation will only be available to historians if data curators, librarians, and archivists work closely with software preservation specialists.

ACCESS

Having introduced a potential user for virtual world history collections, it is time to say something about access to the artifacts and documents that might be held in such collections. Access is perhaps not a core concern for digital preservation per se. This should not prevent us from working on ideas about access that take into account the specific nature of digital collections of artifacts created for digital games and virtual worlds. The assets and

content that go into the creation of a virtual world or multi-player game include 3D models, maps, geometries, textures, and so on. We cannot yet say how future scholars will visualize, analyze, and understand these artifacts in the digital repository of data files and metadata available to them. The interface is essentially a file directory in the administrator mode available today to users of the Stanford digital repository, or for a library user it might be a search interface that provides access to a set of standard document formats. In both cases, access to complex software objects stored in the repository will require additional work of reconstruction, perhaps involving transformation of the data and the installation of additional tools such as emulators. Rather than start digging here, perhaps it makes sense to lean on our shovels and think about another model of access to artifacts from a historical world, also largely comprising models and suitable spaces for these models. This model might just be a natural history museum, in which dinosaur skeletons are placed in a setting that takes the visitor to the prehistoric savannah. Access to the information preserved there is visual and is reinforced by immersion in the world of the artifacts. It should be possible to do something similar with 3D artifacts from virtual and game worlds.

Constructing a platform for direct access to 3D artifacts in what we might call a virtual museum will require multi-disciplinary collaboration of a new sort among curators, historians, computer scientists, and programmers. An example of this kind of work is provided, to name only one example, by the development of the Sirikata platform at Stanford University and at Kata Labs (Au 2010). Software like Sirikata can be used to create a new kind of repository, one in which 3D objects are stored, retrieved, and investigated as 3D objects and accessed via a web browser. This suggests that it is indeed possible to move original, verified geometry and texture data—archival assets—from their original environments directly into such a repository. Rather than sifting through file directories or search results, researchers could walk through the museum or display artifacts that they have selected, thereby giving them visual access to objects such as models. Moreover, with the same technology these objects could be set in an original setting such as a game map, perhaps with additional contextual documentation and metadata provided in this environment. When we include the rebuilding of game assets such as entire game spaces in this proposal, we are moving beyond the analogy based on a collection of dinosaur bones to thinking about what we would do if the entire Library of Alexandria were excavated from the ground. For virtual worlds, the answer is to use it as a library. This conclusion applies equally well to the deployment of digital artifacts such as maps or levels from 3D games, beginning with early titles such as id Software's *DOOM* and *Quake* as it does to exhibitions created in virtual worlds such as *Second Life* by artists and cultural institutions, including libraries and museums (fig. 1.4). Can we move these objects into an instance of an



Figure 1.4. Working with an archival document on Stanford’s Life-Squared island in *Second Life*. Screenshot by Henry Lowood.

open virtual world platform such as Sirikata? If so, might we think of these instances as virtual wings of a library, rather than file repositories, places where the historical artifacts are deposited, preserved, found, and investigated in an environment that puts documentation and narrative alongside the artifacts?

Indeed, maps are among the most important artifacts in game development and player cultures. Players analyze them, re-create them as mods in games other than the ones in which they were originally created, and build viewers and projections so as to better visualize how to optimize their game-play in these spaces. As artifacts in a digital repository built with virtual world technology, historical maps would not just be artifacts; they might also provide spaces in which to site other objects and documentation—such as models, screenshots, videos, or documentation—that provide information about what took place in these settings. This might be where our future historian goes to check out the locations used for the science conference held in *World of Warcraft*, for example, without having to assemble, install, and figure out for herself how to use the original movement and navigation systems of the game’s user interface. When the pipeline to bring 3D objects and maps to a virtual repository is completed, it will be possible to drop in and see these objects with the same geometries and textures they were given in the original game. In fact, these artifacts will be created from certified copies of original game data used to produce them in the first place, utilizing forensics techniques for data extraction and the

preservation methodologies worked out through projects such as Preserving Virtual Worlds. Future access environments will need to consider how to provide scholars with access both to digital artifacts from environments such as virtual worlds and to digital documentation about these artifacts and worlds. Bootstrapping virtual world technology as a means for re-conceptualizing the digital repository as an environment both for the display of objects based on original data and retrieval of documentation about the events of these objects help us to understand provides a potential solution to this problem.

CONCLUSION

Virtual worlds are history. When they go away, we will be left with software artifacts, proprietary data, and documentation. Projects such as How They Got Game and Preserving Virtual Worlds are only the first to explore the many problems associated with preserving virtual worlds and digital games as complex digital artifacts. Thinking of virtual worlds as history reminds us that our solutions to these problems will need to provide access not just to software, but to materials that document the events and activities that took place in the virtual spaces created by that software. If we are to succeed in these efforts, we will need to forge a deeper understanding of how work on software preservation, documentation, and digital humanities are inter-related. Only then will we be able to put together successful teams of specialists with complementary skill-sets in history, curation, and preservation technologies.

REFERENCES

- Au, Wagner James. 2007. Fighting the front. *New World Notes* (15 January), http://nwn.blogs.com/nwn/2007/01/stronger_than_h.html, retrieved Jan. 2009.
- . 2010. Is web the future of 3D worlds? *New World Notes* (3 March), <http://nwn.blogs.com/nwn/2010/03/is-web-the-future-of-3d-worlds-a-stanford-researcher-with-second-life-background-gambles-on-just-tha.html>, retrieved July 2010.
- Avedon, Elliott, and Brian Sutton-Smith. 1971. *The Study of Games*. New York: Wiley.
- Becker, H., et al. 1997. "Dublin Core Element: Coverage" (11 June). http://alexandria.sdc.ucsb.edu/public-documents/metadata/dc_coverage.html, retrieved Aug. 2009.
- Bohannon, John. 2008. Slaying monsters for science. *Science* 320 (20 June), 1592.
- Burke, Timothy. 2006. The history of virtual worlds. Blog post and comments, Terra Nova (1 December), http://terranova.blogs.com/terra_nova/2006/12/the_history_of_.html, retrieved 1 March 2009.

- Candlelight Vigil. 2001. Re: candlelight vigil on Luclin. Posts by Nirrian and Keeter, 12 Sept. 2001. URL: www.everlore.com, retrieved 15 Sept. 2001.
- Crawford, Chris. 1996. Why is interactivity so hard? *Interactive Entertainment Design* 9 (1995–1996), http://www.erasmatazz.com/library/JCGD_Volume_9/Why_so_Hard.html, retrieved May 2004.
- Deathswitch. 2009. <http://www.deathswitch.com>, retrieved 9 April 2009.
- Degtiar. 2008. EA-Land: The final countdown. Archiving Virtual Worlds Collection, http://www.archive.org/details/EALand_FinalCountdown.
- Eagleman, David. 2006. A brief history of death switches. *Nature* 443 (19 Oct. 2006): 882.
- Fiske, John. 1992. The cultural economy of fandom. In *The Adoring Audience: Fan Culture and Popular Media*, ed. Lisa Lewis, 30–49. London: Routledge.
- Koster, Raph. 1998. A story about a tree. Raph Koster's website, <http://www.raphkoster.com/gaming/essay1.shtml>, retrieved Feb. 2009.
- Ledmeister. "What Is a DOOM/DOOM II Demo (or LMP File)?," Classic Doom website, <http://classicdoom.com/lmpintro.htm>, retrieved March 2005.
- Lowood, Henry. 2008. Impotence and agency: Computer games as a post-9/11 battlefield. In *Games without frontiers—War without tears. Computer games as a sociocultural phenomenon*, ed. Andreas Jahn-Sudmann & Ralf Stockmann, 78–86. London: Palgrave Macmillan.
- . 2001. "The Hard Work of Software History," *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* 2, no. 2 (Fall 2001): 141–61.
- Ludlow, Peter, and Mark Wallace. 2007. *The Second Life Herald: The Virtual Tabloid that Witnessed the Dawn of the Metaverse*. Cambridge: MIT Press.
- Manovich, Lev. 2001. *The Language of New Media*. Cambridge, Mass.: MIT Press.
- NDIIPP Program Background. 2007. http://www.digitalpreservation.gov/library/program_back.html, retrieved July 2011.
- NoSkill Memorial Site. 2004. <http://www.doom2.net/noskill/index.htm>, retrieved 1 Dec. 2004.
- Pearce, Celia. 2009. *Communities of play: Emergent cultures in multiplayer games and virtual worlds*. Cambridge: MIT Press.
- Spaight, Tracy. 2003. Who Killed Miss Norway? *Salon* (14 April 2003), http://dir.salon.com/story/tech/feature/2003/04/14/who_killed_miss_norway/index.html, retrieved Feb. 2009.
- Williams, Dmitri, Nicolas Ducheneaut, Li Xiong, Yuanyuan Zhang, Nick Yee, and Eric Nickell. 2006. From tree house to barracks: The social life of guilds in *World of Warcraft*. *Games & Culture*, 1(4), 338–361.
- Williams, Dmitri, Nick Yee, and Scott E. Caplan. 2008. Who Plays, How Much, and Why? Debunking the Stereotypical Gamer Profile. *Journal of Computer-Mediated Communication*, 13(4), 993–1018.

2

Collecting the Artifacts of Participation

Videogame Players, Fan-Boys, and Individual Models of Collection

Megan A. Winget

INTRODUCTION: COLLECTING PHYSICAL OBJECTS—HISTORY AND THEORY

The desire to collect physical objects has been around for millennia (Csikszentmihalyi 1993). Seal impressions, similar to autograph collections, existed in Persia as early as the fourth century BC (Rigby and Rigby 1944), wealthy Romans collected art and copies of art, as well as coins, fossils, and other natural objects (Belk 1994), but collecting really gained popularity during the Renaissance with the rise of the middle class (Blom 2004) and became solidified as a true hobby in the 1930s as a way of asserting individuality and a means to self-education about the world (Gelber 1991).

More than providing an outlet for acquisitional appetites, a good collection is often associated in the mind of the collector with the idea of a “tangible biography” (Benjamin 1969; Beer 2008): the ability to look at a collection and remember different periods of one’s life, to associate objects with experiences, and to “transform the precariousness of consciousness into the solidity of things. The body is not so large, beautiful, and permanent enough to satisfy our sense of self. We need objects to magnify our power, enhance our beauty, and extend our memory into the future” (Csikszentmihalyi 1993, 28).

Csikszentmihalyi believes that the act of collecting is a fundamentally important part of self-creation, and identifies three ways in which collecting artifacts helps substantiate a person’s sense of self: 1) a valuable collection displays the owner’s power, energy, and place in the social hierarchy; 2) objects remind the collector of the self through time, the objects providing a focus of involvement in the present, mementos and souvenirs from

the past, and pointers to future goals; and 3) the act of collecting provides concrete evidence of the collector's place in the social world, the objects in a collection acting as illustrations of valued relationships. "In these ways things stabilize our sense of who we are; they give a permanent shape to our views of ourselves that otherwise would quickly dissolve in the flux of consciousness" (Csikszentmihalyi 1993, 23).

DEFINING A COLLECTOR

Defining the precise nature of a collection is difficult. Tanselle provides a very broad definition of a collector as a person who accumulates "tangible things" (Tanselle 1999, referenced in Case 2009); but that definition, although to be lauded for its simplicity, does not provide any guidance on the nature of the objects collected, nor on the nature of the collection itself. Anyone who owns a set of dishes or living room furniture (for example) could be called a collector under this definition, although collections typically occupy a different conceptual space than the objects that constitute daily life. A more precise definition describes a collector as a person who acquires a series of similar objects where the primary function of the objects is not important and who does not plan to immediately sell the objects for profit (McIntosh and Schmeichel 2004). A chef does not collect knives, for example, although he might own many of them.

Thus, McIntosh and Schmeichel's definition, which characterizes a collection partly by its lack of functional intent, does not seem to account for those instances in which the collected objects are still in use. In these situations the objects in a collection continue to perform their original function; for example, a guitarist with a guitar collection most likely plays those guitars just as a fashion maven with a hat collection might continue to wear those hats. The difference between the aforementioned chef and the guitarist lies in the motivation behind accumulating their respective objects; whereas the chef must necessarily purchase a number of different knives to successfully perform his job, the guitarist really only needs one working instrument to perform hers. Thus, while a guitarist with many guitars could be called a collector, a chef with many knives would more accurately be considered an owner of knives, assuming each knife serves a purpose within the chef's working environment.

However, the chef may decide to bring some of his "special" knives home, where he organizes, maintains, and perhaps even uses the knives outside of their functional domain, the industrial kitchen. At this point the knives are being "saved for prosperity" as part of a collection, and the chef has become a collector. In this example, the chef decides that certain knives have special characteristics that differentiate them from the knives used in

the workplace, which suggests a sense of agency. Additionally, the knife collection is provided with a special space that may or may not emphasize their special characteristics, which suggests an organizing principle. Finally, because the knives have been taken out of their original context and placed into a different space for a different set of uses, which may or may not include their original use, an act of de-contextualization has occurred.

One final problem with this definition is its focus on tangible objects. Although one of the most prolific scholars in the collecting literature has argued that people can collect material objects, ideas, or experiences without tangible manifestations of those experiences (Belk 1994), there is little research on how one would do so, which is a shortcoming that will be addressed in this chapter. For the purpose of this chapter, then, the definition of a collector augments McIntosh and Schmeichel's, and includes some wording for intangible objects: a collector is a person who purposefully accumulates similar artifacts, where the artifact's original function is not the primary reason for integration into the collection.

TYPES OF COLLECTIONS

Numerous scholars have tried to define the salient characteristics of different kinds of collectors and collections. Belk (1991, 1994) provides a distinction between collectors, who acquire objects for either taxonomic or aesthetic purposes; and non-collectors, who merely accumulate or hoard materials without any guiding principles. Broderick (2005) and Hendricks (2008) define collectors from a monetary standpoint: collectors are distinguished from investors and dealers in that collectors acquire objects for non-financial purposes, whereas investors and dealers expect to make a profit either in the near or long term from their collections.

Pearce (1994a, 1994b, 1994c) provides the most comprehensive definition of collections by dividing them into three major categories: *Souvenir*, *Fetishistic*, and *Systematic Collections*. These different types of collections are defined not by the kinds of objects collected, but by the collector's motivation to collect.

Souvenir Collections

A collector forms a souvenir collection to serve a reporting or reminding function. The objects in a souvenir collection are a sample of an event that can be remembered but not relived, "not repeatable, but reportable."

They are an important part of our attempt to make sense of our personal histories, happy or unhappy, to create an essential personal and social self

centered in its own unique life story, and to impose this vision on an alien world. They relate to the construction of a romantically integrated personal self, in which the objects are subordinated into a secondary role, and it is this which makes them, all too frequently, so depressing to curate and to display. (Pearce 1994b, 197)

It is important to stress that it is not the nature of the objects in a collection that determines its type. A souvenir collection could contain ephemera like ticket stubs or Broadway playbills to remind the collector of a New York vacation; or it could include Old Master drawings and valuable historical artifacts to remind a collector of a Grand European Tour.

Fetishistic Collections

The term “fetishistic” has a pejorative tone, and implies a compulsive quality that is not necessarily descriptive. A better term might be “devoted” or even “obsessive” collecting, but unfortunately, the term “fetishistic” is commonly accepted by the scholarly community, and introducing a new term would be counterproductive. Fetishistic collections contain samples, and many of them rather than a few choice exemplars, which is one of the characteristics that distinguish them from systematic collections. The process of collecting is important for the collector; it’s a “deployment of the possessive self, a strategy of desire . . .” (Pearce 1994b, 200). Furthermore, fetishistic collections are not taxonomic, and are not organized or created according to any commonly accepted norms. Instead, fetishistic collectors arrange their collections idiosyncratically, and the collections are typically an extension of the collector’s personality. “This kind of collection is formed by people whose imaginations identify with the objects which they desire to gather” (Pearce 1994b, 201).

Because intensely personal motivations characterize both the fetishistic and souvenir collections, both are typically devoid of context. These types of collectors “ . . . do this by trying to lift objects away from the web of social relationships, to deny process and to freeze time. In museums, therefore, they are perceived as disassociated and static, floating in a kind of purposeless limbo” (Pearce 1994b, 201). The nature of the relationship between collector and collection is what distinguishes the fetishistic from the souvenir collection. In the souvenir collection, the collector merely uses the objects to support their memory of self, whereas in a fetishistic collection, the collection plays a more fundamental role in defining the personality of the collector, who experiences an almost worshipful attitude toward the objects in the collection. Again, a fetishistic collection is not defined by its contents, but by the relationship the collector has to the objects contained within.

Systematic Collections

The most evolved form of collecting, from an institutional standpoint, is systematic collecting, which relies on external principles of organization and valuation, rather than on the more personal motivations of fetishistic and souvenir collections. The boundaries of systematic collections are set externally, either through a history of collecting different kinds of materials, or through the process of observation and reason; and these collections are situated in a commonly understood external reality. Objects in the collection are contextualized by the society in which they were formed, and often reflect historical mores and ideals contemporary to collection building. A systematic collector wants the best examples of a set of objects, and builds the collection based on a preconceived and external taxonomy that can be fulfilled. “The emphasis is upon classification, in which specimens [a revealing word] are extracted from their context and put into relationships created by seriality” (Pearce 1994b, 200–201). The collection is conceptualized by a pre-existing taxonomy, from which the collectors attempt to build a Platonic ideal: their attempt is to build the “best” possible collection given the realities of the market, the materials, and the society in which they live.

Systematic collections are often created, consciously or unconsciously, to demonstrate a point or illustrate a pre-defined theme (Pearce 1994c). The act of collecting different objects and arranging and describing them in a meaningful way serves the purpose of convincing or imposing a set of beliefs, creating a secondary context, or encouraging a particular way of thinking (Pearce 1994c). This pedagogical character is another difference between systematic collecting and souvenir and fetishistic collecting. Because systematic collections are based in an external reality, and there is an objective metric with which to judge for comprehensiveness and value, these kinds of collections are able to draw outsiders into the collection’s frame of reference, from which a user can learn, or with which a viewer can agree or disagree. By depending on an external set of conditions, the systematic collector is able to make a public declaration about the nature of reality, rather than a very private statement about himself.

WHAT DO PEOPLE COLLECT?

People can collect anything. Collected objects “may be material, ideas or experiences (e.g., travel, restaurant or concert experiences, either with or without tangible manifestations of these experiences)” (Belk 1994, 317). As mentioned earlier in this chapter, the literature on collecting focuses on tangible collections, which may include objects we consider typical, like art (Rovers 2009; Grodzinski 2009; Korn 2004), books (Benjamin 1969),

and coins (Case 2009). Descriptions of more unusual physical collections include British children's shrapnel collections from World War II (Moshenska 2008), bricks (Pearce 1994b), and human detritus (i.e., scabs and hair) (Hartman 2006).

Individual and Institutional Collections

Private interests often inspire personal collecting, determining whether the individual has taxonomic or more personal intentions and providing the motivation behind an individual's decision to collect bricks or priceless art. As mentioned earlier in this chapter, collections can help people remember events (Yates 1966), build a sense of self (Csikszentmihalyi 1993; Pearce 1994a), and provide a means to build and become part of a community (Case 2009). The act of collecting can also give a sense of power to the powerless (Moshenska 2008) and provide markers of status for an outsider minority (Korn 2004; Rovers 2009).

The situation for institutions is different. Within an institution, the act of collection building is formalized and systematized and supports overarching institutional or even sometimes national goals. However, the systematic nature of any collection development plan, even one developed by an institution (small or large), is always subject to idiosyncrasies. For example, the Quebecois Historic Monuments Commission's selection of ten kinds of cultural property reveals both a striving toward an ideal cultural identity and a willfully nostalgic remembrance of things past that "appears as a taxonomy worthy of Borges's 'Chinese encyclopedia'" (Clifford 1994, 259). Historic monuments thus include:

- 1) commemorative monuments; 2) churches and chapels; 3) forts of the French Regime; 4) windmills; 5) roadside crosses; 6) commemorative inscriptions and plaques; 7) devotional monuments; 8) old houses and manors; 9) old furniture; 10) "les choses disparues" ["things missing"]. (Handler 1985, 199, quoted in Clifford 1994)

Collecting institutions like museums, archives, and libraries often depend on individuals as the collection's starting point, or as a means to collection building and augmentation. When institutional collectors interact with individuals, they prefer systematic collectors, due to the overlapping goals of comprehensiveness and the collections' taxonomic nature. However, while institutional collections provide a valuable service—they preserve, protect, organize, and provide access to materials—because of their formalized collection development and access models (Tappeiner and Lyons 2008) and institutional models of interaction (Clifford 1994) their collection development processes are much less flexible than those of individuals. Before the advent of the Internet, when cultures were mostly static and objects and

production models were more established, this lack of flexibility translated into a much-appreciated stability. Unfortunately, due to the increasing popularity, centrality, and inherently variable nature of new media, this inflexibility may now translate into rigidity, which could result in dire consequences for the future of traditional collecting institutions.

MATERIAL CULTURE AND NEW MEDIA

New media is gaining importance both within culture at large, and within traditional institutional collections. With the advent of ubiquitous computing in the form of iPhones and other kinds of sensor technology, people are interacting and developing intense personal relationships with technology in a way that has no model with which to work. Further, the open-source movement and the ensuing “maker” culture have given the general public tools and the mindset to interact with media in a way that was not possible even fifteen years ago. Instead of passively receiving media like movies, music, and art created by professionals, individuals are participating in cultural production, creating their own materials, often based on the objects of material culture. These artifacts of participatory culture include objects ranging from materials that look a lot like traditional media movies, music, and art that simply have different production and distribution models to materials for which we have no vocabulary to describe and no model to provide access.

As mentioned earlier in this chapter, the literature on collecting focuses on physical objects, although there is a recognition that people can and do collect experiences or ideas with no tangible manifestations. While there is literature on collecting more ephemeral materials, this literature still, to some degree, focuses on relatively fixed and tangible materials like ‘zine (Koh 2008; Asch 2010) and videogame artifact collections (meaning collections of physical game cartridges or other physical game manifestations) (Tappeiner and Lyons 2008). There is also literature on materials that are digital but have a strong physical model from which to work, like digital music (Kibby 2009; Cunningham et al. 2004; Bainbridge et al. 1999) and digital photograph collections (van House et al. 2005; Wilhelm et al. 2004; Naaman et al. 2004), but the focus there is often on description, access, and infrastructure rather than the nature of the collections themselves. Scholarship focusing on truly ephemeral and variable material is still at the theoretical stage, and deals almost exclusively with esoteric and highly privileged materials like new media art (Depocas et al. 2003) or online videogames, treated primarily as a form of art (Winget and Murray 2008; Lowood 2002).

All of the materials examined thus far, whether they are tangible and have a long collecting tradition from which to draw, or are ephemeral and

require an entirely different collecting model, are created within traditional models of authorship; all of the materials referenced above, even the bricks, have an authoritative creator who works within a traditional model of production for a well-defined audience. For these collections traditional methods of valuation and evaluation apply, and the avenues of ownership and collection building are relatively straightforward. This is not the case for artifacts of a participatory culture, which include materials generated by fans and other members of the general public via new forms of production, and are not easily defined or valued. These materials do have value, however, and in order to remain relevant, traditional collecting institutions must develop new and variable models of collection development, evaluation, and access.

Because these non-traditional materials, chief among them artifacts created with new media, do not fit into traditional collecting models, it has become necessary to study new media materials more closely in order to establish more inclusionary models. The remainder of this chapter is an analysis of a particular kind of new media artifact: videogames. These kinds of entities can be particularly problematic; in addition to the difficulties involved with preserving and representing the videogames themselves, the medium is frequently expanded in wholly unique ways by the contextual artifacts created by the people who interact with the videogames. Thus, after providing an overview of the different kinds of videogame collections and the challenges inherent in their development, this chapter will focus on some of the more problematic materials within the videogame genre: fan-generated materials. We will consider the ways in which these materials fit into the collection models defined above and the ways in which they digress, making necessary the foundation of new models.

VIDEOGAME COLLECTIONS

The term "videogame" covers a broad range of formats and player experiences. Videogames can be disseminated over the Internet in the form of software, or can be sold in a physical format like cartridges or DVDs; people can play games on computer networks via their computer or phone; on coin-operated machines, or on consoles built specifically for a particular game system. Videogames can be text-based or graphically enhanced. Some games are played alone, some are played in small groups, and some can be played with multitudes of geographically distant people. In terms of actual game play, games can follow a narrative exposition, they can be strategy based, or they can test reflexes and reaction times in an athletic-like competition.

Many of the illustrations and findings for this chapter will be relevant for different kinds of videogames and other complex interactive digital systems. For the sake of expediency, however, the term “videogame” here will refer to Massively Multiplayer Online Role-Playing Games (MMORPG), best exemplified by *World of Warcraft*, and defined as:

. . . a genre of computer role-playing games in which a very large number of players interact with one another within a virtual game world. . . . As in all RPGs, players assume the role of a fictional character (often in a fantasy world), and take control over many of that character’s actions. MMORPGs are distinguished from single-player or small multi-player RPGs by the number of players, and by the game’s persistent world, usually hosted by the game’s publisher, which continues to exist and evolve while the player is away from the game. (Wikipedia, 2010)

Videogames present an interesting problem because of their construction as software, and because of their place as a cultural and artistic commodity. Software can unite previously dissimilar domains: Text is united with data, which can be presented in audio-visual displays; data processing morphs into interactive simulations. Metadata applications like indexing and data management systems can themselves become primary artifacts worthy of study. Given current models of curation and collection, which “turn to some degree on institutional and professional allegiances to the conservation of objects” (Lowood 2002), it is very difficult to conceptualize software in a fundamentally different way than as simply an unstable version of a physical entity, and thus we are accustomed to thinking of the preservation of the physical object—in the case of videogames, the code itself—as the most important way to preserve access. When collecting videogames, in addition to any technological and legal concerns, of which there are many, the challenge hinges on the possibility of determining the precise nature of the primary artifact, how it differs from surrogates or secondary artifacts, and how we should represent those distinctions for organization, access, and preservation. These are all difficult problems, but they leave out an important aspect of interactive software: namely, its interactivity, and the resulting flexibility of both development and use. Without a good model for collecting artifacts of interaction, any representation of a digital media artifact will necessarily be incomplete.

Collection Framework

Henry Lowood was the first to discuss the importance of providing access to different game characteristics. He proposed a framework for collecting complex interactive digital systems (i.e., games), and identified four areas

for development: 1) emulation testbeds; 2) game development archives; 3) artifact collections; and 4) game performance archives. Lowood also called for collecting institutions like archives, museums, and libraries to work together so these materials could be collected in one spot, leading to more meaningful access and retrieval (Lowood 2002). This framework reflects the complexity of collecting and preserving complex digital artifacts and provides a meaningful attempt to preserve information in an object-centered culture (Swade 1993, quoted in Lowood 2002).

Emulation Testbeds

From a technological standpoint, long-term preservation of complex digital entities involves the creation of dependable storage and management techniques, as well as the development of strategies to ensure ongoing authoritative and reliable access to these objects. The two major strategies available are migration and emulation. Migration focuses on the digital objects. In a migration strategy, digital files are regularly updated so their original look and feel will not be lost. Rather than focusing on the digital object, an emulation strategy attempts to recreate the technological environment in which the original file was created and accessed. Although each method has strengths and weaknesses (Hedstrom et al. 2006) and they tend to work best when used together, emulation provides the least variable alternative, in that it depends less on human agency and more on technological advances. Therefore, emulation is the current popular favorite digital preservation method for videogames.

Because technology advances so quickly, Lowood called for an emulation testbed to perform experiments related to authenticity, reliability, and access given the variability of emulation algorithms, applications, and differing game foci. For example, game emulation must be able to account for differing operating systems and software environments, but also the advances in audio and video codecs, different programming interfaces, networking protocols, processor speeds, recommended display requirements, and specialized controllers. Existing emulation testbeds include those run by individuals and primarily commercial institutions, like the recently suspended Home of the Underdogs (HotU), the Emulator Zone, and RetroGames.

Game Development Archives

The videogame creation process is fraught with variability—not only within the industry, in that each game company has its own development model, but also within the community of player interaction and expectations of modifiability. Traditional concepts of authorship do not necessar-

ily apply to the game development process, and the collecting community must devise a new creation model in order to authentically and reliably document videogame history. In addition to projects focused on interviewing game designers, producers, and developers for the purpose of building a documentation model for game development (Winget and Murray 2008), there are nascent projects focused on formally defining characteristic game design models and genres for the purpose of scholarship.

Artifact Collections

Because models already exist for collecting objects, it is not surprising that influential and comprehensive collections of game software and hardware already exist. Some examples include Stanford's Stephen M. Cabrinety Collection in the History of Microcomputing and the hardware collections at the Computer History Museum. Additionally, there are numerous academic and public libraries that are collecting game cartridges and CDs. These collections ensure that, even if we are not able to preserve the technology or specifics of the game development process, there will be some record of the variability and complexity in the physicality of these materials.

Game Performance Archives

Because MMORPGs are primarily about interaction—with the game, and with other players—game performance archives provide a means to recreate or access some record of how people interacted with the games themselves. As conceptualized by Lowood, these archives focus on documenting game play, and include artifacts like machinima, game mods, and speed runs. In machinima, individual users use the game engine to imagine alternate or completely unrelated narratives, which are then distributed over the Internet. In game mods, players modify different aspects of a game, and in speed runs, players provide a record of their (usually exceptional) movement through a game level or quest completion. To varying degrees, these kinds of records take the game as the primary artifact. All of the records described above include representations of the game and ignore, to some extent, the social interaction of players within the game. To address this limitation, and to make Lowood's framework more applicable to other kinds of complex interactive digital artifacts, it might be more appropriate to collect a broader field of artifacts, "artifacts of participatory culture," which would include game performance archives, but would also allow for different kinds of materials: mash-ups not related to gameplay, fan-generated fiction, wikis documenting group behavior, or other records that document the effect a given game has on individuals, groups of individuals, or society. While it might seem a pedantic distinction, the broader term "artifacts of

participatory culture" enables the collecting community to identify materials that are related to interaction and game play but are not necessarily focused on the game itself.

With videogames, there's a tension between the relative technological fixity of a finished game and the experiences enabled by the game, which change with every individual interaction. In terms of game development, player experiences are generated through rules, code, and narrative arc; but on the side of player experience, they're engendered through interactivity, social networking, and game modifications to meet individual or group needs. Until traditional institutions create collection development models that include artifacts of participatory culture, the institutional representation of game collections run the risk of being incomplete or even unreliable.

PARTICIPATORY CULTURE WITHIN VIDEOGAMES

In the summer of 2008 a number of grants were awarded to study issues related to videogame representation and preservation, and each received a fair share of positive press. After interviews aired, a number of individuals offered their collections to the Videogame Archive, my project partner at the Center for American History at the University of Texas at Austin, for safekeeping and for use in future research. Each of these individuals collects materials related to his or her gameplay; the collections are comprehensive and complete, each representing a meaningful amount of time and energy in collecting, organizing, and preserving the materials, and each conveying contextual information about the game's effect on individuals and culture. There seems little argument concerning the value of accepting these materials into the archive. However, as in many situations with new media materials, the collecting community has no model to adequately describe, organize, or classify these kinds of collections, much less place these contextual materials within a meaningful collection framework. It is possible, although no trivial matter, for the archive to accept these materials into their collection, but without a vocabulary to describe them effectively, and with no model for representation and organization, it would be difficult to provide any kind of access.

This situation brings to the fore a major distinction between traditional and new media collections. Because new media is such a new format, individuals, rather than curators or collection development professionals, are building most of these collections. Furthermore, the lack of a popular or formalized model for collecting these kinds of materials results in a more ad hoc approach to collection. These collections are, therefore, more idiosyncratic than any physical collection would be, even the most unusual collection. For videogame collections, this means that while there are insti-

tutions and individuals who collect formally produced videogames (both physical and digital copies), there are also people who collect materials that they or members of their community have created in response to, or in augmentation of, the primary artifact. Many of the examples provided in this chapter refer to materials created by members of a user community rather than by an authoritative creator.

PRIVATE VIDEOGAME COLLECTIONS

Individuals are often at the center of an institutional collection. Many of the great museum collections, for example, rely on individuals to donate or loan their treasures to the institution. Sometimes the collection of an individual forms the basis for a collection, as in the Fogg Art Museum at Harvard (Orcutt 2006), or the Isabella Stewart Gardner Museum in Boston (Matthews 2009), and sometimes an individual's collection augments or supports a museum's larger institutional vision (c.f., the Robert Lehman Collection at the Metropolitan Museum of Art). The difference with videogame and other new media collections, though, is the dependence at this point on the individual. Because videogames are still relatively new, the main collectors of these materials are individuals, typically young individuals. Even if material is collected on an institutional level, there is often an individual who is the driving force behind keeping the collection current and permanently valuable. This is problematic for a number of reasons. First, because invested amateurs are primarily driving collection development, the result is that the collections display extreme heterogeneity: there are no standards or expectations for what comprises a good collection, collection building is haphazard and disorganized, and the result is that the collections themselves lack the markers for authenticity. Second, these collections are more vulnerable than more traditional collections. They are vulnerable not only from a technological standpoint, in that new media is famously difficult to preserve (Rothenberg 1999; Hedstrom and Ross 2003; Rinehart 2002; Depocas et al. 2003), but they are also vulnerable due to the lack of institutional support. Running a collection of videogames is expensive and time-consuming. The driving force is frequently personal initiative, which is often dependent on free time and personal resources. Eventually even the most invested individual will lose interest. Even within an institution, a single person is often responsible for a videogame collection—if the guiding force behind a collection retires or is promoted, that collection can languish.

What follows are some examples of collections created by individuals, which, although difficult to authoritatively describe and characterize, represent alternative access models for videogame materials and provide contextual information about interaction, use, and videogame culture.

In-Game Artifacts Supporting Engagement

Videogame players collect in-game artifacts in a number of ways. They collect materials while in the game to achieve success: players collect booty, like jewels or mushrooms, or dots (à la Pac Man), which allow them to buy game enhancements or extra lives; or they collect artifacts with special value, like a special spell that gives their avatar the power to heal quickly or a sword that makes them temporarily more powerful. These in-game components and objects are part of the original design of the game and will be present in any preservation copy of the game. As such, they are not here considered as artifacts of participatory culture. More relevant to this chapter, though, are the materials that some players of virtual worlds create and collect, and which have value outside of gameplay. These objects are still stored and collected in the game world and seem to be created primarily for world-augmentation, community building, or personal engagement with the game. These player-generated components may pertain closely to the gameplay of the virtual world, or they may pertain very loosely or not at all to its gameplay. In all cases, however, players are responsible for creating artifacts of participatory culture. Examples include virtual books detailing a game world, player-generated clothing for their avatars, players' virtual domiciles, vehicles, mounts, ships, and so on.

Case 1: *Ultima Online*: A "Library" of "Books"

In February 2009 Mr. Seth Bacon contacted the game preservation project to donate a library of books that were created and collected in *Ultima Online* to the Videogame Archive. This contact was prompted by a recent BBC piece reporting on research and interests in virtual world and videogame preservation (BBC News 2008). These particular books were collected "on the Catskills shard of *Ultima Online*. They were gathered sparingly from the inception of the server by a character named Stilgar of the Shadow Rangers until 1999 and in earnest [by Mr. Bacon] in 1999 and 2000" (Bacon 2009):

These obviously represent a small slice of the books that were written in game. Many books on Catskills were behind locked doors and their owners inaccessible. Many books before I started collecting in earnest were lost. I myself had small collection decay while trying to move them from a smaller house to a larger one. And obviously many years have passed since I was collecting. (I heard that the person's house that I had left them to may have decayed so my offline copies may be the only that remain.) Also there are many, many more shards than just Catskills with book collections of their own. (Bacon 2009)

Decoding the Message

There are three salient issues to decipher in this message: First, what are some of the characteristics of these books and book collections; second, what is the nature of their “decay”; and finally, what is a shard?

What Is a Shard?

The term “shard” is specific to *Ultima Online*, and refers to different servers running the same game. A shard is an externally hosted game server hosting *Ultima Online*. *Ultima Online* shards are located throughout the world. Because of the distinct but persistent player bases, shards can develop different characteristics and play styles than the “authoritative” or officially hosted version of the game, but “all shards use identical lands and systems” with only a couple of specialized exceptions, thus making all shards essentially identical copies of the game world. Catskills is a North American East shard (Mythic Entertainment 2009).

Players also create their own shards by reverse engineering the game and creating an emulated version of an *Ultima Online* server. Players can then host their own “shard,” allowing major or minor alteration in gameplay and content. Some shards emulate the game world as it was before the release of expansion packs, some support different kinds of fighting, or NPC (Non-Player Character) interaction (Blancato 2005). To further illustrate this phenomenon, below is the text of a “Yahoo Answer” regarding whether people still play *Ultima Online*:

Many people still play it. In fact the official servers are still too crowded for me and full of idiots. Luckily, as usually happens with a mmorpg, there are now hundreds of servers being run by players (over 300 last I looked). . . . They have fragmented the desires of the players. There are servers which allow no player-kill-player, and ones that are totally about pkill and player hunts. There are some that are easy and you get lots of free gifts all the time, and ones where gains are hard and it takes months to get a decent leveled character. There are ones that are locked at some previous version of UO cause they think later versions ruined it, and ones that are modified to the point that you cant even recognize the maps or game altho it plays the same. (Gandalf Parker, “Best Answer” [O’Fama 2007])

As a free shard, an authoritative source no longer controls the game, and players are able to customize almost all aspects of the game to meet their own needs, while still allowing for large numbers of concurrent players to play on a personal server.

While server emulation allows users to have more control over their game-play experience and extends the life and scope of the game, emulation shards

are not legal. Neither Electronic Arts, the publisher, nor Richard Garriott, the creator, are paid for shard emulation; operating and playing on an emulated shard violate the United States' Ultima Online Terms of Service (Electronic Arts n.d., Parts 5.A-D); and the reverse engineering required to bypass the packet encryption also violates the Digital Millennium Copyright Act. While Electronic Arts seems to have taken a somewhat laissez-faire attitude toward shard emulation, other MMORPGs like *World of Warcraft* and *Everquest* have been more proactive in finding and closing illegally emulated servers (Goldman 2010).

To return to the current example, Mr. Seth Bacon played in an "official" shard—the Catskills Shard—of *Ultima Online*, and collected a library of books that he wanted to donate to the Videogame Archive. What are some of the characteristics of this library?

Characteristics of the Books and Book Collections

It was unclear what to expect after initially reading Mr. Bacon's email. These books could take many forms: was he describing actual books, and the electronic file he had sent me was some kind of personal cataloging system? Were the books on the zip drive screenshots? Images? PDFs? Were the books in-game fiction, reference works, or game documentation? Did they have characteristics in common with physical books? Would there be some kind of organizational system?

Figure 2.1 shows all of the directories contained in the zip file, with the directories ranging alphabetically from F to T. The directory names imply a subject-based organizational method: about half of the directories are reference works, with the rest being pretty evenly distributed between Historical Texts, Fiction, and Folklore and Mythology. There was also an additional folder, "New Acquisitions," which held newly acquired texts. Table 2.1 breaks down the characteristics of the materials in each directory.

Reference works could be divided into practical how-to guides and more general reference on the world itself. The how-to guides include topics such as how to be a tailor, work with metals, deal with different races, brew ale, become a scribe, etc.; the Geography and Travel books describe how to get from one place to another within the world and what to expect upon arriving; the books stored in the Magical Arts directory provide lessons on game-centered magic and sorcery, and the books in the Races and Guilds directories give various kinds of information on different races and guilds within the Catskills Shard. General reference works include guides to different plants and animals and various philosophical tracts explaining ideals specific to the shard.

Historical Texts consist of journals and diaries of players' experiences of a specific event or period, or histories and biographies of particular historical figures within the game, either players or computer-based. The events and

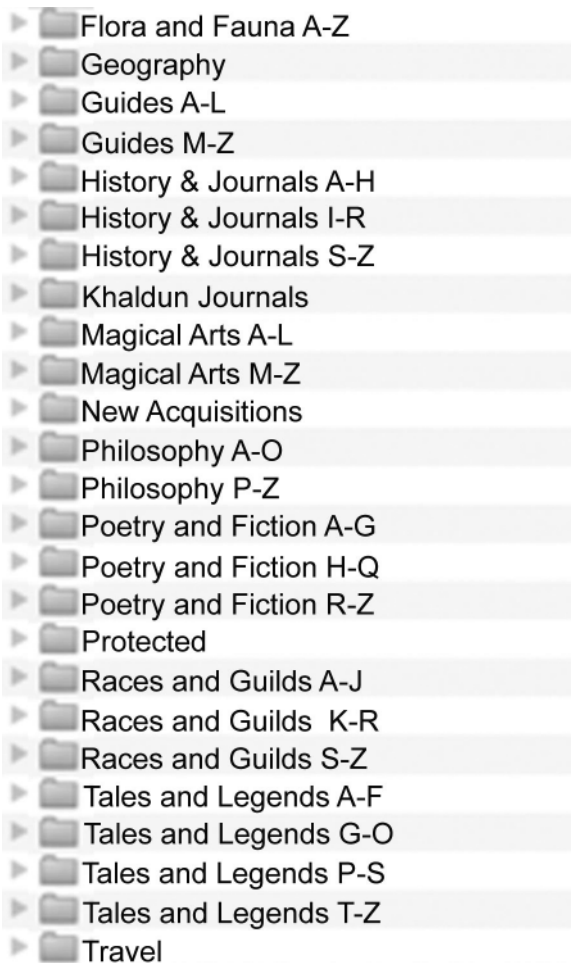


Figure 2.1. Ultima Online, Library of Books.

people described in these texts could either be important to an individual player (or avatar) or significant in terms of the history of the shard. Figure 2.2 shows a sample of Historical Texts' titles.

Fiction and Poetry texts are characterized by a tendency toward the aesthetic, and seem to be created primarily for the enjoyment of the reader. They do not specifically describe the shard or its history, nor do they provide information on how to succeed in the shard. Figure 2.3 provides an example of a piece of poetry within the collection.

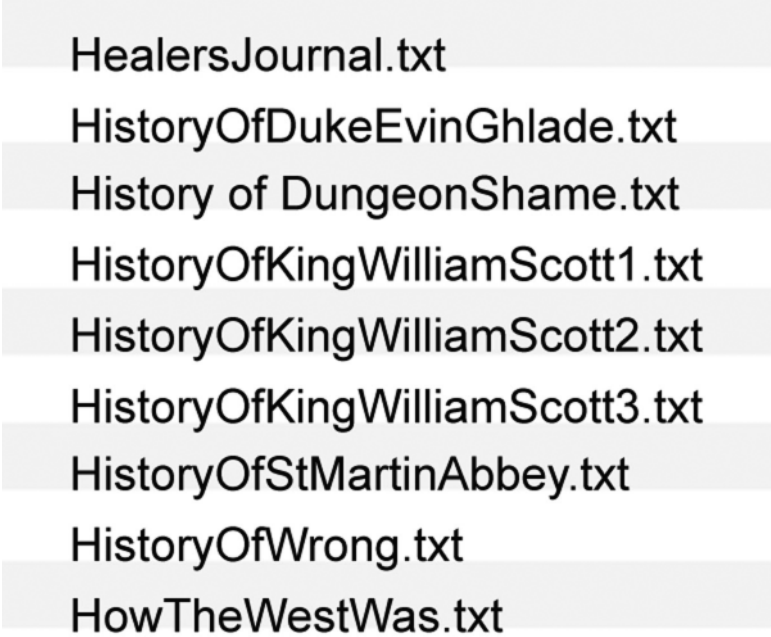
Folklore and Mythology texts fill in the shard's backstory. In a world that is entirely a figment of someone's imagination, it is difficult to make

Table 2.1. Ultima Online Library Organizational Scheme

<i>Type</i>		<i>Directory Names</i>	<i>Number of Files</i>	<i>Number of Directories</i>
Reference	How-to Guides	Geography Guides A–L Guides M–Z Magical Arts A–L Magical Arts M–Z Protected Races & Guilds A–J Races & Guilds K–R Races & Guilds S–Z Travel (201 Total)	2 28 32 30 26 3 22 18 22 18	12
	General Reference	Flora and Fauna Philosophy A–O Philosophy P–Z (52 Total)	18 18 16	
Historical Texts		History & Journals A–H History & Journals I–R History & Journals S–Z Khaldun Journals (123 Total)	34 29 32 28	4
Fiction & Poetry (Art)		Poetry & Fiction A–G Poetry & Fiction H–Q Poetry & Fiction R–Z (78 Total)	30 25 23	3
Folklore & Mythology		Tales & Legends A–F Tales & Legends G–O Tales & Legends P–S Tales & Legends T–Z (76 Total)	28 19 20 9	4
“Other”		New Acquisitions	181 (Total)	1

a strong distinction between folklore and mythology and fiction and poetry (and, for that matter, historical texts and fiction) but the texts in this category are characterized by storytelling tropes popular in folklore and mythology. These texts also focus on events and characters that may be referenced in the game, although not necessarily directly experienced by any particular player. Figure 2.4 is an excerpt from a piece of literature in the collection.

There are 711 books in this collection. All except three have titles, and nearly half have named authors. However, the avatar is typically given authorship credit, rather than the player. There are some cases where the



HealersJournal.txt
HistoryOfDukeEvinGhlade.txt
History of DungeonShame.txt
HistoryOfKingWilliamScott1.txt
HistoryOfKingWilliamScott2.txt
HistoryOfKingWilliamScott3.txt
HistoryOfStMartinAbbey.txt
HistoryOfWrong.txt
HowTheWestWas.txt

Figure 2.2. Sample of historical texts.

avatar's name is ambiguous, i.e., "Simon," "Shawn Tanglewood," "Tatiana," and "Ewan," but more often than not, the author's name more obviously belongs to an avatar: "Cantabrigian British," "Bram the Scholar," "Equines-tra," or "Orgus the Rancher," for example.

All of the books in this collection are text files. There is one .bmp image, which is a map of the world. The books are not long; they range in length from two or three lines to numerous notepad pages; a little more than half of the books are 4KB in size, and the rest are 8KB. The entire collection directory is 4.6MB.

Book culture was introduced at the game's inception, with a small library of various books including a "welcome," a treatise on "virtue" written by Lord British (the game creator's avatar), and various other folklore texts and poems (Stratics n.d.). Players are able to buy these books from NPC (Non-Player Character, i.e., game-controlled) vendors, or find them in NPC buildings.

As illustrated by the number of player-created books in Mr. Bacon's collection, creating books is a popular and enriching experience for players, and the books in Mr. Bacon's collection were created to make the world a richer, more immersive space. Figure 2.5 shows how the books appear within the game world. There is a perceived value of personal libraries

Minocian Children's
 Sing-songs
 by

- Knockers -

Tap tap tap
 you can hear most
 every blow,
 Tap tap tap
 you can hear them as
 they go
 Tap tap tap
 as they dig both to and
 frow,

As the knockers
 do their knocking
 every night.
 The Walls Fall Down

Up comes the keep
 Beechum digs deep,
 Miners cut down
 Up comes the Crown
 The bandits collide
 With Dwarven pride
 And the Dwarves fall
 down.

Figure 2.3. Example fiction and poetry text (partial).

within the Catskills shard, with players trading, copying, and sharing books. Some players are even asked to reactivate old accounts specifically to make their libraries available to other players (Bacon 2010).

How Do These Books Decay?

The existence of these books while in game is dependent on use and game play. The *Ultima Online* Stratics site gives some basic information on

The Giant Who Loved Corn
by
Loic Talecaster

Once in an age long
past, before the times
of even Sosaria and
Britannia, lived a tall
giant by the name of
Garaguk.

Garaguk was taller
than three houses,
and broad in
proportion. He was one
of the mightiest of the
tall folk ever. So one
can imagine the fright
of the elves of the
village of Woodrow,
when one day Garguk
came trudging down
their fields!

Figure 2.4. Example of folklore text.

how long objects in the world will exist without direct player involvement. Figure 2.6 is a screenshot from that site. It communicates that if an item isn't in a player's bank or backpack, or locked down in a house or ship, it will disappear after a certain amount of time. Furthermore, the houses and ships themselves will decay to varying degrees if they are not "refreshed" (accessed) by the player once at least every five days.

In addition to decay, in-game books can also be "damaged" due to bugs in the system that would, among other things, incompletely copy a book, omit the title and author from a copy, and truncate titles and authors. With evolving restrictions on title, author, and book length, and the buggy nature of the in-game copying mechanism, players often take matters into their own hands, transcribing books word for word in a kind of virtual world samizdat, which, while illustrating the importance of these books to players' experience of the rich in-world culture, also introduces typos and "non-authoritative" or even "defaced" versions of books.

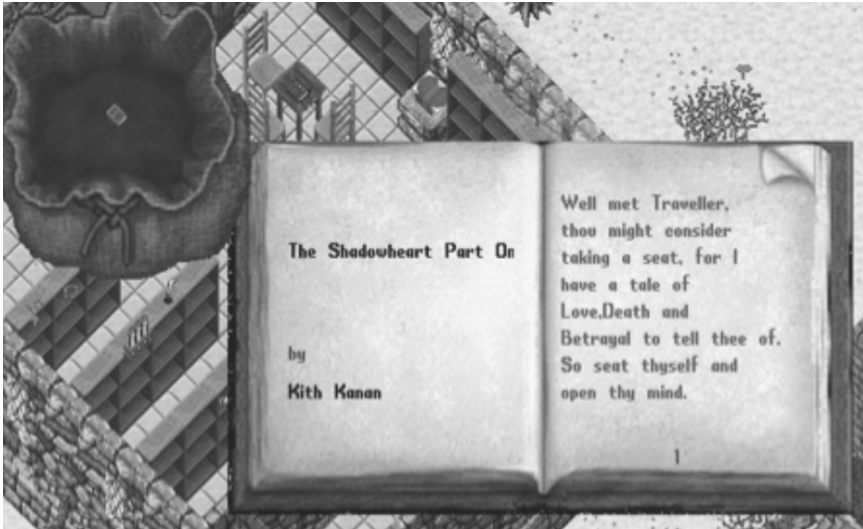


Figure 2.5. Image of a book, in-game.

The majority of these books do not seem to serve any functional purpose within *Ultima Online*. The books do not provide documentation on how to attain goals within the game, and the professional “guides” within the reference section do not refer to official professions within the game. One can “be” a scribe or brewer, for example, but those professions do not necessarily make money, and they are not recognized within the game. Furthermore, the folklore, mythology, poetry, and literature were created to provide player-created backstories for the world. The diaries and journals in the historical books may or may not refer to real battles within the game, and studying them provides no strategic value for players. Furthermore, because many of these materials are written from the perspective of the avatar, rather than the player, there is a level of abstraction in the texts that leads to a disconcerting sense of ambiguity, particularly for those readers not involved in the game. Essentially, these materials represent an attempt by players to engage with the game: the creators engage by imagining different narratives relevant to game play, and the readers’ experience is enhanced by engaging with that literature.

These materials provide a valuable contextual representation of video-game play. In addition to providing an evocative representation of the world as experienced by players, they are a record of the interaction players have with the world, and indicate something of the meaning of the world (and, by extension, the game) to the players.

As artifacts of participatory culture, *Ultima Online’s* treatment of book items provides an interesting variation on traditional book collection.

Decay	
Houses and Ships	
Stage	Duration
"like new"	approx. 5 minutes
"slightly worn"	1 days
"somewhat worn"	1 days
"fairly worn"	1 days
"greatly worn"	1 days
"In danger of collapsing"	more than 18 hours
The overall time from "like new" to the actual collapsing is 5 days. Refreshing a house or ship twice a week is sufficient to keep it from falling apart. It's best to refresh a long time before the server starts saving (at 5 AM local time), more than once has a house decayed because the refresh of the house was not saved.	
Items	
Item	Decay Time
Newbie Items	90 seconds
Regular Items	3 hours
Corpses	
Type of Decay	Decay Time
Animal Corpse	7 minutes
Monster Corpse	7 minutes
NPC Corpse	7 minutes
Player Corpse to Player Bones	7 minutes
Player Bones	7 minutes

Figure 2.6. Screenshot from UO Stratics Site, Decay (<http://uo.stratics.com/content/misc/decay.shtml>).

Clearly the designers have taken pains to translate the labor constraints of book production and book materials into the virtual gamespace. Nevertheless, books in *Ultima Online* fulfill different needs and purposes, and do subscribe to significantly different decay rates and production methods. This mitigates the opportunity to simply export traditional book collecting principles onto these new media artifacts.

Examining even this small subsection of participatory culture in a single MMORPG would require continued study. Clearly book culture for this MMORPG is rich enough to warrant some sort of taxonomy of book purpose and intention. Surveys or an initial exploratory collecting round could help our understanding of participatory culture in this particular game.

VIDEOGAME COLLECTIONS RELATED TO MEMORY

Individuals created the books collected by Seth Bacon, and the collection itself functions to enhance engagement with the game. Although this chapter only described one personal library, there is evidence that many individual players create and collect many different kinds of in-game objects that support their emotional connection and augment their meaningful interaction with the game. In addition to these intensely private collections, players also create and collect materials that are more public, although access and utility for outsiders is limited. This section will discuss collections of materials created by groups of individuals to support memory of the game or experiences within the game.

Historical Documents: Group History / Private History

Many of these small group collections are attempts by players to preserve their in-game history. Some preserve the totality of their personal experience through the collection of chat logs and screen shots of their gameplay, some are creating archives of events on their server or for their guilds (or guild-like communities), and some simply want to provide a place for other players to discuss important in-game experiences.

Case 2: Guild History: The Intrepid History Project

In the summer of 2008, Brent Gueth offered his guild's wiki, "The Intrepid History Project," to the Videogame Archive for long-term preservation. Mr. Gueth explained this collection thus: ". . . a group of us from *Star Wars Galaxies* have worked at trying maintain our past and storyline with a wiki at starsofintrepid.com—what can be done to get this into your project?" (Gueth 2008, first paragraph). *Star Wars Galaxies* was particularly

interesting for these players because it was “a sandbox game, so essentially we had to create our own content and events. Unlike *World of Warcraft* or most other online games, [*Star Wars Galaxies*] had a pure community” (Gueth 2008, second paragraph). Because *Star Wars Galaxies* had less controlled content than other MMORPGs, the artifacts of the player participation frequently expand to events, interactions, communities, relationships, and histories. These kinds of artifacts can be less discrete as digital objects than virtual books, and a wiki or website may be more conducive to preservation of such materials. An excerpt from the Intrepid History Project wiki will help illustrate communal aspect of artifact creation as well the sites’ underlying purpose and intention.

This website is for sharing your memories, sharing your thoughts, and sharing your friends. Hopefully it manages to get enough community support so we can all dig through the memories. Even the vets want to be transported back to the magic that once was. There are many historical things that happened on Intrepid. We also have our own fair share of server legendary events. Share your dreams of times past and contribute to saving Intrepid’s history. (Starsofintrepid.com 2009, homepage)

What Is a Guild?

The *Star Wars Galaxies* website defines guilds as “a group of individuals who have decided to form together as a team to accomplish goals with teamwork” (Intrepid History Project 2009, homepage). Each guild defines its own goals, history, and rules. Guild leadership varies; they can be highly formalized or very informal; they can be democracies, dictatorships, or anything in between. Guilds can be small, with only a few players, to quite large, with hundreds of players. In this case, Stars of Intrepid is the name of a guild on the Intrepid server, and had 517 players listed as members on the wiki.

Guilds are often created so players can join forces and attain higher levels within the game. The relationships formed between guild members is often very strong,

The community of Intrepid is unique in the world of gaming. . . . The communities and relationships that have grown and become strengthened in a virtual environment are as real as the ones that we have in our normal day to day lives. We have watched people from across the world get married from relationships that have blossomed on line. We have also seen relationships torn apart because of it.

If you ever needed someone to talk to, a shoulder to cry on, or just someone to listen. Someone was always available to you on Intrepid. The Intrepid community is a family and unlike games where you can’t cross factions, or you

don't associate outside of your own guild, we did here. We are a family like any other, we have our black sheep, we are sometimes dysfunctional. There are rifts that sometimes tear us apart and force us to take sides. Overall most of us would never have had it any other way. (Stars of Intrepid 2008, welcome page)

Personal experience with MMORPG players shows that many guilds are characterized by strong personal relationships; and many of the larger guilds also create wikis outside of the game to keep track of players, raids, events, and strategies (for a comprehensive discussion of guilds, see: Nardi 2010).

Characteristics of the Wiki

The Intrepid History Project has 1,403 fully populated pages (closer to 1600 if including stubs), divided over 19 sections, which are thematically divided into: 1) general information; 2) player-created content; and 3) biographical pages for every player. Table 2.2 provides information on the site sections and specific section titles.

Informational Pages

The informational pages give general historical and contextual information on different subjects as well as provide definitions and communicate important themes, ideals, and experiences of the guild. The sections "Star Wars Galaxies Information" and "Intrepid Server Information" are narrative

Table 2.2. General Themes in Intrepid History Project Wiki

<i>Theme</i>	<i>Section Title</i>
Information	Star Wars Galaxies Information Intrepid Server Information Planet Information Profession Information City Information Guild Information Player Races of Intrepid Special Intrepid Organizations Intrepid Timeline
Player-Created Content	Player-Created POIs Player Events Music Lyrics Fan Fiction Memories SWG Videos Intrepid Screenshots
Biographical Information	Player Information

pages that provide background information on the game and the server; the rest of the sections consist of linked lists of different planets, professions, cities, guilds, and races specific to the Intrepid server. Each link on one of these pages leads to an in-depth description of the topic under review. For example, within the “Profession Information” section, the “Artisan” entry provides a profession overview, where to find apprenticeships, an overview of base skills, related skill modifications, a listing of abilities, and other community information (Stars of Intrepid 2008, artisan pages).

Within the “City Information” section, there is a list of all of the cities on all of the planets. Each city has an in-depth description, with information on the city’s location, its mayor, a list of previous mayors, which guilds are located there, city services, and player points of interest, like tourist attractions and any guild members’ memories associated with a city. The location information is often a somewhat poetic recounting:

The mountain town of Bohemian Grove, is located in a high vale on Tatooine. It is almost due north (N) of Mos Tyrenia (a rebel sympathetic city) and north-north-east (NNE) of Geigen City (an imperial sympathetic city). It takes approximately 3 minutes by vehicle, 5 minutes by steed and 7 minutes by foot—depending on your particulars. Please be aware that Krayt Dragons do roam the area east of these routes, so try not to stray. Approximate waypoint is 6200/7400. (Stars of Intrepid 2008, Bohemian Grove)

These informational pages provide in-depth, somewhat objective information on the world, its layout, the people in it, and how those people “lived” and worked.

Player-Created Content

Because *Star Wars Galaxies* was a “sandbox” game, players had a lot of control over the world, from the buildings and attractions in the cities, to the rules and etiquette of game play. The materials in these sections refer to objects, artifacts, and texts that were specifically created by players for players, either to augment gameplay or to support interaction.

Player-Created POIs refer to specific player-created locations within the Intrepid server of the *Star Wars Galaxy* universe. Place types include: Heavily Visited Locations, Museums, Cantinas, Malls, and General destinations. The most populated place type is “museums,” with forty-three different museums listed. Each museum has its own wiki page, with information on the museum’s owner, its location, a brief description, and the entrance fee (figure 2.7). Other sections within the “Player Created Content” theme are:

Player Events: Describe player-organized events, like parties, awards ceremonies, holiday celebrations, openings, concerts, and weddings. . . . These pages include copies of the invitations, a listing of things that happened

at the event, and sometimes screenshots from the event itself (http://starsofintrepid.com/index.php?title=Player_Events).

Fan Fiction: Includes links to a database of all player-written fiction on the server, fiction inspired by events, and finally to general works written by individual guild members (http://starsofintrepid.com/index.php?title=Fan_Fiction).

Music Lyrics: Much like fan fiction, players also wrote songs to celebrate different events (http://starsofintrepid.com/index.php?title=Music_Lyrics).

Memories: Includes narrative accounts of specific memories. There are only two entries on this page. Many memories are interspersed throughout the site. For example, all of the events include a space for players to recount their memories, and each city's informational page also includes a space for players to describe their memories of the place (<http://starsofintrepid.com/index.php?title=Memories>).

SWG Videos: Include player-generated videos of historic events and battles, music videos featuring guild members, and "misc videos," which include wedding videos, band performances, etc. Additionally, many player events have related videos that are not included on this page (http://starsofintrepid.com/index.php?title=SWG_Videos).

Intrepid Screenshots: Seems to be a holding pen for player-generated screenshots, without any contextual information (http://starsofintrepid.com/index.php?title=Intrepid_Screenshots).

Biographical Information

Each player who belonged to the guild has a page on the wiki. There are 517 players listed, but the majority of those players have provided only negligible amounts of information, like their avatar's name. Alternatively, some players have provided significant amounts of information. The player information template includes space for: a portrait, a biographical sketch, species, start date, quit date, home town, guilds, marriages, mastered professions, pets, notable accomplishments, outside the game, personal stories, other players' memories, screenshots that include this player, videos that include this player, and writings by this player related to the server and the guild.

An example of a thorough biography would be that of Dayasi Vo'Boda, who describes himself as a "professional scoundrel" and a "Twi'ilek male who grew up in the alien slums of Coruscant." His vital statistics include biographical and physical data as well as a chronology and relationships with other players' avatars. Figure 2.8 shows his self-portrait.

The information contained in this wiki would be useful for anyone interested in the history of *Star Wars Galaxies* or for anyone interested in the cultural implications of videogames. It provides a history of events on the

Fayth Institute of Antiquities

Galactic Museum Directory Entry

Owner/Curator: Fritz Outlander

Location: Fayth, Corellia, 3480-5891

Brief Description of the Museum: Contains all 'obtainable' paintings, including the first complete set of Twi'Lek Portraits on the server. It has a mini Zoo and 'Bug Room' in the basement. It also features the only Wookiee Bowling Alley in all the Galaxies! Put on some bowling shoes, grab a ball, and toss back a few beers while trying to knock down the 10 miniature Wookiees! Leagues forming now, sign up at the information desk.

Entrance Fee: Free

Figure 2.7. Museum Wiki page, Fayth Institute of Antiquities (http://starsofintrepid.com/index.php?title=Fayth_Institute_of_Antiquities).

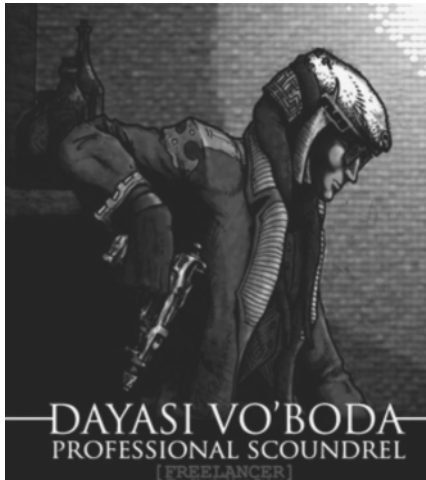


Figure 2.8. Dayasi Vo'Boda Self Portrait (http://starsofintrepid.com/index.php?title=Dayasi_Vo%27Boda#Dayasi_Vo.27Boda).

server, it collects artifacts and texts created by players, and it describes historical and personally important events in the life of the game. Additionally, this resource provides a valuable insight into the relationships players had with each other in relation to the game and the relationship different players have with the game itself.

Case 3: Personal History: "Archival Science in a Post-War Simulation"

The Intrepid History Project was created by a group of people to preserve their history, and worked within a well-organized and functional storage system. The wiki provided a means to store files, experiences, and memories of the game.

The next example is of a collection of player-created and -collected materials created by Chad Gayman, who runs a site called "Archival Science in a Post-War Simulation," which acts as a repository for images, dialogue, missions, and character and item descriptions from the *Matrix Online*. The home page describes it as a "centralized website for [*Matrix Online*] live event transcripts" (Gayman n.d., index page), and currently has over a thousand entries (Gayman 2008). Although the purpose of this site is somewhat similar to that of the Intrepid History Project (i.e., to preserve player experiences within the game), because Mr. Gayman did not use a common organizing technology—the site seems to be created in HTML rather than using a wiki—and because this seems to be a much more personal endeavor, the results are more individualized and provide a different, more private representation of the game in question. Although the site is open to anyone, and any *Matrix Online* player can submit materials to the collection, the site looks and feels very different from the Stars of Intrepid site (figure 2.9).

Characteristics of the Collection

The site primarily preserves live event transcripts of dialogue created by *Matrix Online* employees communicating as in-game characters like Morpheus, Niobe, Trinity, Neo, various agents, etc. Normal operating procedure with MMORPGs is that when a player-controlled avatar "talks"

Archival Science in a Post-War Simulation

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Welcome to my attempt at making a centralized web site for MxO live event transcripts. This is a constant work in progress. Just a couple of notes before we begin.

1: This is my first web site, despite the fact that I've been using the net since the mid '90s. Hosting, site design and utilities have been provided by Daniel Robson, as my interest in making this site look nice wasn't very high.

2: Many of the transcripts on this page have been copied by me from other sources. I did this so I could have an archive of them in case the sites I found them at went down permanently (and some did). I mean no harm, and I'm not taking responsibility for the transcripts that are not mine. If you need to contact me about this, send a calm and reasonable email to me.

Special Thanks

- To Roman, for inspiring me to actually make a web site.
- To Paul Chaudrick, for making a story that uses the potential that the Matrix franchise has.
- To Aauther and the original LET.
- To Ravebit, for not only being a one-man-LET, but for writing the critical missions, creating new characters, making a couple hundred pill loons, being the foundation of the SOE Seattle building, protecting us from melsons, etc. Seriously, this guy deserves a big vacation. Or at least some more dev's to help him out.
- To HCFrog, whatever he's doing now. Can you believe they were going to name him "Frogger"? What kind of a name is that?

Figure 2.9. Archival Science in a Post-War Simulation, home page (<http://archivalscience.shock-therapy.org/>).

(or text chats) with an in-game character, the in-game character is machine controlled, with a set number of responses and a basic Artificial Intelligence algorithm running in the background. *Matrix Online* was one of the first MMORPGs to use real people behind the scenes to provide dialog for these “live events” (Hughes 2008), and this site is very likely the only, or one of the only, resources for accessing these kinds of materials.

Transcripts

The live event transcripts are organized according to the chapter in which they appeared (figure 2.10). Within each chapter, there are multiple representations of each conversation, with different players saving transcripts to submit to the collection. For example some of the transcripts available in chapter 1.2 are: “Niobe before kidnapping speech,” “Niobe before kidnapping speech alt,” and “Niobe kidnapping speech.” A sample transcript from Chapter 1.3, “Niobe finds Morpheus’s body,” is shown in fig. 2.11.

This was a long example, but illustrates a number of points about these chats. The white text represents an in-game character, Niobe in this case. In these live events, real behind-the-scenes actors are responsible for the dialog. The shaded text represents players’ avatars, so we essentially are looking at a dramatic performance of an in-game event. This chat illustrates the evocative language used by both players and *Matrix Online* employees—character is never broken, and when the player HACKD behaves like a troll and reacts in non-acceptable ways, both the other players and the in-game character respond negatively. These live events are organized to push the action forward and to support community building between the publisher and the players.

Although Mr. Gayman is the site developer and many of the transcripts come from him, they are not all his. Because of the site’s idiosyncratic setup, it is difficult to determine exactly how many different people donated transcripts, but we counted fifty unique usernames in the log files section and 115 unique depositors in the screenshots section. There are more than one thousand transcripts on the site.

Image Dump

In addition to providing a space for players to deposit live event transcripts, the site also allows users to upload screenshots from important in-game moments. The photographic databank has five categories of images: Events, Mug Shots, Player Events, Personal Albums, and Assorted Images. The Mug Shots category seems to be the most important, with 648 views, and includes images of both computer-controlled (Trinity) and player-controlled characters.

Category Name	Category Description
<u>Chapter 1.1</u>	'The Race to Find The One'.
<u>Chapter 1.2</u>	'Nightfall' and 'The Hunt for Morpheus'.
<u>Chapter 1.3</u>	The end of the 'Hunt for Morpheus' event, along with 'Choice and Consequence'.

Figure 2.10. Chapter 1, *Matrix Online* (http://archivalscience.shock-therapy.org/logs_main.htm).

Niobe: I am surprised and gratified to see so many people gathered to remember Morpheus.
rageFURY: we miss him
 Niobe: I miss him, too.
Skullcapcomix: I think it is safe to say that we all do, Niobe.
 Niobe: We can't let this loss weaken us. We will find the strength to continue our work in the Matrix. And we will make it a priority to find the killer and eliminate him, her, or it.
*HACKD: ok, not to be rude but we have been waiting here a long time so can u skip the bull s*** and get to the point of this*
[people butchered him for this comment. I was hoping that he learned his lesson. Keep reading.]
 Niobe: Nobody forced you to wait here HACKD.
HACKD:: sorry
 Niobe: You can pay your respects without me.
 Niobe: I only came here to pay my respects along with the rest of you. I'm not here to order you around. You all know what needs to be done.
JamesBob: give us any info you have on the assassin's identity
AlphaDelta: give us a clue
 Niobe: If I knew the Assassin's identity, you had better believe they would be dead.
Kranos: Niobe, we have heard rumors that you've formed your own faction and split from Zion - is this true?
Morlens: Has Morpheus' body been recovered, captain...?
 Niobe: that is absolutely not true, Kranos, and Moriens, I'm assuming you mean Morpheus' physical remains?
 Niobe: Unfortunately, we were never able to track down exactly where Morpheus was in the real when he was jacking in.
HACKD:: why did you change your hair?
HACKD:: i think you looked better with your hair the way it used to be
HACKD:: i just figured i'd ask why i had the chan
[I do not have this guys faction name, but whoever has him needs to stop him NOW]
 Niobe: The last thing I need right now is fashion advice. And as far as the new hardware is concerned, I haven't had orders on that, either.
YEAHUH: niobe, is it true we attacked the merv hastily

Figure 2.11. Live chat transcript: Niobe Finds Morpheus's Body (http://archivalscience.shock-therapy.org/1-3niobefindsmorpheusbody_86.htm).

Although it is this writer's personal belief that the materials present in this collection represent the most objectively valuable materials discussed in this chapter, the collection's HTML format and somewhat peculiar site organization negatively affect its utility. In this case, the collection's format negatively determines its function: it is nearly impossible to dependably extract materials from this collection in any formalized way. Furthermore, because of the complete lack of precedent for such artifacts, it is difficult to describe the nature of this collection and its contents to anyone outside the *Matrix Online* community. A similar set of artifacts might be those created by the MyLifeBits community (Gemmell et al. 2006), but in this case, only important events are preserved, and again, there's a level of abstraction in the use of characters and avatars that makes representation more challenging. The exact curation of this collection is open to numerous possibilities, but the opportunity presents interesting challenges. For example,

the artifact is simultaneously public and personal, dealing with individual encounters and conversations in a public space. The artifact contains real digital objects (screenshots, transcripts, etc.) but seeks to record individual experiences through these objects, rather than the objects themselves. These unique characteristics warrant further research and examination.

COLLECTING NEW MEDIA ARTIFACTS OF PARTICIPATION VERSUS MATERIAL CULTURE

Although the above cases represent a small fraction of the personal collections of videogame related materials available, their individual characteristics are representative of the whole. Upon first glance, these artifacts seem odd and difficult to conceptualize; each collection needs a significant amount of contextualization to make sense to outsiders; each of the collections is very large and presents different approaches to the collection content; and finally, once understood, each collection provides contextual information for the primary artifact, in this case the videogame.

The final section of this chapter is an attempt to characterize these collections in terms of the prevailing collection model. Specifically, this chapter will compare the characteristics of these collections with those of traditional collections to determine where the traditional collection typology holds and where it begins to break down.

Comparison with Physical Collections' Characteristics

At the beginning of this chapter a collector was defined as “a person who purposefully accumulates similar artifacts, where the artifact’s original function is not the primary reason for integration into the collection.” Given that definition, the cases referenced qualify as collections. The artifacts in each collection were purposefully accumulated, and were not collected primarily in support of game play: the books collected in case one and the transcripts in case three did not give the player extra knowledge or power necessary to “win” or even “improve” their gameplay. The information gathered for the historical wiki, case two, were only gathered after the game went out of production. Furthermore, even if one were to argue that the primary purpose of the materials, like the books, was to augment game play rather than to provide valuable knowledge, these cases—though the games are no longer active—still represent collections, because the collections are still actively developed. While the Catskills Shard of *Ultima Online* is still in existence, the collector, Mr. Bacon, no longer plays, but does continue to take care of, organize, discuss, and make his collection available to friends still active in the game. It is not possible to play either *Star Wars Galaxies*

or the *Matrix Online*, and hasn't been for years, but both of the collections referenced here are still in active development, with both collections having been updated within a month of this writing. Although each case referenced in this chapter contains odd materials that are difficult to conceptualize, they still qualify as collections given the traditional model. Is it possible to characterize the collections given the traditional model? As a review of collection types, Pearce (1994b) characterized collections thus:

1. *Souvenir* collections contain materials that help the collector remember certain events; the artifacts serve a reporting function, and the collection is characterized by a deeply personal organizational method. These collections are formed for personal reasons.
2. *Fetishistic* collections contain many samples of artifacts rather than a few choice exemplars. Like souvenir collectors, fetishistic collectors also have deeply personal motivations for creating their collections, but instead of serving a function in support of memory, fetishistic collections support the collector's sense of self. The organizational character of these collections is idiosyncratic and primarily an attempt to show off the "valuable" characteristics of the artifacts in the collection, with "value" being determined solely by the collector.
3. *Systematic* collections are created with an external reality in mind. In this case, the collector is attempting to build the "best" possible collection, with quality being determined by external factors and pre-existing collecting taxonomies. Systematic collections have a frame of reference, and while the artifacts in such a collection might have been decontextualized from their original use, their inclusion in the collection serves a didactic or meaningful purpose. Because a systematic collector is self-consciously making a statement about external reality, viewers of these collections can learn something, or disagree, or have an opinion about the collection as a whole.

Collection type is determined by the collector's motivation in creating the collection and the organizational and contextual character of the collection itself. As mentioned earlier in this chapter, the contents of the collection do not matter: a souvenir collection could include a painting by Picasso, while it's also very possible to have a systematic collection of bricks or manhole covers. While this traditional model provides a constructive typology for characterizing material collections, because of its focus on materiality, it becomes problematic when describing new media collections.

This "materiality" problem exists for all kinds of new media collections, but is best represented by these personal collections of player-generated artifacts. For example, because popular conceptions characterize hard-core gamers as compulsive asocial "nerds," and the need for extensive explana-

tion of the materials contained in these collections to even understand what purpose they serve, these collections would probably be characterized as having been formed with wholly personal motivations. Furthermore, their scope: each collection has at least seven hundred items and one collection has twice that many, which goes way beyond the norm for traditional collecting institutions.

It is true that these collectors have a deeply personal relationship with the objects in their collections and that these collections are much larger than those typically developed by individuals; however, characterizing them as souvenir or fetishistic is ultimately misleading. It is more appropriate to describe these collections as systematic, although that seems equally problematic. While these collections *are* systematic in that each uses external organizational methods to arrange the materials within, and the collectors have attempted to develop the best possible collection from available material, the importance of the materials is almost wholly dependent on the collector's relationship with an outside entity—the game. Furthermore, because of this dependence, it is difficult for the collection to have a wide-ranging frame of reference with which viewers can interact; and finally, because of the emergent nature of these materials, it is difficult to evaluate these collections in a systematic way. For example, it's impossible to understand the importance of the *Matrix Online* collection if one does not know the context of creation, and to understand that, one must have an extensive understanding of the *Matrix Online* generally. The problematic nature of these collections is due to three issues: 1) the emergent nature of these materials generally; 2) the methods of artifact acquisition; and 3) the changing nature of "ownership" of new media artifacts. It is these three issues, taken together, that make the nature of these collections difficult to establish given traditional collecting models.

Emergent Nature of These Materials

People have collected books for hundreds of years. The collecting community has well-understood and established models for describing, collecting, evaluating, and providing access to books. The same can be said for collecting almost any kind of material culture: stamps, coins, clothing, music, art, fossils, and insects; even collections of unlikely materials, like hair and bricks, have a history and a viable model. We do not, however, have a commonly accepted model for collecting new media artifacts, much less new media artifacts that are created outside of traditional production models. Without these models, it is difficult for collectors to determine what kinds of materials are important, and it is difficult for outsiders to evaluate the collections' worth. At the same time, these artifacts of participation are becoming more common, and as a result, more people are collecting them.

Unfortunately, it takes time to develop intuitive and wide-ranging frameworks for description, collection, evaluation, and access; and it takes even more time for those models to trickle down to individuals. The result of all this uncertainty is that individuals collecting these kinds of artifacts right now are less sure of their goals and methods than are those collecting more traditional materials.

The examples provided in this chapter demonstrate that individuals are appropriating traditional models to describe, organize, and provide access to their collections: the texts in the Ultima collection are described using a library model; the Stars of Intrepid site uses an encyclopedic model, and the *Matrix Online* collection calls itself an archive and organizes the transcripts temporally. By using these metaphors the collectors are attempting to communicate the intent of their collections as serious. Unfortunately, the resulting comparisons are detrimental to real evaluation of the collections themselves, because ultimately there are no books, as we currently understand them, in the Ultima collection; and the *Matrix Online* collection is not an archival repository. For these kinds of collections to be given full recognition, new collecting models must be developed that are not focused on physical objects.

Methods of Artifact Acquisition

One of the reasons people enjoy collecting is that it provides a means to connect with other people and to reinforce social ties. The process of acquiring objects in a collection is a deeply social act. The communities to which a collector belongs and the avenues of acquisition provide clues to motivations and collection goals. Furthermore the collectors' physical limitations—how much money they can spend on particular artifacts, for example, or how much physical space their collection occupies—also assist in reliably characterizing a collection. Both the extremely important social aspect of collecting and the physical limitations of collection acquisition; are confounded by these new media collections of artifacts of participation. There are few, if any, physical limitations of collection development, and while the social aspect is equally important as it is with physical collecting, the nature of the social aspect is inherently different.

Physical Limitations

The lack of physical limitations is one of the major differences between new media artifacts of participation and material objects. New media artifacts of participation are easily copied, often free, and take up very little space, either physical or digital. This is not the case for physical collections of any kind, which often focus on scarce or unique materials that cost more

given their relative scarcity, and can often require significant space to store and display. This is not to imply that collecting new media artifacts is easy. The limitations placed on collectors of these materials can also be daunting: collectors' ability to find, organize, and host their collections can turn expensive, and many collectors get so far behind in organizing their materials that collection access becomes untenable.

The nature of the problem is different for new media collections. Because their materials, at least in the cases covered in this chapter, are freely available or easily obtained, instead of focusing on acquisition, new media collectors focus their energies on organization and sharing. Because there are few if any physical limitations to storage and display, these collectors are much more concerned with providing access to as many people as possible.

Collections of new media artifacts of participation look very different from traditional physical collections. Because the objects are free to obtain, the collections are often very large; because the collectors essentially collect in order to share, the collections are often highly organized, if not contextualized for the general public; and because the collections are made up of materials for which there are no traditional collecting and display models, and are exclusively displayed online, the collections look unusual. As arbiters of collection quality, then, the traditional collecting models fail in terms of physical characteristics.

Social Nature of Collecting

The scholarly literature on collecting posits that developing social ties is one of the most important elements of collecting. Developing social ties is one of the main reasons people begin and continue collecting. Not only does collecting a certain kind of object provide access to a community of other collectors; the act of collecting can strengthen one's sense of self and build ego. This social characteristic is even more important for collectors of new media artifacts of participation, but again, the nature of the social interaction is different. Instead of using the collecting community as a means to hone searching skills or trade collecting methods and secrets, the communities focus on building one collection. Collecting is no longer an exclusively individual pastime. While one particular person was responsible for offering each of these collections to the Videogame Archive, the conception of collection "ownership" is different. The Stars of Intrepid collection, for example, is "owned" by the guild, and everyone who donated materials has some responsibility for collection development. One person, Mr. Gayman, runs and is ultimately responsible for the *Matrix Online* collection, but again, materials were donated and organized by multiple contributors. And in the case of the *Ultima Online* library of books, while Mr. Bacon is the primary collector and the collection resides on his machines and in his in-game "houses,"

collection development depended on other players sharing their collections with him. Whereas physical collectors might form a community to discuss where to purchase materials, or which dealers have the most interesting and well-priced stocks, these new media collectors gather to share artifacts in order to build larger, more comprehensive collections. Because there is no scarcity—and copying is the de facto means of communication and sharing on the Internet—communities are formed around one collection, instead of forming around a type of collection artifact (stamp collectors, for example, or coin collectors).

This changes the nature of the digital collections. Instead of individuals owning collections that they can only share with a limited number of people, usually by loaning or donating their collections to institutions, the new media collections described in this chapter become institution-like entities around which communities form, and which are available to vast numbers of people over the Internet. This difference introduces a number of issues relevant to traditional collecting models. First, because these collections are built using ad hoc social ties rather than going through traditional acquisition means, it becomes difficult to determine provenance or authenticity of the materials within. Additionally, because these collections do not represent the vision of a lone collector and must allow for multiple interests, contexts, and types of materials, the resulting character of these kinds of new media collections is less unified than that of traditional collections. Again, this is another instance where the traditional collecting typology does not provide a useful framework for evaluation or classification of these collections.

Changing Nature of Ownership

A major problem with new media materials is the concept of ownership. Popular conceptions of ownership and copyright are in a state of flux, and the law is slow to catch up with common practice. With physical collections, people or institutions typically own outright the materials that they collect, and the act of collecting is primarily acquisitive. This is less true for collectors of new media. For these kinds of materials, it is very difficult, if not impossible, to own the materials related to a videogame in the same way a person can own a coin, or a painting. The primary problem is related to access. Access to games is coupled with additional black-box, proprietary technology, whereas access to physical objects is linked to physical safe-keeping. Beginning with an example that has a close parallel in the physical world: Take an individual's straightforward purchase of the Playstation 2 console game *Grand Theft Auto: San Andreas*. That person does not own *Grand Theft Auto* any more than a reader "owns" the poems of Sylvia Plath, or the contents of any other book. In both cases, the user is buying a physi-

cal copy of a valuable original, which gives him the ability to interact with the material. However, in the case of the videogame, extended interaction is dependent on another piece of technology, the game console. To play *Grand Theft Auto: San Andreas*, a user must own a working Playstation 2 console. Because game consoles represent closed, proprietary technology, players can't *legally* use any technological method to preserve and access their games: they can't tinker with later consoles to enable access to older games, and they can't legally emulate the old players. While neither readers nor game players own the content of their material, gamers essentially only license the ability to legally access their material (through purchasing the console), whereas readers can access their material as long as they can physically access their artifact.

This fuzzy ownership problem is only exacerbated when we move away from cases that have simple physical parallels. How, for example, can the collecting community model ownership of game-related material, in which the authoritative game producers give players the tools to modify and augment games for their own purposes? All of the materials discussed in this chapter are dependent on the ability to modify games to some extent. Writing books is a function that the creators of *Ultima Online* built into the game at its inception. Without that functionality, the books themselves would not be possible. *Star Wars Galaxies* was a "sandbox" game, where players had significant control over what the game looked like and how it was played; everything within the Stars of Intrepid collection is the result of a game modification of one kind or another. The question for institutions considering these kinds of materials becomes: who owns the mods, and who owns the materials dependent on the mods? The collecting community has no good models with which to characterize the ownership of these collections, and without such models, collecting and preserving these materials becomes difficult from both a legal and a bureaucratic point of view (for a more thorough discussion of mods, see: Kow and Nardi 2010).

Taxonomic / Organizational Nature of the Collections

All of the characteristics previously discussed—that there are few pre-existing models for collecting and providing access to these kinds of materials, that they lack easily evaluated attributes, and that determining ultimate ownership is challenging—contribute to the problem of reliably describing them using traditional models. Instead of being self-referential, like physical objects can be, these collections and the materials they contain often describe or augment understanding of the primary artifact: in this case, the videogame. The collections' organization models are an attempt to augment understanding and classification of game experience, or to support the memory of a no longer active community.

Determining Quality

Because of the emergent nature of these materials, it is difficult to objectively differentiate between a “good” collection and a “bad” one. A preliminary evaluative criterion, based solely on the cases provided here, would be whether the collection provides contextual knowledge of the primary artifact. Do uninitiated viewers, either non-players or players not intimately connected to the collection, get any additional information about the game from the collection? Does the collection enhance understanding of the game in any way? Each of these collections provides evocative augmentations of their respective games, but there is a qualitative difference between the Stars of Intrepid wiki and the *Matrix Online* collection that is not fully represented in that statement.

From an institutional standpoint, these collections are valuable because they provide extra contextual information about a game. An additional criterion to further differentiate the collections’ quality could be based on transferability of the collection’s content. Because these collections are digital, and—at least in the case of the Stars of Intrepid and the *Matrix Online* collection—their online presence is fundamentally important to the collection’s character, the ability to get information out of a collection becomes important. Because the materials in *Matrix Online* collection are stuck in HTML and the site design is so personal and unique, its ultimate usability might be less than that of a more traditionally organized collection, like the Intrepid History Project or the library from *Ultima Online*.

How Do We Describe These Collections?

When developing descriptive models for these kinds of materials, there are further issues related to what, exactly, is being described. Should the descriptive focus be on the materials themselves, or on the collection as a whole? Are these collections like archival collections, which can be described hierarchically, or are they more like networks, where multiple descriptive and relational factors are necessary to fully understand the materials within? Furthermore, are these collections primarily notable in terms of the primary artifact, or should they be described and preserved on their own terms?

Without a good descriptive and representational framework, it is exceedingly difficult to provide access to these collections, it is difficult to preserve them, and it is difficult for institutions to argue for their value. This is unfortunate, because these collections provide rich, evocative representations of characteristics that are very difficult to represent: context, game culture, player engagement, and various player interaction styles.

NEED FOR FUTURE WORK

This chapter presented a preliminary exploration of different collections of artifacts of participation. With only three cases, the findings are limited, but it does point the way for profitable future work in building models that describe what kinds of collections exist in different player communities and that better represent the creation and use of these collections and the materials contained within. In addition to performing a more formal and formalized study on the existence of these kinds of materials and collections of them, researchers could also profitably look at new media collections of more traditional materials. New media art, for example, uses the art model for collection building: do those collectors perform the same kinds of collecting acts as do the collectors of these artifacts of participation? How are their behaviors similar and how are they different? Additionally, there is an archival literature on collecting ephemera, i.e., those materials that are not “valuable” (like gig posters, handbills, ‘zines . . .) until they suddenly are; how have institutions dealt with these kinds of materials over the ages, and what literature exists to describe how these personal collections coalesce?

There is also a need for further research on the nature of these materials: how and why they are created, and what kinds of players tend to create and collect them. Men maintained all of the collections offered to the Videogame Archive, for example. Is this a gendered activity? There are questions related to use: how do players use these materials in-game? Do the materials perform some specific function? How is the collection used after the game closes, or the players are no longer active? And finally, there are questions related to collection access: what are some of the expectations of collectors who offer their collections to institutional repositories? How are people using the collections, and will a standardized, institutional representation damage or somehow misrepresent that access model?

These collections provide representative examples of the kinds of collections that were offered to the Videogame Archive after some publicity, and represent a vast, untapped market of material residing in “the wild.” The current collecting typology does not reliably represent the nature of these collections, and must be augmented to prove useful for the changing nature of artifact creation, acquisition, and collection building. This chapter provided a review of the traditional model, and pointed out some of its shortcomings. In order for institutions to reliably represent popular culture, particularly the exploding popular culture related to the Internet and everything it allows, these kinds of materials—artifacts of participation—must be taken into consideration.

REFERENCES

- Asch, Mark. 2010. NYU libraries acquire the Kathleen Hanna papers for their new "Riot Grrrl Collection." *The L Magazine*. <http://www.thelmagazine.com/The-Measure/archives/2010/01/07/nyu-libraries-acquire-the-kathleen-hanna-papers-for-their-new-riot-grrrl-collection>.
- Bacon, Seth. 2009. Ultima Online texts. Email to the author, February 9, 2009.
- . 2010. Re: Ultima Online texts. Email to the author, January 17, 2010.
- Bainbridge, David, Craig G. Nevill-Manning, Ian H. Witten, Lloyd A. Smith, and Rodger J. McNab. 1999. Towards a digital library of popular music. In *Proceedings of the 4th Annual Conference on Digital Libraries*, 161–169. Berkeley, CA: ACM.
- BBC News. 2008. Writing the history of virtual worlds. *BBC News*. <http://news.bbc.co.uk/2/hi/technology/7561553.stm>.
- Beer, David. 2008. The iconic interface and the veneer of simplicity: MP3 players and the reconfiguration of music collecting and reproduction practices in the digital age. *Information, Communication and Society* 11(1), 71–88.
- Belk, Russell W. 1991. The ineluctable mysteries of possessions. *Journal of Social Behavior and Personality* 6(6), 17–55.
- . 1994. Collectors and collecting. In *Interpreting Objects and Collections*, ed. Susan Pearce, 317–326. London: Routledge.
- Benjamin, Walter. 1969. Unpacking my library. A talk about book collecting. In *Illuminations*, ed. Hannah Arendt, 59–67. New York: Schocken Books.
- Blancato, Joe. 2005. The highest form of flattery. *The Escapist* (4). http://www.escapistmagazine.com/articles/view/issues/issue_4/27-The-Highest-Form-of-Flattery.
- Blom, Philipp. 2004. *To Have and To Hold*. New York: Overlook TP.
- Broderick, Ginger. 2005. The art of the deal: Tax consequences of collecting. *The CPA Journal Online*. <http://www.nysscpa.org/cpajournal/2005/405/essentials/p54.htm>.
- Case, Donald O. 2009. Serial collecting as leisure, and coin collecting in particular. *Library Trends* 57(4), 729–752.
- Clifford, J. 1994. Collecting ourselves. In *Interpreting Objects and Collections*, ed. Susan M. Pearce, 258–268. London: Routledge.
- Csikszentmihalyi, Mihaly. 1993. Why we need things. *History from Things*. Washington DC: Smithsonian, 20–29.
- Cunningham, Sally Jo, Matt Jones, and Steve Jones. 2004. Organizing digital music for use: An examination of personal music collections. In *Proceedings of the 2004 International Symposium on Music Information Retrieval*. Barcelona, Spain: ISMIR.
- Depocas, Alain, Jon Ippolito, and Caitlin Jones. 2003. *Permanence through Change: The Variable Media Approach*. New York: Solomon R. Guggenheim Foundation.
- Electronic Arts. n.d. Ultima Online Terms of Service. <http://support.ea.com/>.
- Gayman, Charles. n.d. Archival science in a post-war simulation. <http://archivalscience.shock-therapy.org/>.
- . 2008. "I run an archive website for matrix online." Email to the author, August 15, 2008.
- Gelber, Stephen M. 1991. A job you can't lose: Work and hobbies in the Great Depression. *Journal of Social History* 24(4), 741–766.
- Gemmell, Jim, Gordon Bell, and Roger Lueder. 2006. MyLifeBits: A personal database for everything. *Communications of the ACM* 49(1), 88–95.

- Goldman, Tom. 2010. Blizzard squeezes \$88 million from private server owner. *The Escapist* online magazine. <http://www.escapistmagazine.com/news/view/102805-Blizzard-Squeezes-88-Million-From-Private-Server-Owner>.
- Grodzinski, Veronica. 2009. The art dealer and collector as visionary: Discovering Vincent van Gogh in Wilhelmine Germany 1900–1914. *Journal of the History of Collections* 21(2), 221–228.
- Gueth, Brent. 2008. “Virtual World Archiving.” Email to author, August 17, 2008.
- Hartman, Josie. 2006. Personal Communication.
- Hedstrom, Margaret, Christopher Lee, Judith Olson, and Clifford Lampe. 2006. “The old version flickers more”: Digital preservation from the user’s perspective. *American Archivist* 69(1), 159–187.
- Hedstrom, Margaret, and Seamus Ross. 2003. *Invest to save: Report and recommendations of the NSF-DELOS working group on digital archiving and preservation*. Washington, DC: NSF/DELOS.
- Hendricks, J. J. 2008. The IRS cares about your video game collection. <http://blog.videogamepricecharts.com/2008/04/irs-cares-about-your-video-game.html>.
- Hughes, Link. 2008. Meaning in the machine: The proliferation of collaborative role-playing in the early days of The Matrix Online. Paper presented at the Austin Game Developers Conference, Austin, TX.
- Kibby, Marjorie. 2009. Collect yourself: Negotiating personal music archives. *Information, Communication and Society* 12(3), 428–443.
- Koh, Rowena. 2008. Alternative literature in libraries: The unseen ‘zine. *Collection Building* 27(2), 48–51.
- Korn, M. 2004. Collecting paintings by Matisse and by Picasso in Britain before the Second World War. *Journal of the History of Collections* 16(1), 111–129.
- Kow, Yong M., and Bonnie Nardi. 2010. Who owns the mods? *First Monday* 15(5). <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2971/2529>.
- Lowood, Henry. 2002. Shall we play a game: Thoughts on the computer game archive of the future. In *BITS OF CULTURE: New projects linking the preservation and study of interactive media*. Presented at the Bits of Culture, Stanford, CA: Stanford University.
- Matthews, Rosemary. 2009. Collectors and why they collect: Isabella Stewart Gardner and her museum of art. *Journal of the History of Collections* 21(2), 183–189.
- McIntosh, William B., and Brandon Schmeichel. 2004. Collectors and collecting: A social psychological perspective. *Leisure Sciences* 26(1): 85–97.
- Moshenska, Gabrielle. 2008. A hard rain: Children’s shrapnel collections in the Second World War. *Journal of Material Culture* 13(1), 107–125.
- Mythic Entertainment. 2009. Ultima Online—Shard Selection. <http://www.uoherald.com/guide/guide.php?guideId=114>.
- Naaman, Mor, Yee Song, Andreas Paepcke, and Hector Garcia-Molina. 2004. Automatic organization for digital photographs with geographic coordinates. In *Proceedings of the 6th Annual ACM / IEEE Joint Conference on Digital Libraries*. Presented at the ACM/IEEE Joint Conference on Digital Libraries, Tuscon, AZ: ACM Press, 53–62.
- Nardi, Bonnie. 2010. *My life as a night elf priest: An anthropological account of World of Warcraft*. Ann Arbor: University of Michigan Press.
- O’Fama, Buck. 2007. Does anyone still play Ultima Online? What’s it like these days?—Yahoo! Answers. <http://answers.yahoo.com/question/index?qid=20071108074428AA6TXl>.

- Orcutt, Kimberly A. 2006. Personal collecting meets institutional vision: The origins of Harvard's Fogg Art Museum. *Journal of Historical Collections* 18(2), 267–284.
- Pearce, Susan M. 1994a. Objects as meaning; or narrating the past. In *Interpreting Objects and Collections*, ed. Susan M. Pearce, 19–29. London: Routledge.
- . 1994b. Collecting reconsidered. In *Interpreting Objects and Collections*, ed. Susan M. Pearce, 193–204. London: Routledge.
- . 1994c. Thinking about things. In *Interpreting Objects and Collections*, ed. Susan M. Pearce, 125–132. London: Routledge.
- Rafferty, Pauline, and Rob Hilderley. 2007. Flickr and democratic indexing: Dialogic approaches to indexing. In *Aslib Proceedings: New Information Perspectives* 59, 397–410.
- Rigby, Douglas, and Elizabeth Rigby. 1944. *Lock, Stock and Barrel: The Story of Collecting*. New York: Lippincott.
- Rinehart, Richard. 2002. *Preserving the Rhizome ArtBase*. New York: Rhizome.
- Rothenberg, Jeff. 1999. *Avoiding Technological Quicksand: Finding a Viable Technical Foundation for Digital Preservation*. Washington, DC: Council on Library and Information Resources (CLIR). <http://www.clir.org/pubs/reports/rothenberg/contents.html>.
- Rovers, Eva. 2009. The art collector—between philanthropy and self-glorification. *Journal of the History of Collections* 21(2), 157–161.
- Stars of Intrepid—Bohemian Grove. 2008. *Bohemian Grove—Stars of Intrepid*. http://starsofintrepid.com/index.php?title=Bohemian_Grove.
- Stratics. n.d. UO Stratics—Books—Original In-came Books. http://uo.stratics.com/secrets/books/books_index.shtml.
- . n.d. UO Stratics—Decay. <http://uo.stratics.com/content/misc/decay.shtml>.
- Swade, David. 1993. Collecting software: Preserving information in an object-centred culture. In *Electronic Information Resources and Historians: European Perspectives*. St. Katharinen: Scripta Mercaturae.
- Tanselle, G. Thomas. 1999. A rationale of collecting. *RARITAN* 19, 23–50.
- Tappeiner, Elizabeth, and Catherine Lyons. 2008. Selection criteria for academic video game collections. *Collection Building* 27(3), 121–125.
- Van House, Nancy, Marc Davis, Morgan Ames, Megan Finn, and Vijay Viswanathan. 2005. The uses of personal networked digital imaging: An empirical study of cameraphone photos and sharing. In *Conference on Human Factors in Computing Systems*, 1853–1856. Portland, OR: ACM Press.
- Wikipedia. 2010. Massively multiplayer online role-playing game—Wikipedia, the free encyclopedia. http://en.wikipedia.org/wiki/Massively_multiplayer_online_role_playing_game.
- Wilhelm, Anita, Yuri Takhteyev, Risto Sarvas, Nancy Van House, and Marc Davis. 2004. Photo annotation on a camera phone. *Conference on human factors in Computing System (CHI 2004)*, 1403–1406. Vienna, Austria: ACM Press.
- Winget, Megan, and Caitlin Murray. 2008. Collecting and preserving videogames and their related materials: A review of current practice, game-related archives and research projects. Presented at the Annual Meeting of the American Society for Information Science and Technology. Columbus, OH: American Society for Information Science and Technology.
- Yates, Francis. 1966. *The art of memory*. Chicago: University of Chicago Press.

3

Prim Drift, CopyBots, and Folk Preservation

Three Copyright Parables about Art in the Digital Age

Kari Kraus

ABSTRACT

This chapter employs a series of case studies from the domains of digital arts and creative/experimental new media to elicit tensions and contradictions in the current state of copyright and intellectual property law. I pay particular attention to the role of the “pirate” as preservationist—rather than taint or corrupt, historically we know that piracy has helped guarantee the survival of important works of literature and art. Throughout, I insist that the humanist is not a dabbler or interloper in these matters; humanistic knowledge, particularly semiotics (the study of sign systems) has the potential to lend consistency and coherence to case law that is currently shot through with loopholes, contradictions, and dead ends. To that end, I also outline the potential of a center devoted to intellectual property law and humanities advocacy.

INTRODUCTION

In 2006 the American Council of Learned Societies published “Our Cultural Commonwealth,” a landmark report on cyberinfrastructure for the humanities and social sciences. As used by the commission, the term “cyberinfrastructure” covers the aggregate social, technological, institutional, legal, economic, and human capital needed to advance the humanities and social sciences in a global digital environment (ACLS 2006, 6). Brett Bobley of the National Endowment for the Humanities provided some indication of the stature of the ACLS report at a talk at the Maryland Institute for Technology

in the Humanities when he referred to it as the “Bible” of the NEH’s digital humanities initiative.

“Our Cultural Commonwealth” identifies six key challenges that must be overcome if we are to fulfill the promise of a robust cyberinfrastructure, of which arguably the most daunting and complex is copyright (18–25). In its fifty-one-page document, the commission invokes intellectual property no less than forty-seven times, ultimately concluding that although it “can offer no simple solutions” (31), the various stakeholders named in the report nonetheless have an obligation to do what they can to strengthen and support the public domain and fair use provisions of the law. To decline this advocacy role is to jeopardize the precious few limitations on absolute copyright upon which we as information professionals rely in our efforts to preserve and transmit the cultural record. Perhaps nowhere is that danger more ominously expressed than in Susan Bielstein’s *Permissions, A Survival Guide: Blunt Talk about Art as Intellectual Property*:

Asking permission [of a rights holder] zealously and unnecessarily also catches you up in a mentality of acquiescence. Acquiescence is a wasting disease rooted in anxiety and ignorance, and it helps propel the all-consuming permissions culture . . . in the quotidian world of intellectual property, acquiescence operates far beneath the beacon eye of statute or treaty, and capitalizing on it is not good for anyone’s health. It wastes time, it wastes money, and it produces a compliant society vulnerable to abuse and wholesale ideological shifts in the law. (2006, 10–11)

The purpose of this chapter, then, is twofold. First, it furnishes a case file of network-driven digital art that dramatizes the conflict between private and public rights in creative culture (i.e., the provocative “prim drift,” “copybots,” and “folk preservation” mentioned in my title, which are part of a larger conversation about emergent art genres and creative communication technologies, such as 3D virtual worlds, that, although still in their infancy, will shortly become as established in their own way as television and video are today). Second, it proposes, as an experimental intervention into the legal system (and modeled in part after the Electronic Frontier Foundation), a humanities center staffed by archivists, librarians, visual resource curators, art historians, humanities researchers, and lawyers dedicated to testing in a court of law (with the aim of legally validating) claims that, in the words of Gary Schwartz, have the potential to “maximize our own collective position as holders of copyright” in *public domain works* or, I would add, as *users* of copyright in *private domain works* (Schwartz 1998).

The choice of an arts and humanities dataset to seed the discussion about copyright is inspired in part by a venerable roster of artists who have challenged prevailing assumptions about the nature of creativity, originality, and authorship. These assumptions in turn inform cultural attitudes toward

intellectual property. The cut-ups of William S. Burroughs; the ready-mades of Marcel Duchamp; the appropriation art of Sherrie Levine, Jeff Koons, and Andy Warhol all potentially run afoul of modern IP law. For this reason, the arts frequently act as an early warning system for copyright, alerting us to potential ambiguities in the case law or to legislative actions that alter, intentionally or not, the delicate balance between the rights of creators and the rights of users that the framers of the Constitution sought to protect. It is not only artists themselves, but also the collectors, scholars, publishers, museums, libraries, executors, and rights agents drawn into their orbit who have the power to upset or restore the golden mean of copyright.

PRIM DRIFT

In the multi-user virtual environment *Second Life*, “prims”—short for “primitives”—are the basic building blocks from which 3D objects such as cars, houses, books, and furniture are built. Individual prims can be linked together into larger systems to form complex shapes. Although generally stable, such builds will sometimes “drift” over time: like tectonic plates sliding past each other, prims can randomly shift out of position, producing distorted visual effects (Walsh 2006). While content creators can edit their scripts to repair the damage, potential problems arise once the items have been sold. This is because every creative asset in *SL* is encoded with a set of permissions that dictate how it may be distributed and used by other residents. The permissions system includes four fields: move, modify, copy, and transfer. If either the second or fourth of these is disabled, the owner of the object, as distinct from its creator, is prevented from exercising freedoms that are normally either unregulated or protected by law in real life: the right to modify an object for personal use and the right to resell or give away a lawfully obtained copy under the First Sale Doctrine. Thus, for example, in RL I may annotate my copy of *Gone with the Wind* in preparation for class discussion, or take it to the bookbinder for repair if the pages come loose, or donate it to my local public library when I no longer need or want it, all without infringing on the author’s copyrights. By contrast, if I own a book in *SL*, I may not be able to do these things: I may not be able to repair the book if it shows signs of prim drift or give it as a gift to someone else. The inability to alter objects for personal use warrants further consideration: as an analogy, it would be as if I suddenly found myself in a world where there were no tailors to hem pants or cobblers to mend shoes or antique experts to restore Grandma’s heirloom hutch.

The set of problems I’m describing are as applicable to the 2D Web as they are to the 3D Web. Increasingly, contract law overrides copyright law in electronic commerce. End User Licensing Agreements (EULAs), for example,

complicate the transfer of software applications from one party to another, suggesting that the erosion of the First Sale and Fair Use doctrines in *Second Life* is part of a much larger trend.

Because this example and the other two mentioned in my title function as limit cases for copyright policy, showing us where the system breaks down in a digital environment and allowing us to probe its edges, they help justify what might otherwise be seen as an implausible proposal: to establish a humanities center that would expand the site of activism to include not only the customary conference proceedings working groups, white papers, articles, and symposia but also, crucially, the courts. More than a decade ago, art historian Gary Schwartz urged his colleagues in a spirited talk at the annual meeting of the College Art Association to adopt more assertive measures to revive an ailing fair use doctrine. In an attempt to persuade his audience members of the need for innovative approaches, Schwartz informed them that he had been “assured by counsel that test trials on any of these [copyright] issues, in a well-chosen court, stand an excellent chance of success.” In 1998, such a strategy might have seemed improbable; in 2010, I’m convinced it is not. With the establishment of a grant initiative in 2003 to fund work “in the area of intellectual property and the long-term protection of the public domain,” the MacArthur Foundation has signaled its readiness to support experimental programs; recent recipients include the Electronic Frontier Foundation, which was awarded over half a million dollars in 2007. The EFF—whose mandate is to protect the public interest in a networked world—helps defend free speech, privacy, and consumer rights, in part by subjecting them to legal proceedings in a court of law. It thus serves as an important precedent for the course of action advocated here.

What would distinguish the center I envision from either the EFF or Stanford’s Center for Internet and Society is the role of the humanist, who would serve not as an ancillary figure, but one central to the center’s mission and success. Although I suspect many are capable of envisioning humanities scholars as evangelists, public relations spokespeople, legal assistants, legal researchers, or legislative advocates in this enterprise, I believe they are qualified to do more: to serve as expert witnesses or consultants in civil cases involving intellectual property and the arts. The literary scholar who specializes in textual transmission, the philosopher who investigates theories of language or the nature of universals, and the art historian who publishes on reproductive printmaking are all *de facto* semioticians, experts in sign systems and how they work. Because intellectual property concerns itself with originals and copies, a substantial body of case law hinges on the semiotic distinction between the two. The ability to state when two objects are fundamentally the same or different—to determine, for example, if a copy of Salvador Dalí’s *Persistence of Memory* is primarily substitutive or

transformative—is therefore a legal desideratum, one which many humanists are qualified to help address.

“Given the central and fundamental role of sign systems,” writes Jeffrey Long in a special issue of *Semiotica*, “why is the field that studies them—semiotics—so unknown amongst many who wish to solve practical problems in business, science, the arts . . . , government,” and, we might add, the law (Long 1999, 1). A preliminary survey of judicial opinions on court cases that involve accusations of copyright infringement of visual works of art turns up a network of seemingly contradictory, ad hoc, or ambiguous rulings that would benefit from the rigorous application of semiotic principles of individuation, principles that would allow us to make tighter discriminations among things like originals, copies, versions, remixes, editions, and other relevant categories. The point here is that semiotics could be instrumental in helping courts adjudicate between the competing copyright claims of plaintiffs and defendants, as well as in fortifying fair use and the public domain. Contrary to the position recently espoused by Stanley Fish, professor of English and Law at Florida International University, regarding the lack of any utilitarian value whatsoever of a twenty-first-century humanities education (2008), the Center I’m proposing would provide an affirmation of the power of humanistic knowledge to shape public policy in the digital age.

FOLK PRESERVATION

By “folk preservation,” I mean preservation that is amateur rather than professional; distributed rather than centralized; and unauthorized rather than authorized. It is often of an avocational rather than vocational nature. Many of the current preservation initiatives in *Second Life*, for example, are folksonomic in character: one of the longest-standing structures in the metaverse, a statue representing the burning man effigy of the annual art festival held in the deserts of Nevada (“The Man” n.d.), continues to survive in an old parcel of Natoma, not, at least initially, because of any top-down decree from Linden Lab, the developer of *SL*, or the intervention of Real Life (RL) or Second Life (*SL*) conservators, but because of the ongoing support and efforts of residents.

Of the many varieties of folk preservation, the one on which I’d like to focus is piracy. Consider three examples: According to industry insiders, the New York Philharmonic was ironically forced some years ago, when it began to think seriously about its preservation program, to purchase surreptitiously made sound recordings of its live performances from concertgoers who had smuggled their portable recording devices into the concert hall (Manildi 2008; Winner 2008. The 10-CD commemorative archival

box set of *Leonard Bernstein Live*, for example, which was issued by the NY Philharmonic, includes an entire Wagner concert from 1970 taken from an illicit tape made by Roger Frank (Godell 2001). Such bootleg music was a mainstay at William Lerner's record shop Music Masters in the 1960s and 1970s, a hangout for musicians and collectors often in search of rare material (Kozinn 1990). Although Lerner's reasons for hiring freelancers armed with recorders to fill the seats at concert halls were strictly commercial, both he and Frank nonetheless join the historical ranks of pirates who deserve recognition for archival and preservation achievement in the arts.

My second example comes from the world of cinema. In an online interview, the British screenwriter Peter Briggs relates how he lost and subsequently found his *Alien vs. Predator* script:

I wrote "A vs P" originally . . . on an Amstrad computer, which was about one step above a Univac Room Filler. In '92 I swapped to an Apple Mac, which I've used ever since. And I ended up losing the Amstrad disk, which was some weird, unreadable proprietary brand anyway. It wasn't until whoever it was transcribed it and pirated it onto the Web years later, that I was able to cut-and-paste it into Final Draft and have an electronic copy again. So, thank-you, Internet Leaker, wherever you [are]! (Doctorow 2004)

My third example, the one on which I'd like to spend the most time, is *Agrippa* (a book of the dead), an artist's book co-authored by the writer William Gibson and the artist Dennis Ashbaugh, and published by Kevin Begos Jr. in 1992. Described in contemporary press releases as a "multi-unit artwork" (Gibson, "Introduction to *Agrippa*" 2002), *Agrippa* is difficult to classify, both physically and generically. It was originally sold in two versions. The deluxe version came wrapped in a shroud, its cover artificially aged and its pages scorched—"time-burned," like the photo album described in Gibson's poem (*Agrippa Files* 2005). Inside are etchings by Ashbaugh and double columns of DNA that ostensibly encode the genome of a fruitfly (Kirschenbaum, *Mechanisms* 2008, xi). Nestled in the center of the book is a 3 1/2 inch floppy disk that contains the poem: a meditation on time, memory, and decay. Its governing metaphor is that of the *mechanism*, "a trope," notes Matthew Kirschenbaum, "that manifests itself as a photograph album, a Kodak camera, a pistol, and a traffic light, as well as in less literal configurations" (Kirschenbaum, *Mechanisms* 2008, ix). *Agrippa*, among other things, is about our misplaced faith in the permanence and objectivity of media. Like human memories, media distort, invent, and erase the very objects they're designed to preserve: handwriting fades and becomes illegible, photographs break the fourth wall by constantly reminding us of the world that lies just outside the picture frame, and inert technological artifacts put up no resistance when new ones come along to replace or destroy them. Paradoxically, the speaker of the poem takes recourse in

his own recollections to supplement the incomplete records of the past, records that were originally intended to compensate for the limitations of memory. By such a process, he tries to recapture, for instance, the smells of the sawmill once owned by his father, whose “tumbled boards and offcuts” are pictured in an old photograph (Gibson, *Agrippa* n.d.). Drawing on a synaesthetic imagination, he uses the visual stimulus to prompt an olfactory memory. This complex interplay between mechanism and memory structures the poem as a whole and shapes its manifold meanings.

Agrippa's core themes are expressed through form as well as content: some of Ashbaugh's etchings are overlaid with images printed in uncured toner, which are inevitably smudged and distort those beneath and facing them when the pages are turned (Kirschenbaum, *Mechanisms* 2008, xi). More stunningly, as has been often described, Gibson's electronic poem is encrypted to scroll automatically down the screen once before being irrevocably lost, its text disappearing after a single reading. *Agrippa* is therefore subjected, like all material objects, to the forces of decay, but here those forces are manufactured rather than natural, causing the work to disintegrate at an accelerated rate. Ashbaugh, in particular, took considerable delight in anticipating how this volatility would confound librarians, archivists, and conservators: as Gavin Edwards explains, to register the book's copyright, Ashbaugh “would need to send two copies to the Library of Congress. To classify it, they . . . [would] have to read it, and to read it, they . . . [would have to] destroy it” (1992). Significantly, however, it was not the librarians who found a workaround to the problem, but the pirates. On December 9, 1992, a group of New York University students secretly video-recorded a live public performance of *Agrippa* at The Americas Society, an art gallery and experimental performance space in New York City. After transcribing the poem, they uploaded it as plain ASCII text to MindVox, a notorious NYC Bulletin Board, “the Hells Angels of Cyberspace,” according to Wikipedia, where it was readily available for download and quickly proliferated across the Web. “The Hack,” as the incident has come to be called, is told with the hard-boiled suspense of a detective story by Matthew Kirschenbaum, who uncovered the gritty details while working on his book *Mechanisms: New Media and the Forensic Imagination*, published by MIT Press in 2008.

Although many rare archival and research materials (images, scans, transcriptions, video footage, and simulations) related to *Agrippa* are published on the *Agrippa* Files website with the permission of Kevin Begos Jr., the complete text of the poem—arguably the central node of the work—is not. The editorial team at the University of California–Santa Barbara provides the following notice by way of explanation: “Currently, the *Agrippa* Files does not have permission to reproduce the full text of the poem. Many wild copies of the text exist on the Internet. The official copy is on William Gib-

son's web site" (2005). What is worth noting here is that the access mission of the site is to some degree undercut by copyright laws. Whereas publicly accountable archival projects must abide by these laws, they go unheeded by shadow groups, such as the MindVox users, who transmit culture at risk of civil litigation. The irony, of course, is that despite the poem's omnipresence on the Web, it is absent in textual form from the one authoritative site dedicated to documenting and preserving it.

In late 2008, Matthew Kirschenbaum, Alan Liu, and Doug Reside—with the permission of William Gibson—published video capture of a run of the poem, along with a disk image of the program that readers can download and view in an emulator: a software program that impersonates a retro hardware and/or software environment (Kirschenbaum, "No Round Trip" 2008). One might argue that the availability of the video and disk image on the *Agrippa* Files website not only compensates for the absence of a transcription, but also nullifies the need for one. The transcription, after all, is but a pale reflection of the artifact it represents. It stands in the same relation to the *Agrippa* program as a pottery shard does to the original vase or object of which it was once a part: both are fragments of a larger whole. Conversely, experiencing the poem in emulation is roughly tantamount to viewing a carefully manufactured replica of an antique vessel or reading a photographic facsimile of a medieval manuscript: although in each instance the copy cannot replace the original, it can serve as a reasonable surrogate under many circumstances.

The problem with this line of thinking, however, is that it shortchanges the importance of the pirated ASCII versions in bringing about the revival of *Agrippa*. The crude hack devised by the NYU students allowed *Agrippa* to survive as a text-only fragment on the network for sixteen years, creating the pre-conditions for its eventual emulation. Unlawful (low-fidelity) copies of *Agrippa* indisputably paved the way for lawful (high-fidelity) copies, which now reside on unknown numbers of user desktops. Reflecting on the web-based *Agrippa* Files archive where the disk image of the program now lives, Kirschenbaum explains its significance:

These materials . . . offer a kind of closure to anyone who, like me, has ever stumbled across the text of *Agrippa* on the open net and wondered, but how did it get there? Those mechanisms are now known and documented. So we take satisfaction in the release of these new "Agrippa files" (as it were) to scholars and fans alike, and we marvel that after sixteen years in the digital wild a frail trellis of electromagnetic code once designed to disappear continues to persist and to perform. (Kirschenbaum, "No Round Trip" 2008)

COPYBOTS

In an entry dated from January 2008 on *Architecture +*, a blog covering commercial products and services for multi-user virtual environments,

JeanRicard Broek cryptically proclaims that a “Library of Congress copy-bot is preserving virtual worlds.” Broek, it turns out, was reporting on a recently funded grant sponsored by the Library of Congress to preserve early computer games, interactive fiction, and 3D virtual worlds. The multi-institutional Preserving Virtual Worlds project, with which I’m directly involved, includes the University of Illinois Urbana-Champaign (Principal Investigator), Stanford University, the University of Maryland, and the Rochester Institute of Technology. Because interactive media are highly complex and at high risk for loss as technologies rapidly become obsolete, the PVW project seeks to provide basic standards for metadata and content representation, and has conducted (and, at the time of this writing, nearly concluded) a series of archiving case studies for early video games, electronic literature, and *Second Life*.

The “CopyBot” to which Broek refers is the famed software tool that wreaked havoc on the fledgling economy of *Second Life* in 2006. Developed by libsecondlife, which describes itself as a project directed toward “understanding how *Second Life* works from a technical perspective, and extending and integrating the metaverse with the rest of the Web,” the program generates clones of in-world objects, such as avatars, buildings, books, furniture, cars, and the like. Libsecondlife, which originally created CopyBot with the blessing of Linden Lab, intended for it to be used as a debugging and back-up application (Reuters 2006). Once the source-code was released and distributed through the SL Exchange marketplace, however, it was modified and recompiled to duplicate objects without authorization from content creators, to the great consternation of artists and merchants, many of whom apparently suffered considerable financial losses as a result (Wikipedia, “CopyBot” 2008). Nonetheless, the CopyBot is a technology that, although used by some customers to violate the law, is capable (like the home video recorders, photocopying machines, and computers that came before it) of “substantial non-infringing uses” (EFF, Betamax Case 2008).

The remarkable fact about Broek’s throwaway line is how prescient it proved to be: after surveying a variety of methods for exporting *Second Life* object data and warehousing it in an off-world database, the PVW team eventually settled on the CopyBot application (McDonough et al. 2010, 78–80). Once assimilated into an archival workflow that involves obtaining appropriate permissions from content creators and owners to reproduce and store their in-world objects, the CopyBot tool acquires a newfound legitimacy. Its contingent status is a reminder of the extent to which copyright and software pirates serve a Promethean function, bringing new technologies to industry, academia, and other sectors—technologies that are often of particular value to archivists (the history of computer emulation, for example, is profoundly indebted to gamers, many of whom were inspired in the 1980s and 1990s to create unauthorized arcade and console emulators so that they could play vintage video games).

What are we to make of Broek's analogy, however facetious (and, as it turns out, accurate), between a valid, federally funded preservation program and a software tool best known for its ability to facilitate criminal activity? The easy conflation of preservation with piracy no doubt has something to do with the fact that the simple act of copying is central to both. One of the most reliable ways to preserve an object, after all, is to duplicate it. This idea is so basic that it has been codified as a general principle: "lots of copies keep stuff safe" (LOCKSS 2008). But an intellectual property system that grants only minimal exemptions to libraries, museums, and archives from the prohibition against copying provides insufficient grounds for putting this principle into action—unless, that is, there are official or unofficial lines of communication that exist between them and a grey market economy that plays by different rules.

This, indeed, is the lesson of history: our creative heritage infrastructure has not evolved independently of piratical practices, but co-dependently with them. Writing about early European print culture, for example, in his magisterial *The Nature of the Book*, Adrian Johns observes that in the sixteenth through the eighteenth centuries "pirates were . . . not a distinguishable social group. They existed at all ranks of the Stationers' community, [the guild responsible for enforcing copyrights], and at times were among its most prominent and upstanding members" (Johns 1998, 167). Similarly, Meredith McGill suggests that unauthorized reprinting in nineteenth-century antebellum America was so pervasive—so fully embedded in everyday publishing practices—that it constituted "part of the horizon of the ordinary" (McGill 2003, 4). We need, then, to better understand the systems of exchange that exist between lawful and unlawful preservation regimes and determine the extent to which the former is beholden to the latter. And we need to get a better purchase on the intellectual property restrictions that apply, directly or indirectly, to the contact zone between them. (For example, if a benefactor were to donate a large collection of materials to a library that included pirated books or software, the First-Sale Doctrine would presumably be rendered moot, making parts of the transaction illegal.)

Giving credence to the historical importance of the pirate as preservationist provokes new kinds of questions, some answerable, some probably not:

- Are there authors whose works have descended to us exclusively in pirated editions or unauthorized copies or reprints? If so, who are they?
- If we could tally the total number of books that exist in the world and divide them into two groups, one containing authorized copies, the other unauthorized, what would be the ratio of one to the other? Will we ever have the means to quantify piracy? The difficulty of developing criteria that would allow us to confidently assign a book to one category or the other would only serve to underscore some of the issues raised here.

- Is pursuing a kind of heroic preservation, whereby we seek to transmit a cultural artifact wholly intact and unchanged to posterity, a fool's errand? Does cultural piracy demonstrate the truth of the old adage that the perfect is the enemy of the good? Is the *transformation* of culture from one generation to the next something to be valued rather than lamented? Can a fragment or a shard serve as a synecdoche for a larger whole that once existed?

My background in textual scholarship and bibliography tells me that we would be wise to lower the threshold of what constitutes successful preservation. The distinction between a legitimate preservation regime and a piratical one is often illusory, based on the faulty assumption that the former is the guarantor of stability, while the latter delivers only volatility. As an antidote to such notions, I'd like to close with an account of textual transmission found in the British playwright Tom Stoppard's *The Invention of Love*. Stoppard's play tells the story of the early-twentieth-century poet and classicist A. E. Housman, who, having just died, reminisces about his life while being ferried across the river Styx by the boatman Charon in the underworld. In this passage, an Oxford don narrates the reception history of the Latin poet Catullus, whose textual fate is shared in its broad strokes by countless other writers of antiquity. Here, then, is a tale of preservation, blemishes and all:

Anyone with a secretary knows that what Catullus really wrote was already corrupt by the time it was copied twice, which was about the time of the first Roman invasion of Britain: and the earliest copy that has come down to *us* was written about 1,500 years after that. Think of all those secretaries!—Corruption breeding corruption from papyrus to papyrus, and from the last disintegrating scrolls to the first new-fangled parchment books, with a thousand years of copying-out still to come, running the gauntlet of changing forms of script and spelling, and absence of punctuation—not to mention mildew and rats and fire and flood and Christian disapproval to the brink of extinction as what Catullus really wrote passed from scribe to scribe, this one drunk, that one sleepy, another without scruple, and of those sober, wide-awake, and scrupulous, some ignorant of Latin, and some, even worse, fancying themselves better Latinists than Catullus—until!—finally and at long last—mangled and tattered like a dog that has fought its way home, there falls across the threshold of the Italian Renaissance the sole surviving witness of thirty generations of carelessness and stupidity: the *Verona Codex* of Catullus; which was almost immediately lost again, but not before being copied with one last opportunity for error. And there you have the foundation of the poems of Catullus as they went to the printer for the first time, in Venice 400 years ago. (Stoppard 1998, 24–25)

Note: On the fragment as a unit of preservation, see David Lowenthal, "Material Preservation and its Alternatives," *Perspecta* 25 (1989): 66–77.

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REFERENCES

Unless otherwise noted, all URLs were last accessed on 25 January 2008 or on 1 September 2010.

- ACLS. 2006. *Our Cultural Commonwealth: The final report of the American Council of Learned Societies Commission on Cyberinfrastructure for the Humanities & Social Sciences*. Washington DC: ACLS, www.acls.org/cyberinfrastructure/acls.ci.report.pdf.
- The Agrippa Files. 2005. Transcriptions Project, University of California–Santa Barbara. <http://agrippa.english.ucsb.edu/>.
- Bielstein, Susan M. 2006. *Permissions, a Survival Guide: Blunt Talk about Art as Intellectual Property*. Chicago: University of Chicago Press.
- Bobby, Brett. 16 October 2007. A candid chat about the NEH's digital humanities initiative. MITH Digital Dialogue. University of Maryland.
- Broek, JeanRicard. 19 January 2008. Library of Congress CopyBot is preserving Second Life. Architecture + <http://jeanricardbroek-architect.blogspot.com/2008/01/library-of-congress-copybot-is.html>.
- CopyBot. Wikipedia, The Free Encyclopedia. 14 Jan 2008. Wikimedia Foundation, Inc. <http://en.wikipedia.org/w/index.php?title=CopyBot&oldid=184268503>.
- Doctorow, Cory. 6 November 2004. Alien v Predator script saved by internet pirates. <http://www.boingboing.net/2004/11/06/alien-v-predator-scr.html>.
- Edwards, Gavin. June 1992. CyberLit: William Gibson's latest story costs \$450, comes on disk, and self-destructs after one reading. *Details*. Transcription available at <http://www.matarese.com/matarese-files/3580/cyberlit-william-gibson-latest-story-costs-comes-disk-self-destructs/index.html>.
- Electronic Frontier Foundation. 29 October 2007. <http://www EFF.org>.

- . 2008. The Betamax Case. <http://w2.eff.org/legal/cases/betamax/>.
- Fish, Stanley. 6 January 2008. Will the humanities save us? *New York Times*, <http://fish.blogs.nytimes.com/2008/01/06/will-the-humanities-save-us/>.
- Gibson, William. *Agrippa: A Book of the Dead*. <http://www.williamgibsonbooks.com/source/agrippa.asp>.
- . 2002. Introduction to *Agrippa*. <http://www.williamgibsonbooks.com/source/source.asp>.
- Godell, Tom. 1 March 2001. Bernstein live. *American Record Guide* http://www.accessmylibrary.com/coms2/summary_0286-10950492_ITM.
- Johns, Adrian. 1998. *The Nature of the Book: Print and Knowledge in the Making*. Chicago: University of Chicago Press.
- Kirschenbaum, Matthew G. 2008. *Mechanisms: New Media and the Forensic Imagination*. Cambridge: MIT Press.
- . (With Doug Reside and Alan Liu). 2008. No round trip: Two new primary sources for *Agrippa*. Agrippa Files Website <http://agrippa.english.ucsb.edu/kirschenbaum-matthew-g-with-doug-reside-and-alan-liu-no-round-trip-two-new-primary-sources-for-agrippa>.
- Kozinn, Alan. 7 November 1990. A music lovers' Mecca is closing. *New York Times*, <http://query.nytimes.com/gst/fullpage.html?res=9C0CE7DF1E3CF934A35752C1A9669548260>.
- Libsecondlife. http://www.libsecondlife.org/wiki/Main_Page.
- LOCKSS [Lots of Copies Keep Stuff Safe]. 2008. <http://www.lockss.org/lockss/Home>.
- Long, Jeffrey. 1999. Editor's note. *Semiotica* 125: 1–13. Special issue on notation systems.
- MacArthur Foundation. 29 October 2007. Intellectual property and the public domain. http://www.macfound.org/site/c.lkLXJ8MQKrH/b.943331/k.DA6/General_Grant_making_Intellectual_Property.htm.
- . Recent Grants. 29 October 2007. http://www.macfound.org/site/c.lkLXJ8MQKrH/b.1002695/k.9993/General_Grantmaking_Intellectual_Property_Recent_Grants.htm.
- The Man. Second Life Wiki, http://secondlife.wikia.com/wiki/The_Man.
- Manildi, Donald. 16 January 2008. Email to the author.
- McDonough, Jerome, et al. 2010. Preserving virtual worlds final report. <http://www.ideals.illinois.edu/handle/2142/17097>.
- McGill, Meredith. 2003. *American Literature and the Culture of Reprinting, 1834–1853*. Philadelphia: University of Philadelphia Press.
- Reuters, Adam. 14 November 2006. Outcry as “CopyBot” threatens copyright protection. *Reuters Second LifeNews Center* <http://secondlife.reuters.com/stories/2006/11/14/outcry-as-copybot-threatens-copyright-protection/>.
- Schwartz, Gary. February 1998. No fair: Long-term prospects for regaining unencumbered use. Toronto Town Meeting Program. College Art Association. <http://www.pipeline.com/~rabaron/ttm/SCHWARTZ.htm>.
- Stoppard, Tom. 1998. *The Invention of Love*. New York: Grove Press.
- Walsh, Tony. 11 September 2006. Another look at “Second Life” copyright issues. Clickable Culture, http://www.secretlair.com/index.php?/clickableculture/entry/another_look_at_second_life_copyright_issues/.
- . 10 June 2004. Drifting apart. Clickable Culture, http://www.secretlair.com/index.php?/clickableculture/entry/my_second_life_part_9/.
- Winner, Seth. January 2008. Phone interview with the author.

2

DESCRIBING DOCUMENTS

4

Digital Copies and a Distributed Notion of Reference in Personal Archives

Catherine C. Marshall

Some consider the ability to make perfect copies one of the primary advantages of digital media. Copies ensure the safety of digital belongings—they can be stored in many places simultaneously—as well as rendering individual items easy to share, access from mobile devices, and re-use. Digital creation relies on the facile production of copies: we often make a copy before we make any changes we consider controversial; we take dozens of digital photos of the same scene to get the picture we're after; and re-use is considered part of contemporary art. Copies are also an incidental by-product of standard practice; for example, we might download the same file multiple times, adding a new copy to the local file system each time we view a particular artifact.

Thus, as time goes by, our personal collections of digital media become rife with copies, exact, modified, and partial.

Is this proliferation of copies necessarily problematic? It may not be. A professional archivist may advise us to simply keep them all if there is any question about the nature of the variations or their importance. Differences can be noted and preserved. Computer scientists may give us the same answer for a different reason: storage is cheap, and de-duplication algorithms can eliminate irrelevant copies at any point in the future (see for example Fetterly et al. 2005, Hoad and Zobel 2003, or Shivakumar and Garcia-Molina 1996).

In the realm of personal archiving, however, these copies may introduce unanticipated difficulties. For ordinary people, benign neglect forms the linchpin of a pragmatic archiving strategy (Marshall 2008). That is, little sustained effort is applied to digital stewardship, and it's probably better that way. Digital belongings are simply kept (e.g., in a personal computer's

file system, on removable media, on a server, by uploading them to a social media service, or by using an extended combination of different types of stores) because it's too onerous to do otherwise. Furthermore, people are notoriously poor judges of what they'll want later in their lives, and they're not necessarily technologically savvy when it comes to choosing among formats and storage media.

In other words, in an era of multivalent communication (text messages, Twitter feeds, Facebook walls, email messages, Skype conversations) and promiscuous republication (on sites such as YouTube, Flickr, blogs, and so on), when transient forms have become permanent and artifacts have become too numerous to evaluate individually, *it is easier to keep things than to cull them*. It is rare for people to go through their digital photos one by one rather than dumping them from the camera's storage to a local folder, and picking out a few to name and share. It is rare to keep track of the proliferation of these items; it is easy enough to make another copy if one is needed.

Everyone has plenty of digital belongings—stuff we own individually or communally—and we store these assets wherever is convenient and suits our overarching purposes. We don't worry much about the copies we make, or their provenance.¹ We just store the stuff and plan to sort it out when need dictates with the idea that it'll be easy enough to find the thing that we want later down the line. The good copy will be stored in one of our caches of such files—we'll instantly be able to distinguish the in-focus photo from the out-of-focus version, and the one with red-eye reduction from the unretouched version—and we'll know exactly what we want when we see it.

Where, then, does the "real" or reference copy of any digital artifact reside? Which version(s) do we consider archival? How will we find this reference copy when we once again want it?

Of late, systems developers say things like, "the truth is in the cloud." What they mean is that today the real, authoritative version of the data is stored on the network, possibly in a centralized repository, and that all local copies are acquired by rationalizing them with the cloud-based copy. In the most familiar case, Outlook email works this way. Your local desktop and laptop computers may each have a copy of your Inbox, your calendar, drafts of your messages in progress, your address book, and so on. Newer versions of data (updated address entries, for example) make their way to the server-side storage, and eventually replace all of the local copies that have been rendered obsolete by the change. When you want an item, you don't need to think about where it is—the data is replicated and, if everything is working correctly, the authoritative version is wherever you are.

But does this distributed systems model reflect the real situation for all of our digital assets? Is the truth actually in the cloud?

We might want to hedge our bets. Distributed systems research tells us that even when we rely on the authoritative or reference copy of the data that resides on network servers, the copy with the most recent updates—in some sense, the “truest” copy of the data at a given point in time—may be somewhere else, on a cell phone or on a personal laptop; of course, under the proper conditions in a replicated systems architecture, the updated copy will eventually propagate to the network store, and then to the various local copies.

But evidence from the field shows us that something else, something far more radical, may be happening in the face of imperfect replication, manual copying (the usual state of affairs), an ecology of many interacting systems and applications, and the social use of digital data: *the authoritative copy of any of our personal digital belongings is spread among many stores, and what we regard as the authoritative, archival digital item, the one we want to keep (possibly forever), has become essentially decentralized.* In other words, although it is possible to identify the digital original and all of the copies that have been derived from it (using timestamps and watermarks, for example, to trace the production of a digital original and all of the copies derived from it, or by adhering to standards that implement a more complete notion of digital provenance), it is not necessarily straightforward to point at the copy that we want to keep.

How does this happen? Many serious amateur photographers would identify the digital original as the version in the camera’s native RAW format that was stored on the camera’s memory when the photo was taken. But if pressed, the photographer might allow that there are important enhancements above and beyond the digital original that she might want to consider as part of the original: the metadata she has added, the reactions her peers have contributed to the photo-sharing site where she published the photo, the annotations her friends have made explaining and describing the photo, and the content modifications she has made (e.g., if she has cropped the photo) to express her artistic intent. These enhancements, spread among different copies of the photo, all represent changes she’d want to save (or use as a basis for producing further copies). Thus it becomes less clear which copy is the authoritative one and which store holds it.

We might characterize this situation as one of distributed authority or decentralized reference, although most people don’t acknowledge it as such. At first glance, it does not seem particularly problematic, and people choose a copy in the abstract to consider as authoritative. For example, they might think of the copy on their desktop computer, the version managed by an application designed for this purpose, as the one that is the version they would back up and archive.

There’s plenty of evidence that reveals this simplification to be a think-o.² One manifestation appears as people fall victim to circular reasoning: “I don’t

have to worry about the copy of this photo that I've stored in a network service—I have the authoritative copy on my local disk drive." At the same time, the person might also be thinking: "I don't need to back up my local drive. All of the important photos are out on the network, where I've put them to share them." But the problem is much worse than that. What's really happened is that the version on Flickr has the best descriptive metadata; the version on DeviantArt has the best photographic metadata; both shared copies have attracted valuable (and not-so-valuable) comments and annotations; the version on the camera's flash card is the only one at full resolution; and the version on the local disk is the one to which transformations have been applied to "correct" the base photo (i.e., rotation, cropping). Some transformations are best thought of as archival only in the abstract: a better red-eye reduction algorithm might come along in a couple of years, and that would be the one the photographer ultimately wants to apply in lieu of the original correction.

In short, the way we work with and share digital media, documents, and datasets has left us with complicated notions of which copy is the reference copy. To return to the systems developers' perspective: The truth is not in the cloud; rather, the truth is a cloud.

To tease out the nuances of how copies complicate our personal archives, first I will discuss some of the reasons that people copy files, and will chart an observed case of copying in practice. This evidence in turn is used to form the foundation of a taxonomy of copies that builds on existing abstractions such as the model presented by Currall, Moss, and Stuart (2008), with the pragmatic aim of ensuring we handle the observed cases. I will conclude with a brief look at the implications of these stored copies, both in terms of technology development and in terms of stewardship.

WHY PEOPLE COPY FILES

People copy files for a variety of reasons. All copies are not created equal; they are often created with different purposes in mind, and these purposes guide the degree to which the copies are identical. There are at least five reasons people copy files: 1) for use on different personal devices; 2) to share or publish the files; 3) to back up the files as part of a "best practices" IT regimen; 4) to create a permanent archive of digital assets; and 5) to reuse the content without modifying the original.

Why should we care about the various motivations behind the production of digital copies? After all, the result is more or less the same, or so it seems. But if we look more closely, each form of copying has different consequences. For the sake of this argument, we'll concern ourselves with two kinds of copying in particular: copying files to use them on different personal devices (say, on a desktop computer, a laptop computer, a

phone, and an MP3 player), and copying files to share or publish them. It is these two reasons for copying files (or more generally, any kind of digital items) that are the most apt to lead to interesting types of diversity and—potentially—useful convergences as the different copies are brought back together.

When copies are spread across devices, it is usually to edit (or simply use) the content itself rather than its metadata. We usually (but not always) want these content changes to propagate so that all devices end up with the most current version of the object. In systems research, we refer to this cycle of replication, change, and synchronization as achieving *eventual consistency* (Ramasubramanian et al. 2009). That is, we would like all of the copies to end up in sync again after editing has taken place.

Ideally, the replication and synchronization of files is managed by a systems infrastructure that uses some combination of specialized metadata and/or logs to control the propagation and reconciliation of different versions. For example, systems such as Cimbiosys (Ramasubramanian et al. 2009), Ficus (Guy et al. 1990), PRACTI (Belaramani et al. 2006), Perspective (Salmon et al. 2009), and EnsemblBlue (Peek and Flinn 2006) all implement mechanisms and protocols to replicate and synchronize items among devices. Further research takes into account the differences in object fidelity required by different devices and different use situations; for example, Polyjuz (Veeraraghavan et al. 2009) allows users to maintain parallel stores of objects at different fidelity levels.³ Meanwhile, as systems research progresses, field investigations of these mobile devices in use reveal that people often synchronize the devices by hand, primarily because they don't quite trust the outcome of the automated replication processes (Dearman and Pierce 2008).

This lack of trust can't be attributed to bad software; usually the software works in a predictable way. More often trust breakdowns arise because it's difficult to match operation semantics and human expectations. Although simple operations follow a carefully articulated set of rules—deletes propagate, for example, so that deleting an object on one device has the expected outcome of deleting it from the corresponding data stores on every device—people are often less than delighted with the outcome of inter-device synchronization. Furthermore, to people with different backgrounds, the whole process is unpredictable and uncontrollable: synchronization is more or less magic. As with other aspects of computing, *things just happen*. Thus people take the management of copies across different devices into their own hands. Smaller-scale synchronization processes—say, between an iPod and a Mac, mediated by Apple's iTunes software—are used (and are useful), but they exist in isolation, and don't extend further than they absolutely must. Automatic synchronization is regarded with skepticism and is tolerated rather than celebrated.

This propagation of versions is further complicated when changes come into conflict. That is, if one copy of an object is edited on device A and another copy is edited on device B, the conflicts need to be resolved. Sometimes conflict resolution is simply a matter of merging the changes. For example, if I've edited the introduction to a paper on device A and you've edited the conclusion on device B, it's pretty obvious how the conflicting changes may be resolved: the new copy should have my introduction and your conclusion, although the resulting version of the paper may no longer make sense. Likewise, if red-eye reduction has been performed on a photo on device A and rotated 90 degrees on device B, it is easy to resolve the conflict by combining the operations. On the other hand, if you and I edit the same passage on the two devices, or rotate the photo in different directions, manual intervention may be required to resolve the conflicts.⁴ This model of eventual consistency (wherein changes to copies of a collection propagate throughout a network) and the need for conflict resolution mechanisms drives aspects of distributed systems research.

Thus replicating files among one's own mobile devices introduces a set of thorny problems as the content of the parallel files potentially diverges and must be reconciled.

On the other hand, copying a file to share it or publish it is apt to lead to other issues as metadata diverges, and other content changes are made that are not intended for propagation to all copies (e.g., content resolution is reduced). When files are shared or published, descriptive metadata may be added to reflect the needs and interests of the audience (e.g., tags and captions may be added to videos or photos); social metadata also accumulates as the digital object develops a life of its own online (e.g., viewers may add ratings or comments; the service itself may keep track of the viewers' characteristics—where they are from, or more commonly, the number of viewers a particular online object attracts).

The content changes that accompany publication or sharing are usually different from those made when copies are replicated among one's personal devices, which is why people don't necessarily think of the published copies as archival. Resolution may be reduced to conserve either storage or bandwidth or both. Changes may be made for the sake of intelligibility or privacy (e.g., a photo may be cropped or an email response may be quoted to remove the personal portion of the correspondence). Hence we see different kinds of derived files being produced.

Publication—even informal publication to the cloud—is associated with fixity (Levy 2001); inter-device replication is associated with fluidity and changing content (see for example Ramasubramanian et al. 2009). The reverse is often true for metadata. The idea of replicating content among devices is to arrive at consistent metadata (reconciliation is part and parcel of synchronization). Table 4.1 summarizes this tension between the reason

Table 4.1. The Effect of Copying on Content and Metadata

	<i>Inter-Device Replication</i>	<i>Publication and Sharing</i>
<i>Content</i>	changes ideally propagate and are reconciled among copies (so they are eventually consistent)	changes usually propagate in only one direction (to the publication site)
<i>Metadata</i>	metadata converges (by design)	metadata diverges

the files are copied and the effect this motivation has on content fixity and fluidity as well as metadata accumulation and divergence.

Deriving a Pragmatic Taxonomy of Copies in Action

To investigate the effect of copying digital content, it may be productive to look at a real-world example. About three years ago, I interviewed an animator who had just finished art school in southern Taiwan. Taiwan was not her homeland, so while she was a student, she published a widely read blog about her life and adventures, emphasizing cultural differences and her experiences exploring the Taiwanese countryside. In addition to personal journal videos reporting current events and describing sights she'd seen, she included short animated works in her blog.

Let's look at one of these animations, a music video, focusing on how she published and shared it, how she and others reused it, and how she tried to protect herself against the vagaries of digital storage. Earlier she had lost a series of podcasts because a social media site (primary storage for the large audio files) had gone out of business abruptly, without adequately warning its users; this experience made her wary, and prone to store extra copies in various hospitable places on the Web. We'll also consider the copies that turned up in different places, reused by others.

The animated work I have selected for this example, *Satellite*, was produced as a music video to go with a song by one of her favorite bands, The Motion Sick. The band liked the video enough to reuse it to promote their music.

For our purposes, I'm going to divide the music video into three different kinds of data: 1) the primary data, which consists of the video itself and all derived forms (e.g., individual frames stored as still images) and different versions of the content; 2) descriptive metadata used by the artist and other publishers to characterize the video (e.g., tags, narrative, structured attribute-value pairs); and 3) social metadata, the structured and unstructured metadata (e.g., number of views, comments, and ratings) that accumulated as the music video was used on a variety of sites.

First let's examine three important aspects of the primary data (the content). The first is *versions*. In this case, the band published an earlier

(preliminary) version on their website to whet the appetite of their fans; this version was not maintained once the final version of the music video became available. The second is *variations*. Variations are published in parallel, rather than being replaced.⁵ Finally, there are *derived forms* such as the photos and thumbnails.

During our interview, the artist said that she made copies to protect herself from loss. As of this writing, there are at least ten full copies of the video on social media sites; three of the copies are variants that include 10 seconds of title frames and credits.⁶ A 3:06 variant is found under the artist's name on the Internet Archive in three different formats (QuickTime, Ogg Video, and MPEG4); an identical video is found on YouTube under the artist's name (and stored with her other videos); a third identical video is found on Google Videos (playable from the site, but downloadable in MPEG4); and yet another copy is found on awnTV (a video site devoted to animations). The 3:15 variant is copied on three sites, and seems to be primarily used and propagated by the band. This variant is on the band's MySpace site, on YouTube under another identity, tubetubetube99, and on Facebook on the Motion Sick's fan page. There is also an earlier version of the video on the band's website; it is stored on a temp directory, so there is some evidence that the band intended to replace it.

If we consider the artist's intent—sharing and saving her short film—the nine complete copies are comparable (albeit in different formats, which may involve lossy transcoding operations) even though they are not the same. It would be easy to reproduce the segment that renders them inexact copies or to reverse the transcoding operations.

Table 4.2 compares the descriptive metadata for the seven different sites where the ten videos are stored. The animator's multiple online identities are consolidated as *artist*, and the band's online identities are referred to as *band*. A human viewer can readily ascertain that a) these are copies of the same video, with and without the short title/credits sequence; and b) they were probably uploaded by two different entities, one on behalf of the artist (likely by the artist herself) and a second on behalf of the band. Only one of the sites gives the viewer the ability to contact the artist directly, and only one of the sites (a different one) gives the artist's complete identity. Two of the sites readily support downloads (and therefore, the creation of new copies); the others only support embedding.

The descriptive metadata differs, implying that it was re-created each time the music video was uploaded, presumably to reach the sites' distinct audiences: fans of the band, who are directed via a URL to the band's website; fans of the artist, who might want to know what the video is about ("an epic battle between good and evil"); and fellow animators, who might want to know how the artist made the video ("made using 2D computer animation, cut-outs, a little bit of Google Sketchup"). Two of the content stores

Table 4.2. Comparing Metadata on Seven Websites Where Music Video Is Stored

<i>ID</i>	<i>Site (Depositor; Creator)</i>	<i>Description</i>	<i>Tags/Keywords</i>	<i>Thumb-Nails</i>	<i>Social Metadata</i>
C1–C3	Internet Archive (<i>artist; artist</i>)	A short music video featuring members of the Motion Sick fighting evil forces. Please visit the band's URL.	music; music video; music videos; the motion sick; motion sick; satellite; taiwan; misadventures in taiwan; rock; rock music; band; animation; cartoon; experimental; indie satellite; themotionsick; musicvideo; music; rock; indie; sketchup; animation; cartoon; cutout; cutouts; instruments; flash; taiwan	7 frames grabbed at 30-second intervals	870 downloads; no reviews; no rating
C4	YouTube (<i>artist; artist</i>)	An epic battle between good and evil. Music by The Motion Sick (band's URL). The rotating cube portion in the middle was made with Google Sketchup.	satellite; themotionsick; musicvideo; music; rock; indie; sketchup; animation; cartoon; cutout; cutouts; instruments; flash; taiwan	NA	11,397 views; 4 comments; 3 ratings (5 stars)
C5	YouTube (<i>band; artist</i>)	The Motion Sick's music video for the song "Satellite" made by animator Gem.	The Motion Sick; motion sick; satellite; gem; animation; aliens; battle; fight; space	NA	2,390 views; 1 comment; 2 ratings (5 stars)
C6	Google Video (<i>NA; artist</i>)	Music video of the song Satellite by The Motion Sick (band's URL) made using 2d computer animation, cutouts, a little bit of Google Sketchup (the rotating cube portion in the middle of the song).	NA	15 frames grabbed at 15/20-second intervals	NA

(continued)

Table 4.2. (continued)

<i>ID</i>	<i>Site (Depositor; Creator)</i>	<i>Description</i>	<i>Tags/Keywords</i>	<i>Thumb-Nails</i>	<i>Social Metadata</i>
C7	MySpace videos (<i>band; artist</i>)	A music video for The Motion Sick's song Satellite by Gem.	indie; music; rock; Star; the; video; Wars; motion; Sick; Space; satellite	NA	46 views; no comments rating 92%
C8	awnTV (<i>artist; artist</i>)	A music video made for the band The Motion Sick. It features the band members in an epic battle between good and evil. Animated with cutouts.	NA	NA	3 votes; no comments; 3.33/5 rating
C9	Facebook (<i>band; artist</i>)	The Motion Sick's "Satellite" Music Video by Gem (videos), 3:15; http://www.themotion sick.com ; http://misadventuresintaiwan .googlepages.com/films .	NA	NA	(not accessible to non-fans—probably the main active locus for social metadata)

use automatically derived thumbnails as a reduced representation of the video's content.

The tags, which presumably tell us a bit about how the depositor expects the video to be accessed, overlap, but again reveal that there is more than one audience for the video. In fact, they reveal yet another audience: the regular readers of the artist's blog. They refer to everything from the material's genre, to the band's and song's name, to the blog's name, to the story told in the video, to the animation technique and tools used.⁷

The social metadata—the ratings, comments, and popularity, for example—differs. The artist has indicated that she's interested in such feedback (she's responded to some of the comments, has submitted the video to juried sites, and has said in interviews she attends to such things). Evidence shows that she is slowly accumulating this social metadata. But is it all equal? Differences in audience (does a view from a fan of the band matter as much as view from one of her own fans or from a peer?) and accessibility (some of the hosting sites are less popular than others) make aggregation of the values less straightforward than it would initially appear. The (sparse) comments on the two YouTube sites reveal that the single comment on band's channel—"This is a cool band"—is directed to the band. Or is it? The comment was made by *iluvuartsynerd*, who is also a video-maker, albeit in a different genre. It is easy to see how social metadata has an organic form, shaped by media genre and audience; it is less straightforward to evaluate its utility.

Many of the sites that refer to the video—the artist's own blog, for example, or podcast directories—embed the video content from another storage location. Videos are necessarily large and difficult to move around; thus a video stored on several sites like this one is apt to have many more references to it than actual copies. These references may provide considerably more descriptive and social metadata than the storage sites, since they rely on the strength of this metadata to attract viewers.

I have used the rankings of two popular search engines, Google and Bing, to gather a set of sample copies of the video and references to it. There are no doubt many more than I have collected, but it is impractical to document all of them, and the sense of how they diverge is adequately conveyed by the smaller sample. One of the sites has six different references to the video, without acknowledging that they are duplicates or near duplicates, since it is likely they are de-duped by eliminating references to the "same" video (that is, videos taken from the same URL). Table 4.3 shows some representative metadata that is used by these copies-by-reference. In some cases, the artist has added the reference to the site; in other cases, someone else (the site's owner, the band, or a fan of the artist or the band) has added the video and created (most of) the metadata. As before, the social metadata accretes and is contributed by a number of different viewers.

Metadata-only copies are cheap, and there is considerable motivation to make them. Table 4.3 illustrates some of the different purposes for this kind of copy. First, both the animator and the band have creative impetus to circulate copies of the video among their fans (existing and prospective); this would account for the band's website (see R1 in Table 4.3), as well as their Facebook, livejournal, and MySpace entries. These are sites curated by the band and their fans. The animator curates some of the by-reference sites (see R2) herself. These are minimal, but allow her to direct viewers to the "real" sites and to accumulate social metadata. The artist maintains a blog, which she copies manually as backup (see R9). Other copies were produced for special purposes, for example, to enter them in animation festivals (see R7); although these copies seldom provide access to the actual video, they often have authoritative metadata, including the artist's full name and production information that there is less incentive to include on the more informal sites.

Of more dubious value are the additional metadata-only copies produced by fans, viewers, or commercial sites which hope to draw attention and attract advertisers. For example, six metadata-only copies of the music video reside on a single commercial site,⁸ each originating from one of the sources shown in Table 4.2; the metadata has apparently been scraped directly from the source site.

Finally, one last type of copy to consider is a *derived form*. In this case, the artist has published stills from the video on several different sites as independent artistic works. Derived forms are neither versions (e.g., the early form of the video, now removed from the band's site) nor variants of the work (e.g., the transcoded forms on the Internet Archive, or the band's 3'15" music video); rather, they take some other form with different characteristics.⁹

Table 4.4 summarizes two examples of derived forms using their metadata. One—a still—was stored in Deviantart, an art sharing site, and other stills were stored in Zoomr, a photo sharing site for professional (or serious amateur) photographers. By her own description, the artist also maintains a Flickr account, but has not published the stills there. The copies cross genres to reach another audience.

At first glance, that the information offered by this accumulation of copies skews toward different audiences seems insignificant. From the film festivals, we find the artist's full name and where she went to school; from the band's websites, we learn more about the relationship between the artist and the band and about the video's topic; from the artist's sites, we learn more about the techniques she used to make the video. The stills give us insight into the portions of the video that the artist likes the best, or at least finds the most distinctive. From the fact that the music video is stored in so many places, we discover that both the band and the animator value

Table 4.3. Example Copies Using Embedded Content

<i>ID</i>	<i>Site (Depositor)</i>	<i>Stored</i>	<i>Description</i>	<i>Tags/Keywords</i>	<i>Links</i>	<i>Social Metadata</i>
R1	The band's website "The Motion Sick" (<i>band</i>)	C5 (YouTube)	"Satellite" music video by Gem.	NA	Archive.org videos v2	NA
R2	Gem's animation archive (<i>artist</i>)	C4 (YouTube)	Music video made for The Motion Sick; animated with cut-outs, photographs, and Flash, 3 minutes 05 seconds, 2006. Title: "Satellite" (<i>Satellite</i>) Category: Panorama; Director: Gem Urdaneta; Producer: Animation Institute; Animation: combination; Country: Taiwan; Production Year: 2006; Duration Time: 3'05"; Synopsis: A music video for the Boston based band The Motion Sick, featuring the band members in an epic battle between good and evil.	animation, films, moving images, cutouts, music, stop motion	YouTube v1; the band's website	no comments
R7	ReAnimacija Festival (<i>artist</i>)	(no embedded version)	Title: "Satellite" (<i>Satellite</i>) Category: Panorama; Director: Gem Urdaneta; Producer: Animation Institute; Animation: combination; Country: Taiwan; Production Year: 2006; Duration Time: 3'05"; Synopsis: A music video for the Boston based band The Motion Sick, featuring the band members in an epic battle between good and evil.	NA	NA	NA

(continued)

Table 4.3. (continued)

<i>ID</i>	<i>Site (Depositor)</i>	<i>Stored</i>	<i>Description</i>	<i>Tags/Keywords</i>	<i>Links</i>	<i>Social Metadata</i>
R9	Blogger MIT (<i>artist</i>)	C4 (YouTube v1)	Satellite (a music video) 12-31-2006 update: Hooray! Satellite's been selected as part of "music videos and advertising" for the 2007 Festival Bimini in Latvia! (here's the link—scroll down, until you see "original title: Satellite/Country of origin: Taiwan." that's the one!). Satellite (music by The Motion Sick) (I made this from September to October 2006) [also 6 thumbnails, grabbed manually].	animation, podcast, video	Bimini Festival, YouTube v1; Google video; Internet Archive (QT version) Thumbnails link to full size screen shots in zoomr	6 comments (2 are responses from the artist)—note that these are copies from the original blog

Table 4.3. (continued)

<i>ID</i>	<i>Site (Depositor)</i>	<i>Stored</i>	<i>Description</i>	<i>Tags/Keywords</i>	<i>Links</i>	<i>Social Metadata</i>
R10	The band's livejournal fan site (band)	(no embedded version)	Also don't forget about our video: We'd like to offer you a secret glimpse at our upcoming music video for "Satellite." There may still be some buttons to push and some levers to pull to complete it, but animator Gem has helped us to recount the events that occurred recently in our battle against an evil rogue planet to save the Earth. See the latest version here and let us know what you think: http://www.themotionsick-satellite.mov . (Video is gone; link points to the top level page for the band; this one is signed by band member Rock.)	NA	The band's website	none

Table 4.4. Two Sites with Derived Forms (Frames the Artist Has Selected from the Video)

<i>ID</i>	<i>Site</i>	<i>Title(s)</i>	<i>Refers To</i>	<i>Caption</i>	<i>Tags (Union)</i>	<i>Social Metadata</i>
D1	Deviant Art	Satellite	Google video	The third one was made from September to October of 2006	NA	32 deviations, 15 comments, 1621 pageviews
D2	Zoomr (gem)	Screenshot from Satellite (by 6)	YouTube v2	Screenshot for my latest video	{misadventuresintaiwan, screenshot, animation, drawings, works} by 6; {themotionsick} by 3	Views 527, 497, 328, 376, 352, 229

the film. Certain information (where and when the film was produced) is verified by the apparently independent metadata used to describe it. By the same token, we can infer that other metadata isn't necessarily reliable since it has simply propagated from site to site.

To make something of these distinct entries—to aggregate and verify the description, or to offer a summary of the social metadata, which is sometimes duplicated and sometimes independent—we would need to be more methodical and algorithmic in our gathering and harvesting.

Let's look, for example, at the tags. Tags are associated with many of the copies I gathered (including the derived forms). In aggregate, the video has 172 tags, many of them duplicate or non-normalized forms of the same tags. If we normalize the tags (e.g., consistently using the singular or plural form; using spaces to delimit words in multi-word tags; and using a single tag for the band's name), we find thirty-seven unique normalized tags, only nine of which are used more than six times: animation, motion sick, misadventures in Taiwan, satellite, rock, music, cutout, indie, music video.

Would we be doing a service or a disservice were we to aggregate the tags (as, say, part of an archiving process)? Some are relative to the audience. That the video is part of the artist's blog series, *Misadventures in Taiwan*, may be useful to fans of the artist's blog, but not the band's fans (nor in some cases to other artists, who may only be interested in the artist's animations and not her personal diary podcast entries). That the band, The Motion Sick, provides the music for the animation may not be relevant to the artist's peers, and perhaps not even to her fans. The techniques used in the animation, including cutout, are probably of greatest interest to the artist's peers; others might not even be aware of what this technique entails. On the other hand, that the genre is an animation indie rock music video and that the music video's name is *Satellite* is probably of greater interest to the general indie music audience—perhaps even including people who are looking for new music in a genre they enjoy—than it is to people familiar with either the artist, the band, or both.

This, then, is the puzzle: how do we arrive at the version of the content and metadata that we wish to archive? It's not just a case of conflict resolution (for the content) and metadata aggregation (for the published objects). Figure 4.1 breaks down observed copy practices used to propagate the digital content. If a copy consists of the digital media plus the metadata associated with it, and the digital media is either the literal object (i.e., a copy of the bits) or a surrogate (i.e., a pointer to where the bits are stored), copies can either be exact (the bits are identical), derived (made from the object), or a near copy (e.g., several photos of the same scene taken in quick succession so that it is difficult to tell one from the other). Derived copies may be transcoded (derived by an algorithmic process) or manually edited (derived by human intervention). Transcoding may be reversible or lossy

example action

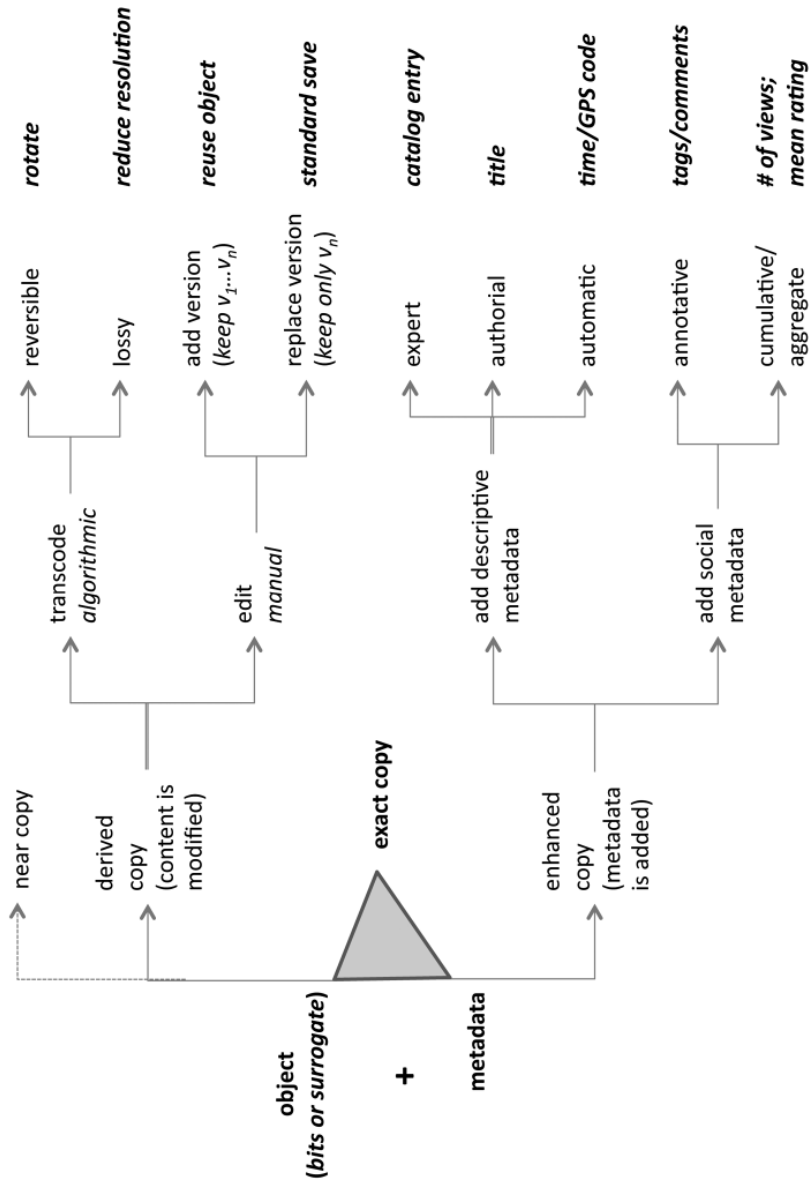


Figure 4.1. Observed copy practices.

(e.g., resolution may be reduced in a copy made by uploading media to a social networking site). Edited copies, which by definition result in a new version, may either *replace* the old one (as Microsoft Word does when a file is saved), or form a set (additional versions are kept).

If metadata is doing its job, it enhances the value of the digital object. Thus we'll refer to a copy with added metadata as an *enhanced copy*. For the sake of keeping things simple, this metadata may describe the object, or it may fulfill a (sometimes vague) social role (e.g., it might be a rating or review). Descriptive metadata may be contributed by the author, by an expert (e.g., a cataloger), or by an automated process (e.g., a Global Positioning Sensor may contribute geographical coordinates, or a clock may contribute the time). Why make these distinctions? After all, we can easily think of examples in which the author is an unreliable source for the object's description, or cases in which a sensor has yielded inaccurate data. What these distinctions hope to tease out is the *anticipated value* of the added metadata and to suggest what we might want to do with it from an archival perspective.

Thus, the purpose of this simple taxonomy is not to split hairs, but rather to suggest modes of archival processing, given how copies are made in the first place; what people do with them; and the think-o that was introduced early in the chapter (that the digital original is on local storage and the backup is in the cloud, or vice-versa). The graph is intended to illustrate ways in which its two branches may be traversed independently to pair stored content with autonomous instances of the metadata (growing out of a surrogate, for example). It is also meant to stimulate thinking about how copies came about (e.g., are they the result of irreversible or lossy transformations?); breaking down the cases this way allows one to make decisions about whether the parent node or its child is archival, and to consider the ways in which people actually handle versions (sometimes they are only interested in the most recent version; infrequently, it makes sense to keep an ordered set of evolving versions). Then we can begin to articulate heuristics for combining metadata according to its source and characteristics.

CONCLUSION

Copying or otherwise replicating digital material to keep it safe is an intuitive and reasonably effective personal archiving strategy; it is a strategy that is not limited by discipline or technological sophistication. Yet the results of this seemingly simple method are far-reaching. Long-standing concepts such as authenticity, authority, and reference must be rethought. Similarly, personal archiving technologies must be designed with copies in mind.

Distributed reference copies and decentralized authority. The primary aim in gathering copies of a digital object from the services and websites on which they are stored is to illustrate an effect: *the copies take on lives of their own*. It would be fairly straightforward to develop criteria to identify authoritative instances that may serve as reference copies or useful kinds of metadata to harvest from these copies. Although some of the metadata outcroppings are intended for a particular audience, others are general, and might be useful permanent annotations for the digital media. In the case developed in this chapter, either the band or the artist (or both) may be interested in saving some of the music video's social metadata (the comments, ratings, or view numbers the video has accrued over time).

Figure 4.2 maps out the music video's lineage, starting from three abstract entities: the artist's original video; an early version of the video; and the band's original video. That the artist and the band each refer consistently to one version of the video or the other—the artist refers to her version without titles and the band refers to its version with them—indicates that these versions have developed parallel authority. In other words, there is neither a single version of the content nor a single locus of metadata that serves as the reference copy.

This case helps illustrate that it is necessary to decentralize authority given the way people manage copies of published material. Not only are there parallel versions of the video; the artist has also created two blog entries, informal copies of one another (the copies were produced manually) that describe the video. Some of the metadata on the original version of the blog (referred to as MIT V1 in the graph) and realized as R17 has been copied over to R9, R16, and R19. Dotted lines in the figure indicate virtual copies; that is, R3 and R10 (early versions of the music video), and R7 and R18 (the copies the artist has submitted to competitions) are immediately available for download (or even to watch), although all four are reasonably good sources of metadata or of evidence.

A Preservation Strategy: Mixed-purpose replication of digital objects has some odd effects on digital stewardship. Most people haven't thought through which version of a valuable file they would like to keep, and therefore need to maintain. The principle of benign neglect dictates that you simply keep all the files, and hope that at least one of them survives. In this case, the artist and band are both maintaining parallel versions of the video in multiple places with the implicit (or, in the artist's case, stated) aim of digital safekeeping. In an interview with the artist, she told me that she would like to save the entirety of the content that R17 represents for a long time,¹⁰ but

the problem is i've hosted it in my school's free space for students [and] they delete the sites of students who've graduated [so] it might get deleted

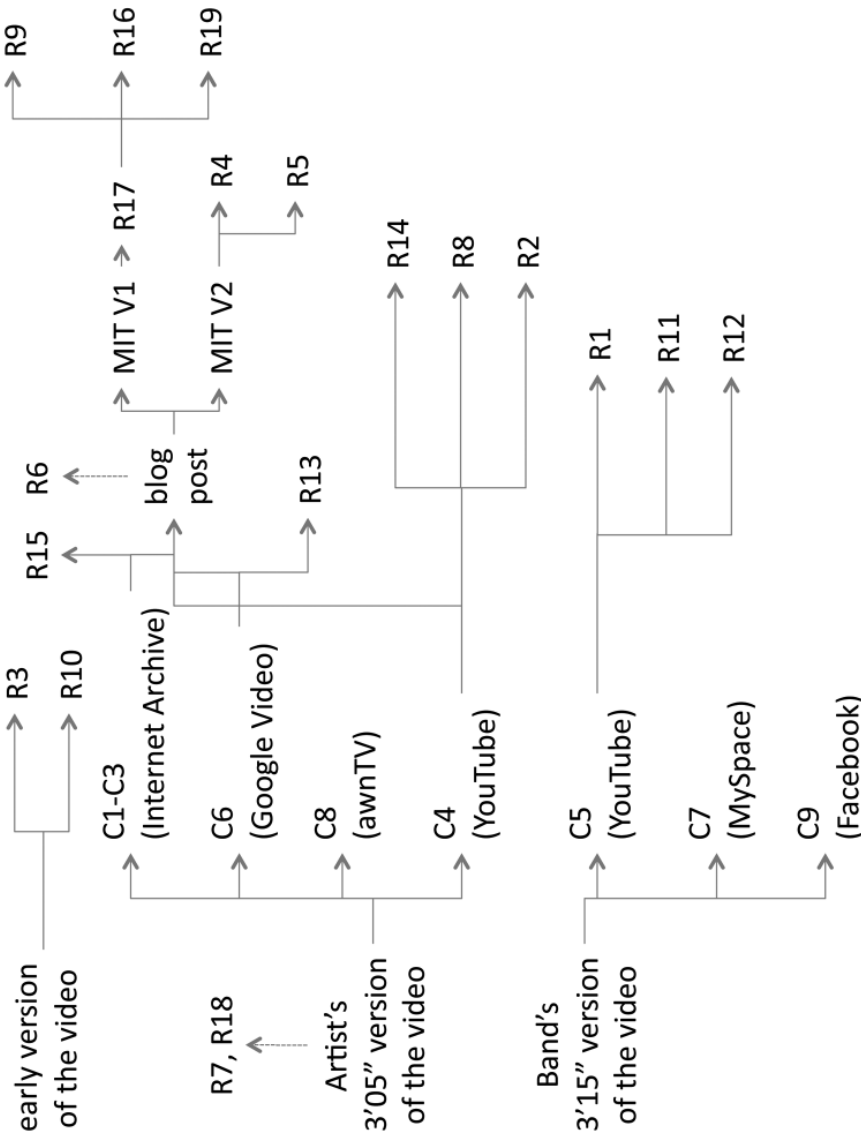


Figure 4.2. Where the copies came from (MIT stands for Misadventures in Taiwan, the artist's blog).

soon¹¹ . . . I've backed up my videos on youtube, and the links to blog posts on Wordpress.com. The thing is many people have already bookmarked this page. . . . I guess i can move them, like migrate the blogger page to a free blogspot page, but there are many things that will go wrong so now I'm just procrastinating . . . but now I have a semi-backup, misadventuresintaiwan.wordpress.com.

She realizes that she's backed up many of the components of R17 (including the video), but she's concerned about her interactions with other peoples' archives, and the content she has archived by way of R5 (her Wordpress blog) is inexact and that her archiving method is, in her words, "nonscientific." Other content that she had archived in the past on a cloud service, coupled with a copy on removable media (burned to a CD), proved to be disastrous when the service was taken offline without warning (as the company failed) and she lost the CDs. Although she continued to use the same strategy—burning DVDs and storing the files in the cloud—after she lost the first batch of files, she became relatively more cautious, making multiple copies in the cloud instead of relying on a single service.¹²

One other aspect of this case worth noting is that the purpose of the artist's archive changed over time. Initially her intent was to save her blog, which centered on a popular series of audio podcasts chronicling her adventures as a student in rural Taiwan.¹³ As time went on—and as she reached the end of her MFA program—she transferred the emphasis of her archive to an online portfolio of her animation work.

A Long-Term Retrieval Strategy: What happens when you look for an object stored this way (as a loosely connected set of copies and near-copies)? As time progresses, it is easy for us to forget just how many copies we've stashed away, where we've put them, and the differences among them. It is also easy for the copies to get away from us (McCown et al. 2009) and to accumulate troves of social metadata, some valuable, some not.

In the absence of a centralized archive and intentional archiving services, search engines (as they work today) are apt to return some combination of the most visited copy (often the copy with the richest metadata) and the copy that is the most common link destination. But is this the copy we'd most like to see? Moreover, if there were a centralized archive, would we be willing to give up all of the metadata that has accumulated on the non-archival sites after the archival copy has been safely tucked away?

Information retrieval research began developing de-duping algorithms once it was faced with the problems introduced by untidy corpora (e.g., see Shivakumar and Garcia-Molina 1996). That is, the original test corpora used to develop information retrieval techniques and algorithms did not factor in copies or near-duplicates. The corpora were tidy affairs, unlike the pastiche of real data sources that even then existed in the real world. Then the pendulum swung in the other direction: the assumption behind most

search engines was that not only did copies exist, but also that we wouldn't want to see them, that we'd want to be spared the messiness of real data stores.

In the long term, we will not only want to see copies, but we'll also want to harmonize them, to harvest their metadata, to select among them. Instead of relying on a simple notion—the truth is in the cloud, embodied as a single reference copy—we will want to expand our sense of what is entailed by the notion of a reference copy and turn to a distributed, social model.

NOTES

1. Neither professional archivists nor computer science researchers have ignored provenance (for example, see Muniswamy-Reddy et al. 2006); however, mechanisms to maintain provenance have generally been omitted from commercially available operating systems, probably because the overhead of such bookkeeping has been considered unwarranted.

2. A think-o is the conceptual equivalent of a typo.

3. What this means is that, for example, an address book record in your email may use many fields to describe an entry; the comparable record on your cell phone may only store a small subset of these fields. Or a photo may be high resolution on your desktop computer and lower resolution when it is stored and displayed on your digital photo frame. A mechanism is used to synchronize changes to the parallel stores.

4. Thousands of person-hours may be sunk into automatically reconciling concurrent changes. Microsoft Word has such a facility that attempts to integrate the concurrent changes made to individual copies of a document.

5. It's easy to see parallels in other endeavors. For example, in scholarly publishing roughly the same ground might be covered in a technical report, a conference paper, and a journal article. None supersedes the others. The technical report might have pseudocode that wasn't published in the other two forms; the conference paper might be an important stake in the ground, published considerably earlier than the journal paper; and the journal paper might have an evaluation section that is a substantial contribution beyond the results reported in the conference paper.

6. There may have been other copies of the full content, but for this example, we'll focus on the six that were easily found using search engines. The artist may have additional copies on old computers and on removable media.

7. It goes without saying that the example illustrates the need for a mechanism to normalize the tags (Guy and Tonkin 2006).

8. They are referred to later in the chapter, in Figure 4.2, as R11–R16.

9. As a practical definition, the derived form *can* be produced by the source form, but the other direction (constructing the full animation from the few frames) would not be possible.

10. R17 is the digital original of the artist's blog, coupled with the copies of the video she has stored on the Internet Archive.

11. It is interesting to note that R17 is still in place at the time of this writing. The artist has not been affiliated with this institution for at least three years.

12. She refers to them as “half-copies” because she is unable to store all of the content on the same server.

13. It might be interesting to know if the artist has considered asking her listeners if they have stored her published files so she can get those she values back. Unfortunately I did not pursue this line of questioning.

REFERENCES

- Belaramani, N., Dahlin, M., Gao, L., Nayate, A., Venkataramani, A., Yalagandula, P., and Zheng, J. 2006. PRACTI replication. In *Proceedings of the USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pp. 59–72.
- Currall, J. E. P., Moss, M. S., and Stuart, S. A. J. 2008. Authenticity: a red herring? *Journal of Applied Logic* 6, no. 4, The Philosophy of Computer Science, December 2008, pp. 534–544.
- Dearman, D., and Pierce, J. 2008. It’s on my other computer!: Computing with multiple devices. In *Proceedings of CHI 2008*. New York: ACM Press, pp. 767–776.
- Fetterly, D., Manasse, M., and Najork, M. 2005. Detecting phrase-level duplication on the World Wide Web. In *Proceedings of SIGIR 2005*. New York: ACM Press, pp. 170–177.
- Guy, M., and Tonkin, E. 2006. Folksonomies: Tidying up tags? *D-Lib Magazine* 12, 1.
- Guy, R. G., Heidemann, J. S., Mak, W., Page, Jr., T. W., Popek, G. J., and Rothmeir, D. 1990. Implementation of the Ficus replicated file system. In *Proceedings of the Summer USENIX Conference*, pp. 63–71.
- Hoad, T. C., and Zobel, J. 2003. Methods for identifying versioned and plagiarized documents. *Journal of the American Society for Information Science and Technology*, 54, no. 3, pp. 203–215, February 1, 2003.
- Levy, D. M. 2001. *Scrolling forward: Making sense of documents in the digital age*. New York: Arcade Publishing.
- Marshall, C. C. 2008. Rethinking Personal Digital Archiving, Part 1: Four Challenges from the Field. *DLib Magazine*, 14, 3–4.
- McCown, F., Marshall, C. C., and Nelson, Michael L. 2009. Why websites are lost (and how they’re sometimes found). *Communications of the ACM*, November.
- Muniswamy-Reddy, K., Holland, D. A., Braun, U., and Seltzer, M. 2006. Provenance-Aware Storage Systems. In *Proceedings of the 2006 USENIX Annual Technical Conference*, Boston, MA.
- Peek, D., and Flinn, J. 2006. EnsembleBlue: Integrating distributed storage and consumer electronics. In *Proceedings of the 7th Symposium on Operating Systems Design and Implementation (OSDI)*, pp. 219–232.
- Ramasubramanian, V., Rodeheffer, T. L., Terry, D. B., Walraed-Sullivan, M., Wobber, T., Marshall, C. C., and Vahdat, A. 2009. Cimbiosys: A platform for content-based partial replication. In *Proceedings of the USENIX Conference on Networked Systems Design and Implementation (NSDI)*. Boston, MA.

- Salmon, B., Schlosser, S. W., Cranor, L. F., and Ganger, G. R. 2009. Perspective: Semantic data management for the home. In *Proceedings of the 7th USENIX Conference on File and Storage Technologies (FAST)*.
- Shivakumar, N., and Garcia-Molina, H. 1996. Building a scalable and accurate copy detection mechanism. In *Proceedings of the First ACM International Conference on Digital Libraries*. New York: ACM Press, pp. 160–168.
- Veeraraghavan, K., Ramasubramanian, V., Rodeheffer, T., Terry, D. B., and Wobber, T. 2009. Fidelity-aware replication for mobile devices. In *Proceedings of the ACM Conference on Mobile Systems, Applications and Services (MobiSys)*. Krakow, Poland.

5

Organization as Expression

Classification as Digital Media

Melanie Feinberg

For most people, the word *classification*, if it connotes anything at all, conjures up a sensation somewhere between mild boredom and a gnawing unpleasantness. A mysterious anxiety-ridden dream, perhaps, of an older woman with hair pulled into an extreme bun, every tendril controlled, admonishing that the book in your hand on DNA profiling methods belongs in RA 1057.55 (public aspects of medicine—forensic medicine—DNA), not K 5465 (criminal procedure—DNA evidence), and no more silly mistakes of that sort, dear. Classification systems seem arbitrary, meaninglessly complex, and old-fashioned, not especially relevant to the dynamism of today's malleable information landscape. If one can call any particular classifications to mind—perhaps the Linnaean taxonomy of animals—they seem like fossils, somehow disgorged from nature instead of being man-made, relics of arcane academic interest, perhaps, but not alive or adaptable to one's current concerns. Classifications might have passing interest as intricate, brittle antiques, but not as strong or flexible tools for managing massive, constantly mutable information flows with the kind of customization or power that we've grown to expect from search engines and other modern information-management techniques.

If we strip away the preconceptions brought by distortions of classifications past, however, it is equally possible to see the general process of classification—the description, grouping, and arrangement of objects—as a particularly apt form of creative expression for the digital environment. Classification, for example, provides the conceptual infrastructure by which scattered information resources are brought together under a particular interpretive frame and made accessible to others. It is the selection, representation, and categorization of resources, I suggest, that propels the communicative

force of your Facebook profile, of your Flickr photo database, of your blog's annotations upon other networked information sources. Through classification, you implement the filter of curatorship upon the vast expanse of Internet data, and in this way classification provides the basis for a growing set of network-based communicative artifacts. In this perspective, while classification still involves the revelation of underlying structure that characterizes and links both physical and conceptual objects, it is less a scientific enterprise than, as Jack Andersen suggests, extending the ideas of Lev Manovich, a cultural form (Andersen 2008).

It is possible, in other words, to consider classification as a form of digital media. In this chapter, I explicate this assertion of relationship and show how it forms a manifesto with implications for the creation and use of information systems. I also consider how the interactions between a classificationist's goals for rhetorical expression and a user's information needs can constitute a productive crucible for innovative design.

CLASSIFICATION DEMYSTIFIED

A *classification* is a structure for grouping, describing, and relating objects. Classificatory structures go by many names—taxonomies, classifications, ontologies, metadata schemas, information architectures, controlled vocabularies, systematic bibliographies—all of which involve core functions of description, categorization, and relation. While there is a common perception that classification mandates the imposition of an inflexible, and thus inevitably tenuous, order upon every object in the universe, most classification is limited and contingent, applicable only to a particular set of entities in a specific context, with the order that it suggests merely one interpretation among many possibilities. Too, as regards the general process of classification, there is no necessary requirement, at least if one is not bound by restrictions of single physical manifestations, that any entity appear in only one category (although, since one goal of classifying is to emphasize distinctions between groups, too much cross-classification typically dilutes the utility of any organizational scheme; if *all* your Web bookmarks are “useful,” then the meaning of that category becomes uncertain, and the description may not provide much expressive power). To be sure, some classificatory forms do have strict rules associated with them: a true hierarchy, for example, takes the shape of a tree, beginning with a single root node whose children are derived based on a single principle of division at each level (for example, with the root node of Animals, the first principle of division is the presence of a backbone, and the children are vertebrates and invertebrates). Characteristics are inherited down the branches, so that one can be certain, for example, that all mammals, being also vertebrates,

have a backbone; and all dogs, being mammals, have both hair (from being mammals) and backbones (from being vertebrates) as well as particularly shaped teeth (from being dogs). Placement of entities in multiple classes is thus frowned upon in true hierarchies, as this would imply some sort of contradiction, as in both having a backbone and not having one.

The type of restrictions mandated by true hierarchies, when implemented, enable various useful properties in a classification, as in the ability to use relationships to make logical inferences about entities in certain classes (for example, because wolves, dogs, and coyotes are in the same branch of the hierarchical tree, we might infer, if we were to meet a coyote on a lonely mountain trail, that its mode of attack might be similar to a dog's, based on their shared physical characteristics, and we might fear its teeth). But classification itself, as a basic activity, does not necessitate these sorts of constraints. In some contexts, such as the characterization of living things by their physical properties, rigid structural rules and relatively clear demarcations of category boundaries are both useful and possible to implement (although probably with more difficulty and flexibility than many people might initially think, as Umberto Eco notes in describing the categorically ambiguous case of the platypus). In many contexts, though, object properties are both delightfully and woefully ambiguous, and our attempts to design systems that organize and arrange them may aspire to a limited pragmatic utility, perhaps even a flickering sense of illumination, but not to the permanence of truth.

For example, the goal of the Dewey Decimal Classification is merely to arrange books on shelves in smaller libraries in a way that facilitates browsing for the general library patron, so that, for example, the materials about physics (530s) are next to chemistry (540s) and someone interested in atomic properties can productively scan the stacks for pertinent resources in both areas. In the way that it includes, labels, and relates its categories, the DDC formulates some particular interpretations of the subjects that it describes, some of which we may find helpful, and others that we may disagree with, some that match our own way of viewing the world, and others that do not. But the classification aims to help library users find books, not to dictate a grand, falsifiable model of the world's knowledge in which every concept has precisely one correct place (Miksa 1998). By selecting, describing, and arranging its books, the library as an institution creates the library as an artifact, the structure of described and organized resources that are made accessible to the public. The patrons of the library are readers not only of the books, but also of the library itself. Just as we don't always agree with everything we read—in fact, we may derive the most benefit from documents that differ from our current way of thinking—we don't need to agree with the way that a classification organizes objects in order to find it useful or interesting.

The point here is to illustrate the limitations and possibilities of all classificatory structures, whether they are developed by individuals or institutions, whether they are longstanding or ephemeral, whether they attempt to corral libraries full of assorted documents, the chemical elements, or your astoundingly eclectic music collection. All classifications have some motivating purpose, and accordingly they describe and label categories in certain ways, emphasize some characteristics at the expense of others, and select only a small subset of possible relationships to depict. In describing the competing interests at work as the scientific community debated the best place in the Linnaean taxonomy to add the dinosaur, Rebecca Bryant (2000) notes that even scientific classifications may reflect personal and political agendas, that while they may accord with natural evidence, they are also motivated by specific interests and situations. In other words, a classification is itself something to read and interpret, just like the documents or other entities that it arranges. A classification isn't merely a container for documents; it is a type of document. Take this very book, for example: if the constituent chapters were arranged and described differently, wouldn't the character of the overall volume, and even of each component chapter, be changed, perhaps subtly, perhaps significantly?

CLASSIFICATION AS DIGITAL MEDIA

The idea of a library, as structured through its classified resources, being a form of artifact to read and interpret, is of course equally true for a digital library, or any type of resource database. If you've used PubMed, the online database of the U.S. national library of medicine, to access articles from medical literature, you've also been reading PubMed itself, as structured through its controlled vocabulary, MeSH (the Medical Subject Headings). If you've searched JSTOR, the non-profit archive of scholarly journals in the social sciences and humanities, you've also been reading the form and structure of the JSTOR collection. JSTOR, for example, enables browsing by discipline, and one can select fields such as African American Studies and Film Studies, or Library Science. Why Library Science as a category and not Library and Information Science, or Information Studies? In the circles I run in, this apparently innocuous bit of categorization and description could be seen as a political statement in favor of traditional views about the discipline: that it should continue to emphasize the library context, instead of branching out to encompass all information-related phenomena and institutions. To any reader of the database, even one not steeped in academic controversies, such descriptive choices, in conjunction with other category definitions, labels, and relationships, and combined with the assignment of resources to each category, work together to provide an interpretive frame through which the database contents are filtered.

While a classification or organizational structure need not be digital or involve digital resources, the potential of the networked world to create, store, and aggregate documents or information resources goes hand in hand with the need to develop and scale new organizational structures to manage and make sense of these data masses. In turn, the digital environment enables an explosion of possibilities for the design of new types of classifications and means by which categorized resources are arranged and presented, revealed to system users. It also enables those “users” to themselves more easily be information system designers, creators of accessible information repositories, or, even more easily, creators of organized citations to network-accessible resources, or designers of metadata installations.

It’s easy to think how you or anyone might invent quite original and creative means to organize the physical collection you have selected for display via your office bookshelves: arranging your books to display your intellectual lineage or development, or to argue for your current pet idea (for example, that critical theory has a place within information studies), or to show how you, despite being a professor and a classificationist, still have a sense of the cool (see how I put Umberto Eco’s *Foucault’s Pendulum* on the shelf with the *Anglo-American Cataloging Rules*? They’re both about description, see? Isn’t that cool? I am pretty cool!), and so on. However, just as with the physical library, the books in your office are embodied objects that can only be placed in one order at a time. You can certainly arrange the books with multiple descriptive attributes (metadata), ordering by color or length or level of verbosity to suit your whim, and if you are extremely industrious, you can even imbue a linear order with multiple characteristics, organizing your tomes by subject and language and author, for example (first all of the art history in English, then the art history in Italian, then the biochemistry in German). But you can’t reshuffle your categories easily, and you can’t put a single book with essays about music, art, and literature in multiple spaces on your shelves. Moreover, because of differences in size and form, it’s difficult to mix media in your display; although you might want to showcase the similarities between a DVD, a few flimsy journal issues of disparate sizes, some books, and a videocassette, it’s not so simple to place all of these together in a clear physical arrangement along with other disparately shaped items.

However, just as with the artifact classes we are perhaps more commonly used to defining as media types—text, still images, music, moving images—organized collections that describe, arrange, and collocate a selected universe of resources have the potential to become quite different sorts of objects in the digital world. In a digital implementation, I can organize by multiple attributes at once and rearrange automatically, and I can put any resources in as many categories as makes sense. In digital form, it is also much easier to create, publish, and access such documents. To browse your bookshelf, I have to

go to your office. To access your bookmarks, I don't have to go anywhere, and neither do you, when you are selecting, organizing, and publishing them. Moreover, to create a digital collection, one doesn't need to own a physical copy of each resource, just a network-accessible address to the item's location. While the communicative impact of a traditional printed bibliography may be blunted by the potentially laborious task of locating and accessing each item of interest, a digital bibliography—that is, a curated arrangement of online resources, described with key metadata and annotated with critical commentary—enables instant access.

CLASSIFICATION AS CREATIVE EXPRESSION

Within information science, the design goals of classifications and other organizational structures have focused on user-directed acts of retrieval and question answering; information systems, from bibliographies to databases, have been conceptualized as tools for locating known objects rather than as communicative artifacts for interpreting and discovering ideas. To create useful finding instruments, the standard thinking goes, designers of information systems need to describe documents consistently in ways that match how information seekers are most likely to look for those resources. If information is described in a manner seen as outdated, biased, or idiosyncratic, that has the potential to impede accurate retrieval, and it is likely problematic. If someone is looking for information on physical activities to increase flexibility and strength, they should be able to find all such activities in the same place: Pilates, yoga, and so on. If Pilates and yoga are grouped together, so that even if I search for yoga, I may also become aware of Pilates, then we have a useful tool, an organizational structure that accurately reveals the relationships between subjects, and I, as a user, have some measure of control over the chaotic mass of information lurking out there in databases, in digital libraries, on the Internet. I have isolated the pertinent information from whatever structure it might be housed in; I have lifted a diamond out of the muck of the mine. (And this, incidentally, is where search engines lack the potential contextual awareness of a curated, organized collection; full-text retrieval will not relate concepts unless document creators use the words that indicate each concept in their texts.)

But if information science has tended to be interested in the efficient extraction of diamonds, I have to confess that I have become an enthusiast of the muck. No doubt the more typical goal, of creating organizational schemes to facilitate the efficient extraction of just the right knowledge from the world's information messiness, of answering questions clearly and "objectively" in just the way I expect, with nothing extraneous—is a noble one, with a long history. Indeed, the nineteenth-century Belgian classifica-

tionist Paul Otlet, creator of the horrendously complex Universal Decimal Classification, sometimes described as “Dewey on steroids” and still in use in European libraries, fervently believed that by classifying knowledge accurately and completely, he could engineer world peace (Rayward 1994). If you are an optimist it makes sense that perfect information leads to perfect understanding, and so to political harmony—but to me, this goal has always seemed both impossible and a little pallid. It supposes that information seekers view both individual documents and the systems that make them accessible merely as repositories of (true or false) facts, of interest only for the raw data they might provide, and not at all for the means by which any information is shaped, styled, and structured. It’s a drab existence if we don’t value a text for the enjoyment and perhaps inchoate insight it may bring, in addition to the informational evidence it might provide. But if the kinds of things that we are more used to identifying as documents—books, articles, images, videos, songs—convey meaning, utility, and pleasure beyond the facts that they contain, then the repositories that hold these resources also have the potential to express ideas, to be surprising, amusing, even illuminating. (While information science has been slower to embrace such ideas, archivists and museologists have begun to acknowledge the rhetorical inevitabilities of systematically described and arranged collections, as in Duff and Harris 2002, and Cameron and Robinson 2007.) Moreover, this expressive potential of information systems is a property that might be exploited and appreciated. If we want to keep the gemstone analogy but ascend from the mucky underground, we might think instead of the infinite variation of jewelry settings, and how each carefully crafted necklace or ring can transform the way we see the collected stones that are integrated into the design. Not every setting is to our taste; some settings fall out of fashion and seem outdated and ugly. But a well-made, original necklace can make us appreciate even flawed jewels, the artistic sensibility of the maker spurring a reappraisal of the raw materials.

More often, however, when the communicative aspects of information systems are acknowledged, the goal is to identify and suppress these characteristics as a form of bias. A variety of commentators throughout the information science field have noted the difficulties involved in attempting to classify anything in a manner that will consistently be viewed as objective, accurate, and useful, as a true model of reality removed from any underlying social and political context (for example, Bowker and Star 1999; Beghtol 2001). As numerous critiques of various descriptive paradigms have repeatedly noted, today’s accurate representation of the world’s knowledge becomes tomorrow’s unanticipated bias (Olson and Schlegl [2001] review subject-access critiques in library catalogs, for example). Many critics of established classifications have pointed out, for example, how that darn Dewey Decimal Classification religion class has eight primary categories

for Christianity and one for all other religions, and the Internet pundit Clay Shirky used this classificatory snippet as part of his rationale for why established classifications are inevitably incorrect and ultimately not worth the effort they take to produce (Shirky 2005). A generous assessment would call the interpretive frame expressed via the Dewey religion classes a historical remnant of the nineteenth-century America in which the classification was initially constructed, in which religion for most library patrons was primarily defined by Protestant Christianity. More pointed critiques would say that the DDC (now on version 22, so it's not like it's never changed) characterizes religion in a way that's outdated, biased, and just plain wrong.

I wholeheartedly endorse the critical spirit that motivates such analyses of existing classifications. The application of rigorous skepticism is an important aspect for the systematic reading of any document, including information systems. Many commentators on information systems, however, still yearn for the ideal of a neutral, objective representation of concepts, and their critiques are propelled by a sense that rooting out the "biases" they uncover will "fix" the systems they investigate (as, for example, Sanford Berman's classic 1971 critique of the Library of Congress Subject Headings). If a classification has been tainted by virulent subjectivity, then it needs to be altered to fit reality. The DDC's religion classes need to more fully represent the religious diversity that characterizes our current society because that better reflects the objective state of the world. While I might agree with the goal of creating a classification that endorses tolerance by providing more categories for more religions, I find the justification here flawed. This type of perspective supposes that we don't just prefer some jewelry settings over others, but that some jewelry settings are false. While we might have a variety of cogent arguments to support our preferences which make use of social, moral, political, and personal perspectives, reaching for the grail of unbiased, objective representation seems misguided, as accusations of bias can easily cut in opposite directions. (In the current American political climate, for example, such arguments fuel accusations of "reverse racism" and calls to rescind affirmative action.)

In contrast, I would say that the DDC, or any classification, is not problematic if it expresses a point of view on the subject matter that it organizes. Indeed, there is no way it can avoid doing so. The problem is that when the DDC, or any classification, is not forthright about its position, when it doesn't acknowledge its own rhetorical effects, when it hides behind an assumed tool-nature to avoid coming to terms with its document-nature. The DDC, or any representational system, cannot be reduced to a type of hammer, and designers of such systems need to recognize and take responsibility for the communicative aspects of their creations. Of course, one could attempt to limit the purview of the classificatory enterprise to encompass only those characteristics that could be the most objectively determined.

One could choose to organize a set of documents by the number of characters they contain, or by the precise date and time of creation, or other attributes that seem consistently and reliably measurable. (Creation date can actually be quite complicated if we leave open the possibility of continuous revision, but we'll leave that aside.) Still, however, our "objective" organizational scheme has nonetheless applied its own form of interpretive frame on the documents; we've asserted that the important characteristics of description are those we can express with the most agreement and consistency in definition. We are indeed making some statement about brevity and freshness as document attributes, whether we have some explicit rhetorical goals in that direction or not. And we are certainly expressing a preference for the quantifiable and measurable as the means by which relationships are drawn between information entities.

If acknowledging the rhetorical aspects of information collections implies increased responsibility on the part of designers, however, it also suggests a corollary responsibility for system users. Information seekers need to acknowledge their equal role as readers of system-documents. As readers, users of information systems need to question, and not blithely accept, the collocation of, say, children's comic books with graphic novels, characterizing this classificatory element as some technical side-effect, perhaps inconvenient but without meaning. Indeed, this relationship might indicate a variety of judgments upon the material: that visual media are less serious than text-based media; that, perhaps due to this perceived inconsequentiality, for visual media, form is a more important signifier than content or theme; and so on. The "user" must be active, critically engaged, and expect to be challenged in his or her thinking.

And, indeed, to my mind, this is a responsibility that both users (or readers) and designers (or authors) should welcome. We should relish the opportunity to confront, explore, and enjoy systems of organization that differ from those we might instinctively gravitate toward ourselves. The interest and pleasure of looking at your bookshelf, be it physical or virtual, comes partly from its difference from my bookshelf. In fact, it's the potential for a classification to embody a unique perspective, or interpretation of the subject matter that it organizes, that to me enables the possibility of more radical discovery, innovation, and creativity. If I discover the digital library of Yoga as a Way of Life, which, through the way that it selects, organizes, arranges, and makes available its collected documents, advances an argument that yoga is not merely a physical practice, that it is nothing like Pilates, that it, in its comprehensive form, encompasses spiritual, mental, and physical aspects that cannot be easily separated without losing significant parts of its character—even if I don't agree with that interpretation, even if I think that I can experience and enjoy the full potential of yoga merely by vigorously contorting myself in a hot room, my idea of yoga has

potentially been expanded, and this library, this set of resources arranged in a way that creatively communicates a particular interpretation of yoga and what it means, has worked itself as a type of document, an interactive expression that is, to me, an increasingly common and important form of digital media. The explosion of so-called social software is to me an explosion of organized, collected citations working as a new form of writing, of a reanimated bibliography as document for the networked age. Facebook? Bibliography of friends, framed to convey a certain idea and arranged for expressive display. Blogroll? Potentially, manifesto via systematically arranged citation.

DESIGNERS AND USERS: PRODUCTIVE TENSIONS

So far in this chapter, I've contended that information systems are communicative artifacts with rhetorical goals. Moreover, I've also claimed that the online environment facilitates the aggregation and access of disparate resources and their description via multiple characteristics, and also enables the flexible rearrangement of collections. These properties work to promote the creation of collections-based digital media of increased complexity, originality, and expressive power, through the agency of both traditional information-providing institutions (such as libraries, archives, and museums) and of the general citizen hoping to share insights by creatively filtering the continually growing onslaught of network-accessible information. Furthermore, I've argued that the acknowledgment of such qualities in information systems necessitates a certain responsibility on the part of both designers and users: designers need to be forthright about the rhetorical effects their systems produce and about their own communicative goals for design, and users need to approach information systems as documents to read and evaluate, as suggestive interpretations rather than neutral models. Then we can all be happy readers and writers in a multilayered universe of metadata-fueled documents, exploring numerous potential visions of the world's resources through filters of expressive bibliography. It's my own Habermasian version of an information utopia!

But what about the goals, activities, and perspectives of various user communities? Within the frame I've laid out, doesn't power reside mostly in the writer? Haven't I essentially said that it's okay for a library that uses the Dewey Decimal Classification to effectively endorse Christianity, as communicated through the DDC's organization of resources about religion, as long as the library is honest and open about it, if it acknowledges and accepts the responsibility associated with adopting that position? While I've also said that the library patron should be encouraged to criticize the viewpoint expressed via the collection, is that really acceptable? Shouldn't user needs

and preferences be more explicitly taken into account, especially when considering institutions, such as libraries, archives, and museums, that have enjoyed historical power to regulate information access? Jonathan Furner (2009) suggests that information seekers have an affirmative right to access materials by means of the seeker's own vocabulary, arguing that any system of organizing information should match the way that a particular user currently sees the world (and similar calls have been made in archival science and museum studies: that archives and museums should better represent the descriptive preferences of marginalized groups). If, for example, I describe my academic field as information science, then the JSTOR database should be structured so that resources that I define as "information science" are labeled as such and grouped together in a way that I expect, given my self-determined identity as an information scientist, and not described as "library science" or "knowledge management" or "documentation." If, however, I were to define my area of study as "library and information science" or "information studies," I should be able to locate appropriate materials with those descriptions as well. Furner's goal, I believe, is noble, and in a way similar to Otlet's vision of world understanding through accurate classification. Access to information is a form of power, and if people are prevented from finding and using information because the resources they need are cloaked in an unfamiliar, perhaps even hostile interpretive frame, that constitutes a significant social problem, particularly when the means of organization are pervasive, endorsed by institutional authorities (such as libraries and their use of standard schemes such as the DDC). Who is any system designer/author to impose a foreign way of thinking upon people whose need for information may be urgent? Can't that form a cornerstone of systematic oppression?

But does that line of reasoning also mean that if I am a committed advocate of the scientific method, either as an individual or as an institution, such as the National Science Foundation, which believes it is ethically untenable to describe intelligent design as a form of scientific dissent to evolution, that I have to enable supporters of intelligent design or creationism to access information about evolution as "just a theory," as its adherents claim? Wouldn't doing so imply some endorsement of the legitimacy of that position on my part? There is a conflict here between my rhetorical goals as a system designer, or author, and between the information needs of a potential user community, or the existing vocabulary of a particular audience group. How are these competing perspectives to be negotiated? Whose goals take precedence, and by what justification? On the one hand, I want to be able to share my own ideas, in the spirit of learning, discovery, and debate, and to see that activity as a potential instrument of liberation. On the other hand, descriptive power seems to be equally able to enforce domination.

My approach to this dilemma is to focus once again on the information system's character as a communicative artifact, as a document, and on making those rhetorical properties more salient. It is rare, in information systems design, to systematically and purposefully consider the way that any particular system forges an interpretation of its subject matter, and to create designs that candidly seek to advance a determined position on the materials being collected, organized, and made available to some defined public. For example, the traditional means by which semantic judgments are determined when creating controlled vocabularies and other schemes for organizing information involve the designer's selecting only the form of authority that the scheme should faithfully reflect; the most common is "literary warrant," in which decisions about which concepts to include in a classification and the meaning and form of those concepts are determined based on the terms used by authors in the collection being structured (Hulme 1911; Beghtol 1986). If, for example, scholarly books and articles use the term "information" to describe the basic phenomenon under study in the field of "information science," and this term is distinguished in the literature from "knowledge," "data," and "documents," then all those terms should be specified, defined, and related in a resource collection as they are used by authors. Other forms of warrant include user warrant (the ways a system's user groups define and label concepts) and cultural warrant (the same for the larger culture). In discussions of traditional design methods, the role of the designer is merely to compile a set of categories and associated relationships based on the selected warrant (Soergel 1974; Aitchison, Gilchrist, and Bawden 2000). In practice, however, it is not so easy to discern the structure mandated through any selected warrant. There are not merely several schools of thought, or identifiable discourse communities, within a particular discipline, for example, as Birger Hjørland and Hanne Albrechtsen (1995) suggest; debates and ambiguities are common even when experts discuss basic phenomena in their fields, such as "information" within "information science" (Buckland 1991; Meadow and Yuan 1997; Floridi 2002; Bates 2006, among many others). Inevitably, the designer of an organizational scheme must bring his or her own judgment to bear on the way that categories are defined, described, and included. However, this crucial aspect of design is not well characterized. Marcia Bates (1976) is one of the few to find this omission problematic. In proposing that systematic bibliographies, or subject guides, should incorporate their own specifications into the final product, Bates endorses a position similar to that I have been advocating here. Bates claims that "it is not enough to say that a bibliography is on trees if it in fact has been defined to include shrubs, or if it is meant to cover only material on tree species and not to cover ecology of trees." In other words, who decided what the scope and extent of the subject should be, and what rationale was used to make that

decision? Indeed, Bates asks, “is it not absurd how little information reference sources provide about themselves?” The designer’s status as an author, as opposed to a compiler or documenter, is submerged, and thus the designer’s responsibility to identify and justify a coherent position in relation to a selected audience is also not recognized.

If an information systems designer accepts the mantle of authorship, however, then the basic activities associated with rhetorical production—formulating a cogent argument, using various modes of evidence to support the argument, tailoring the argument’s content and structure toward identified audience values—become necessary aspects of the design process, and they need to be explicitly and forthrightly addressed. As with the creation of any rhetorical document, authors must identify and implement persuasive strategies that carefully consider the audience’s current views on the subject at hand, or the document will fail to advance the position. In accepting the document nature of information systems and their own status as authors, in other words, designers can no longer shift decision-making responsibilities to other authorities (the “literature,” the “users,” and so forth). They need to accept their power.

To use that power effectively, designer/authors need to honestly examine both their own rhetorical goals and the current values, beliefs, and feelings of their intended audience (or user group) toward those goals. While the common view of rhetoric is that it involves some level of nefarious manipulation in which unsuspecting, naive recipients are led to agree with opinions contrary to their interests, the determination and application of persuasive strategies need not adopt a dastardly character. In fact, I would argue the opposite: that there is potential in more actively taking on the roles of author and audience, as opposed to designer and user, to increase respect and understanding between the parties. There is a tendency, which I have often observed as a practitioner in the fields of technical communication and information design, for well-meaning teams of user experience professionals to portray “the user” as a formless other who is far removed from the designer’s own experience. Countless times, I’ve heard variations of the idea that a system should be designed so “your mom” can automatically understand it, using “your mom” as a signifier for someone whose lack of experience requires a patronizing simplification of system features. Never mind the fact that no one would think of their actual mom in such terms—my mom, for example, was a school principal who managed a staff of hundreds with an efficiency that I could never hope to master—“your mom,” or “the user” is almost inevitably an infantilized, reductive concept. Within this perspective, systems are rarely conceptualized as vehicles through which competent, if perhaps initially inexperienced, users might gain new knowledge and skills. Occasionally an attempt is made to sketch more vivid, realistic accounts of various potential users via devices such as

personas or scenarios (Pruitt and Grudin 2003; Carroll and Rosson 1992). However, in actual practice, these tools are used with much less rigor than is proposed by the researchers who describe them. Instead of using personas to craft succinct yet lifelike portrayals of potential users based on extensive research data, for example, user experience practitioners cobble together a set of stock attributes that end up creating further distance between designer and user, instead of facilitating actual understanding.

However, it seems more difficult to encourage someone to consider a position they do not currently hold toward a subject if one characterizes them primarily via stereotypes and platitudes. You may wish to instruct the audience by means of a rhetorical argument, but you also need to court them, to demonstrate how their goals and yours align—or in the words of the literary critic Kenneth Burke, who developed a model of rhetoric as courtship, to show how author and audience are *consubstantial*. Burke elaborates that:

A is not identical with his colleague, B. But insofar as their interests are joined, A is *identified* with B. Or he may *identify himself* with B even when their interests are not joined, if he assumes they are, or is persuaded to believe so. . . . In being identified with B, A is “substantially one” with a person other than himself. (Burke 1969, 20–21)

Again, some may catch a slight whiff of the unsavory with this idea, that B, the author, is deluding A, the audience, into recognizing a false relationship that is against A’s interests. Rhetorical tools, such as the construction of ethos, or a believable authorial character, are morally neutral; deception is possible. But I suggest that the rhetorical *process*, if approached with care, sensitivity, and honesty, has the potential to engender both sympathy and respect between author and audience. If the author looks upon the audience as an equal partner in argumentation, then it becomes more readily apparent that rhetorical success is difficult to achieve without some significant understanding of audience goals and values. One cannot hope to persuade a mass of formless others to change their current position on a topic via generic truisms. Not that platitudes can’t form a persuasive rhetorical argument—of course they can! But even platitudes must be accurately aligned with audience beliefs if they are to succeed. The formless other must be allowed to take firmer shape. The digital environment, I think, facilitates this recognition, too: while, as various contributors to this volume have emphasized, the empowerment potential of the online universe, for consumers to become contributors, may be overblown to some degree, nonetheless that potential is there, and barriers to reciprocal authorship have been lowered. The knowledge that any audience comprises a multitude of potential authors provides yet another stimulus to approach information system design as if one were joining a complex, many-faceted

debate. Incidentally, though, I do not mean to imply by this that all participants in such dialogues may have equivalent standing, although determining what merits authority is a difficult question. But I am often quite happy to be guided by those with superior, complementary, or just plain different expertise; this can be a powerful means of learning and discovery. As a mundane example, when I go to the salon, I want a stylist who will use his or her skills and experience to provide interesting suggestions for a cut; I've got no clue what actually suits me and no sense of new developments in fashion, let alone the vocabulary to structure any vague images I might have. But if the stylist can explain and teach me, then I can begin to participate in the conversation, and we can both come to a shared understanding of the new me to be formed under the shears.

To make this discussion less abstract, I offer an extended anecdote based on a personal design experience in which I took on the role of author/designer with clear rhetorical goals for an information system. I wanted to explore, in the vein I've been explaining here, the potential for systems of organized documents to act as communicative devices. In particular, I focused on examining how it is that a classification is able to persuasively convey its perspective on the subject matter that it is organizing or more generally, how it is that classifications are able to be persuasive through the employment of what structural elements. So, for example, I described ways that some existing schemes of organization are able to marshal evidence with which to make rhetorical arguments, and I looked at ways that classifications can display a unique authorial voice and how that works as a persuasive mechanism. Once I had characterized some of the means by which classification systems can communicate persuasively, I then wanted to use this understanding in design. So I created some prototypes, two information systems to make available documents on the subject of vegetarianism. In one prototype, I tried to design an environment that argued for vegetarianism as a moral imperative. I called this prototype *The Ethical Vegetarian Resource Library*. In the other prototype, I tried to convey the argument that, when considering all potential costs and benefits of the position, vegetarianism just makes sense; it's the logical lifestyle choice. I called this one *Flourish: The Vegetarian Way*. As I began prototype design, I was interested in designing a particular form of digital artifact in order to exploit what I saw as its expressive properties. I wanted to create a form of the artifact that was creative and potentially challenging, yet ultimately cogent and persuasive, and that potentially used new combinations of structural elements to expand the boundaries of the form.

At this point, I was so focused on my goals as an author, I wasn't sure how the explicit consideration of user needs would help me in the creative process. To be sure, I was interested in rhetorical effects, and so I had to think about the audience I wanted to address and its projected values and

expectations, but I wasn't really sure what that meant in practice. I was thinking, for example, more about the thoughts my audience might have for the subject in the abstract, and not much about the context of goals and activities through which my audience might initially approach my prototypes: the kinds of information they might want or expect to find, for example, and how those needs might complicate or complement my own communicative purpose.

Given time and resource constraints, I had grudgingly (and warily) decided to employ the tools of user personas and scenarios as an initial envisioning exercise to think about the overall experience of how the organized collection would be made accessible, be revealed to its audience—and not just immediately on its categories—and so forth. I had misgivings about these tools, to be sure, and I wasn't quite sure what would happen with them, but I nonetheless needed some systematic means to explore different ways in which my communicative goals as an author—to express my position on a subject—might interact with the particular situations of different audience groups.

So I devised relatively detailed portraits of three characters, Jason, Mabel, and Lucy, and tried to imagine how they might come to these two information systems—the Ethical Vegetarian Resource Library, and Flourish: the Vegetarian Way—and how they might interact with these collections and experience the arguments that I would present through the organization of resources and so forth. As soon as I began this exercise, I realized that my initial ideas for selecting and describing information resources would not address my characters' immediate tasks, and that my nascent rhetorical strategies, devised without sufficient consideration of the audience's equally powerful desire for access to certain types of information in particular ways, were doomed to fail, even if the intended audience might be sympathetic to my position at some abstract level. In other words, if I did not consider those needs and the means by which to fulfill them, I would not be able to accomplish my primary goal of creating a persuasive interpretation of the subject matter. I would not come close to persuading these folks to consider the ethical necessity of a vegetarian lifestyle.

When I imagined my personas, Jason, Mabel, and Lucy, whom I had conceived as a group of non-vegetarians with some moderate to negligible interest in eating less meat, I could not see them arriving at the Ethical Vegetarian Resource Library with no other goal than to experience it, as I had initially, naively, imagined ("I will present my views, and the audience will just arrive with open minds, and I will show them a new way of thinking!"). I could see Lucy, for example, a middle-aged woman with high cholesterol and some extra pounds, who was interested in generally becoming healthier, wanting some easy and satisfying vegetarian recipes. However, based on my rhetorical purpose alone, recipes would not be central to my

arguments, and so would be deep within the site's structure, if they were there at all. I imagined Lucy getting very confused browsing through the top levels of the collection: Moral Standing of Animals? What does that mean? Compassionate Conduct? That sounds nice, but what does it have to do with eating vegetables? What about basic advice for eating less meat and cooking penne with eggplant? Living as an Ethical Vegetarian? What is an ethical vegetarian? Now, the last question is what I would actually be pleased, as the author, to see Lucy ask. But I had to admit that, were I in Lucy's shoes, I might well abandon the Ethical Vegetarian Library before I got to that point. If I didn't make some accommodation for the efficient resolution of Lucy's information needs, if I didn't embrace her goal to retrieve information in a way that she could immediately understand—in addition to facilitating my own, authorial desire to create an interesting and instructive textual experience—then my rhetorical goals would fail, no matter how convincing my arguments or how captivating my authorial voice, and despite the theoretical success of any of the other mechanisms that made up my persuasive strategy.

Now, my prototype design experience was, of course, a preliminary venture in this area. But it certainly emphasized, for me, the seriousness and depth with which the author of an information system, with the purposeful intent to persuade an audience of a specific position on a particular subject, must attempt to understand and incorporate that audience's complex and multifaceted web of goals, activities, beliefs, values, preferences, the full extent of their potential perspective, in order to craft an effective rhetorical case in the form of a persuasive system/document. To have some chance at wooing my Jason, Mabel, and Lucy characters, I needed to assimilate and negotiate their different ways of thinking into my rhetorical plan. I could not ignore them or patronize them as formless others; I had to accept them as rational agents, as my argumentative equals.

CONCLUSION: POWER, PARTICIPATION, AND PERFORMANCE

Information systems, and the classifications that structure them, are a form of document, and a form of digital media. By adopting this orientation, and by recognizing the inevitable measure of editorial sensibility with which these documents are shaped, we can become more responsible readers and writers in the digital world. When we create collections of information resources, be those as simple as a set of personal Web bookmarks or as complex as a fully functioning digital library, we are publishing a document that conveys a position on the materials we have made available, and we need to approach this task systematically and purposefully, taking ownership of

our rhetorical goals, strategies, and even unintended effects. And when we browse a friend's Flickr photos, or when we search a research database, we are reading the collection as well as each individual document, and we need to look critically upon the interpretive frame with which our experience is bounded.

While it's true that the ability to provide access to information is a power that must be taken seriously, and that description of resources in particular ways can be linked to oppressive practices, especially when endorsed by gate-keeping institutions, such as libraries, archives, and museums, I suggest in this chapter that conscious assumption of the role of author can compel a system designer to actively consider the intricate web of context in which an identified audience community, or user group, approaches the system. Indeed, failure to characterize the audience with sufficient accuracy and complexity may result in the reciprocal failure of the author's persuasive strategy and in a document that satisfies no one.

In these complementary acts, of taking on the responsibilities of authorship and of being a responsible audience, we begin to actualize the potential of digital media, where these roles are becoming more fluid, and where the barriers to participation have, with some overenthusiastic hyperbole, but also with some truth, been lowered. In curating our own expressive, online bibliographies, and in providing public access to our unique information filtering mechanisms, we have the potential to extend an emerging creative form of dialogue and discovery, to communicate our own views and examine the perspectives of others.

REFERENCES

- Aitchison, Jean, Alan Gilchrist, and David Bawden. 2000. *Thesaurus construction and use: A practical manual*. 4th ed. London: Europa Publications.
- Andersen, Jack. 2008. Knowledge organization as a cultural form: From knowledge organization to knowledge design. In *Advances in Knowledge Organization*, Vol. 11, *Culture and Identity in Knowledge Organization*, ed. Clement Arsenault and Joseph Tennis, 269–274. Proceedings of the Tenth International ISKO Conference (5–8 August, Montréal, Canada).
- Bates, Marcia. 1976. Rigorous systematic bibliography. *RQ* 16: 5–24.
- . 2006. Fundamental forms of information. *Journal of the American Society for Information Science and Technology* 57(8): 1033–1045.
- Beghtol, Clare. 1986. Semantic validity: concepts of warrant in bibliographic classification systems. *Library Resources & Technical Services* 30: 109–125.
- . 2001. Relationships in classificatory structure and meaning. In *Relationships in the organization of knowledge*, ed. Carol Bean and Rebecca Green. Boston: Kluwer Academic Publishers.
- Berman, Sanford. 1971. *Prejudices and antipathies: A tract on LC subject heads concerning people*. Metuchen, NJ: Scarecrow Press.

- Bowker, Geoffrey, and Susan Leigh Star. 1999. *Sorting things out*. Cambridge, MA: MIT Press.
- Bryant, Rebecca. 2000. *Discovery and decision: Exploring the metaphysics and epistemology of scientific classification*. Madison, NJ: Fairleigh Dickinson Press.
- Buckland, Michael. 1991. Information as thing. *Journal of the American Society for Information Science* 42(5): 351–360.
- Burke, Kenneth. 1969. *A Rhetoric of Motives*. Berkeley: University of California Press.
- Cameron, Fiona, and Helena Robinson. 2007. Digital knowledgescapes: cultural, theoretical, practical, and usage issues facing museum collection databases in a digital epoch. In *Theorizing digital cultural heritage*, ed. Fiona Cameron and Sarah Kenderdine. Cambridge, MA: MIT Press, 165–191.
- Carroll, John M., and Mary Beth Rosson. 1992. Getting around the task-artifact cycle: how to make claims and design by scenario. *ACM Transactions on Information Systems*, 10(2): 181–212.
- Duff, Wendy, and Verne Harris. 2002. Stories and names: archival description as narrating records and constructing meanings. *Archival Science* 2: 263–285.
- Floridi, L. 2002. What is the philosophy of information? *Metaphilosophy* 33(1-2): 123–145.
- Furner, Jonathan. 2009. Interrogating “identity”: a philosophical approach to an enduring issue in knowledge organization. *Knowledge Organization* 36(1): 3–16.
- Hjorland, Birger, and Hanne Albrechtsen. 1995. Toward a new horizon in information science: domain-analysis. *Journal for the American Society of Information Science* 46(6): 400–425.
- Hulme, E. W. 1911. Principles of book classification: chapter II—Principles of division in book classification. *Library Association Record* 13: 389–394.
- Manovich, Lev. 2001. *The Language of New Media*. Cambridge, MA: MIT Press.
- Meadow, Charles, and W. Yuan. 1997. Measuring the impact of information: defining the concepts. *Information Processing and Management* 33(6): 697–714.
- Miksa, Francis. 1998. *The DDC, the Universe of Knowledge, and the Post-Modern Library*. Albany, NY: Forest Press.
- Olson, Hope, and Rose Schlegl. 2001. Standardization, objectivity, and user focus: a meta analysis of subject access critiques. *Cataloging and Classification Quarterly* 32(2): 61–80.
- Pruitt, J., and J. Grudin. 2003. Personas: practice and theory. In *Proceedings of the 2003 Conference on Designing for User Experiences*, 1–5. ACM Press.
- Rayward, W. Boyd. 1994. Visions of Xanadu: Paul Otlet (1868–1944) and hypertext. *Journal of the American Society for Information Science and Technology* 45(4): 235–250.
- Shirky, Clay. 2005. Ontology is overrated: categories, links, and tags. Available at: http://www.shirky.com/writings/ontology_overrated.html. (Last accessed July 7, 2009.)
- Soergel, Dagobert. 1974. *Indexing Languages and Thesauri: Construction and Maintenance*. Los Angeles: Melville Publishing Company.

3

THE PERSONAL NATURE OF DIGITAL MEDIA

6

Personal Theory

A Method for Humanities Scholarship in a New Media Moment

Abigail De Kosnik

THE (UN)IMPORTANCE OF WRITING METHODS IN THE HUMANITIES

A decade into the 21st century, methods of scholarly writing in the humanities disciplines are rarely a topic of discussion. After a tumultuous thirty-year period, spanning roughly the late 1960s through the late 1990s, when different methods—deconstruction, New Historicism, discourse analysis, to name a few—vied for preeminence in the humanities fields, the furious debates over what type of scholarly writing seems most appropriate, most relevant, most interesting and significant and suitable, for our generation and the demands of our times, has subsided.

Perhaps humanities departments at universities across the United States and throughout the world have become thoroughly postmodern, in the sense of being ecumenical and accepting of the full range of methodological diversity practiced by their faculty members. It could be that a postmodern tendency for mixing various styles and approaches has influenced academic writing to the point of becoming a key characteristic of contemporary scholarship, as Clifford Geertz suggested in his 1979 masterpiece on method, “Blurred Genres.” Or perhaps the sharp differences of opinion over writing methodology that, in previous years, divided academics into antagonistic camps simply recessed, went underground, and became privately held, rather than publicly aired, judgments. I cannot here account for all the mechanisms that effected a sea-change on the subject of method from twenty or thirty years ago to today, the sea-change being that humanities scholars used to battle in journal articles and book chapters over the worth and merit of each other’s approaches to, and practices of, critical

writing, and today no longer engage one another on such topics. Regardless of how we got to this point of either widespread tolerance or apathy toward methodological difference, present-day students in U.S. humanities upper-division courses and graduate seminars read Barbara Christian's 1987 essay "The Race for Theory," a scathing critique of deconstructive scholarly writing ("I am appalled by the sheer ugliness of the language, its lack of clarity, its unnecessarily complicated sentence constructions, its lack of pleasureableness, its alienating quality" [56]) as a historical document, unique to the moment of the 1980s "culture wars" (Christian's essay is often interpreted as a black feminist's attack on the growing cultural capital of the predominantly white and male camp of deconstructionist theorists), not as a template for the kind of writing that they, themselves, will one day produce as trained humanities scholars. In other words, we no longer fight much, or even talk much, about writing methods in the humanities.

NEW MEDIA AND "I"

The years that humanities scholars' public debates regarding writing methods went on the decline coincided with the rise of the Internet, and an incredible proliferation of published writing, that is, writing made public online. Today, the explosion of writing on the Internet—in the form of blogs, commentary, gossip, individually reported news, and analysis—calls for a resurrection of the question, What form of humanities scholarship might speak best to the current moment? How does the fact that many millions of people's perspectives and voices are now available and circulated online prompt a rethinking of writing methods for humanities scholarship?

The current new media moment is one of personal revelation. Following Marshall McLuhan's formulation that the content of new technologies is always older technologies ("[T]he content of the book is speech, and the content of the movie is the novel" [305]), the content of the Internet is the personality-driven, first-person presentation that pervades television. Television is populated with news anchors and commentators, interviewers and expert interview subjects for every topic of interest, talk-show hosts and celebrities and reality-television contestants and "ordinary" people constantly sharing or confessing their private opinions and thoughts by speaking directly into the camera, addressing mass audiences as if they were engaging each viewer one on one ("[T]he direct address has been important from the first days of television. . . . From the early experiences of live television, programmers have 'naturally' resorted to television mediators, who looked and talked at the camera," writes Jérôme Bourdon [540]). Going back to even older media, the content of the Internet might be said to be the diary, the op-ed essay, the movie review, the curatorial catalog. The

Internet facilitates many modes of address, but the individual sharing her or his unique perspective is the most remarked upon.

In 2006, *Time* magazine named as its Person of the Year “You,” signaling a shift from the few, the elite with access to the channels and networks of print publishing, radio and television broadcasting, or film distribution, to the many, the masses, anyone with Internet connectivity, at least, in the field of cultural production and mass media. The World Wide Web, states the *Time* article explaining the editors’ rationale for the Person of the Year selection, is

a tool for bringing together the small contributions of millions of people and making them matter. . . . We’re looking at an explosion of productivity and innovation, and it’s just getting started, as millions of minds that would otherwise have drowned in obscurity get backhauled into the global intellectual economy.

Who are these people? Seriously, who actually sits down after a long day at work and says, I’m not going to watch *Lost* tonight. I’m going to turn on my computer and make a movie starring my pet iguana? I’m going to mash up 50 Cent’s vocals with Queen’s instrumentals? I’m going to blog about my state of mind or the state of the nation or the *steak-frites* at the new bistro down the street? Who has that time and that energy and that passion?

The answer is, you do. And for seizing the reins of the global media, for founding and framing the new digital democracy, for working for nothing and beating the pros at their own game, TIME’s Person of the Year for 2006 is you. (Grossman 2006)

The year before “You” appeared on the cover of *Time*, the media hosting website YouTube launched, allowing users to upload home videos—and site visitors to watch them—for no charge; the site’s slogan is “Broadcast Yourself.” As of this writing in June 2010, YouTube is averaging more than 100 million monthly viewers in the U.S. alone (Quantcast “youtube.com”). Also in 2005, *The Huffington Post*, whose tagline is “The Internet Newspaper,” was founded. From its inception, the majority of the website’s content has consisted of opinions and analysis contributed by bloggers. Today, *The Huffington Post* attracts approximately 58 million global viewers per month (Quantcast “huffingtonpost.com”). On the site’s home page is a prominent button that says, “If you have something to say . . . say it on Huffington Post”; clicking on the button automatically opens a new e-mail on the user’s computer addressed to pitch-blogs@huffingtonpost.com, inviting the reader to nominate himself to become a *HuffPo* blogger. YouTube and *The Huffington Post* are only two websites that encourage “You” to author content for the Internet and that give authors the opportunity to reach the millions of people who visit the sites regularly. But every social media and networking site, every online message board and fan community, similarly

depends on users to publish their words and images, often stemming from their personal experiences and perspectives, on the Internet.

Internet-published authorship, criticism, expertise, tastemaking, and gatekeeping are not reserved for a specific class (like philanthropists, professional journalists and artists, media industry executives, or humanities professors), nor are they restricted to delimited sites (such as wealthy urban centers, newspapers and magazines, academic journals, or university campuses). The social role of “published writer” is available to nearly every digitally literate person with access to the necessary editing and distribution tools. This is not to say that, in aggregate, the millions of non-professional, unpaid writers who publish on the Web have accrued cultural or financial capital equal to the coterie of bestselling or critically acclaimed print authors (though several influential bloggers have turned their stories into successful books and sold options to their books to movie studios). However, the wave of writing facilitated by the Internet has been marked as a contemporary cultural phenomenon, and humanities scholarship cannot remain unaffected by it.

The dominance of first-person writing today, the rapid expansion of the number of individuals writing and publishing personal accounts since the advent of the Web, invites humanities scholars to give serious consideration to how to incorporate the first-person perspective into their writing. Academics must ponder how the preponderance of personal narratives online will influence the way that they produce scholarship, or risk letting slip the chance to align their work with the *zeitgeist* of the early digital era.

THE PERSONAL THEORY METHOD

I propose that a method of humanities writing appropriate to the current historical, technological, and cultural moment is a style that combines first-person narrative with theoretical arguments. I call this method “Personal Theory.” This brand of scholarly writing is hardly new: a great many of Plato’s Socratic dialogues, St. Augustine’s *Confessions*, the letters of Abélard and Héloïse, portions of René Descartes’ *Meditations on First Philosophy*, and Henry David Thoreau’s *Walden* stand as well-known and well-loved examples of philosophy couched in first-person storytelling dating from four different historical periods. But the present moment is rich with possibility for Personal Theory to become a more widely employed and refined strain of academic discourse than it has ever been.

To explain my conception of Personal Theory, I turn to a bestselling book originally printed in 1934, political journalist Vincent Sheean’s *Personal History*, which served as the basis for Alfred Hitchcock’s 1940 film *Foreign Correspondent*. Sheean explains his choice of title in the book’s introduction:

I thought of those two words in their separate and combined meanings—that the book should be both personal and a history, both subjective and objective, and that the proportions of each element should be determined not only by the accident of the author's own experience, but by the relative importance of the two in a modern life. I meant to indicate that the purely personal would be omitted—so that everything personal included would have some relationship to the general—and that the purely historical would be scarcely touched. It may be seen that this has nothing to do with “autobiography,” and in fact much essential material for autobiographical writing is ignored in this book. It is, I suppose, a hybrid form, and is neither personal nor historical but contains elements of both. (xi)

My idea of a method called Personal Theory closely resembles Sheean's definition of Personal History, the difference being that while Sheean is interested in relating events of global significance that he witnessed (those immediately following World War I, including the founding of the League of Nations, the rise of Fascism in Europe, and the Chinese Civil War), Personal Theory scholars write about critical theory through their personal experiences, infusing the most abstract of ideas with concrete memories and specific people, places, and plots.

Works of Personal Theory tell stories about crucial aspects of a scholar's life. Authors of these pieces invoke theory and investigate cultural objects as a means of understanding these parts of their lives better, or use their recollections to illustrate, to make vivid and graspable, a set of theoretical arguments. George Bernard Shaw said that Sheean's *Personal History* “was the expression in an individual form of ‘the sickly conscience.’” What Sheean gleaned from Shaw's comment was that he had succeeded in giving his generation access to a higher understanding of their shared, collective experience by sharing slices of his individual experience:

I decided that it was not I alone who experienced the sickly conscience, but that many thousands—perhaps even most—of my contemporaries were alike in this, and that this book was read by many of them for no other reason. Certainly the whole of modern society has a sickly conscience, and if some books express that phenomenon individually, it is only one more proof that books are, like their authors, the product of the conditions of life. (x–xi)

Personal Theory essays operate in a similar fashion, expressing general phenomena—or, rather, theories that attempt to explain phenomena—individually, that is, through the individual writer's perceptions and interpretations. Personal Theory works are neither autobiographies nor memoirs; as Sheean says, everything “purely personal” is omitted, and all that is personal in the narrative relates to the general. In Sheean's case, diving into his personal history as a participant in world political events provided a means for other members of the interwar generation to grasp the particular

malaise, which Shaw deemed (following Ibsen) “the sickly conscience,” that seemed characteristic of them, their social landscape, the specific era of modernity through which they lived. I anticipate that Personal Theory can, and will in the near future, provide lenses for this current crop of humans, living through the analog-to-digital transition and straddling two millennia, so that they can more clearly focus on just what it is that this era means, how it feels to experience it, what its peculiar sensibilities are, and in what ways larger society and culture are currently functioning and transforming; the lenses will consist of the stories of the individual scholars’ life events.

Shaw remarked to Sheean that “he [Shaw] found the same phenomenon in a number of modern books otherwise dissimilar, and named T. E. Lawrence’s *Seven Pillars of Wisdom* as particularly akin to this one” (x). (Lawrence’s book was a primary source for David Lean’s 1962 Academy Award-winning film *Lawrence of Arabia*; the Personal History genre appears to have often provided a useful narrative formula for movies, which is logical, given that much of cinema takes as its subject extraordinary events, seeking to provide grand spectacle to audiences, while at the same time giving moviegoers a way to make sense of, and feel emotionally invested in, these epics through the figure of a single protagonist.) Lawrence and Sheean’s books may be regarded as masterpieces of the Personal History method from the World War I and interwar years, but they were not the only works of this kind published at that time: Shaw perceived an entire category coming into being, comprised of “books otherwise dissimilar.” I expect that the Personal Theory method will likewise rise to fashion shortly in our times, or at least will yield a handful of masterworks. It is perhaps too early to tell what the first few decades of digital culture have done to our collective psyches. What is our equivalent of the post-WWI period’s “sickly conscience”? Social fragmentation, and a sense that we all have divided, multiple subjectivities, pre-dated the digital, and the death of irony that was hailed as the marker of the new millennium seems to have proved a short-term condition. But the predominance of first-person narrative on the Internet, and the fact that readers today have already developed a strong taste for personal perspectives on every subject makes now a more likely time than ever for even “high theory” to be made palatable, digestible, and interesting by being linked to individual points of view.

ARGUMENTS AGAINST, AND FOR, PERSONAL THEORY

1. *Must* we call for the personal to infiltrate scholarship even *more* than it already has?
2. Don’t we know from past experience how annoying, how superficial, how clumsy are academics’ attempts to insert themselves into their work?

3. Aren't we already bored to death by the endless self-centered prattling, the infinite use of the "I" voice, everywhere on the Web?
4. Can't we leave that type of writing to blogs and tweets, and let scholarship remain the refuge of third-person objectivity and authority?
5. As for advocating for any one method to come into vogue in the humanities, didn't we suffer enough from what was wrought by the vogue of deconstructionist writing in the 1980s, and of every method du jour: mountains of scholarship that clearly attempted to copy the style's founders, only to come off as ridiculous imitations that fell entirely flat as academic treatises?

Yes to the last four of the above questions. We could do without Personal Theory; I could stop myself from invoking it with this chapter or any remarks I might speak aloud in a conference or a classroom. When deconstruction was the trend, a great deal of painful academic writing appeared in print. Scholarship can and must be differentiated from the casual writing typical of most blogs, and the first person has been deployed in academic writing over the last few decades with varying results. However, despite these reasons to not write a chapter such as the one I am writing, I persist in answering yes to the first of the five questions above. Yes, despite the fact that there are good reasons to not *want* to invite academics to experiment with Personal Theory, there are also reasons why the invitation must be extended.

One reason is the opportunity that the current moment of digital writing affords scholars to bring to fruition some of the most ambitious, as-yet-unrealized goals of the cultural studies movement. For decades, that movement has lobbied to make intellectual discourse hospitable to intersections of "the popular," "the political," and "the personal." In their "Manifesto for a New Cultural Studies" essay that opens their 2002 anthology *Hop on Pop: The Politics and Pleasure of Popular Culture*, editors Henry Jenkins, Tara McPherson, and Jane Shattuc express their hope for an "emergent cultural studies" that "can assume the immediacy and vibrancy of its objects of study, that can draw productively on models from vernacular theory and fan criticism, and that can claim new freedoms in the ways it engages with the political" (6). Jenkins, McPherson, and Shattuc do not ask cultural studies to adhere to a strictly delineated critical method which must be dogmatically followed; rather, they suggest that a certain attitude can be held and conveyed by an academic in her work, an attitude which makes her writing accessible to a variety of readers by explaining her engagement with, and interest in, her objects, and how her personal interest connects to political and cultural theory. The emphasis on the personal was felt to be crucial by a generation of scholars who were trained to be as impersonal as possible in their profession: "As academics, we are told that our affective relations to popular texts must be cast aside so that we may more fully understand

how 'they work on us'. . . . [But Lawrence Grossberg argues that] as critical intellectuals, we are inextricably linked to the dominant forms of popular culture; we are fans writing about the terrain, if not the objects, of our own fandom. . . . My existence as a fan, my experiences . . . are the raw material, the starting point of critical research" (7).

Grossberg's exhortation dates from 1997, five years before the *Hop on Pop* collection appeared. In recent years, it has been less necessary to argue that humanities critiques should take the author's affective commitments as "the starting point" of their investigations, since many an essay and book begins with a paragraph along the lines of, "I first became involved with [insert name of specific popular culture text] when I was in graduate school, seeking ways to distract myself from my seemingly endless studying for qualifying exams. . . ." Yet this kind of admission seems more like a disclaimer than a revelation. Rather than leading to rich explorations of the interrelatedness of the writer's personal preferences and political or cultural theories, the brief acknowledgments of personal investment that open academic pieces give the impression that the writer wishes to "own up," as quickly and briefly as possible, that they cannot be wholly objective about, nor are they coldly distant from, their topic. Once she has confessed her history with 'zines, Super Bowl parties, or burlesque nightclub acts, the contemporary scholar usually moves into third-person perspective for the remainder of the piece, sometimes throwing in a line or two recalling a specific personal interaction with the object, or occasionally beginning a sentence with "I think" or "I believe." This is not the kind of personalized scholarship for which Jenkins, McPherson, and Shattuc are issuing a call in *Hop on Pop*.

The kind of scholarship they seek is "intimate critique," a term they borrow from literary studies, but which they claim has also appeared in anthropology, sociology, feminist philosophy, and other disciplines which have had to "rethink the value of 'insider' perspectives" (8). The editors point to a number of academic works that practice this method of intimate critique, including Jane Tompkins's "Me and My Shadow," which "called for feminists to escape from the 'straitjacket' of 'rational' academic language and to draw on powerful feminist traditions of autobiographical and subjective writing," and in which Tompkins used "a double voice, speaking both in the abstract discourse of theoretical debate and in the more personal voice of someone who 'wants to write about their feelings'" (8). Other examples of intimate critique named in the *Hop on Pop* Introduction are Annette Kuhn's *Family Secrets*, which is "at times shockingly honest and open about [Kuhn's] troubled relations with her mother, while offering sophisticated critical insight into family photographs, British melodramas, and news coverage of Queen Elizabeth's coronation" (8), Richard Hoggart's revered *The Uses of Literacy*, a study of cultural hierarchy which originated, as Hoggart

makes explicit, in the author's experiences as a working-class scholarship boy, and the "powerful autobiographical passages" of Stuart Hall's essays (8). But intimate critique is hardly the norm, lament the editors: "In general, academic cultural studies has displaced more personal voices from its core project. . . . As a result, we often find ourselves struggling with the same 'straitjacket' Jane Tompkins tried to shed" (9).

What I am calling Personal Theory is what Jenkins, McPherson, and Shattuc call intimate critique. We have seen most academic discourse shy away from thoroughly combining the personal and the theoretical, even after the interventions of the cultural studies movement; an author may acknowledge that her project began in a personal commitment, and the humanities and social sciences may no longer hold fast to the myth of the objective, removed scholar who is a "pure" outsider to her object of study, but a widely employed method which is rooted in the understanding that "[e]ven in its most abstracted forms, theory can never allow us to fully escape our own subjectivity, the play of our emotions, the tug of our lived experiences" (9) has yet to emerge. Now, however, is a prime moment for such a method's emergence.

I have argued above the fact that the Internet largely consists of, and continually elicits, first-person writing. Digital narrative is personal narrative. The predominance of first-person perspective online might alone be reasonable grounds for scholars to consider how to allow this perspective to influence their writing, but then again, the vast majority of Internet writing is considered by many critics to be dilettantish, of low quality, and unworthy of imitation. As Andrew Keen writes in his 2007 book *The Cult of the Amateur: How Today's Internet Is Killing Our Culture*, "[I]nstead of creating masterpieces, these millions and millions of exuberant monkeys [that is, Internet users—Keen is alluding here to T. H. Huxley's "infinite monkey theorem," which postulates that if enough monkeys were allowed to pound out words on typewriters for long enough, they would eventually produce Shakespearean plays]—many with no more talent in the creative arts than our primate cousins—are creating an endless digital forest of mediocrity. For today's amateur monkeys can use their networked computers to publish everything from uninformed political commentary . . . to unreadable poems, reviews, essays, and novels. . . . We are blogging with monkeylike shamelessness about our private lives, our sex lives, our dream lives, our lack of lives, our Second Lives" (2–3). Another formulation of this opinion is the question often asked of Internet writing: "Yes, there's a lot of it, but is any of it any good?"

Of course, contrary to what Keen and similar critics believe, a great deal of important and very creative writing has been published online, but I accept that the sheer volume and popularity of personal perspectives on websites is not sufficient reason for academics to consider adopting a new

method of authorship that incorporates key elements of Internet authorship. What should motivate such consideration is not the fact that millions of people are now *writing* in the first person online, but that exponentially more people are now *reading* first person narratives online. In other words, what humanities scholars have today is the chance to engage a broader public by producing scholarship that jibes with the style of writing to which non-academic readers have become accustomed via their Web browsing. And an objective of cultural studies has always been to make intellectual discourse accessible to audiences outside of the academy.

"Organic intellectuals," a category of scholar first proposed by one of the core philosophers of cultural studies, Antonio Gramsci, "have come to be defined as those able to articulate the knowledge, interests, or experiences of their own class or social group within wider social and political fields," write Jenkins, McPherson, and Shattuc. "These critics move beyond the academic in both their writing styles and publication venues, addressing and engaging a wider audience, reaching different publics. They strive, in the words of Tricia Rose, to merge 'multiple ways of knowing, of understanding, of interpreting culture and practice. . . . to use theoretical ideas in enabling and creative ways'" (22). Personal Theory can be one of the ways that scholars use "theoretical ideas in creative ways"; it has the capability to translate obscure theoretical terminology into concepts legible and significant to non-Ph.D.-holders. What makes the present time ripe for Personal Theory to surge in popularity is that, since the Internet became a mass medium, readers have become increasingly conditioned to expect and enjoy first-person narrative.

N. Katherine Hayles, in her 2007 essay "Hyper and Deep Attention: The Generational Divide in Cognitive Modes," explains that media stimulation affects the human brain due to the brain's plasticity, its ability to evolve; as media changes, so do the brains of its consumers and users. "Children growing up in media-rich environments"—as are the "born digital" generation—"literally have brains wired differently from those of people who did not come to maturity under that condition," writes Hayles (192). People raised using digital media therefore have a different *receptivity* to information than people raised without digital media. The aspects of information receptivity that Hayles discusses are the length, quantity, and order of information that digital natives choose to take in (they prefer "multiple information streams" and "switching focus rapidly among different tasks" over "concentrating on a single object for long periods" [187]), but I argue that those born digital also have been trained, by virtue of growing up with the daily habit of reading Web pages, to be more receptive to writing infused with personal narrative than to writing characterized by detachment and abstractions.

What if contemporary humanities scholars can learn to produce academic writing that appeals to digital natives' tastes? The lofty mission of cultural studies, to blend the popular, the personal, and the political in ways that prove accessible to non-academics, would become more fully realized in some small measure. Hayles argues that digital natives' media-influenced cognition must impact the way that institutions of higher education conduct their business. Hayles writes, "[E]ducators face a choice: change the students to fit the educational environment or change the environment to fit the students" (195). I propose that college professors can adapt not only their pedagogy, but also their scholarly writing, to the preferences of the "millennials," not for the sake of pandering to the customer or spoon-feeding the young an easier, gentler version of difficult concepts, but with the goal of producing a form of scholarship that translates deeply complex theories into a vernacular in which digital natives are fluent. Intellectual rigor need not be compromised when academic discourse aims to appeal to a wider audience than university researchers; as Jenkins, McPherson, and Shattuc state, "In the end, we know that writing and reading cultural theory is serious work. We also hope it might be fun" (6).

THREE MODES OF THE METHOD

Throughout this chapter, I have discussed Personal Theory in the present tense, as a method that currently exists in the humanities, and not as a method yet-to-come. I predict that Personal Theory may become far more pervasive in scholarship in the near future, but several sophisticated examples of this type of writing are already in circulation. In addition to the texts already mentioned, works such as Susan Howe's 1985 book *My Emily Dickinson*, Hayles's 2002 book *Writing Machines*, and Charles E. Weigl's 2002 essay "Introducing Horror" provide outstanding models of Personal Theory. I place each of these exemplars with into a specific category of Personal Theory:

- *My Emily Dickinson* displays the *Interpreting* mode of Personal Theory.
- *Writing Machines* showcases the *Narrating* mode of Personal Theory.
- "Introducing Horror" demonstrates the *Alternating* mode of Personal Theory.

After discussing each text, I will cite a contemporary sample of Internet-published writing that illustrates the same mode of Personal Theory, in order to show how online essayists are already employing the "I" perspective to great effect.

Interpreting

Howe's title clearly explains her method: she is writing *My Emily Dickinson*, her version of the American poet and her work. The title informs the reader that the book will contain highly idiosyncratic, unusual, *personal* interpretations of Dickinson's life and poems. Every page of the text fulfills the title's promise. Howe's prose ricochets between quotations from works that she believes had a strong influence on Dickinson (treatises on Calvinism by Increase and Cotton Mather, Robert Browning's "Childe Rowland," Emily Brontë's *Wuthering Heights*), Dickinson's letters, anecdotes from her life ("Jenny Lind is the only professional singer or musician that Emily Dickinson is known to have heard perform" [55]), and a close reading of not only Dickinson's poems, but how her poems appeared on the pages as Dickinson wrote them—a study of Dickinson's handwriting that takes into account the cryptic markings (plus signs and dashes in the body of her poems, and words that appear at the bottom of her pages, as free-floating substitutions or glosses) that feature heavily in Dickinson's manuscripts but do not often appear in print editions. *My Emily Dickinson* is divided into chapters organized around definite themes, but Howe does not at all conform to conventional styles of argumentation; one is hard-pressed to find thesis statements or transitions between separate ideas. Instead, Howe uses bricolage to make her points, laying out for the reader first a facsimile of Dickinson manuscript, then the poem in print (not as it appears in current published editions, but as Howe would prefer it to be printed, with her preferred headings and punctuation), then a quick summation of the scholarship that verifies when the poem was written, then a commentary on the poem's style and meaning that is, like Dickinson's poetry, delivered simply but puzzles the reader ("Like all poems on the trace of the holy, this one remains outside the protection of a specific solution" [35]), then a comparison to Nietzsche. Then, a line break, and three stars that demarcate the ending of one set of Howe's ideas from another. Howe begins a new set of ideas after the stars:

This is a frontier poem. Forester of New New-England wayward pilgrim. Trees have been stripped to the root by a seer on her path across circumference of intellection. This is a tragic poem. A pioneer's terse epic. Sorrow's melody is magic. Pitch of vowels, cadence of consonants, sound fused with sense—asceticism. For years I have wanted to find words to thank Emily Dickinson for the inspiration of her poetic daring. (35)

Howe's assertions, close readings, facts, contextualizations, trivia, opinions, citations, and insights appear one after the other like disparate images in a collage. Some sections are several pages in length; others consist of a single line. Many of Howe's observations, as in the paragraph quoted above, are not delivered in full sentences, but in fragments.

Howe is delivering a work on Dickinson that defies genre: it is a biography, it is New Historicist criticism, it is a close reading, it is archival research, it is a fan's tribute. It is one person's highly individual interpretation of another's work. The unwritten thesis of an essay in the Interpretive style of Personal Theory is, "This is my private, idiosyncratic take on a text." It is an appropriation, a version of an existing text. Another word for the Interpretive style of Personal Theory might be "personal reaction."

A contemporary Internet-based example of the Interpretive mode is the long essay on the final episode of ABC's puzzle-like series *Lost* by Jeff "Doc" Jensen for *Entertainment Weekly* magazine's official website. Jensen, a senior staff writer for *EW*, wrote substantial treatises on every episode of *Lost* throughout the show's run that only appeared on www.ew.com, not in the print version of the magazine, and so we can assume that Jensen only had an online readership in mind when writing his epic *Lost* "recaps" (which typically ran seven to ten Web pages and attracted between 2,000 and 4,000 online comments).

Jensen frequently uses the first-person perspective in his close readings of *Lost*, but he does more than simply emphasize how much he loves and appreciates the show. He also relates moments of the show to his personal experiences and feelings, as in this excerpt from his recap of the show's finale:

I loved Jack's long-awaited confrontation and reconciliation with his father. [. . .] I had always imagined a slightly angry encounter, with Jack using the opportunity to settle some old scores with his dad. Instead, it was all about Prodigal Son joy. It spoke to and for any parent and child, young or old, who hopes for an afterlife where they can see their family again, especially their parents, and especially if they parted company with too much unsaid, too much unresolved. I know that some people found the Jack/Christian moment to be "mawkish" and "sentimental." Not me. I thought—and felt—that the moment was painfully honest. It was direct and knowing about the very real and very frightening prospect of eternal separation and loss. I felt and could relate to the pain and the anguish and the yearning of both the father and the son. And it left me energized to be a better husband, father, son, and friend. I appreciate stories that can give me that inspiration, because I need it in my life. I'm thankful for *Lost* for the soul boost. (Jensen)

In this passage, and throughout his writings about the six-year serial narrative of *Lost*, Jensen offers his idiosyncratic, private reactions to the episodes as a means of interpreting the often opaque, mysterious text to his readers. What the reader learns from Jensen's writing in the Interpretive style of Personal Theory is not necessarily how to read Jensen's history with his father, but how to read *Lost*'s last episode, and (because this father-son reunion takes place in the last episode) how to read the entire series: as a tale of relationships, of how we struggle against, and hopefully forgive and reconcile

with, our loved ones. Jensen's take on *Lost* influences his readers to view the narrative not as science-fiction, fantasy, or mystery, but as dramatic realism. Just as Howe's personal interpretation of Emily Dickinson invites the reader to share her unique perspective on the poet's work, Jensen's personal interpretation of *Lost* coaxes us to regard the serial from his vantage point. This technique works especially well for Howe and Jensen because both essayists are trying to sway their readers to highly unorthodox analyses of the objects of their analysis. Their first-person statements lead us identify with them, to feel as if we are inside their heads as they interpret their texts. This feeling of proximity to their innermost thoughts and feelings helps to convince us that Howe's unusual reading of Dickinson, and Jensen's atypical reading of *Lost*, are the most worthy and legitimate ones—it is as if the essayists are whispering in our ears, making us stand where they stand with respect to the texts, making us see what they see in the works that fascinate them.

Narrating

Hayles declares that *Writing Machines* is an “experiment” on the opening page of the first chapter, and several experimental aspects of the book are already clear to the reader by this point: different type sizes are used throughout, with some portions of the text ballooning out in a distorted fun-house manner, mimicking the enlargement that occurs when one makes use of a “rollover” function coded into a Web page; also, the text on each page is contained within a sharply delineated white space against a graphic background that resembles a barcode, with the very edges of the words “WRITING” or “MACHINES” providing the borders, calling to mind an occurrence that used to be common with dot-matrix printing, the cutting-off of words that straddled the perforation between two pages. The chapter title appears on each page but in most cases is obscured by the white box that contains Hayles' text, drawing the reader's attention to the fact that the layout of any published work is a cut-and-paste affair, with design elements being hidden or revealed at the graphic designer's behest. It is as if the formal qualities of the book's design announce that there is nothing natural or inevitable or necessary about the way that information is communicated through an artifact called a book.

Writing Machines is not just an experiment in the graphical presentation of text, however. It is also an experiment in how to write about machine-facilitated and machine-displayed writing. Hayles announces, also on the first page of the first chapter, that she has chosen to discuss a set of objects that has not been much discussed before her book—electronic literature, including what the advent of new technologies has done to instigate new genres of literature—via a method that is unusual in academia: telling stories about her life.

Telling a fuller story requires . . . narrative chapters interrogating the author's position, her background and experiences, and especially the community of writers, theorists, critics, teachers, and students in which she moves.

[I have] become an autobiographer almost against my will. . . . Insofar as my life experiences can be of interest to anyone outside my immediate family and friends, it is because they are characteristic of the transition generation raised and formed by print but increasingly molded by electronic environments. . . . Although there are autobiographical elements in the persona who will be written in these narrative chapters, no one should confuse her with me. To mark that crucial difference, she needs a name related to mine but not the same. I will call her—Kaye. (9–10)

Hayles intersperses passages in which she theorizes about the unique qualities of electronic literature with passages about Kaye's education and career choices (Kaye receives a degree in a scientific field but then chooses to become an English professor), her early encounters with early hypertext and sophisticated hypermedia works, her love of artists' books and novels that bear a family resemblance to machine-operated texts, her moments of sudden awareness and turns of thought. Writes Hayles of Kaye:

The speculation sent chills down Kaye's spine. It was her first glimpse into how significantly literature might change if the literary body was not a book but a computer. . . . [T]he trembler now rippling through her consciousness hinted at a shift in tectonic plates massive enough to send an earthquake roaring through the terrain of literary studies, for it implied that a shift in the material SUBSTRATE of the artifact would affect not just the mode of delivery but everything about the literary work. (38–39)

Hayles attempts to convince the reader of the importance of electronic literature, the significance of the shift from writing and reading in print media form to writing (programming/coding/designing) and reading (using/interacting/experiencing) in digital and networked media form, in two ways. One is through traditional argumentation, stating claims and backing them up with illustrations and evidence. The other way is through the experiences of Kaye, with whom the reader can identify. Kaye affords the reader a way to comprehend the momentousness of the old media-new media transition "close up," by feeling the feelings that the character Kaye does, by having the sense that as lightbulbs go off in Kaye's head, they go off in the reader's, too. Hayles wants the reader to get, at a gut level, that the advent of electronic reading and writing is not a mere step forward in convenience (or backward, depending on one's beliefs about technology-as-progress), but a sea change in human cognition, information transmission, and pleasure. By being privy to Kaye's gut reactions, the reader internalizes the force of the realizations that Hayles has had about these issues. Kaye is the reader's avatar in Hayles's game of critique about the digital and the literary.

It is by *narrating* parts of her life story, excluding (as Sheean lobbies for) any part of the story that does not pertain to the more general, theoretical arguments Hayles advances, that Hayles makes her criticism persuasive. The Narrating mode of Personal Theory operates through introduction and commentary: autobiographical narratives serve to introduce or comment upon the abstract critical passages. The author's intention when writing in the Narrating style of Personal Theory is, "I am going to theorize from a perspective shaped by my experiences." Another term for the Narrating style might be "personal frame."

An example of the Narrating style is Katy Butler's June 2010 essay for *The New York Times Magazine*, "What Broke My Father's Heart." Although Butler's essay appeared in the print version of the magazine, it also became one of the most e-mailed and blogged articles from www.nytimes.com the week that it was published on the website, and received more than four hundred comments from online readers. Like many essayists' work today, Butler's piece was born in two places simultaneously, on the presses and on the Web, so it is fair to consider it written at least as much for an Internet readership as for a print edition readership.

Butler's article investigates an issue that affects an increasing percentage of U.S. society: the health care system's treatment of elderly individuals, who sometimes receive life-prolonging care that they do not want. Around this issue, Butler puts a personal frame: her observation of her parents' struggles in their later years, as various doctors' interventions extended her father's lifespan but severely decreased the quality of his life. Butler tells stories of how her mother spent years, while she herself was of an advanced age, caring round-the-clock for a beloved husband whose pacemaker kept his heart beating long after his mental and physical faculties had completely deteriorated, and then battled to be allowed to turn her husband's pacemaker off, and finally refused to have any late-life surgery performed on herself so that she would not suffer her husband's fate of becoming a living vegetable. Writes Butler:

I don't like describing what dementia did to my father—and indirectly to my mother—without telling you first that my parents loved each other, and I loved them. That my mother, Valerie, could stain a deck and sew an evening dress from a photo in *Vogue* and thought of my father as her best friend. That my father had never given up easily on anything. [. . .]

[T]hey weren't likely to die prematurely of the pneumonias, influenzas and heart attacks that decimated previous generations. They walked every day. My mother practiced yoga. My father was writing a history of his birthplace. [. . .] Even so, I watched them lose control of their lives to a set of perverse financial incentives—for cardiologists, hospitals and especially the manufacturers of advanced medical devices—skewed to promote maximum treatment. At a point hard to precisely define, they stopped being beneficiaries of the war on sudden death and became its victims. (Butler)

This narration of personal experience does not make Butler's piece a pure memoir; rather, Butler's family stories serve as a frame for the data she presents on elder care, and for her argument that doctors need to provide seniors with far more information about the benefits and risks of each surgical operation they propose. Without Butler's recollections about her parents, her article would be a straightforward work of investigative journalism. By including her recollections, Butler draws the reader into sharing Butler's own emotional connection to the question of whether seniors are being well served by the health care system, even when doctors have the best intentions. Butler's argument becomes more persuasive as the reader enters into it through the portal of her memories and feelings. Just as Hayles convinces her reader of the momentous significance of electronic literature by framing her analyses with reminiscences of her own initial encounters with hypermedia, so does Butler sway her reader about the importance of reforming elder care by framing her investigation with family histories. The personal frame is a means by which the author transmits to her audience the force of her convictions—it allows the author to communicate, by appealing directly to the reader's own memory centers and emotional triggers, *why* she believes her argument and her analysis are so necessary, real, and right.

Alternating

Weigl's "Introducing Horror" contradicts a respected body of film theory about U.S. horror films made during the Cold War. The prevailing interpretation of American Cold War-era fright cinema is that these movies (Weigl discusses *Invasion of the Body Snatchers*, *Night of the Living Dead*, and *Invaders from Mars*, among others) are political parables about the dangers of communism: your neighbors, your friends, your family members can all be taken over from within, and once they are turned (into Soviet sympathizers, into aliens, into zombies), they will turn against you. Americans must safeguard themselves from enemies within—the Communists among us, potentially hiding in plain sight—and take care to not let themselves be corrupted by Soviet propaganda, lest they become "the enemy" (alien, zombie) who must be destroyed (informed on) by their loved ones.

Weigl argues against this conventional interpretation of Cold War horror, claiming that films about alien invasions and zombie attacks are not about communism, terrorism, or other national political threats. Rather, they are about the hidden horrors in our domestic and everyday lives that plague us, haunt us, and threaten to drive us mad:

[W]hat are our worst nightmares? Not Martians or even the Commies they supposedly represent. The most frightening scenes in the film [*Invaders from*

Mars] are also the most prosaic: an angry father, a little girl in a pretty dress who gives flowers to her mother just before burning their house down, cops who seem to lack any human emotion. The fears that this film plays on are not fears of invaders from outer space (despite the title), but of the invaders who are already here: the fear of the things Dad is capable of, the fear that there's something sinister about your next-door neighbor, the fear that the police are not there simply to protect and serve. The fear, in short, that the ground you stand upon is a thin crust over a vast network of underground tunnels occupied by forces that want to destroy you, that can suck you and everyone you know down whenever they want. (708–09)

Weigl argues this point by alternating between three different styles of writing. Not all three make use of the first person, but all three are personal.

1. Using a second-person epistolary frame (letters to his partner, addressed to "Honey," and set in italic typeface), he discusses the major theories about horror cinema and calls them into question.
2. In a third-person voice, but talking about himself ("he" instead of "I," printed in plain type) he relates stories of moving in with his aged grandmother, who was suffering from dementia, and caring for her.
3. In a first-person voice, he writes aphorisms from the point of view of his senile grandmother, recalling in disjointed language and broken memories bits and pieces of her past (set off in bold typeface).

All three styles of storytelling in "Introducing Horror" expose Weigl's private life and thoughts—the horrible aspects of them. The pain of living far away from his partner, the emotional and psychological and physical suffering of nursing an ill grandparent, the awful confusion and sorrow felt by that grandparent near the end of her life; these are all Weigl's personal horrors, plus many besides, involving dread and violence and terror, all from incidents drawn from Weigl's recollections. By alternating between anecdotes about everyday horrors drawn from the bank of his experiences and ruminations on the scholarship of horror cinema, Weigl invites the reader to internalize his point on several levels. The reader feels for Weigl, for his grandmother, for their sad situation; the reader also understands, on a rational level, Weigl's claim that the power of horror cinema lies in their evocation of how swiftly and totally the ordinary can become the horrible. The emotional and intellectual components of Weigl's essay are tightly interwoven, since the reader moves from one form of writing to another swiftly, shuttling between Weigl's "you" voice (which is also his theorist's voice—it is in his "letters" to "Honey" that he delves into cinematic theory), his "he" voice (which is about Weigl himself), and his "I" voice (in which Weigl writes from his grandmother's confused, depressed perspective) every couple of paragraphs.

The reader's empathy for Weigl's personal horrors and the reader's understanding of his reading of the horror genre as an encoding of the quotidian demons and catastrophes which we cannot bear to confront directly (filmic metaphors for horror, such as aliens and zombies, therefore permitting us to safely acknowledge the fears deep within us that are caused by our real nightmares) fuse climactically in the essay's final two sentences, written in Weigl's grandmother's voice: "I don't need no monster movies. I got plenty of monsters already" (718).

In the Alternating mode of Personal Theory, the author forwards a theoretical argument by interspersing references to his personal life throughout his scholarly discourse. The author's mindset is, "This theory makes me think of my own experiences in a new way," or "My experience makes me think of this theory differently." The reader has the sense, reading an essay written in the Alternating style, that he is following the author's train of thought, as it wanders from the personal to the general to the personal to the general fluidly, shifting between those two vantage points frequently, but not randomly—each juxtaposition of the personal and the general makes the author's overarching claim more solid in the reader's mind. Another phrase that describes the Alternating style is "personal association."

An essay by Henry Jenkins posted to his blog (www.henryjenkins.org) in June 2010, entitled "Transmedia Education: The 7 Principles Revisited," serves as a Web-based example of the Alternating mode of Personal Theory. Jenkins's subject matter is a style of pedagogy that Jenkins recommended in his 2006 white paper for the MacArthur Foundation, which was published as *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. Transmedia education, Jenkins proposes, will be a form of teaching and learning in which students learn to navigate the multiple media platforms with which they are confronted daily in a digital culture, and develop media literacies, meaning that they become capable not only of reading transmedia stories (for example, stories which are told in video games, on websites, in films, in comics, and in novels simultaneously), but also *producing* transmedia stories. In this essay, Jenkins advocates strongly that transmedia education become more frequently practiced in classrooms serving all grade levels, because our mediatised society will increasingly call upon individuals to do work across multiple media platforms. He makes these arguments using a traditional scholarly method, by citing other scholars' work: "[Gunther] Kress argues that we need to teach students the affordances of different media through which we can communicate information and help them to foster the rhetorical skills they need to effectively convey what they want to say across those different platforms," Jenkins writes in one paragraph, and in the next, he states, "As educators, we need to model the effective use of different media platforms in the classroom, a practice which would support what Howard Gardner has told us about

multi-intelligences. In this case, I am referring to the idea that different students learn better through different modes of communications and thus the lesson is most effective when conveyed through more than one mode of expression." But these references to Kress and Gardner, a customary style of argumentation in humanities scholarship, are not the only means by which Jenkins forwards his thesis.

Jenkins intersperses his blog essay with mentions of his own experiences teaching according to his principles of transmedia education—"I've had good luck at getting students to think in these terms through assignments which ask them to propose ways of translating an established story into a new medium—for example, translating a novel or film into a computer game," he writes—as well as his experiences in coaching and collaborating with other instructors to put these principles into practice—the first line of the essay reads, "Last week, I participated in one of the ongoing series of webinars for teachers which is being conducted by our Project New Media Literacies team." In addition, Jenkins liberally hyperlinks to other websites throughout this online essay. Some of the links lead to his own research and practice with transmedia education, some lead to the archives and webinar schedule of Project New Media Literacies, and other links conduct the reader to other entries in Jenkins's blog, which address in detail topics that are relevant to the subject of transmedia education.

So Jenkins's blog entry demonstrates the Alternating style of Personal Theory in that the author shifts between various personas in order to make his case: the "I" that is Jenkins the university professor, who uses transmedia education techniques in his own undergraduate and graduate courses; the "I" that is Jenkins the co-director of Project New Media Literacies, who can be regarded as a leading activist and influencer in pedagogical reform; the "I" that is Jenkins the scholarly blogger, who often engages others in conversations on his blog about topical issues, such as "the dangers of talking about 'learning 2.0' because it confuses a business plan for a pedagogical approach." All of these "I"s, these personal experiences and activities of Jenkins's, serve to back up the impersonal author who opines, via references to others' scholarship and logical arguments, that transmedia education is a worthy goal.

One might say that what I am calling Jenkins's "alternating" between various subjectivities (teacher, activist, blogger), by including hyperlinks and narrating his own experiential findings in the classroom and as a webinar leader, does not stand out as unique in any way on the Web. Most intelligent bloggers combine subjectivities in this way, drawing on personal history and linking to other websites and their own prior blog posts throughout their entries, and combining these with straightforward fact-opinion argumentation. I claim that Jenkins's lack of uniqueness in this respect is exactly the point of this chapter. Almost every author who writes

and publishes online understands the power of deploying multiple “I”s, multiple links to their prior writing and to others’ writing, multiple modes of address, in their work. With the Alternating technique, the author multiplies his own authority, as the reader glimpses the firsthand knowledge the author has of the subject from several perspectives, and can easily reference (by simply clicking on the included hyperlinks) any other information that the author thinks will be helpful for comprehending his perspective. As Jenkins writes, students today are so acclimated to inputs from multiple media sources that a “lesson is most effective when conveyed through more than one mode of expression.” The Alternating style of Personal Theory attempts to convey an author’s point of view through more than one mode of expression, an approach well suited to today’s hypermedia-conscious readership.

A METHOD FOR THE FUTURE OF THE HUMANITIES

I have discussed three variants of what I am calling Personal Theory in order to show that I am not suggesting that scholars in a new media age attempt a radically new or untried method. Personal Theory has been proven to be a successful, compelling method for a number of writers. But the current historical moment, when online content is being increasingly dominated by writing characterized by the first-person perspective and self-disclosure, when young readers are developing a taste for personal, idiosyncratic perspectives from an early age by virtue of their habitual interactions with the Internet, has created an opportunity for humanities scholars to write in a way that brings their work to audiences beyond the academy, thus moving forward the project that cultural studies’ founders began: making “high theory” and university research in the humanities accessible to non-specialists. A method that serves as a bridge between academic writers and mass readers would certainly benefit the readers, in that they would gain new knowledge, but it would no less benefit the writers, whose productions have often been regarded as needlessly esoteric and too obscure to hold any appeal for general audiences. Through Personal Theory, scholars encourage reader identification with themselves (or with the narrator character who is their avatar or proxy—as both Hayles and Weigl establish, the “I” of the essay is never exactly the same as the author), and this identification, combined with the narrative power of autobiographical confession, can lead a reader to develop a far deeper affinity for, and interest in, theoretical writing than she would have otherwise.

There is no reason for humanities scholars to refrain from using every tool in their collective toolbox to convince populations outside of college campuses of their works’ significance, especially when so many humanities departments today are smarting from budget reductions and must defend

their contribution to universities' broader social relevance in order to justify their continuation. The predominance of the personal as the primary mode of online writing demands that academics consider using Personal Theory as a method of scholarly writing in much greater numbers. The pleasure that the mass reading public takes in intellectual discourse, and the public's collective belief that humanities research has broad social relevance and significance, only stand to increase as a result.

REFERENCES

- Bourdon, Jérôme. Live television is still alive: On television as an unfulfilled promise. *Media, Culture & Society* 22 (2002): 531–556. Print.
- Butler, Katy. What broke my father's heart. *NYTimes.com* (*The New York Times*), June 14, 2010. Web. June 26, 2010. <http://www.nytimes.com/2010/06/20/magazine/20pacemaker-t.html?src=me&ref=general>.
- Christian, Barbara. The race for theory. *Cultural Critique* 6 (Spring 1987): 51–63. Print.
- Geertz, Clifford. Blurred genres: The refiguration of social thought. *The American Scholar* 49.2 (1979): 165–179. Print.
- Grossberg, Lawrence. "It's a sin": Politics, postmodernity and the popular. In *Dancing in Spite of Myself: Essays on Popular Culture*, ed. L. Grossberg, 191–252. Durham, NC: Duke University Press, 1997. Print.
- Grossman, Lev. Time's person of the year: You. *Time*, December 13, 2006. Web. June 25, 2010. <http://www.time.com/time/magazine/article/0,9171,1569514,00.html>.
- Hayles, N. Katherine. *Writing Machines*. Cambridge, MA: MIT Press, 2002.
- . Hyper and deep attention: The generational divide in cognitive modes. *Profession* (2007): 187–199. Print.
- Howe, Susan. *My Emily Dickinson*. Berkeley, CA: North Atlantic Books, 1985. Print.
- Jenkins, Henry. Transmedia education: The 7 Principles revisited. *Confessions of an Aca-Fan: The Official Weblog of Henry Jenkins*, June 21, 2010. Web. June 26, 2010. http://henryjenkins.org/2010/06/transmedia_education_the_7_pri.html.
- Jenkins, Henry, et al. *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. 2006. Cambridge, MA: MIT Press, 2009. Print.
- Jenkins, Henry, Tara McPherson, and Jane Shattuc. The culture that sticks to your skin: A manifesto for a new cultural studies. In *Hop on Pop: The Politics and Pleasures of Popular Culture*, ed. H. Jenkins, T. McPherson, and J. Shattuc, 3–26. Durham, NC: Duke University Press, 2002. Print.
- Jensen, Jeff. "Lost" finale recap, part two: Step into the light. *EW.com* (*Entertainment Weekly*), May 25, 2010. Web. June 26, 2010. http://www.ew.com/ew/article/0,,20313460_20388269,00.html.
- Keen, Andrew. *The Cult of the Amateur: How Today's Internet Is Killing Our Culture*. New York: Doubleday/Currency, 2007. Print.
- McLuhan, Marshall. *Understanding Media: The Extensions of Man* (1964). Cambridge, MA: MIT Press, 1994. Print.

- Quantcast. Directly measured data on huffingtonpost.com. May 31, 2010. Web. June 24, 2010. <http://www.quantcast.com/huffingtonpost.com>.
- Quantcast. Estimated data on youtube.com. May 31, 2010. Web. June 24, 2010. <http://www.quantcast.com/youtube.com>.
- Sheean, Vincent. *Personal History*. 1934. New York: The Modern Library, 1940. Print.
- Weigl, Charles E. Introducing horror. In *Hop on Pop: The Politics and Pleasures of Popular Culture*, ed. H. Jenkins, T. McPherson, and J. Shattuc, 700–719. Durham, NC: Duke University Press, 2002. Print.

7

Empowering U.S. Citizens through Access to Information Technology and Digital Media

Henry Jenkins Meets Larry Snyder

William Aspray

Ever since the rapid rise of personal computing and the Internet in the 1980s and 1990s, there has been public discussion of the role of information technologies in civic education in the United States, i.e., what every citizen should know or know how to do in order to fully engage in modern American society. Perhaps the most influential recent analysis of this issue has been a white paper written in 2006 by Henry Jenkins, then the director of the Comparative Media Studies Program at MIT (now at the University of Southern California). The white paper, entitled *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*, is the foundational document for the Digital Media and Learning initiative of the John D. and Catherine T. MacArthur Foundation.

The goal of this chapter is to provide perspective on the Jenkins white paper in three ways. First, we compare and contrast its recommendations with those in a major report on information technology and American civic education written in the 1990s: *Being Fluent with Information Technology*. That study was prepared in 1999 by a National Research Council study group led by Larry Snyder, a professor of computer science and engineering at the University of Washington in Seattle. Second, we show the ways in which these two reports target different publics and concentrate on different knowledge and skills not only because of the state of the technology and the principal uses of technology at the time they were written, but also because of the backgrounds of their principal authors, Jenkins and Snyder. Finally, we consider the ways in which fifteen years of scholarship on the digital divide provides a lens through which to examine both of these reports, and in particular to highlight some of the shortcomings of the Jenkins report.

Why is it reasonable to set these two visions of civic education in juxtaposition and examine them from the perspective of digital divide issues? First, there is a *linguistic argument*. Jenkins himself uses divide language in his report:

A central goal of this report is to shift the focus of the conversation about the digital divide from questions of technological access to those of opportunities to participate and to develop the cultural competencies and social skills needed for full involvement. (Jenkins 2006a, 4)

At the same time that Jenkins is making this claim that his subject concerns the digital divide, he is attempting to differentiate his approach from the earlier digital divide literature by arguing that the earlier literature was about access to technology while his topic concerns the ability to develop the skills and knowledge to use the technology. We will argue later in this paper that Jenkins misrepresents the earlier digital divide literature when he claims it is only about access to technology, and that in fact there was a rich discussion in this earlier literature about access to skills, knowledge, and usage—from which Jenkins could have learned and strengthened his argument. In fact, we believe that Jenkins's argument about the digital media divide can be seen as a continuation of the mainstream digital divide literature.

One might argue that the digital media divide is more about media than about information technology. In addition to this linguistic justification mentioned above, in which Jenkins explicitly compares the early digital divide with a divide in participatory culture, a historical justification can be made. The *historical argument* goes as follows: the history of information technology has been characterized by waves of technological development and applications, and each succeeding wave of development supplements rather than supplants existing developments. Thus we can see the history of information technology having its era as the big calculator in the 1940s and 1950s, the data processing machine in the 1960s and 1970s, the personal business tool in the 1980s, the communication device in the 1990s, and the entertainment and participation tool in the first decade of the new millennium.¹ Under this historical understanding, the digital media divide can be regarded simply as the application of the digital divide concepts to the most recent conceptualization of the computer (as an entertainment and participatory device).

THE DIGITAL DIVIDE

Over a period of time, as the scholarship on the digital divide in America matured, it came to involve six elements: a digital technology, a popula-

tion of concern, differential access, the importance of the technology, its social value, and a political dimension. Let us consider each of these in turn.²

Throughout the 1990s and during the first five years of the following decade, the technology in question in the digital divide discussions changed as one after another of the personal computing and personal networking technologies became pervasive in American society. The discussions were first about having access to any kind of computer, then to a computer with more powerful internal capabilities such as high processing speed or large memory (so as to be able to effectively run common software packages), then to whether there was an Internet connection, and finally to whether there was a high-speed broadband connection (so as to take full advantage of what was offered on the Internet).

The digital divide discussions have always been about dividing populations of individuals into categories of haves and have-nots. Sometimes the discussion was about whether the poor had the same access as the wealthy. Other times it was about whether women had the same access as men, blacks and Hispanics the same access as whites, older people the same access as younger people, or rural residents the same access as urban residents.³

The digital divide debates were fundamentally about differential access to technology for these various demographic groups. However, the notion of access itself changed over time. At first, it was about having any kind of technology access—whether it was at home, at school, or in the public library. Over time, progressively more information of value could be found on the Web, and at the same time email became more valuable as the number of people with email accounts increased. The value of the Web and email multiplied to a point where it was regarded as so essential that occasional access through school or the local library was insufficient; one also needed to have ready access at home. More recently, access is being redefined again, in the time of rapid growth in mobile devices and satellite connections, to being about ready access wherever you are.

If there was to be any substance or merit to these digital divide claims, an argument needed to be propounded that this technology was important to individuals in these populations. Mostly, the discussants took access to computers and Internet connections as a given good, without scrutiny. When discussants did address the importance of these technologies to individuals, they sometimes would talk about having new technical capabilities such as the ability to blog or connect online with others. A few of the discussants talked more generally about access issues: to information, to ideas and opinions, to educational opportunities, to help with the development of computer-related skills, or to the development of human labor.

Access to computers and the Internet might enable some particular individual to have access to a powerful technical tool, but the argument for the importance of resolving the digital divide is made more compelling if there is an important societal value attached to resolving the divide issues. I have heard private remarks about the Jenkins report, for example, that people are skeptical as to whether the ability to mash-up media or blog are associated with any societal good. Arguments for the societal value of resolving the digital divide might range, for example, from enabling a disadvantaged group to have an improved chance of economic advancement, improving citizenship skills and increasing participation in government, and making individual workers and the nation as a whole more competitive in the global marketplace.

When cast as a political argument, the U.S. discussions of the digital divide have mostly had a domestic perspective. They have been about improving opportunities for disadvantaged American citizens or enabling individual Americans to be more informed and engaged citizens—generally ignoring the international situation. Where a more global perspective has been discussed by American scholars, it has generally been cast in terms of foreign aid, national competitiveness of the United States against other developed countries in Europe or developing countries such as India and China, or protection of intellectual property—both the software that runs personal computing devices and the music and other entertainment that can be shared online.

Jenkins is partly correct in his assumption that the focus of these digital divide discussions has been access to technology—a sort of “make it available and they will come” mentality. These discussions have all too often ignored the context of effective use of personal computing and networking. Over time, however, scholars have evolved a broader interpretation. The entry on “Digital Divide” in the *SAGE Handbook of Media Studies* is representative of this broadened perspective.

According to the SAGE account, there are four kinds of access issues at play in the digital divide. *Material access* is the one that most scholars had been discussing all along: inadequate or nonexistent computers or network connections. But the SAGE account points to three other kinds of access of equal importance, it argues, for individuals to make effective use of personal computing and networking technologies. There is the issue of *mental access*, namely a lack of elementary digital experience caused by lack of computer experience, computer anxiety, or unattractiveness of new technology. There is the issue of *skills access*, namely a lack of digital skills caused by insufficient user-friendliness and inadequate education or social support. Finally, there is the issue of *usage access* created by a lack of significant usage opportunities. A school might have computers, for example, but limit usage by policy (to those enrolled in the official computer classes) or by practice

(monopolization of the computers by a small number of students, usually male, that is not controlled by the school).

Consider as an example the explanatory value of the SAGE categories in understanding the discussions about the hundred-dollar laptop, which its advocates propose to distribute around the world as a solution to many of the world's problems. Advocates of the hundred-dollar laptop are in part blinded by their narrow focus on material access. They often conflate material access with usage access, not paying attention, for example, to whether the residents in a village will have a reliable source of power to run these laptops, or time or inclination for such activity after a long day of work devoted to gaining adequate food and potable water. These advocates almost always ignore the mental and skills access issues. These technologies are likely to be underutilized, or not used at all, because the people for whom they are intended do not have the computer skills or the background knowledge to make effective use of the technology at hand.⁴

Considering mental, skills, and usage access as well as material access is but one way in which the digital divide discussions have been broadened. Another type of broadening has been to apply the concept of a digital divide not only to individual citizens or classes of citizens, which has been the focus of most of the American discussions, but also to organizations, industries, regions, nations, or continents. A quick search on the Web found a number of examples of this kind of broadening in the context of digital media; for example, a comparison of digital media use in Asia compared to use in Europe; an article on the advantage held by businesses in southern England over those in Scotland because of their greater use of digital media in their business operations; and the advantage of wealthier museums over poorer ones because of their greater ability and means to use digital media to present their stories to their constituencies (PC Pro 2008; NMK 2008; Seales and Landon 2005).

Using this background material about the digital divide, in the next several sections we describe and compare two visions of empowering U.S. citizens through IT and digital media: first, the concept of IT fluency as put forward by Larry Snyder and the National Research Council, followed by the concept of participatory culture as put forward by Henry Jenkins and the MacArthur Foundation.

LARRY SNYDER, THE NATIONAL RESEARCH COUNCIL, AND THE CONCEPT OF IT FITNESS

In 1997 the National Science Foundation engaged the National Research Council to study the question of what every U.S. citizen should know about

IT. One strong supporter of this effort was William Wulf, president of the National Academy of Engineering. As he explained:

At the NAE I was at the nexus of science, engineering and public policy. It seemed like every day I had my nose rubbed in the fact that the vast majority of U.S. citizens don't understand enough S&E [science and engineering] to meaningfully discuss some of the most important public policy issues of the day. Not to be too dramatic about it, but I keep wondering what it means for a society to call itself a democracy when its citizens are incapable of thinking rationally about the issues facing them. (Private communication with the author, 14 August 2009)

NSF's avowed interest in this study was to produce more informed citizens, better prepared workers, and people who were better empowered to pursue personally relevant goals. Following its standard practice, the NRC formed a blue-ribbon panel of scholars to study the issue. (See the list of people on the committee in Table 7.1.) Larry Snyder, a senior computer scientist from the University of Washington, was chosen to chair the committee.

The composition of the study group was selected by the NRC staff and vetted by Snyder. The committee included four distinguished computer scientists from research universities or research labs (Snyder, Aho, Ullman, and van Dam), a computer scientist focused on undergraduate education (Tucker), a faculty member specializing in science and technology education (Linn), and a labor economist (Packer). As Snyder reflected after the study, the composition of the committee, not surprisingly, had an effect on the outcome of the report. Speaking from the committee's majority perspective (of research-oriented computer scientists), he noted the influence of the other members:

Their backgrounds did affect the outcome. Most significantly, Marcia Linn is a strong proponent of projects and the sort of learning that that encourages, and she made a persuasive case to the committee; Arnie Packer emphasized business practices, and indeed probably influenced the business computing feel that I think you [the author of this chapter] sensed. . . . The only other spin that I was aware of was a reminder of the small college interest that came from

Table 7.1. Members of the NRC Committee on IT Fitness

<i>Name</i>	<i>Affiliation</i>	<i>Academic Field</i>
Lawrence Snyder (chair)	U. of Washington	Computer science
Alfred V. Aho	Lucent Technologies	Computer science
Marcia C. Linn	U. California–Berkeley	STEM education
Arnold H. Packer	Johns Hopkins U.	Labor policy
Allen B. Tucker	Bowdoin College	Computer science
Jeffrey Ullman	Stanford U.	Computer science
Andries van Dam	Brown U.	Computer science

Al Tucker, though it probably didn't show up explicitly. So, the diversity did shape the report and IMHO in a very good way. (Snyder, private communication, 2 August 2009)

The target for the study was the American population at large. The committee settled on two principles that guided its work: first, that there is no fixed list of skills or knowledge that can be identified in the rapidly changing IT world, so they must instead discuss these issues at a more abstract level and give examples merely as illustration; second, that their focus is to be not on computer "literacy," which conjured up for them the notion of basic knowledge and skills, but instead on IT "fluency," which implies the commanding knowledge to use IT effectively in everyday life.

IT fluency (or "FITness" as the report sometimes called it), the study argued, requires acquisition of three different kinds of knowledge. First there are *fundamental concepts* such as: how and why IT works as it does; constraints and limitations on computer-based applications; principles on which to build new understanding; and ideas that can be used to make IT more personally useful. Second are so-called *contemporary skills*, such as job preparedness and using education as a tool to make students productive. Finally, there are *intellectual capabilities*, such as abstract thinking, learning by analogies, analysis, and judgment. The following provides examples of the skills, concepts, and capabilities that were identified by the NRC committee (<http://csta.acm.org/csits/presentations/snyder.pdf>):

Top 10 skills:

- Setting up a personal computer
- Using basic operating system features
- Using a word processor
- Using a graphics/artwork/presentation tool
- Connecting a PC to a network
- Searching via Internet to locate information
- Using a computer for email
- Using a spreadsheet
- Querying a database
- Using online tutorial information (help)

Top 10 concepts:

- Principles of computer operation
- Enterprise information systems
- Networks
- Digital representation of information

- Information structure and assessment
- Modeling with computers
- Algorithmic thinking and programming
- Universality
- Limitations
- Information in society

Top 10 capabilities:

- Engage in sustained reasoning
- Manage complexity
- Test a solution
- Locate bugs in a faulty use of IT
- Organize and navigate information structures
- Collaborate with others using technology
- Communicate IT to other audiences
- Expect the unexpected
- Anticipate technological change
- Think technologically

There are several interesting points about the FITness report. The digital divide, which was being written about extensively by social scientists at the time, is not explicitly discussed in the report; instead, there is an implicit argument that one will be a “have-not” if one does not develop the prescribed set of skills, concepts, and capabilities. The report is strikingly different from—and indeed an advance on—much of the contemporary digital divide literature in one important respect. By focusing on learning skills, concepts, and capabilities, the report recognizes the importance of knowledge and skills, and not just material access. The NRC study does not identify populations that might not widely have the skills, concepts, or technologies, but instead focuses on identifying those skills and concepts required for any individual to fully participate in a modern digital society. This set of skills is independent of whether the individual is rich or poor, black or white, rural or urban. The report remains silent about material access and usage access; there is an assumption in the report that the technology will be available to those who want to use it. Apparently, the committee did discuss the issue of access and did not regard it as a problem (private communication from Larry Snyder, 2 October 2009).

The report advances the digital divide discussion by identifying particular skills, concepts, and capabilities that an individual needs. Although the report makes a big point at the outset that these will change over time, it says little about what those changes might be or how soon they might arrive. The assumption is that the changes will be caused by technical advances, not by other reasons such as changes in use or users. However, the report does give

detailed lists of current examples; and those listed as the top skills, concepts, and capabilities are all firmly rooted in either traditional computer science (as it had been practiced since the late 1960s) or routine business computing practice. The examples focus on algorithms, computers as a universal calculating instrument, and software bugs (all of these being computer science concepts) or on the computer as a business tool for word processing, email, databases, and spreadsheets. This was their vision of the skills needed in the 1990s, with no hint of the near future when online entertainment, social networking, and consumer production would become significant uses of the computer. It was a report written by a committee dominated by traditional computer scientists about a world in which they were firmly established.

Typically, the chair of an NRC study committee does not take all the credit or blame for the report prepared by the committee, although it is often the chair that makes most of the public presentations about the findings and sometimes the study comes to be known by the name of the chair. In this case, it is particularly appropriate to identify the FITness idea with Professor Snyder because of the work he did subsequent to the report's publication. Although the report presented the basic ideas that the committee believed the populace should learn, it did not present them in a way that was congenial or effective for learning. Snyder carved out time from a busy research career to implement the ideas in the report: to write a textbook for classroom use to teach these skills, concepts, and capabilities, which he has seen through three editions. As he explained his motivations:

The book came out of the realization from teaching the class [on IT fluency at the University of Washington] that non-techies are smart but not mind readers. They need a book, and it needs to explain the fluency stuff clearly and directly. So, given the idea that it could be taught (I didn't think I'd proved that yet), I started in Summer [19]99 to work on programming notes that I planned to use in the fall offering of the course; their descendants became the book. The other reason to write the book was that the bullet points of the report didn't make it clear the depth and breadth of what the committee was saying, and I realized that a book could translate the bullets to actual content. As you know a book takes on a life of its own, and once invested in it, one stays with it. (Snyder, private communication, 2 August 2009)

Snyder later prepared a self-study course for those students not in a position to enroll in a formal course, so that they could teach themselves these skills. This self-study course, known as BeneFIT, is available free of charge on his employer's Web pages: <http://courses.washington.edu/benefit/FIT100/>. As he explains the motivation for the online course:

The online course was . . . derived from the "5 year commitment" promise [I made to devote five years to working on FITness issues]. It was clear that without teachers, it was not going to be possible to get this out to a wide audience, so right before leaving on sabbatical in '01, I wrote an NSF proposal to do an

online course. The idea is that teachers—-independent learners—could teach themselves fluency with an online tool, and then become part of the teaching resource needed for the class. Online stuff wasn't anything I was good at, but UW [University of Washington] is, and I figured if I could get funding (NSF voted [affirmatively]), they could do a good job. I think they did, and lots of people have used the site. (Snyder, private communication, 2 August 2009)

HENRY JENKINS, THE MACARTHUR FOUNDATION, AND PARTICIPATORY CULTURE

In this section we discuss a report written in 2006, seven years after the FITness report. This report on participatory culture was sponsored by the MacArthur Foundation and had Henry Jenkins of the MIT Media Lab as its principal author. This report initiated the MacArthur Foundation's five-year, \$50 million digital media and learning program, with the goal to "help determine how digital media are changing the way young people learn, play, socialize, and participate in civic life. Answers are critical to developing educational and social institutions that can meet the needs of this and future generations" (Ito et al. 2008). The emphasis here is on computer- and network-enabled media studies, not computer science.

Challenges of Participatory Culture: Media Education for the 21st Century called for schools, after-school programs, and parents to prepare youth for active involvement in participatory culture. By this account, "a participatory culture is a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices."

The report identifies four forms of participatory culture: affiliations, expressions, collaborative problem-solving, and circulations. Affiliations involve "membership, formal and informal, in online communities centered around forms of media, such as Friendster, Facebook, message boards, metagaming, or MySpace." Expressions involve "producing new creative forms, such as digital sampling, skinning and modding, fan videomaking, fan fiction writing, zines, mash-ups." Collaborative problem-solving involves "working together in teams, formal and informal, to complete tasks and develop new knowledge (such as through Wikipedia, alternative reality gaming, spoiling)." Circulations are about "shaping the flow of media (such as podcasting, blogging)."

Like the NRC report, Jenkins identifies specific literacies that the individual young person in America should know in order to fully participate in modern society. These are listed in the following box, which is an exact quotation from a Jenkins's blog entry (<http://newmedialiteracies.org/blog/2008/11/10/>)

NMLSkills.pdf). They all concern use of the personal computer as an entertainment and communication tool, and they are aligned much more with media skills when using a computer than with more traditional business skills such as using email, word processing, or databases or with concepts from computer science such as universality or algorithms.

Play: The capacity to experiment with one's surroundings as a form of problem-solving

Performance: The ability to adopt alternative identities for the purpose of improvisation and discovery

Simulation: The ability to interpret and construct dynamic models of real-world processes

Appropriation: The ability to meaningfully sample and remix media content

Multitasking: The ability to scan one's environment and shift focus as needed to salient details

Distributed Cognition: The ability to interact meaningfully with tools that expand mental capacities

Collective Intelligence: The ability to pool knowledge and compare notes with others toward a common goal

Judgment: The ability to evaluate the reliability and credibility of different information sources

Transmedia Navigation: The ability to follow the flow of stories and information across multiple modalities

Networking: The ability to search for, synthesize, and disseminate information

Negotiation: The ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms

Visualization: The ability to interpret and create data representations for the purposes of expressing ideas, finding patterns, and identifying trends

Jenkins identifies three overarching problems related to participatory culture. One (the *participation gap*) is characterized explicitly as a digital divide issue; the other two are not characterized in that way. According to the report, the participation gap is "the unequal access to the opportunities, experiences, skills, and knowledge that will prepare youth for full participation in the world of tomorrow." The other two issues are ones that all youth will face in a modern participatory world. There is the *transparency problem*, namely "the challenges young people face in learning to see clearly the ways that media shape perceptions of the world," and the *ethics challenge*, namely "the breakdown of traditional forms of professional training and socialization that might prepare young people for their increasingly public roles as media makers and community participants."

We will focus here on the participation gap, and apply to it our analysis of the digital divide from earlier in this chapter. Jenkins emphasizes mental, skills, and usage access issues. He does not address the issue of material access in his report; the report assumes (incorrectly) that all young people will have adequate access to the kind of computers and Internet connections that are needed to fully participate in this participatory culture. Nor does Jenkins spell out what those material technology needs are, though one can surmise the need for a media-oriented computer (e.g., enough memory, fast processor, good sound and video cards) and high-bandwidth Internet access, so as to have the ability to read and create various kinds of media and participate in online communities. Even when focusing on mental and skills access, he does not identify the groups that do and don't have access to a way of learning the skills required to be involved in a participatory culture. He does not consider, for example, whether ethnic minorities, or poor people, or people living in rural areas are less likely to have access to this kind of education.

Jenkins's writing is weak, like that of most of the participants in the digital divide debates, in justifying the importance and social value that result from widespread ability of youth to participate in this type of culture. He makes unsubstantiated claims that these skills are important because they: provide opportunities for peer-to-peer learning; encourage a changed attitude toward intellectual property; promote diversity of cultural expression; develop skills valued in the modern workplace; and instill a more empowered conception of citizenship. The social value case is not articulated, merely asserted. The political argument can be inferred but is not made explicit. It is hard to argue that the specific skills—for example being able to mash up media or build a better blog—have much political value. Rather, the case would need to be made that such skills can support important political goals such as improved education for American citizens, ameliorated intellectual property issues such as illegal file sharing of music and films, better trained workers, and more politically engaged citizens.

COMPARISON

Both the NRC report and the MacArthur Foundation report provide recommendations for what an American citizen should know about information technology in order to be a fully empowered citizen. There is little commonality between the two sets of recommendations. The ten skills listed in the NRC report (setting up a personal computer, using basic operating system features, using a word processor, using a graphics/artwork/presentation tool, connecting a PC to a network, searching via Internet to locate information, using a computer for email, using a spreadsheet, querying

a database, and using online tutorial information) are ones that Jenkins would presumably assume that youth already know, and their absence in his report may simply be an artifact of the passage of time and the wider familiarity today of American youth with basic computer and networking technology.

Jenkins perhaps would be less concerned about some of these NRC basic skills such as using a presentation tool, a spreadsheet, or a database because they are more business oriented. Most of the concepts listed in the NRC report would be relevant to Jenkins's call for a participatory culture, but he would expect American youth to already know them. But not all: Jenkins would presumably regard knowing about enterprise information systems and programming as irrelevant for the domain of applications that interests him, and universality and limitations as computer science concepts that are largely unimportant abstractions for his purposes.

Many of the capabilities the NRC report mentions would be good for youth in a participatory culture, although they may not have been learned nearly as well as some of the NRC skills and concepts. However, there are several capabilities in the NRC list that are clearly oriented toward computer science and would be less important to Jenkins's message: testing solutions, locating bugs, and thinking technologically.

If one considers Jenkins's list of new media literacies, some of them (Play, Performance) are not about technology at all and would have had no place in the NRC report. Several (Simulation, Appropriation, Visualization) are literacies that have a technology component and existed at the time of the NRC report and so would have fit well in the NRC report as either technical skills or concepts, but they were not mentioned there. They take on added importance in the new world of online entertainment, social networking, and consumer production that makes them worthy of note by Jenkins. Several of Jenkins's other literacies are either about media skills (Transmedia Navigation) or about Web 2.0 skills of shared collective production (Negotiation, Distributed Cognition, Collective Intelligence) that had no place in the world of computing as discussed in the NRC report.

EXPLAINING THE DIFFERENCES

How do we explain the striking differences in expectations of citizens in the two reports? It may partly be a consequence of the times when the two were written, given the rapid advancement of information technology and the rapid advancement in people's comfort level, computer skills, and familiarity with computer-related concepts. The Jenkins report, written seven years later, implicitly relies on its readers to already possess some of the basic computer tools and knowledge described in the NRC report. But as

Snyder found out as he continued to work on FITness education, there is a large pool of people who do not yet possess this basic level of IT education. The difference in recommendations might be explained in part by the fact that the NRC report was written by computer scientists while the MacArthur report was written by media scholars. Another possible explanation is that the NRC report is targeted at the average citizen, while the MacArthur report is targeted at youth, and thus keys on some particular characteristics of youth regarding their facility with Web 2.0 tools and their attitudes toward intellectual property.

But there may be more to these differences. The two reports also reflect the differences in background and goals of the two principal authors. Let us consider Jenkins first. He comes out of what is sometimes called the “aca-fen” tradition of academics who are also active in fan life and who are interested in actively adding value to media, not passively receiving it. Jenkins’s first words in his book *Fans, Bloggers, Gamers* are “Hello. My name is Henry. I am a fan” (p. 1). Indeed, much of this book is autobiographical, explaining how he became a leading scholar of participatory culture. The adult establishment, he argues, was familiar with the media industries and scornful of the efforts of youth to appropriate this culture as their own; and he made it his goal to offer respect to these youthful efforts and provide academic legitimacy to their study. He explains how his 1992 book *Textual Poachers*

described a moment when fans were marginal to the operations of our culture, ridiculed in the media, shrouded with social stigma, pushed underground by legal threats, and often depicted as brainless and inarticulate. Inspired by work in the Birmingham cultural studies tradition, which helped reverse the public scorn directed at youth subcultures, I wanted to construct an alternative image of fan cultures, one that saw media consumers as active, critically engaged, and creative. (p. 1)

In fact, Jenkins was so totally immersed in this fan culture that he had trouble with his identity as an academic scholar:

When I began my career I had enormous ambivalence about being an academic, because I felt this enormous tension between the academic world and the fan world, and I felt uncomfortable with speaking from the position of the academic because it was such an antagonistic space. As the academy has made its peace with fandom, to some degree, and as we’ve closed the gap between those identities, then I’ve come to feel much more settled in what I think an academic is, as well as beginning to redefine what the role of the academic is in response to other sectors of knowledge production. (p. 35)

As Jenkins sees it, both technological and economic changes have created a situation in which average people can today participate in much more profound ways in the creation of media and culture than in the past:

The new participatory culture is taking shape at the intersection between three trends:

1. New tools and technologies enable consumers to archive, annotate, appropriate, and recirculate media content;
2. A range of subcultures promote Do-It-Yourself (DIY) media production, a discourse that shapes how consumers have those technologies; and
3. Economic trends favoring the horizontally integrated media conglomerates encourage the flow of images, ideas, and narratives across multiple media channels and demand more active modes of spectatorship. (pp. 135–136)

In this new world, fans are not seen as second-class citizens who simply react to the productions of the established media companies but instead are themselves a new kind of knowledge community that is producing knowledge of important independent standing:

[Pierre] Levy [in *Collective Intelligence*] gave me a way of thinking about fandom not in terms of resistance but as a prototype or dress rehearsal for the way culture might operate in the future. Levy describes his vision of “collective intelligence” as an “achievable utopia”—not something that grows inevitably from the new configuration of technologies but rather something we must work toward and fight to achieve. Fandom is one of those spaces where people are learning how to live and collaborate within a knowledge community. We are trying out through play patterns of interaction that will soon penetrate every other aspect of our lives. Levy, in short, gives us a model for a fan-based politics. (p. 134)⁵

Note in the last sentence of this quotation the reference to a fan-based politics. In fact, one can see the MacArthur report as a political document, talking about how to empower youth using these new technologies—a world that Jenkins wants to see created, not one that already exists. Jenkins’s latest book, *Convergence Culture: Where Old and New Media Collide*, examines the interplay between what he calls *corporate convergence* (consolidation of media ownership into a few multinational corporations that try to control all media channels and content internationally) and “*Grassroots convergence*—the increasingly central roles that digitally empowered consumers play in shaping the production, distribution, and reception of media content” (*Fans, Bloggers, and Gamers*, 155). Jenkins is preparing youth to do battle at the grassroots level.

Let us now consider Snyder, who is a sharp contrast to Jenkins. Snyder explains how he became interested in this IT fluency study:

So, I don’t know why I was asked to do the report in the first place. I had done the “Experimental CS” report [another National Research Council study on

computer science as an experimental scientific discipline], and had for some time thought that doing studies and such was the best way for me to return [something of value] to the community, relative to my abilities and interests . . . But, when my pal Herb Lin phoned to offer the job, I kind of groaned and said that I didn't think a Literacy report (recall we were the Ad Hoc Committee on Computer Literacy) was particularly useful or interesting to me; I was reluctant to say "yes"—it sounded dumb—and I was reluctant to say "no"—I like Herb and like working with him. He, in his inimitable way, said, "Don't give me an answer today. I'll call back in two weeks." Immediately, I got thinking, "What should my mom know about computing? What should my neighbor (a retired car salesman) know about computing? Etc." Over the two weeks I got absorbed in the question. When he called, he said, "Larry, 1 or 0?" "1" was my reply, because by that point I'd gotten totally engrossed in what knowledge I knew that others should also know. I think to some degree these questions drove my interest in the topic throughout the whole study. (Snyder, private communication, 2 August 2009)

This work was a distraction from Snyder's research career and training of his graduate students, but nevertheless he decided to continue to devote time to Fluency even after the report was completed.

I said that I wanted to try to teach Fluency since I was sure that I could do it. So, with the endorsement of UW [University of Washington], CS [the department of computer science] and the newly formed iSchool at UW, I piloted the course in Spring Q[uarternine]99 . . . I was very naïve about what non-techies know and how tough the material on the syllabus was to learn; I spent much of the term hand-holding, but in the end all of us survived and the students got it, though not by a means that would scale. . . .

The follow-on activities were motivated by (a) a real feeling that the report made a contribution—I described it to many people as one of the few committees that I'd served on whose outcomes couldn't have been predicted at the start—meaning that we did do something important, and (b) lots of NRC reports go onto the shelf with no further life. Since this was important, someone had to evangelize about it, and so I said to myself, I'd contribute up to five years to push the topic. (It's long enough, I now realize, to completely monopolize a career.) (Snyder, private communication, 2 August 2009)

Why did the report and Snyder's subsequent educational efforts take the form that they did? Partly it was the influence of some of the members on the committee, as explained above. But partly it was also influenced by Snyder's personal beliefs, for example about the role of IT in increasing productivity in the office place:

But recall that this was the late [19]90s and everyone in CS with even a casual interest in business/econ (I was an econ[omics] major as well as a math[ematics] major) recognized that America was going through a produc-

tivity infusion from IT—and as you know, this has since been validated. So, Packer didn't have to work hard to convince me. . . .

That said, I have never thought of Fluency as a “business centric” or even “business leaning” subject. I was astonished as people made that assertion. The use of “IT” didn't help, but we chose it to make a cute acronym. Many people got the “business” idea. (The Fluency book was first solicited by the “business texts” unit of Prentice Hall, which also surprised me.)

Why? Well, though most CS people seem to be oblivious to it, data, databases and data manipulation are all very interesting to the public, even if we CS people find the processing part of computing most interesting. The DB [database] folks know this, of course, and Ullman was a significant player on the committee. So, if asked—as we were—what should everyone know about computing (not CS), I think we produced the best answer. Knowing “non-CS topics” such as databases, using spreadsheets, using library resources, etc. are all critical. So, I guess I was thinking along some of these lines the whole time. (Snyder, private communication, 2 August 2009)

In addition to the emphasis on the computer as a business tool, Snyder and the committee generally were interested in enabling individuals to use the computer for various kinds of personal activities. The hope was that the general public would learn to “get the benefits out of computers that the cognoscenti did” (Snyder, private communication, 2 August 2009).

The Jenkins report focused on youth and providing them with appropriate training. This training might be provided through the public schools or through clubs and other after-school programs. Snyder's committee was instead focused on college students: “We didn't concern ourselves with deployment, except for college: Below college you have boards of ed[ucation] and we knew nothing about that; after college we were clueless as to how to deploy” (Snyder, private communication, 2 August 2009).

Looking back from today, Snyder has interesting remarks to make about how well the NRC report weathered the rapid changes in technology. Despite having a markedly different set of recommendations from the more recent Jenkins report, Snyder believes that many parts of the NRC report remain sound today and that his committee had a good appreciation at the time of which of their recommendations would remain sound and which would become obsolete:

Rapid change probably got the emphasis [in the public talks I gave about the study committee's work] because it panicked the committee. We were supposed to make recommendations, and we were very aware that we could be making statements that would look very silly very soon.

This led to the tripartite classification: Skills, Concepts, Capabilities. The *Skills*—using the computer today in a productive, “personally relevant” way, are apps [applications] knowledge with little staying power—teaching only that [which] was wrong with literacy courses. We gave a sampling of 10 for

each. . . . We knew that the Skills list was a moving target (and said so) as it should be, and we fully expected that the 10 would change; they have.

The *Concepts* were fundamental knowledge—book learning, if you will—that everyone should know about computing. It was not expected to change. I think it's totally solid today. Ditto *Capabilities*, which are really "life skills" that are exceptionally useful in a computing setting, e.g. debugging. They are the best part of our three-part structure, and any student is better off improving on these topics. So, I think that what we expected has happened—skills changed, concepts and capabilities remained unchanged. It might be that people still think we got the list wrong, but no one came forward that I know of. (Snyder, private communication, 2 August 2009)

When asked in particular about the Web 2.0 skills that are the focus of Jenkins's report, Snyder replied:

Our report came out more than 10 years ago, and was written well before that. . . . the main data gathering was 12 years ago. If we'd done it today, we might well have changed the skills substantially to reflect Web 2.0. Since our goal was to get people on the machine in the current environment (Skills) and give them the foundation to learn throughout life (Concepts & Capabilities), I'd argue that anyone who learned the fluency package in 1999 would be doing just fine with Web 2.0. There is nothing fundamentally different about Twitter from a computer perspective of 1999; from a sociological perspective of 1999 it's probably big news. My view is that in 1999 the cognoscenti were online all of the time—I was and so was everyone on the committee—but the public was not. Now they are because of Facebook and Twitter, but my impression is that they are not using computers anywhere near as effectively as they could in their lives; [I suspect] many adults are still not fluent . . . just noticing what people do and use, makes me think that it is probably the device; they have a phone rather than an iPhone (and so can Tweet) but can't really use a computer for more exotic apps [applications] all of the time." (Snyder, private communication, 2 August 2009)

CONCLUSIONS

What the informed American citizen needs to know and needs to know how to do with respect to information technology changes over time in part because of changes in the technology, but also in part because of the changing uses and users of the technology.⁶ The role of information technology in educating the informed citizen is based not only in the development of faster, smaller, newer, and less expensive devices, but also in the ways in which these devices are used and who uses them. IT was used first as a mathematical machine valued primarily for calculation important in scientific and engineering work, then as a data machine for the business environ-

ment, and later still as a networking and communications device for use by individuals in their everyday lives. It is not clear what the future purposes of IT will be, but it is probably a mistake to believe that its purposes tomorrow will be the same as today. None of these purposes ever seem to disappear; rather, new purposes supplement old ones—but it is the new purposes that create most of the public attention as political and social scientists study the role of IT in civic education. One has to expect that every few years, as technology changes and the conceptualization of its proper uses change, a new set of scholars will have to reexamine this issue of the role of IT in the education of the American citizen.

One of the major differences between the Snyder report and the Jenkins report is a difference in target audience. The Snyder report was targeted at all Americans, or at least at American adults, and what they needed to be effective in the workplace and secondarily in their home life. The Jenkins report, by contrast, is targeted at American youth, and it is clear that the needs of youth are at least somewhat different from those of adults. Youth need to spend time creating their own identities, learning to express themselves, learning to think critically, and building up social networks. Adults of course also gain from the ability to express themselves, think critically, and build strong social networks, but their lives are more directly focused on the daily needs of their family; for example, providing for their family by doing such things as building the skills that qualify them for remunerative work and paying attention to personal health needs.

The Jenkins report would have gained from a better understanding of the digital divide literature and a recognition that the issues the report addresses are not so different from those in the digital divide literature that came before it. The report is built on an incorrect assumption that all young people will have adequate access to the kind of computers and Internet connections that are needed to fully participate in this participatory culture. A major strength of the report is its contributions to our understanding of mental and skills access, but in these areas the report focuses on individuals and does not recognize there may be (probably are) divides between groups that affect the abilities of individuals in those groups to participate fully in a participatory culture as Jenkins describes it. Educational opportunities to learn these skills are less available in inner cities and rural communities than in white, middle-class, suburban America. Jane Margolis's book about IT education in public schools in Los Angeles, *Stuck in the Shallow End*, makes this point clearly. One would assume from reading the Jenkins report that learning to mash up media or build a better blog are good ends in themselves—a point that many scholars of a civic education might question. Even if one abstracts from these particular skills, as Jenkins does in his list of twelve media literacies, such as Appropriation or Collective Intelligence, he falls short of explaining the social value of these literacies. He

makes unsubstantiated claims about them being socially important because they provide opportunities for peer-to-peer learning, encourage a changed attitude toward intellectual property, promote diversity of cultural expression, develop skills valued in the modern workplace, and instill a more empowered conception of citizenship. He offers no empirical evidence for any of these claims; these are merely statements of his beliefs.

The two reports each show the mark of the background of their principal author. The NRC report focuses largely on the interests of computer scientists, which was the background of Snyder and most of the other members of the committee. The NRC report also had a business skills orientation, which Snyder has indicated is consonant with his training as an economics major and his belief in the value of information technology as a driver of business productivity. Jenkins, by contrast, focuses on the participatory aspects of modern information technology, to the exclusion, for example, of people who want to be more passive consumers of media, or who want to use their information technology for the mundane everyday purposes that are addressed by many parts of the NRC study. It is no coincidence that this participatory aspect direction of the report is one that aligns well with Jenkins's celebration and promotion of fans as active rather than passive consumers. No serious argument is given in the Jenkins white paper that one can be successful in modern American society only by taking a participatory approach; it is simply what most interests him.

If one examines the twelve media literacies that Jenkins claims every youth should know in order to participate fully in American society, one can see the influence of his aca-fen background—both in his target being a youth audience and in his heightened sense of the importance of participation as opposed to, for example, familiarity with the tools of IT or the ability to think critically. Of the twelve media literacies, two of them, Play and Performance, are specifically about giving youth the tools to experiment with and develop their identities; and these are less important to the civic education of adults. Two of the literacies, Collective Intelligence and Distributed Cognition, are especially important only if one believes the future is going to be driven by a kind of Web 2.0 collaborative world, which is the world most consonant with Jenkins's interest in collective fan action. Four of the literacies, Multitasking, Judgment, Networking, and Negotiation, appear to be useful in preparing all youth for the modern world. The final four, Simulation, Appropriation, Transmedia Navigation, and Visualization, seem less compelling for all Americans or even all youth to hold; they are important only if one believes the world must necessarily be participatory in this IT-enabled media kind of way in order to be fully empowered citizens.

The skills and knowledge discussed in the Snyder study may lay a good foundation for the education advocated in the Jenkins white paper. Perhaps

the Snyder study would have embraced some of the recommendations from the Jenkins white paper if the NRC study had been written a few years later. Nevertheless, there are significantly different messages in these two reports about the knowledge and skills necessary to thrive in the modern digital and digital media world. The reader needs to appreciate these underlying assumptions when trying to determine the right civic education for Americans or American youth, whether it be that of Jenkins, Snyder, or anyone else.

NOTES

1. Campbell-Kelly and Aspray (1996; 2nd ed., 2004) provide a general history of the computer that differs from earlier historical accounts by retelling the story not as a story of big calculators but instead as data processing machines. It is time for some historian to retell the story focusing on the importance of the personal computer while not fully eradicating the history of the computer as a big calculator and as a data processing machine.

2. This chapter is not the place to track the history of the changes in the digital divide debates over time, for example as the debate evolved as scholars paid attention first to having a computer, then to having a dial-up connection, and later to having a broadband connection. One way to observe these historic changes would be to track the various reports on the digital divide produced by the U.S. Department of Commerce's National Telecommunications and Information Administration. These reports appeared in 1995, 1998, 1999, 2000, 2002, and 2004. They can be accessed at <http://www.ntia.doc.gov/reports/anol/index.html>. Another place one can find many reports and demographic data on digital divide issues to use for trend analysis is the Pew Internet & American Life Project. See <http://www.pewinternet.org/topics/Digital-Divide.aspx> for their latest reports, but one can also find online earlier reports, each of which gives a snapshot of both demographics and policy issues for a given point in time. For some of the changes that were politically motivated in the digital divide debates, see the analysis in Jesse 2004.

Professor Greg Downey of the University of Wisconsin–Madison kindly shared with me the syllabus from his spring 2009 course: LIS 640 Digital Divides and Differences. The following papers are a subset of those in his course, and they represent some of the best scholarship on the digital divide. This is not intended as an exhaustive list, merely as a representation of some of the good scholarship, organized by topic: gender (Borsook 1996; Dilevko and Harris 1997; Light 1995; Losh 2004), race (Burkhalter 1999; Nakamura 2002), income (Margolis 2008; Sandvig 2003), geography (Goss 1995; Greenstein and Prince 2006), access in schools and libraries (Apple 1986; Bishop et al. 1999), social barriers and issues (Stanley 2003; Warschauer 2003), and general and miscellaneous other topics (Hannemyr 2003; Hanson 2000; Levy and Murnane 2004; Mossberger et al. 2003; Selwyn 2003; van Dijk 2005; van Dijk and Hacker 2003).

3. There are aberrations in these patterns. To take a personal example, while Great Falls, Virginia, (where the author once lived) is the wealthiest community per

household in greater Washington DC, it had among the worst Internet service in the region. The low population density (large lots) meant that it was not economically viable to run coaxial or fiber optic cable to many parts of the town, while heavy tree coverage precluded satellite connections for many.

4. For other papers critical of the \$100 laptop project, see Brewer et al (2005); Carneiro (2002); and Malakooty (2007).

5. Throughout *Fans, Bloggers, and Gamers* Jenkins talks about the people who influenced his approach: the “new journalist” writers Hunter S. Thompson and Tom Wolfe, education scholars James Paul Gee and David Buckingham, legal scholar Rosemary J. Coombe, media scholars Steve Duncombe and Kurt Lancaster, marketing research scholar Robert Kuzinets, anthropologist Geraldine Bloustein, philosopher Thomas McLaughlin, literary scholars David A. Brewer and Carolyn Sigler, cultural studies scholars Ien Ang, Janice Radway, John Tulloch, David Morley, John Fiske, and others.

6. What the informed American citizen needs to know also may depend on what constitutes being civically engaged. Bennett (2007, pp. 2–3) identifies two varieties of youth engagement. One view, which Bennett identifies with Jenkins, is that of the *engaged youth paradigm*: “The *engaged youth* paradigm implicitly emphasizes generational changes in social identity that have resulted in the growing importance of peer networks and online communities. In this view, if there is a decline in the credibility or authenticity of many public institutions and discourses that define conventional political life, the fault lies more with the government performances and news narratives than with citizens who cannot engage with them. . . . In an important sense, this paradigm emphasizes the empowerment of youth as expressive individuals, and symbolically frees young people to make their own creative choices.” The *disengaged youth* paradigm, by contrast, has a more traditional view: “By contrast, the *disengaged youth* paradigm may acknowledge the rise of more autonomous forms of public expression such as consumer politics, or the occasional protest in MySpace, while keeping the focus on the large body of empirical data showing a generational decline in connections to government (e.g., voting patterns) and general civic involvement (e.g., following public affairs in the news) as threats to the health of democracy itself. Those who speak of disengaged youth often worry about the personalization or privatization of the political sphere (young people living in heavily commercial online worlds), and focus more on how to promote public actions that link to government as the center of democratic politics, and to other social groups and institutions as the foundations of civic life.”

REFERENCES

- Apple, Michael W. 1986. Is the new technology part of the solution or part of the problem in education? In *Teachers & Texts: A Political Economy of Class & Gender Relations in Education*. New York: Routledge, 150–174.
- Bennett, W. Lance. 2007. Changing Citizenship in the Digital Age. *OECD/INDIRE Conference on Millennial Learners* (Florence, Italy, March 5–6). Available at http://spotlight.macfound.org/resources/Bennett-Changing_Citizenship_in_Digital_Age-OECD.pdf.

- Bishop, Ann P., Tonyia J. Tidline, Susan Shoemaker, and Pamela Salela. 1999. Public libraries and networked information services in low-income communities. *Library & Information Science Research* 21, no. 3: 361–390.
- Borsook, Paulina. 1996. The memoirs of a token: An aging Berkeley feminist examines Wired. In *Wired Women: Gender and New Realities in Cyberspace*, ed. Lynn Cherny and Elizabeth Reba Weise. Berkeley, CA: Seal Press.
- Brewer, E., M. Demmer, B. Du, M. Ho, M. Kam, S. Nedevschi, J. Pal, R. Patra, S. Surana, and K. Fall. 2005. The case for technology in developing regions. *Computer* 38, no. 6 (May): 25–38.
- Burkhalter, Byron. 1999. Reading race online. In *Communities in Cyberspace*, ed. Marc A. Smith and Peter Kollock. New York: Routledge, 60–75.
- Campbell-Kelly, Martin, and William Aspray. 2004. *Computer: A History of the Information Machine*, 2nd ed. Boulder: Westview Press.
- Carneiro, Robert. 2002. The big picture: understanding learning and meta-learning challenges. *European Journal of Education* 42, no. 2: 151–172.
- Dilevko, Juris, and Roma Harris. 1997. Information technology and social relations: Portrayals of gender roles in high tech product advertisements. *Journal of the American Society for Information Science* 48: 718–727.
- Goss, Jon. 1995. “We know who you are and we know where you live”: The instrumental rationality of geodemographic systems. *Economic Geography* 71, no. 2: 171–198.
- Greenstein, Shane, and Jeff Prince. 2006. The diffusion of the internet and the geography of the digital divide in the United States. Working Paper 12182, National Bureau of Economic Research (April).
- Hannemyr, Gisle. 2003. The Internet as hyperbole: A critical examination of adoption rates. *Information Society* 19: 111–121.
- Hanson, Susan. 2000. Reconceptualizing accessibility. In *Information, Place, and Cyberspace: Issues in Accessibility*, ed. Donald G. Janelle and David C. Hodge. New York: Springer, 267–278.
- Ito, Mizuko, Sonja Baumer, Matteo Bittanti, danahboyd, Rachel Cody, Becky Herr, Heather A. Horst, Patricia G. Lange, Dilan Mahendran, Katynka Martinez, C. J. Pascoe, Dan Perkel, Laura Robinson, Christo Sims, and Lisa Tripp. 2008. *Living and Learning with New Media: Summary of Findings from the Digital Youth Project*. The John D. and Catherine T. MacArthur Foundation Reports on Digital Media and Learning, November.
- Jenkins, Henry. 2006a. *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*. MacArthur Foundation, Digital Media and Learning.
- . 2006b. *Convergence Culture: Where Old and New Media Collide*. New York and London: New York University Press.
- . 2006c. *Fans, Bloggers, and Gamers: Exploring Participatory Culture*. New York and London: New York University Press, 2006.
- Jesse, Jolene Kay. 2004. The Digital Divide: Policy Myth or Political Reality? In *Chasing Moore’s Law: Information Technology Policy in the United States*, ed. William Aspray. Raleigh, NC: SciTech Publishers, 247–272.
- Levy, Frank, and Richard J. Murnane. 2004. How computers change work and pay. In *The New Division of Labor: How Computers Are Creating the Next Job Market*. New York: Russell Sage Foundation, 31–54.

- Light, Jennifer S. 1995. The digital landscape: New space for women? *Gender, Place & Culture* 2, no. 2: 133–147.
- Losh, Susan Carol. 2004. Gender, educational, and occupational digital gaps 1983–2002. *Social Science Computer Review* 22, no. 2: 152–166.
- Malakooty, Nina. 2007. *Closing the Digital Divide? The \$100 PC and Other Projects for Developing Countries*. Personal Computing Industry Center (PCIC) University of California, Irvine, February. Available at <http://pcic.merage.uci.edu/papers/2007/100PC.pdf>.
- Margolis, Jane. 2008. Technology rich, but curriculum poor. In *Stuck in the Shallow End: Education, Race, and Computing*. Cambridge, MA: MIT Press, 27–49.
- Mossberger, Karen, Caroline J. Tolbert, and Mary Stansbury. 2003. Redefining the digital divide. In *Virtual Inequality: Beyond the Digital Divide*. Washington, DC: Georgetown University Press, 1–14.
- Nakamura, Lisa. 2002. Head-hunting on the Internet: Identity tourism, avatars, and racial passing in textual and graphic chat spaces. In *Cybertypes: Race, Ethnicity, and Identity on the Internet*. London: Routledge, 31–60.
- National Research Council. 1999. *Being Fluent With Information Technology*. Washington, DC: Computer Science and Telecommunications Board, 1999.
- New Media Knowledge. 2008. North and South: The UK Digital Media Divide. <http://www.nmk.co.uk/articles/1049>.
- PC Pro. 2008. Asia Closing Digital Media Divide (13 December). <http://www.pcpro.co.uk/news/242808/asia-closing-digital-media-divide.html>.
- Sandvig, Christian. 2003. Public Internet access for young children in the inner city: Evidence to inform access subsidy and content regulation. *Information Society* 19: 171–183.
- Seales, W. Brent, and George V. Landon. 2005. The Museum and the Media Divide. *D-Lib Magazine* 11, no. 51 (May), SSN 1082-9873.
- Selwyn, Neil. 2003. Apart from technology: Understanding people's non-use of information and communication technologies in everyday life. *Technology in Society* 25: 99–116.
- Snyder, Lawrence. n.d. Fluency with Information Technology. PowerPoint presentation to the Computer Science Teachers Association. <http://csta.acm.org/csits/presentations/snyder.pdf>
- . 2004. *Fluency with Information Technology: Skills, Concepts, and Capabilities*. Reading, MA: Addison Wesley (3rd edition).
- Stanley, Laura D. 2003. Beyond Access: Psychosocial Barriers to Computer Literacy. *Information Society* 19: 407–416.
- U.S. Senate. 2002. *Digital Divide and Minority Serving Institutions*. Hearing before the subcommittee on science, technology, and space of the Committee on Commerce, Science, and Transportation 107th Congress, 2nd session, S. 414 (February 27), 75 pages.
- vanDijk, Jan A. G. M. 2005. A framework for understanding the digital divide. In *The Deepening Divide: Inequality in the Information Society*. Thousand Oaks, CA: Sage, 9–26.
- vanDijk, Jan, and Kenneth Hacker. 2003. The digital divide as a complex and dynamic phenomenon. *Information Society* 19: 315–326.
- Warschauer, Mark. 2003. Conclusion: The social embeddedness of technology. In *Technology and Social Inclusion: Rethinking the Digital Divide*. Cambridge, MA: MIT Press, 199–216.

4

INTERACTIONS BETWEEN TECHNOLOGY AND CULTURE

8

The Impact of New Media on Musical Creativity

Bruce Pennycook

This chapter examines the impact of new media software on musical creativity by tracing some important moments in the history of music technology. Innovations since the late 1950s by musician-scientists have contributed to significant changes in our listening habits and to the processes of creating music and sound using digital resources. As the technologies become more sophisticated, the role of the professional musician throughout the music industry is being eroded by software automation and the increasing availability of digital music and sound libraries. Furthermore, the emergence of new musical genres based on experimental instruments and techniques are appearing in commercial game systems and, like music software, have become commodity products. These issues are examined from both a technical and historical perspective.

My students in Radio-TV-Film at the University of Texas at Austin are only mildly bemused when I show them the stack of Hollerith cards that formed my first computer music composition made at the University of Toronto in 1973. The fact that a few decades ago one would line up in the IBM 360 mainframe queue, drop the stack into a card reader then wait perhaps a day or two for output is so completely unthinkable that it appears to have little or no impact on them. What they do not seem to grasp is that using mainframe computers for any purpose, from running a simple Fortran homework problem to calculating statistical data to generating sound, required a great deal of time and effort. It also required access to institutional machines which then were strictly controlled by card reader clerks, output operators, queue managers, system operators—a legion of staff surrounding the massive beast, protecting it from unauthorized use. In this introductory class I also discuss the difficulty of correcting punch card errors; one could

not instantly edit and resubmit a program that failed to execute correctly (or execute at all for that matter). Corrections meant punching new cards, getting back in line and waiting. The specialized programs I worked with were designed to create electronic music pieces using digital sound synthesis and I explain to my class that the long turnaround times were a bit like walking up to a piano, playing a chord, then hearing the sound a week later. None of these computing tales seems to faze my students.

The larger objective for the Hollerith card and mainframe computing class presentation is to illuminate three concepts that I believe are central to understanding the impact of new technologies in media: the role of the interface, issues regarding access to computer technologies, and the capacity to iterate processes.

These three themes—*interface, access, and iteration*—will form a thread throughout the following observations on the impact of new technologies and new media on the domain of sound production and music making. What this chapter will not address are issues surrounding digital music distribution—a topic that has so completely dominated discussions of music and new media that I will leave it to others.

As a starting point, I take a rather broad view of what is or isn't new media. (The term digital media to me seems quite passé—what media isn't available in digital form today?) While there are certainly many good sources for definitions, I prefer the openness of the following from the organization Digital Media Alliance Florida: *the creative convergence of digital arts, science, technology and business for human expression, communication, social interaction and education* (Digital Media Alliance Florida, 2007). The first element in this list—*digital arts*—is usually absent in definitions from the print and news industries. Moreover, the focus on *creativity* as the starting point is both refreshing and accurate. Everything we do with computers is the result of the creation of software. The early innovative programs, often the efforts of one individual researcher, opened entirely new ways for end-users to find novel means for personal expression. In the domain of music, one such example was the discovery in the 1970s of musical applications of frequency modulation, a signal processing method widely used in analog signal transmission (the FM band on your radio, for example). Composer John Chowning at Stanford University discovered a way to apply a unique version of the technology to digital sound synthesis. His landmark work on *FM* led to countless new musical compositions by Chowning and others, a patent for Stanford and himself, and the commercial production of the most celebrated of all synthesizers, the Yamaha DX7 (Chowning 1973). Chowning's work serves as a perfect new media story—a *convergence* of digital art, science, and technology that has enriched composers and audiences in both the art and pop worlds and became a commercial success, eventually returning substantial royalties from Yamaha to Stanford and Chowning.

NEW METHODS FROM OLD TASKS

New media audio and music production software emerged from three primary forces: a need to edit, manipulate, and manage digital audio; a need to develop software emulation of familiar analog editing tasks; and a need for software tools that would permit new digital signal processing procedures to be applied to digital sound files. These three requirements apply to all fields of digital media production software based on sample acquisition: sound, still images, and video. What they all have in common is that the interfaces provide users with a visually comfortable workspace in which familiar tasks can be performed. In the case of audio waveform editing, the early programs blended the functions of a tape recorder with the cut-and-paste procedures and file management tools from word processing programs. Subsequent generations of audio editing software incorporated the imagery of a sound mixing board adding graphic sliders, knobs, and buttons to the graphical interface. Thus modern audio processing software offers all of the tools that were available in an analog radio studio—recorder-player, tape editor, and multichannel mixer.

Having spent countless hours editing analog tape in electronic music studios during my undergraduate studies, I can say with certainty that working with the current sophisticated audio editing tools on my laptop, especially ones that make revisions and corrections as fluid as typing and editing this document, has significantly enhanced my ability to produce new work. In other words, the combination of a superb *interface*, immediate and unlimited *access* to my work, and the ability to indefinitely *iterate* procedures have had a profound impact on my own creative activities. Software such as Avid/Digidesign Pro Tools and Apple Logic Studio at the professional end and Apple GarageBand at the budget end are available to anyone—skilled and experienced or not. Though my training with analog tape helps to inform my choices and actions with digital editing software, there is no doubt that anyone could learn to edit sound today with little or no prior training.

The replacement of the analog audio studio with work-alike software is only part of the story. Just as early word processor systems first modeled electronic typewriters and very rapidly evolved into powerful document editing and formatting programs complete with built-in spell checking tools and grammar checking algorithms, modern sound editing systems include specialized audio signal processing functionality. Devices such as compressors, equalizers, pitch shifters, reverberators, spatializers, and many other complex sound manipulating functions are now fully incorporated into software audio editing platforms. Though many of these functions simply could not run on standard personal computers only a few years ago, significant advances in the engineering and design of audio signal processing algorithms coupled with fast personal computers has led to more powerful

software, and at the same time, much cheaper products that comfortably operate on commodity hardware. Now anyone with a personal computer can have access to complex audio recording and mixing resources that not long ago were available only in commercial or institutional studios.

Like the superb capabilities and ease of use of current word processing software, sound editing and mixing software replaces once-tedious manual procedures such as “find the loudest sound in the track” or “apply the parameters of device A on track 4 to device B on track 8” with a few mouse clicks. Ignoring for a moment the cost of an acoustically isolated listening space, inexpensive software has displaced expensive studio hardware, placing sound mixing and editing in everyone’s home workplace.

In parallel with the development of audio recording software was the development of MIDI (Musical Instrument Digital Interface) sequencing and music notation programs. These programs focused on the creation of music compositions rather than sound manipulation. MIDI composition software presents the composer with a graphical representation of common music notations symbols and/or a time-line graphic score called piano-roll notation.

These two examples show symbolic representations of the same musical passage; one in familiar musical notation, the second shown in piano-roll notation. Both representations can be used to transmit MIDI data to synthesis software or hardware, permitting the composer to immediately hear the work. Both programs also provide for data input from an external MIDI keyboard and from computer keyboard and mouse actions. Current music notation programs such as *Sibelius*, *Finale*, and *Score* are able to extract individual parts from the score and automatically format these, taking into account document layout and page turns. It is worth noting here that *Score*, like Chowning’s FM synthesis, was also developed at the Center for Computer Research in Music and Acoustics at Stanford University. Leland C. Smith, a bassoonist and professor of composition, tackled and solved some of the hardest problems of music engraving such as note spacing, page formatting, and part extraction.

Programming in Fortran on mainframe computers in the late 1970s, Smith worked with music publishers to create a comprehensive system capable of handling the most demanding notational problems such as those presented by the musical scores of Elliot Carter and other contemporary composers. The earliest versions of the software were called “MS” (for manuscript) and required the user to enter data as a file of lists of parameters specifying each and every symbol on the page. Though this method seems inconceivable today, it was very accurate and surprisingly flexible, allowing for minute positional changes of the symbols. My doctoral dissertation, a composition entitled *Concerto for Double Wind Ensemble and Percussion*, was encoded in this fashion and was among the first large-scale

pieces to be encoded and printed with Smith's system. An assistant and I spent nearly two months entering data, proofing output, and extracting individual instrumental parts for this piece directly alongside Leland Smith, making adjustments to his code to accommodate the idiosyncrasies of my score. Today, using *Finale* or *Sibelius*, the same work would take a couple of weeks at most.

This story illustrates a common thread in the history of music software: most of the innovations have been the product of professional musicians who became highly skilled programmers. Chowning's FM synthesis technique and Smith's *Score* program are just two examples of this kind of creative symbiosis—the realization of an artistic objective through software development—and many examples of this music-science research can be found in the domain of digital sound synthesis.

This chapter is not the place for a detailed examination of the history of computer music. However, the previous examples serve to amplify the central point—innovation in music media software has emerged from artistic challenges combined with scientific research. Digital sound synthesis, MIDI sequencing and production, audio recording and mixing, music engraving, and music and audio signal analysis among many other music production categories have profoundly transformed musical creativity and the processes of music production. I will explore some of these transformative outcomes below but first it is instructive to consider the impact of new technologies from the perspective of the listener.

IMPACT ON LISTENING

Public distribution of music is said to have begun with an extraordinary invention by Thaddeus Cahill in 1897—the telharmonium, also known as the Dynamophone (Weidenaar 1995). An immense two-hundred-ton structure of sound-producing spinning dynamos controlled by a two-player keyboard pumped acoustical (not electrical) audio over the telephone network in New York City. Three versions of this instrument were built delivering concerts until 1916 of classical music to local telephone receivers. Cahill's vision of subscriber-funded mass distribution of music to homes, stores, theaters, and hotels over a private telephone network was eclipsed by the emergence of radio broadcasting in the 1920s. Though ultimately a commercial failure, the Telharmonium was the model for two highly successful music technology innovations during the 1930s: the popular Hammond Organ invented by Laurens Hammond and Muzak, invented by army signals expert, Major General Owen Squier.

Muzak's success was predicated on the concept of functional music; that is, collections of music arrangements that were presumed to produce a

beneficial state of being on workers, shoppers, and even farm animals. The derisive “elevator music” term came from the ubiquitous soporific instrumental string orchestra arrangements of popular songs; first the balladeers of the 50s (Frank Sinatra, Bing Crosby, Peggy Lee), then later, rock music. What could be more odious than 100 violins playing the Stones’ *Satisfaction*? Muzak abandoned the string orchestra model in 1987 having realized that there was more than enough “easy listening” product to deliver the real thing (Muzak, Inc.). Today, with over sixty channels of packaged music programs beamed primarily by satellite to subscribers we, as unwilling listeners, are awash with wall-to-wall Sting, Stevie Wonder, and Simon and Garfunkel. I imagine that these programmatic selections are the contemporary equivalent to the polite classical repertoire Cahill deemed “respectable music.”

Like listening to radio programming, the Muzak listener is completely passive. Someone else is making the decisions about playlists based on factors that have some perceived economic viability. For commercial radio it is all about ad revenue, demographics, and market share. For Muzak it is targeted environmental sound filler optimized for different workplaces. But with Muzak, unlike radio, the listener has no power to change the channel or even just switch it off. Worse, when bombarded by canned music stations like Muzak we have no choice but to hear every note: there is simply no way to “close our ears.” Instead, we have become adept at hearing without listening, of tuning out the perpetual background murmur of *music lite*. (I have often wondered what the visual equivalent might be: tropical fish tanks?)

In 1979 SONY introduced the Walkman, a portable listening device that significantly altered our listening habits. Today, after several technological advancements and numerous competitors, the SONY model of personal listening has succeeded. No longer passive receivers, listeners stock up their personal music players with their own playlists culled from vast catalogs (both legal and illegal) of popular and classical repertoire. Now the “elevator music” of the 70s has been transformed into personal music stations leaking out that annoying high-frequency “tch tch tch” from ear bud headphones into everyone else’s private spaces. The technologies of data compression, especially the now ubiquitous “mp3,” were a crucial step in this transformation.

In the summer of 2000 I had the opportunity to hear mp3 encoding technology in the acoustically pristine listening labs of the Fraunhofer Institute in Erlangen, Germany. Co-inventor Karlheinz Brandenburg demonstrated the mp3 codec with several types of music—pop, jazz, orchestral and choral—proving his primary objective: that audio compression need not minimize audio quality. The mp3 format (a short-hand for MPEG-2 Layer 3) reduced CD-quality digital audio data rates by at least a factor of ten,

making Internet distribution of music recordings feasible. Patented in the US in 1996 and released under licensing agreements with the Fraunhofer Institute, mp3 rapidly became the universal standard for digital music distribution and the central technology for portable music players. One could argue that many of the ills the record companies and music radio stations face today are directly attributable to the high quality of the mp3 codec. An equally important factor was the decision by Fraunhofer to release the mp3 decoding software royalty-free, resulting in an avalanche of software and players. Portable music devices like Apple's iPod are predicated on these low bit rate audio codecs such as mp3 and its successor, AAC (advanced audio compression) (MPEG.org). It is important to recognize that these players also rely on other significant technological advances, especially low-cost digital flash memory systems and the extreme miniaturization of analog/digital hybrid devices necessary for audio input and output.

From the first audiocassette-playing Walkman in 1978 (which legend suggests was built to ease the long transpacific flights for then SONY co-chairman Akio Morita, who wanted to fill the time enjoying opera) to the dizzying mp3 player marketplace today, personalized music listening has eclipsed all other forms of listening, including radio and home stereo players. Portability and instant access have come to completely dominate our listening habits. With device storage capacities exceeding one thousand songs (hundreds of operas?), personal playlists are effectively limitless—so much so that devices such as the minute Apple iPod Shuffle strive to spare the listener from having to organize their favorites by providing a random selection mechanism. Who can manage and catalog one thousand songs? How do you make decisions about this or that song? Who can remember all those downloads? Recognizing this problem, Apple has added a voice-speaking component to announce the title and artist of each song (which requires accurate metadata to be transferred with the music download), thus dynamically reminding the listener what they have stored on their device. The system, not the user, remembers.

The iPod phenomenon perfectly embodies the three criteria for new media: an exquisite design and user *interface* (which in the best products like the iPod are indivisible); instant and ubiquitous *access*—not only to the stored playlists but to immense song download sites; and effortless task *iteration*. Simplifying task iteration is arguably the most important of the three criteria, and efforts to address this issue can be readily observed in Google and other search engine technologies. Of course, providing information access is *functionally* the primary objective of any searchable database system, but Internet consumer systems have moved far beyond the automated card catalog or word finder. Consider the process of online purchasing at Amazon.com: we are offered items that we may wish to buy based on our own prior habits and on the habits of other buyers. Like song

downloads that carry metadata in the XML header information, the items we buy are cataloged with sufficiently rich descriptors to permit multiple relational references. Meaning, the “you may also wish to buy” process can be derived from many more metadata components than simply the name and category of the purchased item. Combine this process with comparisons across thousands or even millions of buyers and these systems begin to *appear* to make reasonable choices. When we shop at Amazon, our user profiles become stuffed full of searchable information constructed from our own purchasing history and compared to the histories of all the buyers in the database. Thus, not only does the task of buying become progressively easier, the task of *choosing*—actually finding and selecting merchandise—moves into the murky area of computer-assisted shopping. The construction of user preference tables in these shopping systems is based on relationships among database fields stored as text descriptors. We are never *really* asked our preference for this or that or how we *feel* about a certain product. But extracting and cataloging our *emotional* preferences is exactly the kind of “assisted shopping” that current research in music information retrieval is investigating.

Automatic identification of sound segments, a central aim of music information retrieval, is predicated on technologies that can analyze and compare audio tracks without relying on preconstructed text-based descriptors. One area of application is copyright infringement; song authorship can be tested by software that recognizes critical musical features in each audio segment, generating a ranked similarity score. If the match is high then it is very likely that one of the pieces contains copied materials. Another application is software to assist sound effects artists who normally do not have the time to audition every entry in vast commercial digital sound effects libraries, some with over 100,000 individual sounds. Though the libraries are constructed in directories—for example, “car sounds”—there are simply too many to make quick, informed choices. Audio feature recognition software allows a sound designer to first select a sound they are interested in; then it directs the software to search for similar sounds in other files. Though this type of research is more than a decade old, we gain some insight into the process by the following excerpt from a recent paper by Stephen V. Rice, one of the Comparisonics founders:

[Rice] developed one of the first “sound-matching” algorithms and it is incorporated into *FindSounds Palette*. Any sound can serve as the example sound in a sounds-like search, and *FindSounds Palette* responds by retrieving the most similar sounds. A similarity score, on a scale from zero (least similar) to 100 (most similar, i.e., identical), is shown for each hit, and the hits are displayed in decreasing order of their similarity scores so that the best matches appear first. (Rice 2008)

These applications of automatic music recognition target narrow areas of the music industry, but there are ramifications of this research for the general listening audience. First though, let's consider the popular Internet radio site Pandora. This site uses a system Pandora calls *The Music Genome Project*. Apparently skilled music theorists conduct analyses of each musical selection to construct 400+ element descriptor tables for each song. From the website we learn that:

The Music Genome Project's database is built using a methodology that includes the use of precisely defined terminology, a consistent frame of reference, redundant analysis, and ongoing quality control to ensure that data integrity remains reliably high. Pandora does not use machine-listening or other forms of automated data extraction. (Pandora)

In short, Pandora makes preference matches based on sets of keywords from manually executed music analyses. Many listeners would say that this works rather well. But my request for a jazz piece by Herbie Hancock yielded a "similar" song by a band called Biohazard. This is not even close to the musical style of Hancock, despite the statement on the site claiming that both pieces exhibit "minor key, heavy guitar, strong beat," and other attributes. Nice try, Pandora, but not even close! Jazz pioneer and creative giant Hancock and some inconsequential thrash band in the same playlist? No one with any musical knowledge would categorize the music of Herbie Hancock with metal guitar music. I submit that the reason my Pandora test failed is that music theory-based descriptors—no matter how many and how clever the analysts may be—do not convey truly salient auditory perceptual characteristics. A very different research strategy by a team at NYU and Harvard Medical School shows much more promise. Sourcetone.com was founded in 2004 to develop a new type of Internet radio that is based on matching emotional descriptors such as "sad, aggressive, ecstatic" with audio signal feature analysis data. The Sourcetone site states:

Through the joint efforts of the Sourcetone Research Team and research conducted at Beth Israel Deaconess Medical Center/Harvard Medical School, Sourcetone delivers music through Sourcetone Interactive Radio and its Music Classification System Technology[®] evaluative system, Sourcetone Music Library, and groundbreaking software and audio engineering applications. Sourcetone Interactive Radio provides music tailored to individual, emotional, and musical preferences based on extensive empirical research. The company engages in far-reaching research to increase the role of music in such diverse areas as health, education, business, and culture. (Sourcetone 2008)

From private discussions with composer-scientist Robert Rowe, part of the Sourcetone team and a music professor at NYU, I learned that formal studies

on musical preference and emotional impact were undertaken with a large number of subjects then aligned with data from audio signal feature space analysis to produce data for the Sourcetone similarity wheel—a kind of on-screen preference joystick.

The emotion space wheel is the central interface component of the radio station. After selecting a music genre such as *blues*, one is invited to “click anywhere in the circle.” The matching algorithms then find a song similar in style but that exhibits the newly selected emotional attribute. My trials certainly worked better than the Pandora experiment, but being unfamiliar with much of the music in the Sourcetone catalog, I can’t really make a reasoned assessment of how well this all works. The website clearly states that Sourcetone is currently in beta testing and I look forward to experimenting with this compelling research in the near future when the project is officially launched.

What is evident from these examples is that *access* to music is not the online music listener’s primary problem. In fact, we now have access to too much music. The real problem is helping listeners find songs that they like. With computer-assisted song selection based on proven psycho-acoustical feature analyses, one can easily imagine a feature on the iPod dial interface that, like the Sourcetone wheel, successfully selects just the right playlists for each and every mood and listening occasion. From being passive receivers of corporate radio playlists to ubiquitous mobile personal listening to automated preference management, listeners should be able to enjoy nearly unlimited access to musical selections customized precisely to their personal preferences.

IMPACT ON WORK

The rapid growth of the recording industry during the 1960s reflected the explosion of rock and pop youth culture. To meet the demands of this new kind of music making, the professional audio equipment industry produced a steady stream of innovative technologies that gave sound engineers greater and greater flexibility and new creative ways to record and mix. Studios bristled with expensive high-end gear—24-track tape recorders, immense and very complicated mixing desks, and forests of superb microphones, all set in seductive soft lighting. Many musicians were drawn away from playing gigs to become recording engineers and record producers trading life on the road for the glamour of the studio.

During the same period a parallel growth in opportunities for studio musicians occurred. Studio pay rates in North America were then and are still tightly controlled by the American Federation of Musicians. Top players and arrangers could make a great deal of money doing overdubs for

rock records, making jingles for radio and TV ads, and playing film and TV movie scores. For about fifteen years—up to the mid-'80s—there was enough studio work in most major cities to support a large contingent of musicians earning hefty union rates as so-called “side men” playing string and brass arrangements for the commercial music industry.

Two key factors have led to a substantial compression of this once thriving scene. First, the availability and relatively low cost of studio hardware has substantially lowered the entry barriers for all kinds of recording and production. Second, the musical tastes have changed dramatically. The punchy horn styles of '70s bands like Chicago and Blood, Sweat and Tears and the gushy string overlays that seemed obligatory for every slow ballad became totally inappropriate for the musical styles of the new bands. No one wanted to make recordings that sounded like disco or the overproduced mush of the late 1980s. What would a '90s power group like Bon Jovi or Van Halen want with a string orchestra? (A brief side note here: the “easy listening” Muzak channels we hear literally everywhere are still saturated with strings, flutes, and French horns so the studio scene has by no means totally disappeared.) With the exception of mega-budget thrillers like *Spider-man* or *Lord of the Rings*, movie sound tracks have also moved away from the traditional orchestral scoring that has dominated the industry since the 1930s. Young filmmakers I interact with in the Radio-TV-Film department at the University of Texas want “authentic” music—music that they would want to hear on their iPods or in a club. (I cannot help but wonder why the superb music of film scoring masters such as Enrico Morricone and Jerry Goldsmith are now considered “artificial.”) My recent private conversations with the well-known film and TV composer Paul Chihara, who now teaches film scoring and composition at UCLA, provides further evidence of this aesthetic shift. He confirmed that even the A-list players in L.A.—Hollywood's very best orchestral and jazz musicians—have seen a substantial reduction in session work and a subsequent downsizing of their lifestyles.

Over the past fifteen years or so, commercial music has been dominated by hip-hop and rap—styles that have emerged in part from low-cost music technologies. Scratch music, DJ, techno, house, bass, and drum to name just a few sub-genres of electronic music, are predicated on digital music systems such as those described in the opening section of this chapter—digital audio mixing software, sound synthesis and sampling software, MIDI sequencing and editing software, along with custom devices for manipulating vinyl records and compact disks. Originating from traditional analog turntables and audio mixers, the DJ performance systems today are compact digital performance devices that can play regular and mp3 compact disks. A typical dual CD player has a built-in microphone inputs, a mixer section, and cross-faders to move from one sound source to the other. It is easy to understand how manually changing the speed of an analog vinyl

record—scrubbing the platter back and forth, for example—would change the sound from higher to lower, forward and reverse. It is not at all obvious how this works for digital media, as no equivalent of the record groove and needle exist. Very sophisticated digital signal processing software operates within the device that gives the DJ performer an interface that *behaves* like a vinyl record player. The tactile and tangible motions of scrubbing a vinyl record past the needle are now simulated by complex algorithms embedded within the hardware.

Low-cost PC software for remix and DJ applications offers functionality similar to the hardware devices minus the platter controllers. In the descriptions of one such PC software product, MixMeister Fusion, we are told that:

MixMeister Fusion frees you from monotonous tasks like beat matching, setting cue points, and counting beats in your head. It gives you the power to unleash your creativity and shape your music in a million ways, with live looping and remixing, VST effects, harmonic mixing and more. (MixMeister)

Why learn all those tricky tasks like beat matching and counting when the software will solve the problem? It is unlikely that any but the vinyl purists care how any of these systems work. And why should they? Their interests are to make new tracks and to perform at the club. The more automated assistance the tools can provide the better.

Computer-assisted music functionality also appears in products such as Apple's GarageBand. GarageBand, shipped free with every Mac, has evolved from predominantly a sample loop player (more about loops in a moment) to include an attractive and ingenious live performance mode. When the user opens GarageBand '09 (version 5.1) he/she can select "Magic GarageBand"—a live performance stage in which one can choose a genre, select from a bank of instruments, then click the play button to hear the result.

The stage view has spotlights that indicate where to choose an instrument sound. The instrument depicted in the center is the user's performance instrument for karaoke-style play-along from an external MIDI keyboard. All of the instruments shown on the stage can be changed. For example, by clicking on the guitar, the software offers a variety of guitar models and playing styles, all within the context of the genre.

Next, the preconstructed musical content, such as a gritty blues setup, can then be opened and edited in the track view of the software. The chunks arranged into tracks—guitar, organ, drums, etc.—consist of short recordings of actual performed music called loops (in this case, the quality of playing is quite convincing). The loops can be repeated, extended, matched to specific tempos and keys, and ultimately assembled into a complete song. I like to call this "Lego music" as one can build and rebuild quite complex and

intricate pieces from the thousands of loops available within the software and from countless online third-party sources. The software also provides for audio and MIDI recording from microphone or keyboard and these new recordings can be cut up and stored in the user's personal loop library. If loops are the snap-together building blocks, the materials from which these blocks are made are individual instrument samples. Sound sample libraries are collections of recordings of individual notes of hundreds of Western and non-Western instruments played with different articulations, dynamics, and even "feel."

Sound samples can be played by a MIDI instrument or, as is more common, controlled by MIDI loops and tracks. Though sample playing systems are not new, the rapidly increasing ease of constructing convincing musical passages coupled with the high audio quality of digitally recorded audio samples and loops has had a profound impact on commercial music production.

Sample-based scoring is displacing the traditional two-stage process of first composing then recording a score. Composers now produce complete, polished digital simulations. In the film industry these simulations are often referred to as "mock-ups" and have been normally reserved for preproduction simulation and verification of the style and timing of the eventual "real" music. But the quality of these mock-ups now is so good that many producers are reexamining the enormous budgets needed to contract arrangers, copyists, and professional orchestral musicians plus the \$200–\$500 per hour recording and editing studio fees and are turning instead to sample-based simulations. By doing so they may forfeit some of the excitement and emotional veracity of performed music, but there are other significant gains beyond the elimination of studio costs. During post-production it is often likely that scenes will be added, dropped, lengthened, shortened, or altered in some way by the director and picture editor. Sometimes these changes occur after all the music has been recorded and edited. Sample-based music tracks offer a distinct advantage here—they can be adjusted and regenerated with a few mouse clicks, thus eliminating the need for additional and costly recording sessions. The ease with which versions of the same musical materials can be rapidly adjusted and re-recorded has no equivalent in the real world, and film producers have begun to recognize significant reductions in time and expense by using mock-ups as the final product.

In the computer game industry sample-based music is the norm. The short repetitive music tracks common to most computer games have evolved from simple electronic sounds into lush, but entirely artificial, orchestral phrases or, even more common, driving hip-hop style beat music. We also hear sample music in many television shows such as *CSI*, *Law & Order*, and made-for-TV movies. The much smaller music budgets and

short production schedules for these entertainment products made them a prime target for digital audio tracks. In fact, much of the music for these shows is created by a single composer-performer in his or her own personal production studio, thereby completely eliminating audio recording and performer production costs. Of course there are still some traditional orchestral scoring contracts for big-budget feature films but overall, digital music technologies are clearly responsible for an erosion of the role of the professional musician and a decrease in recording studio revenues across the entire entertainment industry.

For the novice or amateur, the automated features in software-based music systems like GarageBand minimize the learning curve and accelerate gratification. The musical materials delivered with the software—loops, MIDI tracks, sample libraries—continue to expand with each release and are readily augmented from countless online resource sites extending the palette of choices to accommodate many musical styles. Certainly these programs facilitate amateur music making. Thus as Andrew Keene suggests in his book, *The Cult of the Amateur* (Keen 2007), they will help engender more and more low-caliber YouTube offerings. But all the wringing of hands over amateurism on the Internet is really misplaced in music. Amateurs have been creating and performing wonderful music and enriching their cultures for centuries! Can we say, for example, that Luciano Pavarotti was a “better” singer than is Bob Dylan? Of course. Does it matter? Not a bit.

Given that the mechanics of sound and MIDI recording and editing are essentially solved and readily executed on even modest home computers, we can expect future generations of music software to focus on the automation of complex music composition decision-making functions. Programs will include more and more compositional operations to assist the user with hard choices such as how to construct the bridge or “B” part of a song such that it is different yet exhibits the essential properties of the “A” part. While the great songwriters seem to get this right intuitively, these are hard concepts to learn (and to teach for that matter). Current research in music theory, music cognition, and music mathematics seeks to uncover these deep structural elements in music and to express them algorithmically. This research, along with the development of new instruments and music control devices, is spawning new modes of music making and I will explore a few of these in the following section. But first, I will share a Yahoo exchange from two years ago (Yahoo 2007) that reveals how audio software has truly become an online commodity much like Internet cookbooks:

Question from noor_sk: How can u remix songs? how do u remix parts of one song w/ another? like i wanna know how i can get 1 part of 1 song, and next part is from another song? please tell me!!! i will reward 10 pts 2 d best and most clearly described answer!!! Thanx.

Best Answer—Chosen by Asker: Go to www.download.com and search for 'audio mix' or 'song mix'. there are lot of software you can use for this. sound editing is an art—each software is somewhat deferent and you have to choose what is most comfortable with you. Most of the software let you add multiple songs in to it is interface and some even display time line graft and let you move the audio tracks overlapping on each other.

Asker's Comment: thanx . . . i did dis and got wat i needed but its jus a trial and ends in like 7 days. (Yahoo Answers UK 2007)

Maybe before the trial period ended noor_sk created a startlingly original and poignant remix that is still floating around the remix sites. Maybe not.

EMERGING GENRES

The invention of new instruments for music performance has a long, wonderful history. The Hammond Organ, Moog synthesizers, and the Yamaha DX7 series are only three of countless electronic and digital performance devices invented since the early part of the last century. Instrument design, software development, and powerful personal computers have contributed to the emergence of entirely new musical genres. To keep the discussion manageable, I will examine the following three trends: interactive music, installation/performance art, and finally generative and autonomous music. Unlike music made in the recording studio that produces a "fixed media" object such as a compact disk, these three genres are unified by the role of the computer as participatory agent. Meaning, the computer music system contributes in a significant and inextricable way during the realization of the composition or performance.

Interactive Music

Personal computers in the 1980s were not fast enough to generate or play sound, but synthesizers and sound processing devices were being produced that supported MIDI connections that could communicate with computer software in real-time. The first programmable MIDI software was developed at Carnegie Mellon University by Roger Dannenberg. His work, called the CMU MIDI Tool Kit (Dannenberg 2006) was followed by many other efforts including my own MIDI-LIVE software developed in the early 1990s (Pennycook 1991). These programmable MIDI languages permitted composers to create pieces in which music data generated by one or more performer(s) could be captured, processed, then replayed in real-time. Thus, a kind of dialog between the performer and the computer software can be constructed. Using current hardware that does support real-time

digital audio processing, in pieces such as those by University of Texas composer Russell Pinkston, the software constructs new sonic events directly from the sounds of the performer (a flute for example). This is a very different concept from traditional soloists and accompaniment pieces such as a Mozart violin sonata in which both parts are composed in their entirety then performed as written. In interactive compositions, the accompaniment is often derived directly from the actions and sounds of the soloist during the course of the performance, thus taking on a dynamic and even improvisatory role for much of the piece. In short, the computer becomes an equal partner during the performance.

Today the software most widely used by the interactive music community is Max/MSP. It combines both real-time MIDI data processing and real-time sound signal processing. Taught in university music programs throughout the world, Max/MSP has become the dominant software for all forms of interactive music creation. One the primary reasons for this is that it is programmed through a visual interface complete with familiar objects such as knobs, sliders, and signal meters. Augmented by hundreds of additional processing modules that can be downloaded for free, this software provides the interactive music community with a common creative platform for interactive music and performance art.

Recent versions of Max/MSP are now compatible with the award-winning and widely used live performance software Ableton Live. In a testimonial on the Live site, recording engineer and producer Al Riley sums up the features perfectly:

"Live is awesome. For me it's consistently the fastest and funnest way to create music . . . whether that be creating beats in the studio, programming a DJ mix or performing live. And with the new synths and sample sets there's not much more you need."

By combining the audio software programming power of Max/MSP with an efficient and effective performance tool such as Live, composer-performers can create quite elaborate and responsive real-time interactive performance works. The functions and operations of the digital recording studio plus sample and loop control plus software-mediated live performance plus visual image manipulation has helped transform computer music into dynamic and responsive real-time interactive performance systems. Over the past decade this kind of music-making has migrated from academic music conferences and festivals to the pop/commercial world. Perhaps the best-known artist in the genre is DJ Spooky (Paul D. Miller), whose politically charged DJ/VJ remix shows such as "Rebirth of a Nation" have received rave reviews and led to concert tours that would rival those of any rock group. Below is a response to a DJ Spooky performance by an unnamed journalist in New Zealand:

[DJ Spooky] is as brainy as a Mensa meeting, sharp as Zorro's sword, funny as Falstaff. He is Einstein with a better haircut, a streetwise black Tolstoy, a revved-up renaissance man for the digital age, obsessed with art, information and digital technology.—*Sunday Star Times* (Auckland, NZ)

The live interactive performance pieces and systems that DJ Spooky has created effectively combine all the elements of new media: digital audio, digital video, digital imagery, samples, clips, loops, plus remixed media foraged from old media, hip-hop culture, and the Internet. These pieces would not be possible without the past scientific and technical innovations of the digital media community nor would they be possible without modern personal computers. Though multimedia performance pieces have existed since the 1960s, what has changed is the availability of relatively inexpensive and highly flexible new media software and hardware created to facilitate interactive art.

New Interfaces for Music Performance

Concurrent with the development of interactive performance software has been the invention of new performance devices. Robert Moog's analog synthesizers were predicated on piano-style keyboards, but they also included innovative sound controllers such as a rubber ribbon above the keyboard to permit continuous glissandi and sets of knobs and buttons to alter the sounds during performance. Over the past thirty years these alternative controller (meaning non-keyboard) concepts have led to an explosion of commercial and experimental electronic and digital devices to manipulate sound and enhance musical expression.

Every electric guitar player uses an array of foot pedals, switches, and stomp boxes. Some are simple, such as volume pedals, while others are quite elaborate, producing signal delay (like echo or tape looping), reverb, and various kinds of distortion effects. These devices *extend* the guitar player's sonic palette by providing an array of sound-altering devices easily controlled on stage. But perhaps more interesting are the totally new modes of performance presented by inventions such as Donald Buchla's *Lightning*, which first appeared in the late 1980s. Buchla describes *Lightning III* as follows:

LIGHTNING III is a specialized MIDI controller that senses the position and movement of handheld wands and transforms this information to MIDI signals for expressive control of electronic musical instrumentation. In addition to functioning as a powerful MIDI controller, LIGHTNING III, with its self-contained 32-voice synthesizer, comprises a complete, ready to play instrument. (Buchla and Associates)

Buchla's Lightning device exemplifies the central motivation of new instrument designers: the desire to explore new modes of human expression through the detection, coding, and transmission of physical movement. Interest in human motion sensing has led to the emergence of a boutique industry that builds specialized body sensors for the music, dance, and installation art creative community. The most widely used devices are from the Italian company Arduino. Their website describes their product line as follows:

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. (Arduino 2009)

Their tiny programmable interface board accepts a variety of sensors and controllers that capture and codify movement. The output of these interface devices communicates directly with programs such as Max/MSP and Processing, a popular image synthesis and manipulation programming language. Sensors can be acquired from numerous diverse sources. For example, the company iCubeX markets many devices that can transmit information about heart rate, galvanic skin resistance, joint flexing, and proximity to other objects, to mention just a few. These physical motion sensors have enabled new forms of collaboration between musicians, dancers, and visual artists. With these devices, movement is captured and translated into control information for the creation of interactive performance art exploring new territories of human expression.

Specialized controllers are well known to the gaming community. Car wheels, joysticks, laser guns, game pads, dance surfaces, and other game-specific devices have been invented to simplify and enhance game play. Recently the digital entertainment industry has entered the area of motion control. The immensely popular Wii console from Nintendo introduced the Wii remote. Nintendo's novel controller wirelessly transmits movement in the form of three-dimensional acceleration data, along with signals from the various buttons on the device. One of Nintendo's advertisement clips shows a woman doing a fitness exercise with a Wii-mote (as it is called) in her hand with Nintendo's Nunchuk extension attached to her thigh. The impact of this device on the game community and on interactive performance artists cannot be overstated. Interest in the Wii-mote has generated new research in low-cost motion tracking, such as the novel head-tracking systems by Johnny Lee; produced low-tech amateur interactive pop bands (also inspired by the popular Guitar Hero and Rock Band games and devices); and led to new forms of "art" music pieces, such as those by composer Jeff Stolet, a music professor at the University of Oregon.

Stolet has created a series of works that incorporate Wii-mote sensing data. In one of his pieces Stolet uses two Wii-motes to perform and conduct computer generated piano sounds. He is able to affect tempo, dynamics, pitch range, and other direct musical parameters as well as control the sectional progress of the piece through motions and button data from the device. Stolet's interactive pieces blend the traditional roles of the player and the conductor, suggesting entirely new modes of music creation and performance practice.

Some performers, especially dancers, find controllers attached to their bodies inhibiting and have turned to other forms of motion detection. Research and development in camera-based motion capture systems grew out of military and surveillance initiatives and is now widely used in the creation of moving image data for animated computer graphics. Early applications of motion and color detection for artistic purposes were pioneered by visual artist David Rokeby, whose installations based on his "Very Nervous System" have won him worldwide acclaim. The most recent versions of his software, along with similar packages for Jitter (the image-processing component of Max/MSP), are now a part of the lexicon of interactive dance-music-image creativity and production.

If we consider the Wii-mote to be a commercial game version of devices like Buchla's Lightning, stunning new research from Microsoft will bring full-body motion capture to the commercial space. Project Natal, part of the Xbox360 development effort, promises "Controller Free Gaming and Entertainment." A tiny video camera and microphone array are mounted in front of the player to capture motion and sound directly from the player's movements. *USA Today*, reporting on the unveiling of Natal in June 2009, by Don Mattrick of Microsoft accompanied by legendary film producer and now game developer Steven Spielberg, described the event as follows:

Microsoft executive Don Mattrick demonstrated the technology, code-named Project Natal (named after a Brazilian city). Live demos included a painting game that lets players fling paint onto the screen like Jackson Pollock. Another dodgeball-type game had a player moving forward and back, left and right, using arms, legs and the whole body to ricochet balls and knock down walls of 3-D tiles. (Snider 2009)

I have not yet had the opportunity to try this new technology, but the online demos at the Xbox360 site and on YouTube are very intriguing. The Natal interactive technology initiative extends well beyond motion-capture to include voice and speaker recognition and individual facial recognition. These features are demonstrated in different kinds of game play scenarios and, more impressively, in demo clips of a boy avatar called "Milo." Milo appears to communicate verbally and emotionally with a human in unscripted

man-machine situations. If all this really works as well as the demos suggest, Microsoft is poised to significantly expand interactive capabilities into the realm of simulated personal communication. Predictably, the Natal technology—renamed and marketed as Kinect, has entered the creative arts world along with the Wii-motes and plastic guitars from Guitar Hero.

The transformation of game controllers into music performance devices is simply another moment in the history of mechanical, analog, and digital musical instrument design. Researchers at centers such as STEIM in Holland, founded forty years ago, and CIRMMT—The Center for Interdisciplinary Research in Music, Media and Technology at the Schulich School of Music, McGill University—are exploring new modes of music performance using analyses of human physical and psycho-acoustical behavior. Much of this work is presented at conferences such as NIME—New Interfaces for Musical Expression—now in its tenth year, and in competitions such as the Guthman Musical Instrument Competition. (The winning entry last year was Jaime Oliver's "Silent Drum," which used a camera to detect and analyze motion of an elastic drumhead.) Admittedly, most of the musical results are experimental, residing exclusively within the genre of computer music, and it is unlikely that John Adams or Phillip Glass will be incorporating these new devices in their next commissions. But in 1840, Adolph Sax envisioned a new wind instrument that had string-like qualities derived from the properties of both the brass and woodwind families. He could never have imagined what his saxophones would become in the gifted hands of Charlie Parker and John Coltrane.

Generative and Algorithmic Music

The first computer-generated composition is purported to be the *Illiad Suite* (1957) for string quartet, composed by Lejardin Hiller in collaboration with Leonard Isaacson at the University of Illinois Champagne-Urbana. Since then, there has been a rich and continuous history of music research and compositional output from programmer-composers. Using computational algorithms such as Hidden Markov Models and stochastic probability theories, composers have constructed programs to manipulate numerical representations of pitch, rhythm, dynamics, register, instrumentation, and other musical parameters. Seeking greater insight into the medium and long-term control of these parameters, composer-programmer David Cope developed composition systems based on formal analyses of musical practices. Cope, now a professor emeritus at the University of California at Santa Cruz, has published nine books on the topic including *The Algorithmic Composer* (Cope 2000), completing a trilogy of books on musical intelligence, music analysis, and musical style simulation. Anyone with even a cursory knowledge of music knows that a connection exists between scales,

chords, and harmonic progressions and numbers. Extending this idea to formal (meaning computable) descriptions of structural elements such as musical phrases or even entire symphonic movements presents formidable challenges. Though some of Cope's impressive simulations of the musical styles of Mozart and other masters can fool even trained music scholars, producing full-scale original symphonic compositions remains elusive. The following two examples, however, show that generative music creation research can be successfully applied on a somewhat smaller scale.

Generative Music Apps

A charming and entertaining download created by ambient music composer Brian Eno and musician-programmer Peter Chilvers appeared for the iPod in 2008. *Bloom* capitalizes on the iPod's multi-touch interface. Touching the iPod screen with one or more fingers generates pleasant little pings that evolve into sustained, soothing ambient electronica. A more recent download from Eno called *Trope* promises the following:

Trope, designed by ambient pioneer Brian Eno and musician/software designer Peter Chilvers, expands further on the ideas introduced by *Bloom*, their acclaimed iPhone application. Darker in tone, *Trope* immerses users in endlessly evolving soundscapes created by tracing abstract shapes onto the screen, varying the tone with each movement.

The interface for *Trope* presents a kind of dreamy pastel finger-painting system that produces tones and layers within the preselected "mood." The moods are whimsical made-up names (at least I think they are made up) that lead the listener into slightly different ambient sound spaces while touching and changing a soothing mixture of shapes and colors.

Other music apps for the iPhone created by the company Smule include the wildly popular *Ocarina*, the multi-player *Leaf Trombone*, and *I Am T-Pain*, an app that does real-time voice auto-tuning. They all include some component of automatic music generation. That is, the user need not know very much at all about playing an instrument or making songs to successfully operate these programs. Developer Ge Wang at Stanford's Center for Computer Research in Music and Acoustics (CCRMA) states on his home page that his interests are in "social music making," echoing the social interactions of Web 2.0 applications. Wang also leads the Stanford laptop orchestra called SLOrk, in which a group of twenty or so laptop programmer-performers engage in networked, interactive algorithmic compositions.

While for most audiences laptop orchestras may seem rather esoteric, Smule's clever iPhone apps remain in the top ten at the iTunes store and have sold millions of copies, generating a fortune for Wang and his company.

Automatic Film Music

Turning again to the impact on film music scoring, computer-assisted composition has appeared in music software packages such as Cinescore from SONY Creative Software that allows the filmmaker/composer to “automatically generate an unlimited number of musical compositions using royalty-free Theme Packs in a wide array of popular styles.” The intent here in part is to address the shortcomings of canned, royalty-free tracks that have fixed length, tempo, and key, and thus may not fit perfectly within a given scene. The user-composer starts by selecting from a set of typical pop styles suitable for scenes such as a casual gathering in a bar. Then, assisted by the routines within the program, the composer/operator can customize the tracks to fit the visual materials and scene timings. Applications such as Cinescore are not truly generative in that they don’t really produce the musical materials directly from computer algorithms. But manipulating thematic material into complete music cues for the screen is a demanding and difficult part of the creative composition process, and programs like Cinescore significantly lessen the burden. There will be many more programs like this over the next decade, with deeper and more sophisticated modes of compositional automation such as deriving the temporal structures and emotional style of the cue directly from automatic image analyses of the screen content coupled with automatic speech recognition of the dialog. The extracted information could then generate complete musical sound tracks from thematic and sample libraries that automatically and dynamically conform to the film content.

Popular social music apps and automated film music software systems clearly exhibit the central properties of new media: attractive and intuitive graphic interfaces; access to stored musical resources such as thematic materials, style descriptors, and sound resources; plus the simplification of complex musical operations into simple, repeatable commands. Generative and autonomous composition systems will extend these properties further by creating musically rich constructions. As generative music technologies mature, more and more of the difficult tasks of composing will be provided by software and like assisted shopping at Amazon, the act of *choosing* a personal musical expression will be assumed by the program.

DISCUSSION

Music and audio technologies have led the media hardware and software world since the first digital recordings and CDs in the 1980s. There are three primary reasons why this is the case.

Telephony and Acoustical Research

Research by the major telephone companies, especially Bell Laboratories in Murray Hill, New Jersey, has produced many of the most important fundamental scientific and engineering innovations in audio and speech processing. A primary motivation for these efforts was the explosive growth in telephone traffic in the post-WWII period. Companies like Bell required new solutions to manage call switching and to constrain overall call volume. Both problems were addressed by the conversion of analog electrical telephone systems to all digital networks. Digital telephone technologies permitted computer-controlled call management and switching, multiple calls on the same digital cable through packet multiplexing, and precise control over audio quality. Other innovative audio technologies have led to our modern digital telephone system offering features such as automatic voice and speaker recognition, automatic caller response and, most important, relatively inexpensive local and global calling. Telephony—an exclusively audio-based world—is an essential service affecting every aspect of our lives, and I would submit that there is no equivalent mode of communication. The sound and music software I have described above has evolved from the vast wealth of knowledge from digital telecommunications research.

Numerical Basis of Music

Music theories reach back to the Greeks. The invention of the single string instrument, called the monochord by Pythagoras in the sixth century BC, was to attempt to reveal the uncanny correspondence between physical vibrations and musical tuning and scales. Concepts of harmony and proportion have appeared in nearly every music theory treatise since then seeking to uncover and formalize the presence of numerical relationships in music scores. One of the defining aspects of music is that, unlike painting, dance, sculpture, and film, these numerical representations and properties can be codified, analyzed, and subsequently computed. The vast wealth of music software created since the 1950s, especially programs for composing, is largely attributable to the ease with which musical symbols can be accurately translated into computable entities, then transformed into new musical creations.

Bandwidth and Storage

The data rates of digital audio are at least a full order of magnitude lower than digital video. Table 8.1 is an abbreviated comparison of the approximate audio and video data rates and storage requirements, where Kbps

Table 8.1. Audio and Video Data Rates and Storage Requirements

<i>Format</i>	<i>Typical Data Rates</i>	<i>Approximate Storage</i>
CD Audio	1.42 Mbps	10 MB per minute
Mp3 audio	192 Kbps	1 MB per minute
DV NTSC / PAL	25 Mbps	187.5 MB per minute
MPEG-2 DVD	5 Mbps	37.5 MB per minute

stands for kilobits per second, Mbps stands for megabits per second, and MB stands for megabytes of data.

Given the much lower data requirements for audio signals, especially the very efficient mp3 compression technology, it is not surprising that audio on personal computers and portable devices preceded digital video by several years. Furthermore, the symbolic information in musical scores can be represented in MIDI format, yielding substantial reductions in descriptive data. A MIDI encoding of an entire Beethoven symphony lasting over thirty minutes can be stored in about 200 kilobytes. MIDI software for music sequencing and notation engraving has been available since the 1980s and continues to play a central role in all music software. MIDI also provides an efficient and convenient protocol for controlling and editing sound mixers, lighting boards, real-time gesture capture devices, and much more. The low data requirements for MIDI, along with efficient high-quality audio compression such as mp3, gave music software nearly a ten-year head start over digital video software.

CONCLUSION

A fourth factor explaining the significant role of music in digital media has nothing to do with technology or numbers but is possibly the most important of all—the voracious demand for and cult-like devotion to rock and pop music, which has largely eclipsed all other forms of entertainment. Preferences for very narrowly defined musical styles are powerful cultural identifiers, reflected in nearly every aspect of most people’s lives. Since the British Invasion of the 1960s, allegiance to bands and all the lifestyle elements that each particular musical genre seems to evoke has helped people define themselves and understand the complex world around them. All of this is well known and well documented. There can be no doubt that the global impact of pop music on hundreds of millions of people worldwide exerts a powerful force, encouraging researchers, inventive composers and performers, and the music technology industry to continue seeking new modes of musical expression and enrich our lives with music and sound.

What can be concluded from this chapter is that digital music technologies are helping music audiences create their own personal listening spaces with increasing refinement. They are also reducing the entry barriers to creating music through sophisticated computer modeling of musical processes. Finally, an overriding observation should be the evidence of the central role that musicians have played in the scientific and technical innovations that continue to provide new modes of personal artistic expression. Returning to the Digital Media Alliance Florida definition of new media, there can be no question that innovations in music media are truly a *creative convergence of arts, science, and technology*.

REFERENCES

- Ableton Live. <http://www.ableton.com/live>.
- Arduino. <http://www.arduino.cc/>.
- Buchla and Associates. Lightning III. <http://www.buchla.com/lightning3.html>.
- Chowning, J. 1973. The synthesis of complex audio spectra by means of frequency modulation. *Journal of the Audio Engineering Society* 21(7); reprinted in *Computer Music Journal* 1(2), 1977.
- Cope, David. 2000. *The Algorithmic Composer*. Madison, WI: A-R Editions.
- Dannenberg, Roger. 1996. The CMU Midi Tool Kit.
- Digital Media Alliance Florida. 2007. What is digital media? http://www.dmaflorida.org/digital_media_is.html.
- Finale. Finale music composing and notation software. <http://www.finalemusic.com/default.aspx>.
- Keene, Andrew. 2007. *The Cult of the Amateur: How Today's Internet is Killing Our Culture*. New York: Doubleday.
- Lee, Johnny Chung. Projects—Wii. <http://johnnylee.net/projects/wii/>.
- Microsoft. 2009. Project Natal—Milo demo. http://www.metacafe.com/watch/3111391/xbox_360_project_natal_milo_demo/.
- MIDI Manufacturer's Association. The official source of information about MIDI. <http://www.midi.org/>.
- Miller, Paul. Notes for Paul D. Miller's "Rebirth of a Nation"—Remix of D.W. Griffith's 1915 film "Birth of a Nation." <http://www.djspooky.com/art/rebirth.php>.
- MixMeister. MixMeister DJ Mixing Software. http://www.mixmeister.com/products_mmfusion.html.
- MPEG.ORG. MPEG resources and software. <http://www.mpeg.org/MPEG/audio/>.
- Muzak, Inc. CompanyHistory. <http://www.fundinguniverse.com/company-histories/Muzak-Inc-Company-History.html>.
- Pandora. About the Music Genome Project. <http://www.pandora.com/corporate/mgp>.
- Pennycook, B. (1991). The PRAESCIO series: Composition driven interactive software. *Computer Music Journal* 15(3).
- Rice, Stephen V., and S. Bailey. 2008. A system for searching sound palettes. *Proceedings of the Eleventh Biennial Symposium on Arts and Technology*, New London, CT. 174–179.

- Rokeby, David. <http://homepage.mac.com/davidrokeby/home.html>.
- Score. 2003. <http://www.scoremus.com/>.
- Sibelius. Sibelius—the leading music composition and notation software. <http://www.sibelius.com>.
- Snider, M. 2009. Microsoft unveils hands-free gaming. *USA Today*. June 2, 2009.
- Sony Creative Software. Cinescore. <http://www.sonycreativesoftware.com/Cinescore>.
- Sourcetone. 2008. Sourcetone: Our History. http://www.sourcetone.com/home/about_history.
- Weidenaar, R. 1995. *Magic Music from the Telharmonium*. Lanham, MD: Scarecrow Press.
- Xbox. Project Natal. <http://www.xbox.com:80/en-US/live/projectnatal/>.
- Yahoo Answers UK. 2007. How can u remix songs? How do u remix parts of one song w/another? <http://uk.answers.yahoo.com/question/index?qid=20080314134734AA15F9h>.

9

The Digital Humanities and Technocultural Innovation

Anne Balsamo

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 Ellul 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 chapter, 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-infrastructure 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 emerge 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 focused 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 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 (1963) 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

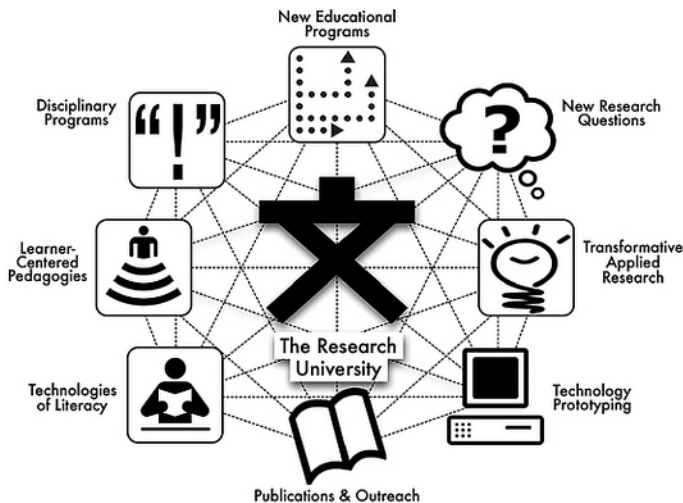


Figure 9.1. Digital humanities and technocultural innovation.

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. *Example: 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. *Example: 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. *Example: 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 allow 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. *Example: Multimedia Literacy Programs.* 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 chapter 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 collaboratively 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 at www.vectorsjournal.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 *Labrynth 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 Star, 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 Star, 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 cooperative 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) offer 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/>.

REFERENCES

- Balsamo, Anne. 1996. *Technologies of the Gendered Body: Reading Cyborg Women*. Durham, NC: Duke UP.
- . Forthcoming. *Designing Culture: The Technological Imagination at Work*. Durham, NC: Duke UP.
- Bowker, Geoffrey C., Susan Leigh Star, William Turner, and Les Gasser, eds. 1997. *Social science, technical systems, and cooperative work: Beyond the Great Divide*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Brown, John Seely, and Paul Duguid. 1998. Universities in the digital age. In *The Mirage of Continuity: Reconfiguring Academic Information Resources for the 21st Century*, ed. Brian L. Hawkins and Patricia Battin, 39–60. Washington, DC: Council on Library and Information Resources.
- Davidson, Cathy N., ed. 1989. *Reading in America: Literature and Social History*. Baltimore: Johns Hopkins UP.
- Davidson, Cathy N., and David Theo Goldberg. 2004. A manifesto for the humanities in a technological age. *The Chronicle of Higher Education* 50.23: B7.
- . 2006. Managing from the middle. *The Chronicle of Higher Education* C1, C4.
- DuGay, Paul, Stuart Hall, Linda Janes, Hugh Mackay, and Keith Negus. 1997. *Doing Cultural Studies: The Story of the Sony Walkman*. London: Sage Publications Ltd.
- Hayles, N. Katherine. 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press.
- Johnson, Richard. 1986/7. What Is Cultural Studies Anyway? *Social Text* 16: 38–80.
- Lury, Celia. 1993. *Cultural rights: Technology, Legality and Personality*. New York: Routledge.
- Mitchem, Carl. 1994. *Thinking through Technology: The Path between Engineering and Philosophy*. Chicago: University of Chicago Press.
- Mumford, Lewis. 1934. *Technics and Civilization*. New York: Harcourt, Brace & Company, Inc.

- Schriebman, Susan, Ray Siemens, and John Unsworth. 2004. *A Companion to Digital Humanities*, ed. Oxford: Blackwell. 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.
- Slack, Jennifer Daryl, and J. Macgregor Wise. 2005. *Culture and Technology: A Primer*. New York: Peter Lang.
- Snow, C. P. 1963. *The Two Cultures: And a Second Look*. New York: Cambridge University Press.
- Suchman, Lucy. 2007. *Human-Machine Reconfigurations: Plans and Situated Actions*. Cambridge, MA: Cambridge University Press.
- University of Illinois at Urbana-Champaign. 2007. *Creating a Brilliant Future for the University of Illinois*. Accessed September 11, 2007: www.uillinois.edu/president/strategicplan/plancomponents.cfm.
- University of Southern California. 2004. *USC's Plan for Increasing Academic Excellence: Building Strategic Capabilities for the University of the 21st Century*. Accessed September 11, 2007.
- Willis, Paul. 1977. *Learning to Labor: How Working Class Kids Get Working Class Jobs*. New York, Columbia University Press.

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