Chapter 1. TEXT RAIN

THE DIGITAL EXPERIENCE

To design a digital artifact
is to choreograph
the experience that the
user will have.

If we only look *through* the interface,

we cannot appreciate the ways in which

the interface itself shapes our experience.

The Art Gallery of SIGGRAPH 2000

SIGGRAPH 2000 was a carnival for the twenty-first century. Its distant predecessors were the medieval and Renaissance trade fairs of Europe, where people crowded into a muddy town marketplace to gawk at tables of exotic goods (cinnamon and silk), to be entertained by singers, jugglers, players, and animal acts. The delights of SIGGRAPH 2000 were more high tech; there were no dancing bears. For the conferees of SIGGRAPH 2000, technology itself was the attraction: the latest releases of Photoshop and OpenGL; the fastest new texture-mapping hardware from SGI; the newest games for the Sony Playstation 2. All these attractions were collected in a maze of booths in the enormous, refrigerated halls of the Morial Convention Center in New Orleans.

The conferees came not only to see the newest technological toys but also to discuss the future. For, unlike Comdex, the Las Vegas extravaganza of electronic consumerism, SIGGRAPH is an academic conference as well as a trade show. In the technical sessions, conferees considered technologies yet to be released. Academic computer specialists and industry researchers met to review work on subjects like the psycho-physiological models of shading and lighting, the modeling of snow, the animation of clouds, and non-photorealistic virtual reality. Unlike other academic conferences, SIGGRAPH has long recognized that digital art can contribute to this discussion—that digital art too is technology yet to be released. The Art Gallery has been a part of SIGGRAPH since the 1980s, and the

Figure 1.1
The Art Gallery of SIGGRAPH 2000.

gallery at SIGGRAPH 2000 was the largest and most varied in the history of the conference, exhibiting the work of sixty leading digital artists.

Hall D, which alone seemed large enough to assemble the space shuttle in, housed the Art Gallery (figure 1.1) as well as the Emerging Technologies exhibit. You might have found it difficult to decide where the art ended and the emerging technologies began. Like the digital art, many of the Emerging Technologies exhibits provided visitors with interactive experiences. Like the Emerging Technologies exhibits, installations in the Art Gallery were experiments in design. The most visible, and in some ways the most important, part of any digital application is its interface—the face that the application presents to its users. And digital art is all interface, defined entirely by the experience of its viewing or use. That is why digital art can provide such a clear test of the possibilities and constraints of digital design: it fails or succeeds unequivocally on the strength of its interface.

Digital art can provide the clearest test of the possibilities and constraints of digital design.

In the following chapters we tour the Art Gallery of SIGGRAPH 2000, stopping to examine a few pieces closely, because this tour has a specific purpose. We want to ask of each piece: What does this work have to offer to the digital design community in general? What lessons can we carry from this work over into other applications, other domains of digital design? Because each piece is a realization, an embodiment of radical design, it will embody the following three points:

1. **The computer has become a new medium (a new set of media forms).**
2. **To design a digital artifact is to design an experience.**
3. **Digital design should not try to be invisible.**

Since the 1970s, it has become increasingly clear in our culture that the computer and related digital technologies are media technologies and support a range of new media forms. Media forms are not just channels for information, they also provide experiences. Furthermore, in every digital artifact, from spreadsheet to video game, the physical shape, the interface, the look and feel are part of the user's experience. Every digital artifact needs at times to be visible to its user; it needs to be both a window and a mirror.

TEXT RAIN

It's July 25, 2000, and the gallery is crowded with visitors. An installation that everyone visits sooner rather than later is *TEXT RAIN,* created by Camille Utterback and Romy Archituv. *TEXT RAIN* consists of two large parallel screens; one features projected video, while the other serves as a backdrop. These two screens form a corridor about ten feet wide within the gallery, and no one passes through that corridor without glancing up at the screen, slowing, and then stopping, at least briefly, to take part in the show. As the visitor immediately discovers, she herself becomes the show, when her face and figure are caught by the video camera and projected on the screen in black and white. At the same time, a rain of colored letters falls steadily from the top of the screen. Wherever the letters come in contact with the viewer's image, they cease to fall. Whenever the viewer moves, the letters that had collected resume their fall. Visitors instantly want to play, making visual and verbal patterns by holding the letters in their hands or along their arms (figures 1.2 and 1.3). They hold up boards or sheets in order to catch the letters and even make them rebound (figures 1.4 and 1.5).

Figure 1.2
Camille Utterback and Romy Archituv, TEXT RAIN: *Catching the falling letters.*

Figure 1.3
TEXT RAIN: *A dancer channels the letters with her body.*

TEXT RAIN is not simply an expression of the artist's personality. (That romantic notion doesn't fit digital art well.) Rather, the experience of this piece comes from the interaction of the viewers with the creators' design. *TEXT RAIN* is as much an expression of its viewers as of its creators; it is what the viewers make of it. Without them, the piece is incomplete, for there is nothing on the screen but the falling letters. In fact, *viewers* is not an entirely adequate term; they are participants or users at the same time. *TEXT RAIN* is a text that its viewer-users help to create, a text that they write in the process of reading. Like the other digital installations in the gallery, *TEXT RAIN* is about the process of its own making.

The letters of the text come from the poem "Talk, You" by Evan Zimroth (1993). If you cup your hands, you sometimes manage to capture a whole word or a short phrase. The word or phrase belongs to the original poem, if the letters manage to stay together during

Figure 1.4
TEXT RAIN: *Using a sheet to catch . . .*

Figure 1.5
TEXT RAIN: *. . . and toss the letters.*

Figure 1.6
TEXT RAIN: *Making a kinetic poem.*

their fall. When one or more letters are lost or the letters of another word intervene, *TEXT RAIN* becomes a kinetic poem—one that re-forms itself before your eyes. *Turning* could become *tuning*; *limb*, *limbo*. Often, the letters that rain down offer only nonsense, but sometimes they make just enough sense to encourage the viewers to find meaning. "TuninGear und too" or "ym for limbs" or "Im faces" could be phrases from James Joyce (Figure 1.6).

In this way *TEXT RAIN* comes to mean what the viewer-user wills it to mean. Digital works like *TEXT RAIN* make us playfully aware of our relationship to our technology, and they suggest that we can assert some degree of control over the relationship.

TEXT RAIN not only invites its participants to make meaning; it puts them on video as they do so. Other visitors to the gallery can see them holding up their arms and smiling, and they can see the images on the screen, which explain the participants' funny gestures. The behavior of the participants brings other visitors over, who then become participants themselves. *TEXT RAIN* is a poem and a video program at the same time. As an experiment in the future of digital technology, it suggests that that future belongs to presentation and representation.

In our digital culture, we are indeed coming to value computers for their capacity to present and represent. We have known for decades that computers can represent numbers and texts, but now we know that they can also present images and sounds. Using a computer has become a multimedia experience—an experience so compelling that we in the industrialized world now surround ourselves with digital devices. In the past, we were reluctant to acknowledge that computers offered us such experiences. Only teenage boys and geeks were allowed to admit that digital technology could be fun or exciting. For the rest of us, computers were supposed to be "good for something." However, just like films, CDs, and books, what digital artifacts are often good for is to stage experiences for their users.

HCI expert and cognitive scientist Donald Norman tells us that as computers become smaller and more portable, they are morphing into information appliances. Although

it is certainly true that digital technologies are conveyors of information, the term *appliance* is too limiting. We do not call books, still cameras, or movie cameras "appliances." We do not simply apply computers to tasks of information storage and retrieval, any more than we use books or television strictly for that purpose. Books, televisions, and computers stake out a cultural territory that is more varied and more mysterious than refrigerators. That's the territory that *TEXT RAIN* and the other installations of SIGGRAPH 2000 are exploring. Each installation calls its participants into an active relationship, asking them to perform rather than merely to view.

Brenda Laurel understood the performative and representational power of the computer when she wrote *Computers as Theatre* (1991). She argued that we should design computer applications not only to be used, but to be performed and experienced. But Laurel put too much emphasis on one rather specialized media form, the theater. In fact, the computer is not only a new stage for theatrical performance; it can also be a new cinema, a new television, and a new kind of book. The computer does not fuse all its representations into a single form, but presents them in great variety. If there was ever a technology that did not have a single essence, it is the digital computer.

In its fifty-year history, the computer so far has been a calculating machine, an electronic brain, a filing cabinet, a clerk, and a secretary. If we trace that history briefly, we can see how the computer has now become a medium, or rather a growing set of media forms.

The computer becomes a medium (a new set of media forms)

It's 1949. Depending on your definition of a computer, there are three or four such machines in the world, whose names sound like villains in Superman comic books: ENIAC, EDSAC, BINAC. These machines are used almost exclusively to do complex calculation for military and civilian scientists and engineers. Computer pioneer Howard Aiken is reported to have told the U.S. Bureau of Standards that the world would only ever need five or six computers like the ENIAC.

The computer did not start out as a medium. In the 1940s, when the brilliant and elegant John von Neumann, the brilliant and eccentric Alan Turing, and many others were designing the first programmable computers, they were *not* defining a new medium. They were building super-fast calculating engines to solve problems in science and engineering. Their work was

funded by the U.S. and British governments as part of the effort to win World War II and then to ensure the advance of technology after the war. Even at that time, however, von Neumann and Turing understood their machines as something more—as "symbol manipulators." It didn't matter whether the symbols were numbers, words, or the elements of any logical calculus. The computer could take these inputs, apply the rules of logic, and produce new patterns as output.

In the late 1940s, when he was working at Manchester University and musing on the significance of the first computers, Alan Turing came to believe that the essence of human thought is symbol manipulation. Turing was in many ways a stereotype of the British mathematical genius, lost in thought and unconcerned with appearances: he bit his nails, went out without his tie, and rode a bicycle whose chain derailed with mathematical regularity (Hodges 1983). During World War II, Turing had helped to build and use the mechanical Bombe and the electronic Colossus to decrypt messages from the Germans' Enigma coding machines, so he knew that a computer could function as a technology for transforming and transferring messages—that is, as a medium. But he went in another direction, appropriate for an introverted genius, and became convinced that the digital computer was not a medium but a mind. For Turing and others who followed him, the computer should not just be a channel for human messages; it should be a thinking machine, capable of producing its own messages.

It's 1954. The U.S. economy is already spending $10 million a year on computer hardware (Cortada 1997, 32). The machines are beginning to be used not only for military and scientific research, but also for large-scale bureaucratic tabulation and business data processing. On election night in November two years earlier, the UNIVAC computer had predicted a landslide win for Dwight Eisenhower, suggesting that computers can manifest greater political savvy than the pollsters, who were predicting a close race.

Turing became the patron saint of the artificial intelligence (AI) movement. Following Turing, AI specialists, including John McCarthy and Marvin Minsky, argued that computers could make that ultimate leap over the wall that the French philosopher Descartes had erected between the mind and the body. They believed that computers were physical machines that could exhibit mind, the very idea that Descartes had thought impossible. These enthusiasts proceeded to frighten and fascinate us with this vision for almost half a

century, although even today, no machine can come close to passing the Turing test. Sadly for AI enthusiasts, 2001 has come and gone, and there is no HAL. Yet the idea of the computer as a symbol manipulator was and remains powerful. All the scientific and engineering uses of the computer, the business information systems, the databases and text archives, and more recently the spreadsheets and word processors in personal computers, are expressions of the computer as symbol manipulator. Throughout the last half of the twentieth century, the enthusiasts kept insisting that the essence of both human and machine intelligence was symbol manipulation—that there was, in fact, no essential difference between human beings and computers. And because of the way we used the computer in these decades, they made some sense. It was easier to think of the computer as an ersatz human being than as a medium like print, radio, film, or television.

It's 1962. There are 10,959 computers in the world (Cortada 1996, 70). In the following decade, the first time-shared computer systems will allow some lucky programmers at MIT and elsewhere to input their programs "interactively"—by typing them into a text editor. Nevertheless, many still fail to see the computer's potential to store and transmit even textual information.

A few voices were suggesting that the computer was a medium, but it took us decades to hear them over the noisy claims of the AI enthusiasts. No one listened in the early 1960s, when a young humanist, Ted Nelson, began to argue that the computer made possible a new kind of reading and writing that he called "hypertext." Douglas Engelbart got a much better reception in 1968 when he gave a masterful demonstration of his NLS (oNLine System), which included collaborative word processing, data file sharing, teleconferencing, and hypertextual linking. His audience of a thousand computer professionals was overwhelmed. J. C. R. Licklider and Robert Taylor were moved by NLS to write, "In a few years, men will be able to communicate more effectively through a machine than face to face" (Licklider and Taylor 1999). Their article, "The Computer as a Communications Device," written in 1968, was one of the first to label the computer as a medium. Licklider and Taylor had seen a very early version of the future, however; Engelbart was still years ahead of his time. In order to make the computer a communications medium for our culture as a whole, two technologies had to be developed and put into widespread use: electronic networks and the personal computer.

It's 1979. The number of personal computers in the United States already exceeds 500,000 (Cortada 1997, 33). Two college dropouts are building and marketing a microcomputer they call the Apple. The networking of universities and corporate research centers, which began around 1970 as the ARPANET, continues. College students at Duke and the University of North Carolina are devising a protocol called Usenet to allow people to subscribe and contribute messages to newsgroups.

Licklider at the Advanced Research Projects Agency in the Defense Department supported the development of the wide-area network, the ARPANET, which eventually led to the NSFNet and the contemporary Internet. Robert Metcalfe and others at Xerox Palo Alto Research Center (PARC) in the 1970s created the software and hardware for local-area networking, called Ethernet. Meanwhile, Alan Kay and his team at Xerox PARC were inventing the personal computer, which Kay called the Dynabook, or "personal dynamic medium" (Hiltzik 1999). Kay had no doubt what the computer was when he wrote, "Although digital computers were originally designed to do arithmetic computation, the ability to simulate the details of any descriptive model, means that the computer, viewed as a medium itself, can be *all other media* if the embedding and viewing methods are sufficiently well provided" (Kay and Goldberg 1999). Kay was claiming that the computer was the ultimate medium and could make all other media obsolete. Using his Dynabook, we could create, edit, and store texts; we could draw and paint; we could even to compose and score music.

What Kay and his colleagues actually produced was the Alto (figure 1.7), an "interim" Dynabook that could perform all these wonders in some form. But the Alto was a research machine, which only the workers at Xerox PARC and some lucky students at the Jordan Road Middle School in Palo Alto ever got to use. In order to convince the rest of us, the Dynabook had to come into the hands of millions of users, and Steve Jobs added that necessary element when he marketed

Figure 1.7
The Alto computer, a "personal dynamic medium" of the mid-1970s. Courtesy of Xerox Palo Alto Research Center.

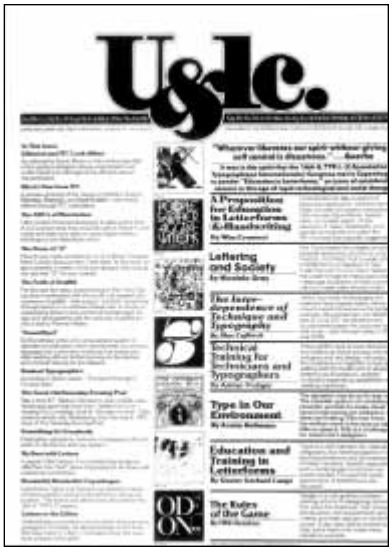

Figure 1.8
Herb Lubalin, computer-controlled graphic design from the 1970s.

the Macintosh computer. The graphics and sound capabilities of the Macintosh were the key to convincing us that the computer was a medium. At that time when someone said the word "medium," we thought first of television, film, and radio. Now, as the computer screen began to look and act like a television screen and as its speakers began to play music or even speak words, we saw the computer itself in a new way.

Computer specialists had been exploring the power of the computer to display, manipulate, and animate images since the 1960s, but a popular audience for their electronic images developed only later. American culture first came to appreciate computer graphics in such movies as *Star Wars* (1977) and then on television. Meanwhile, graphic designers began to use computer-controlled photocomposition to create layouts in magazines and newspapers (figure 1.8).

It's 1989. There are almost 14 million computers in American homes; 75 million Americans use a computer at home, at school, or at work (Cortada 1997, 33). Now eight years old, the IBM PC has established the word processor and the spreadsheet as indispensable business tools. (And as a result, typewriter sales are declining for the first time in a hundred years.) For millions of business users, the computer is now unquestionably a medium for words and numbers. For a smaller group of designers and educators, Apple is offering the first computer that is both a tool for visual design and an artifact of visual design.

With the Apple Macintosh computer, users had at first primitive and then increasingly sophisticated tools with which to create their own graphics. The computer became a

medium when these tools and practices became widespread and the rhetoric of their enthusiasts became plausible. That rhetoric moved from articles in journals to advertisements in newspapers and on television, as communications and computer corporations began to announce (prematurely) that the computer was replacing the printing press. (It is amazing how seductive the rhetoric of prediction is. As recently as 2000, in *Designing Web Usability,* Jakob Nielsen was predicting that computers would replace printed books by 2007.)

It's 1993. With its Windows operating system, Microsoft ensures the success of the graphical interface that Xerox and Apple pioneered. The supporters of the DOS interface are left to join the Society for Creative Anachronism. Meanwhile, when Marc Andreessen shows the "inline image" tag to Tim Berners-Lee, the World Wide Web becomes a medium of visual design that will soon rival magazines and books.

The World Wide Web was the final element, creating in the 1990s an audience of millions of viewer-users for the digital experiences that networked computers had to offer. The creator of the Web, Tim Berners-Lee, had originally conceived of it as a textual medium, a global hypertext of words. But a few years later, Mark Andreessen and his colleagues devised the graphical Web browser and placed images and text together on a Web page for the first time. Within a few more years, it had become apparent that the computer could reconfigure and re-present much of the information and experience that our culture had previously located in books, newspapers, and magazines, in radio, in films, and on television. The computer was now unquestionably a medium, and it seemed hard to think of it as anything else.

At that point, our fears and fantasies changed too. For decades, AI specialists had fascinated us with the notion that the computer would change what it means to be human. (In 1984, Sherry Turkle summed up their vision in her book *The Second Self.*) If the essence of human thought was symbol manipulation, then it seemed inevitable that computers would eventually outthink us. In the 1960s, 1970s, and 1980s, philosophers, psychologists, and computer scientists argued furiously over what computers could or could not do—whether there was some human essence that computers could not duplicate. The argument was never settled, though, because it was a debate over cultural constructions. Collectively as a culture, we decide how computers are going to be used—whether as aids to human intelligence (calculators and word processors), replacements for human intelligence (AI applications), or expressive

Figure 1.9
Virtual reality headset (photograph: Ted Esser).

media. What happened was that we lost interest in the AI question as we changed our idea of what computers are for.

Computer graphics became more compelling to us than numerical analysis and logic programming. Although computers were still used to perform physics calculations, tend databases, write memos and letters, and control industrial processes, these applications had become routine. What caught our imagination now was the computer as a perceptual manipulator—as a graphics engine to make images move and as a MIDI (Musical Instrument Digital Interface) controller for sound. Virtual reality (VR) replaced AI in our digital dreams and nightmares, and in VR the old debate about technology and humanity was again redefined. The supporters of AI had insisted that human beings, like computer programs, were information processors. The VR enthusiasts now offered a different definition of human identity that emphasized the senses rather than abstract information processing. They suggested that to be human was to be a bundle of perceptions, a moving and malleable point of view, just what we feel when we are wearing a VR headset. The most compelling computer experience changed. It was no longer playing chess against an AI program like Deep Thought; instead, it was the experience of being immersed in a virtual world (figure 1.9).

The Internet was the other technology that changed our view of computers. The Internet realized the vision of Nelson, Engelbart, and Licklider for the computer as a node in a (potentially) global network. With the coming of e-mail and the World Wide Web, a standalone computer, one without a network address, now seemed incomplete. Digital devices, from desktop computers to palmtops, became portals to connect us with other people and devices. The texts we typed into our word processors no longer had to be printed out and delivered to readers in the traditional form of ink on paper. Now the computer itself was a medium of both creation and almost instantaneous publication. Now there were chatrooms, MOOs, and applications for instant messaging, which carried with them the excitement and potential danger of communicating with people around the industrialized world—people whom we might never meet and yet with whom we might have long, even intimate, conversations.

If we put these two defining digital technologies, graphics and networking, together, then we get global hypermedia on the World Wide Web—or we get a more poetic vision: novelist William Gibson's cyberspace, a globally networked virtual reality. In either case, digital technology today offers an experience that is more vivid than the phrase *information processing* can convey.

To design a digital artifact is to design an experience

We live in a media-saturated environment, in which many different forms and technologies compete for our attention. The traditional media (television, radio, film, and magazines and newspapers) are far from dead, and new digital forms, from video games to Web pages, must compete with them and with each other. The design of even the most business-like computer applications must take this competition into account. Computer applications can no longer afford to be (if they ever were) simple channels for the delivery of information, as if that were the same thing as delivering milk or cat food. Every application must be an experience.

In fact, interacting with a computer was an experience even before the computer was a medium, even in the era of plugboards, magnetic tapes, and punch cards. Talk to the veterans of the days before computers had interfaces, and they will tell you about the laborious process of inscribing programs on decks of punch cards. In the 1940s, 1950s, and 1960s, to use a computer meant to operate a machine. Yet even batch programming by punch card had its own rhythms and even pleasures. Anyone who really disliked the required precision and repetition presumably went into some other line of work.

Today, we do not operate computers; rather, we interact with them, and successful digital artifacts are designed to be experienced, not simply used. The term *user* is unfortunate (but now unavoidable), as if we were habituated or addicted to the artifact. Good digital designs do not addict; they invite us to participate, to act and react. To design a digital artifact is to choreograph the experience that the user will have. If the design is too restrictive, the choreography too heavy-handed, the experience may alienate the user. (The whole genre of computer-based training is heavy-handed in this sense.) If the design is ill defined, however, we cannot figure out what genre we are in. A new application can fail precisely because the user does not know what it is for.

To design a digital artifact is to choreograph the experience that the user will have.

Hypertext itself almost failed in this sense because people couldn't grasp what it was for. Ted Nelson, who coined the term, wandered through the computer world for more than twenty years talking to anyone who would listen about his vision for a global hypertext system he called Xanadu. A combination of the McDonald's franchise and an electronic Library of Congress, Xanadu would have linked together much (and eventually all) of the world's texts. In 1984, Nelson wrote that by the year 2020, "there will be hundreds of thousands of file servers—machines storing and dishing out materials. And there will be hundreds of millions of simultaneous users, able to read from billions of stored documents, with trillions of links among them" (Nelson 1984, p. 0/12). For Nelson, the Xanadu system had to be perfect, however—no compromises in architecture or coverage. He was waiting for this perfect system in order to organize and incorporate all of his own ideas and writings. The legend is that the rooms of Nelson's house were filled with slips of notepaper waiting to be fed into Xanadu and "intertwingled." Xanadu was never built, except in ephemeral prototypes, and almost no one else could see why hyperlinked texts were necessary at all. Tim Berners-Lee and then Mark Andreessen finally came up with the right package in the form of the World Wide Web. Here was a media form that people could understand—a combination of electronic text and images that recalled all the uses of graphic design for print and ultimately promised global multimedia. It could be a digital library for scholars and scientists, but it could also be a new kind of shopping mall for consumers. It could entertain surfers with everything from pornography to the virtual Louvre. The Web finally presented hypertext as a convincing digital experience.

Such a digital experience does not simply enhance the delivery of information. The information itself becomes an experience. Even word processing programs and spreadsheets provide experiences. Using a word processor may be frustrating, as it is with Microsoft's animated paperclip (the software agent from hell) that insists on advising you how to write a letter when you are not writing a letter. Nevertheless, it is an experience. Listen to your friends and colleagues complaining about the Microsoft paperclip; it annoys them in a way that they want to share with you, just as they want to share the experience of having their flight cancelled or being caught in a two-hour traffic jam.

In a similar fashion, people like to share their adventures on the Web. William Gibson's often quoted description of cyberspace in *Neuromancer* (2000) really does seem to fit the Web: "a consensual hallucination experienced daily by billions of [human beings]" (51). The Web may still have only millions of participants, but it is an experience of enormous

power. Pragmatists like Jakob Nielsen, who tell us that the Web is about gleaning information as rapidly as possible from transparent pages of words and images, do not seem to understand why this technology is extraordinarily popular. They tell us how bad most Web sites are at conveying information. Yet if the Web is so bad at doing what it is supposed to do, why do millions of people choose to share the "hallucination"? The Web is a multimedia experience in which users are prepared to indulge for five, ten, or twenty hours a week, and the visual design of Web pages is not "window dressing" for the content. The form and content of Web pages are inseparable. Pragmatic explanations of the Web as an information system are not wrong, but they are insufficient. The same pragmatic explanation fails to account for the influence throughout the twentieth century of visual design in posters and magazines and on television. It fails to explain why successful corporations have been willing to pay millions of dollars on branding and design programs for stationery and physical products and why they continue to do so on the Web.

In the past decade, some digital designers have come to speak of their task as "interaction design," understanding an interface or application not as a series of static screens, but rather as a process of give and take between computer and user. Interaction designers must keep in mind a world of if-then scenarios. In a sense, they must think like scriptwriters preparing the dialogue for a film or play, but with a key difference: in a film or play, the dialogue is fixed, while in a digital interface, the possibilities multiply as the user's choices call forth different visual or textual responses from the computer. A digital artifact can be designed to unfold in multiple ways. The best digital art can help us see how to design for multiplicity, because such art adapts itself to the user rather than forcing the user to follow a rigid script. Works of digital art are experiments in interaction design. They can afford to be radical experiments because they do not have to meet the (often contradictory) demands of a client. As pure interfaces, they demonstrate that content and form are inseparable. A work of digital art can isolate and explore with clarity the relationship between itself and the user.

Works of digital art are experiments in interaction design.

As Nathan Shedroff (2002) puts it, "The emphasis in Interaction Design is on the creation of compelling experiences," and for that reason he also calls his approach "experience design." Shedroff is one of a number of innovators (including Clement Mok, Richard Saul Wurman, David Kelly, Shelley Evanson, and Hugh Dubberley) who are bringing graphic and

Figure 1.10
Workers at SIGGRAPH 2000, playing in the TEXT RAIN.

visual design together with information design in the digital realm (Winograd 1996; Wurman and Bradford 1996). Their goal is a digital experience that is carefully structured yet both visually compelling and open to creative interaction with the user. The interaction between designer and user *through* the technology is what gives the experience its meaning. Experience design is also contextual, in the sense that designs must both respond to and shape the many contexts (personal, physical, and cultural) in which they function.

Digital art is an expression of this new design philosophy. When we walk into the SIGGRAPH Gallery, we expect to have an experience that we would not have in everyday life. We are prepared to let the artist-designer choreograph our experience. If the design is successful, however, the experience can seem both inevitable and surprising.

To set up SIGGRAPH in the enormous bays in the Morial Convention Center, construction workers with forklifts and scaffolds were needed. As these workers assembled the Art Gallery, they too began to play with *TEXT RAIN*. They caught the letters on the railings of their forklifts (Figure 1.10). Instantly and effortlessly, *TEXT RAIN* became part of their working world. *TEXT RAIN* is not an elite piece of art, but an experience to be appreciated by both construction workers and Ph.D.s in computer science. It manages to be immediately accessible to a broad audience.

Digital applications offer an experience like that offered by books, films, and photographs: a media experience that is also an "immediate" experience. The essence of digital design is to work on two levels at once—to be both mediated and immediate. Digital applications

cannot deny that they are media forms, depending on highly sophisticated, electronic technology. At the same time, in crafting digital applications, designers must try to make their work easy to grasp and accessible for their users. Digital art, like the work at SIGGRAPH 2000, contributes to digital design by showing us how media forms can also be immediate.

TEXT RAIN, for example, combines forms of print and video to give us a new kind of reading and writing. A poem and a television show at the same time, *TEXT RAIN* is both visible and invisible as a media form. The participants find the interface so easy to use, so natural, that they need no instruction at all. They understand instantly how to project their images on the screen and interact with the falling letters. The space of *TEXT RAIN* is an image of the physical world and at the same time an interface, a space for the manipulation of texts.

Digital art, like other digital applications, often opens a window for us, as we look through the computer screen to see the images or information located "on the other side." But *TEXT RAIN* is also a mirror, reflecting us as we manipulate the letters. It is as if we have passed through the screen and find ourselves inside some malfunctioning word processor that is raining letters down on us. *TEXT RAIN* surprises and pleases us by being simultaneously a mirror and a window. If there is one reason that digital art is important for digital design, it is this: digital art reminds us that every interface is a mirror as well as a window.

Digital design should not try to be invisible

Think of the computer screen as a window, opening up onto a visual world that seems to be behind or beyond it. This is the world of information that the computer offers: texts, graphics, digitized images, and sound. Concentrating on the text or images, the user forgets about the interface (menus, icons, cursor), and the interface becomes transparent. HCI specialists and some designers speak as if that were the only goal of interface design: to fashion a transparent window onto a world of information.

There are times, however, when the user should be looking at the interface, not through it, in order to make it function: to activate icons or to choose menu items, for example. At such moments, the interface is no longer a window, but a mirror, reflecting the user and her relationship to the computer. The interface is saying in effect, "I am a computer application, and you are the user of that application." No interface can be or should be perfectly transparent, because the interface will break at some time, and the user will have to diagnose the problem. Furthermore, even when the interface is working, we should not allow

it to take us in completely. If we only look *through* the interface, we cannot appreciate the ways in which it shapes our experience. We should be able to enjoy the illusion of the interface as it presents us with a digital world. But if we cannot also step back and see the interface as a technical creation, then we are missing half of the experience that new digital media can offer.

If we only look *through* the interface, we cannot appreciate the ways in which it shapes our experience.

The same would be true if we treated any other medium as exclusively transparent. When we watch a film, we can sometimes get so absorbed in the story that we may temporarily forget about everything else, even that we are watching a film at all. The film as an interface has become transparent for us. Sometimes, however, we want to step back and appreciate how the film was made. This awareness enriches the experience of the film, and not only for a small group of film scholars. Many viewers of this popular medium are eager to learn more about how films are made, and they can. If we buy the DVD version of *The Sixth Sense,* for example, the disk includes scenes left out of the final cut, an interview with the director, M. Night Shyamalan, and descriptions of the special effects. These segments ask us to reflect on how the film succeeds in scaring and fooling us. Popular interest in the process of making films, television shows, and music has increased in recent decades, so that we enjoy all of these media forms as mirrors as well as windows. The same is true of the computer, itself now a medium. Every digital design functions as both a window and a mirror.

When we look in a mirror, we see ourselves, and we see the room behind and around us—that is, ourselves in context. Digital interfaces are like mirrors in the sense that they reflect the user in context, including her physical surroundings, her immediate working or home environment, and the larger environment defined by her language and culture. They do this work of reflecting whether or not the designers consciously intend it. Because the user brings all of these contexts to her interaction with any digital interface, the design cannot help but reflect them. The success of an interface, however, depends on the ways in which it can adapt to these contexts. The most compelling interfaces will make the user aware of her contexts and, in the process, redefine the contexts in which she and the interface together operate. This is where digital art can make a special contribution, because digital art is precisely the kind of interface that both reflects and redefines contexts.

Like other digital artists in the past two decades, those at SIGGRAPH 2000 want us to be aware of the contexts in which their individual works in particular and digital technology in general function. For that reason, there are more mirrors than windows among their exhibits. *TEXT RAIN* is a mirror that reflects its users, for as passers-by are caught by the camera, they find themselves projected on the screen in a rain of falling letters. The exhibit we visit in chapter 2, called *Wooden Mirror*, combines mechanical and electronic technology to produce a beautifully textured image of its visitors. In chapter 3, we visit *Nosce te ipsum* ("know yourself"), a digital collage that contains at its center a captured video image of the visitor. Other pieces in the gallery are mirrors in a metaphoric sense, reflecting the layers of media and culture in which we find ourselves situated today. *Magic Book* and the *Fakeshop* Web site remind us of the variety of media forms that surround us in our media-saturated culture. *T-Garden* concentrates on the spatial context in which we as embodied creatures operate, and *Terminal Time* reminds us playfully of the ideological lenses through which we understand history. None of these pieces is content just to reflect us; they all invite us to reimagine and redefine our contexts.

Taken together, all of these pieces from SIGGRAPH 2000 demonstrate the value of digital art for the larger fields of digital design and HCI. Works of digital art have a critical function: they critique the art of design itself. They make us aware of the assumptions that are built into the practices of designers and computer specialists. Because computer designers so often assume that the interface should be a window, digital art insists that the interface can also be a mirror. And in the process, it demonstrates the other great strategy of digital design. Those who understand and master both strategies will be more effective designers.