New Media Art: A New Frontier or Continued Tradition?

Kaley Middlebrooks

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Jeff Solomon, Series Editor
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The Good Work Project
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Since 1995, three teams of investigators, under the direction of Howard Gardner, of Harvard University, Mihaly Csikszentmihalyi of Claremont Graduate University, and William Damon of Stanford University, have been researching the ways in which leading professionals in a variety of domains carry out good work. "Good work" is used in a dual sense: 1) work that is deemed to be of high quality and 2) work that is socially responsible. Through intensive, face-to-face interviews, the researchers have investigated several domains, including journalism, genetics, business, jazz music, theater, philanthropy, and higher education. Pilot studies have been conducted of medicine and the rapidly emerging domain of "cyberlaw", with plans to explore these areas more fully in the future.

In addition to this central line of study, several other related lines of investigation have been launched:

1. The Origins of Good Work project is an examination of teenagers who excel in extracurricular activities.

2. The Dedicated Young Professionals Study focuses on those who have just begun (or will soon begin) promising professional careers.

3. Good Work in Interdisciplinary Contexts. Pilot studies of new arts/science media and of the Massachusetts Institute of Technology's Media Lab have been completed. Plans are underway to study interdisciplinary work at the pre-collegiate, college, and research institution level.

4. The Role of Contemplative Practices investigates the ways in which contemplation/meditation influence how professionals carry out work.

5. Encouraging Good Work in Journalism. This project, carried out in conjunction with the Committee of Concerned Journalists, is currently developing a "traveling curriculum" for use in newsrooms around the country.

6. Good Work as Transmitted through Lineages examines how the principle of doing good work is passed down through continuous generations of teachers to students or from mentors to less experienced professionals.

7. Good Work in Other Societies is a project spearheaded by colleagues at Denmark's Royal Danish School of Education that investigates good work in Denmark and Latvia. In the future, additional international components will be added.

The Project expects to issue a variety of books, reports, and related documentation. The present series, launched in early 2001, includes reports on several of the lines of research mentioned above. For further information on the Good Work Project, contact Professor Howard Gardner's office at 617-496-4929, via email at hgasst@harvard.edu, or through regular mail at 201 Larsen Hall, Harvard Graduate School of Education, Cambridge, MA, 02138.

Papers On Good Work
February 2001

1. The Project on Good Work: A Description (April, 2000), Howard Gardner, Mihaly Csikzentmihalyi, and William Damon.

2. The Ethical Responsibilities of Professionals (July, 1998), Howard Gardner

3. The Empirical Basis of Good Work: Methodological Considerations (June, 1997), Howard Gardner, Anne Gregory, Mihalyi Csikzentmihalyi, William Damon, and Mimi Michaelson.

4. Good Work in Business (August, 2000), Kim Barberich and Howard Gardner.

5. Good Work Among Dedicated Young Professionals (July, 2000), Becca Solomon, Greg Feldman, and Marcy LeLacheur.

6. Contemplation and Implications for Good Work in Teaching (August, 1998), Laurinda Morway, Jeff Solomon, Mimi Michaelson, and Howard Gardner.

7. Good Work in a Complex World: A Cross Cultural Comparison (November, 1998), Hans Henrik Knoop and Howard Gardner.

8. Opportunities and Obstacles for Good Work in Medicine (August, 2000), Jeff Solomon, Jennifer DiBara, Sara Simeone, and Dan Dillon.

9. New Media Art: A New Frontier or Continued Tradition? (January, 2001), Kaley Middlebrooks.

10. The Origins of Good Work (April, 2000), Wendy Fischman and Grace Lam.

11. Good Work among Albert Schweitzer Fellows (April, 1999), Wendy Fischman, Becca Solomon, and Deborah Shutte.

12. High Abilities and Excellence: A Cultural Perspective (2000), Jin Li

13. Interdisciplinary Research and Education: Preliminary Perspectives from the MIT Media Laboratory (January, 2001), Dan Dillon.

14. Good Work in Cyberlaw (August, 2000), Evan Zullow.

15. Getting Kids, Parents, and Coaches on the Same Page (2000), Becca Solomon and Howard Gardner.

Acknowledgement

I. Introduction: A Question of Hands and Minds In New Media Art

Michelangelo once said, "A man paints with his brains and not with his hands." Even in the 16th century Michelangelo knew that the idea behind a work of art was just as important as the skill of the hands needed to produce it. Today the processes by which art is made can involve very little of the hand's work at all because of the technology available to make artists' visions a reality. The genre of new media art furnishes several examples. The computer technology used in this burgeoning art form offers artists ways to realize their ideas that increasingly make the physical work of the body obsolete. Powerful programming can render both fantastic and life-like images of objects and landscapes; artists now just use keystrokes instead of brushstrokes to create them. Not only does this art-making process rely less on the skilled work of the hands; much of the art no longer consists of objects that can be held. Many forms of computer-based art are visual images generated from immaterial code. In web art – a new media art form exclusive to the Internet – the immediate access to virtual images made possible through the World Wide Web defies the notions of physical presence traditionally assumed by museums and galleries. With cyberspace's free access to art, some wonder whether the market's "invisible hand" will also disappear.

Beyond these changes to art's production, exhibition, and exchange, the appropriation of computer technology may also significantly alter the creative process. The speed and power of computer processing is said to simulate human intelligence and creativity. Some new media artists consider computers to be collaborators instead

of mere tools. In the future, will machines provide the crucial contribution that human imagination made to art in Michelangelo's day?

This question, when considered in concert with many others that new media art is posing, raises a broader and more profound concern: is technology fundamentally changing art as we know it? Does new media art represent a qualitative change in the way art, at least in the West, has been conceived, created, and shared? I posed these questions to artists and curators who work with new media and whose interdisciplinary expertise pushes the boundaries of art's intersection with science and technology. This report presents the resulting debate as well as areas of agreement about recent technology's influence on art.

The artists and curators I interviewed acknowledged that art has both changed and showed continuity over the last forty years of technological developments. Each subject spoke from a perspective that acknowledged several centuries of art history. All agreed that technology has altered neither the fundamental notion of what art is nor the role of the artist in the creative enterprise. Yet they clearly believed that computer and Internet technology *have changed* the tools, the skills, and the processes by which art is made. The sheer rate and range of digital processing, and the subsequent freedom from traditional methods such power allows, are just two examples. Others include the unique programming skills required by computer work, the effects that artificial intelligence may have on the human creative process, new degrees of digital interactivity, and the way that the Internet has challenged the standards by which art has been displayed, valued, judged, and sold.

While subjects differed as to the degree and duration of these changes, and whether they should be regarded as qualitative, most predicted that even greater changes will come with the next generation. Younger artists who have grown up with computer technology will more ably tap its potential than most other artists have to date. Accompanying the subjects' predictions, however, were warnings about the impoverishment that artists risk -- both creatively and physically -- should they become too dependent on technology and too detached from their bodies. While celebrating the promise of the future, the subjects recommended the disciplines of the past. All affirmed that fine motor skills and liberal arts education would be needed to ensure artistic hands *and* minds in the 21st century.

II. Description of the Project

This study on new media art draws on my interviews with six artists and three curators who work with the tools and materials of modern science and/or computer technology. I also interviewed an artist who works in traditional media but maintains his own promotional web site and serves as an on-line arts educator. Many of the subjects have gained national and international recognition for new media art as both an emerging art form and a subject of theory. Individually and as a group they are helping to define the contours, characteristics, and standards of this evolving genre. Despite broad areas of consensus, the subjects do not all agree on new media art's distinctive qualities or, for that matter, its future course.

III. Definitions of New Media Art

This study identifies three broad forms of new media art. *Computer-based art*, which has existed since the 1960's, uses computer programming and platforms to generate and render visual images. Examples include the fractal images and landscapes made by Benoit Mandelbrot in the 1980's that depict infinite dimensions in striking colors and shapes. *Network-based art* is comprised of computer-based art, but is designed specifically for the ultimate medium of the Internet. Examples include web sites by artists Ben Benjamin or Annette Weintraub selected for the 2000 Whitney Biennial. These artists' works respectively present American culture in parodied and nostalgic form. Their medium is video-like imagery and textual narrative presented through a series of linked web pages accessible with any Internet browser. Finally, *science-based art* is comprised of and/or rendered through other, usually non-digital, forms of advanced scientific technology. Cultivated strains of *e. coli* bacteria containing artistically-engineered DNA featured in the Ars Electronica 2000 festival represent one example; robotic sculptures are another. While these categories are not hard and fast, they help distinguish among the varied kinds of art that the subjects and others are working with today.

IV. The Interdisciplinary Quality of New Media Art

The characteristic common among the new media artists interviewed is the way they cross disciplinary boundaries between the arts and the sciences in their work. Often identifying *themselves* as interdisciplinary workers, the subjects defy the stereotypes of what artists create in the studio and what scientists do in the lab. For instance, Harriet Casdin-Silver, who pioneered the use of white light holography with physicist Stephen Benton in 1972, has incorporated the technology of holographic sound into recent work. Her photographs feature inanimate objects and human subjects that have yielded holographic prints that can appear to reach eight feet back in space. Casdin-Silver's work is scientifically-based on laser technology. "I have always thought of myself as an artist," she states. "Not a holographer, [but] an artist concentrating on holography."

Do While Studio Founding Director and Rappaport Prize winner Jennifer Hall similarly employs neurological research on temporal lobe epilepsy in her art. She is completing a project with the help of a team of neurologists in which her own epileptic seizures are triggered so that scientist and artist can study them together. Her science-based work also includes DNA extraction and Magnetic Resolution Imaging analysis. "Intention usually is the thing that differentiates between the work that I'm doing and those laboratories -- on any site where an artist is not usually doing that kind of work," Hall explains. "I find it challenging, actually, when I have to build bridges with a neurologist or a pharmacologist; the people in other fields."

Karl Sims' work in artificial life offers another example of interdisciplinarity. His projects involve biological evolutionary theory and complex computer programming, and produce hundreds of generations of computer life forms that evolve and mutate through the computer medium. Because they are rendered with such high quality graphics and motion, however, his computer- and science-based work exhibits in gallery space. "I usually think of myself as a creator of new kinds of tools and processes for making images," says Sims. "In general I think definitions can be limiting and [I] tend to avoid them. I am sometimes viewed as an artist because my processes generate visual results, and the results or the process itself have been presented as art. However I don't fit some definitions of 'artist' because I usually don't directly design and create specific aesthetic results as a traditional fine artist would."

California artist Rebecca Allen works with not only artificial life forms, but also with the virtual worlds in which the forms live. She is a pioneer in haptic interface technology that enables humans to enter physically into and become a part of virtual worlds. Her art is primarily computer-based. She describes herself as "an artist who has a fairly strong technical background," and explains that one of her goals is "to explore new technologies and understand what an artist may contribute." As an artist, Allen tries to come up with some models of where technology can be going creatively. What particularly attracts her is "how can we use new technologies to express ourselves in different ways or new ways…ways [we] can physically interact with virtual environments [and] combine a physical environment and a virtual environment."

Before working in network-based art, Michael Samyn and Auriea Harvey, known together as the web-creation team Entropy8zuper, began in multi-media/graphic design and sculpting respectively, but found HTML computer language "a medium come true." The language enabled them to create and combine visual images and sound in a way they could not do with more traditional art forms. The primary medium for their work is the Internet. In the spring of 2000, they received the San Francisco Museum of Modern Art's first grand prize Webby Award. As for what may be the newest form of new media art, Samyn explains that "there's no definition for art on-line yet. There's really no such thing as an artist on-line yet, so anything can be considered on-line art. That's what's so great about it." Speaking for himself and Harvey, he continues, "[W]e really hope that that doesn't get ruined…The fun part is that you can come across something that you consider to be a work of art. Everybody's got their own tastes, and everybody has their own style of creation."

V. Bridging the Divide Between the Arts and the Sciences

A. Subjects' Backgrounds

The aforementioned artists' backgrounds and creative development speak to the academic divide between art and science. Only one of the artists I interviewed had been trained in science (Karl Sims studied biology at the Massachusetts Institute of Technology). The rest were educated in the humanities, and four of them specialized in the study of art at the collegiate level. Yet each was drawn to science or computer technology in the late 1960's and 1970's (for web artists Harvey and Samyn, in the early

1990's) because of the promise of the powerful new tools. Those who were artists came

to their present work by breaking out of the standard fine arts education in order to

learn how to use computers or materials along side physicists, biologists, engineers and

neurologists. Despite the fact that the subjects originally came from all over the

country, half of them either trained or worked in MIT's Media Lab where they learned

how to appropriate computational tools and materials for their own artistic ends. [1]

Each of the artists interviewed demonstrates computer and science-based skills

beyond those developed by most artists who work in more traditional media.[2] At the

same time, these new media artists clearly distinguish their mission from that of their

scientific colleagues in the lab. Rebecca Allen is a case in point. Originally interested in

moving images as an art student at the Rhode Island School of Design, Allen eventually

decided that she did not want to make films or work with traditional animation. She

saw that computers could be a helpful tool in trying to create new kinds of films. She

also understood early on how profoundly the technology was going to change society.

She took computer programming classes at Brown University and worked in computer

animation in order to "find out what was happening with [the technology] and try to

think of what I [could] do creatively with it." Her interests then led her to the

Architecture and Design Group at MIT (soon to become the Media Lab).

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[1] Located on MIT's East Campus, the Media Lab has become a world-renowned institution since its inception in 1985 for its pursuit of innovative product development involving media, computers, and the arts. Students and professors work together in an interdisciplinary environment that supports artists, designers, scientists, and engineers.

[2] According to both curators and artists, even the most innovative video artists of the 1970's and 1980's have been slow to embrace the computer as an artistic tool or medium.

As she looks back on her time as a student, Allen recalls that working with computers was then considered "blasphemy" because it was such "a separate thing." In her early work she was very often "the only kind of artist person in a group of scientists," and her continued interest in leading-edge technology consistently puts her in a dual art/research position. She still feels like a "rebel in the field... infiltrating areas that aren't typically appropriate for the arts," yet tries nevertheless to have an impact that way. "I think in our society we've separated [art and technology] so much that it's really painful trying to get them back together," she comments, "and it's been much slower in happening than I expected."

Jennifer Hall's experience is similar: "I'm always the one having to clarify myself: 'What are you doing in this biology lab? Why are you isolating your DNA?'" For Hall, art is about "crossing boundaries and not having to worry about definitions that have existed in the past." Originally she found herself crossing them out of ignorance and a lack of fear "that I [belonged] in one or the other." Defining the differences between boundaries, Hall says, "has been less interesting than trying to figure out where I can make the bridges." She, too, encountered a sense of frustration and dislocation in her education: "I went to traditional art school, but that just taught me what the confines of the traditional art world [were]; it was a bore to me. I had seen so many other interesting possibilities before that." Hall describes her graduate school experience at MIT's Media Lab as "unusual…because I was immersed in a bunch of technologists. At that point, I had realized the kind of journeys that I was going to have to take to understand better what I needed to do."

A generation before Allen and Hall were students, Casdin-Silver avoided physics in high school and college. "I always stayed away from the sciences," she confesses. "I was much better at writing and the arts and such things as psychology and sociology." These talents led her to integrate the visual and theatrical arts. She created installation art for which she eventually sought more sophisticated lighting. Hoping to find a solution in lasers, she then discovered the science of holography and its potential for artistic expression.

One of the subjects nearly failed to enter the field of art at all because of academic obstacles at the collegiate level. When David Ross, Director of the San Francisco Museum of Modern Art (SF MoMA), was double majoring at Syracuse University, his political science and journalism departments were neither impressed with nor supportive of his interest in video and its potential for societal change in the early 1970's. The only place he could explore the medium was in the arts department where faculty and students were receptive to exploring the new technology. Ross' subsequent exposure to art and new media completely changed his career path: he was taken with video's possibilities and, after graduating, worked as the assistant to the campus museum's forward-looking director. Within five years Ross led the field as the first curator of video art in the country.

VI. Subjects' Experiences with Divisions Among Art, Science, and Technology

Rebecca Allen believes that the academic divisions and resistance to new technologies described above still exist. Whether they reflect a dichotomy that naturally

results between those who are talented in the sciences and those who are gifted in the arts, or whether academic divisions themselves perpetuate that divide, is not clear. Regardless, Allen has to work to overcome the divide with her students.

> [A]s a professor, I…work with both computer science, engineering, design, music and dance students. So as a stereotype, probably those who are drawn first to…and [are] strong in the arts often don't go as far or as deep in the technology and the tool building. And [for] those who start in the sciences it's very unusual…to make breakthroughs as artists in how they're developing their art. [T]here are exceptions to all of that, and there's certainly great creative people that can feel pretty comfortable and pick up the technology pretty quickly. I've seen some very hardcore science people [with whom], even without too much artistic background, something just clicks when they get in an environment that allows them to think more creatively…[T]hey're able to absorb it and integrate it in their work. But overall, there [are] very few people that I would say are really strong technically and really strong creatively simultaneously.

In addition to the resistance exhibited toward art in the realm of science, the subjects spoke of similar challenges in utilizing technology in the art world, whether in the schools where they teach, the institutions where they lecture, or in the galleries where they exhibit or curate. Hall describes a challenge she encounters as a faculty member at the Massachusetts College of Art:

> I feel slightly askew there because it's a traditional art institution. For instance: everybody is assigned to a traditional department. "You are in 3D," or "You are in 2D," or "You are an architect." Or a communications designer versus an industrial designer. I'm the only senior faculty member at the institution that is referred to as a floater now, and I go from department to department and work with faculty to develop different kinds of curriculum.

DeCordova Museum Media Art Curator George Fifield sums up the consensus of the subjects when he says, "There is definitely a feeling that…this is art because it's

done with traditional art technology and this is not art because it is done with new technologies…The fear of new technologies, which is a fear which is quite operative even in techno-philic times like today, extends well into the art world." Rebecca Allen adds, "[T]he fear that the art world has had in embracing technology is something that I've really pondered a lot. You know, why they're so afraid, why they've been some of the last to get onto this technology…[T]hey fell for this idea that technology was supposed to be one thing and the arts were at the other end of the spectrum, so they never really thought about technology and what role it had it with the arts."

VII. What's So New About Technology? Arguments for Continuity

Paradoxically, the cutting edge work produced by these artists can be seen as carrying on a long tradition of technology's use in the arts. The subjects describe that tradition in four ways: a) art's historic appropriation and use of technology as a tool; b) the history of artists as inventors; c) the enduring need for basic skills in art regardless of technological tools available; and d) continuities between 20th century tools and 19th century technology. While there were differences of opinion, the majority of artists and curators I interviewed believe that these continuities are more significant than the changes that new media art is bringing to the Western arts tradition.

A. Art's Historic Appropriation and Use of Technology As A Tool

All of the subjects attest to the fact that "technology" itself is nothing new. "Technology -- there has always been technology," says SF MoMA's Media Art curator,

Benjamin Weil, hired by David Ross in 1999 to help the museum explore new media art's potential. Jennifer Hall agrees: "I avoid the word technology because it doesn't mean that much…other [tools] were the technologies of the time." Furthermore, the subjects repeatedly note that artists have always used whatever technology has been available to them in their day and age, whether in the forms of pens and pencils or paints or computers. Nineteenth century artists' use of photography and twentieth-century artists' use of video demonstrate how readily artists have explored new technologies in their practice. New media artists are no different for mastering the computerized and scientific technologies so prevalent in the present culture than artists who used pencils, photography and video before them.

The majority of the subjects consider even the most advanced technologies as tools (albeit very powerful ones) to assist them in their work. "[E]ach of the modern technologies, whether…video, holography, or photography…are tools as are paintbrushes and paint," says Harriet Casdin-Silver. Painter and Millennium Arts Project Manager William Hays agrees, and cites the metaphors of paints and brushes found in computer painting programs as evidence that new technologies have changed the practice of visual arts very little. "[I]f you look at [computer] drawing and painting programs, what's the terminology that they use?…They talk about the same tools that visual artists use because there isn't a vocabulary for digital art yet; it's all still based on what has happened for…6000 years of painting."

Most of the artists interviewed believe that the changes in art wrought by digital tools are not unique. Hays, for instance, acknowledges that the computer is a visual

arts tool with "tremendous capacity to modify imagery." With it artists have been able

for the first time to "really put together 2-dimensional interactive imagery" and

"respond to something by touch or by click…so that it would be modified." While he

admits that such capacity is new, he doesn't perceive it as "revolutionary." Instead,

Hays sees computer technology as "a new medium" that is "not really doing new

things." New media art's innovation, he explains, essentially lies in a manipulation of

imagery, which is not unlike that which occurs in traditional media: "[W]hen an artist is

using a computer to create visual imagery, the end result is…an image on the monitor,

[or] it's a flat image which is printed out on a substrate, usually paper…So it's a new

medium to create a printmaking process." Like Hays, Casdin-Silver believes that

computers "offer a different slant, a different angle, a different way to learn things, a

different way to project whatever the statement is of the artist." But rather than

changing the notion of what art is, Casdin-Silver explains that computer technology is

another tool that has simply changed the means of arriving at art: "[I]t's given [artists]

an enormous variation of possibilities to use to arrive wherever [they're] going."

B. The Artist as Inventor

    Artists have also historically served as technological innovators and tool inventors

as part of the creative process involved in realizing their ideas. Renaissance painters

pioneered both the method of perspective and the oil paint that revolutionized painting

in the fifteenth and sixteenth centuries. Four hundred years later, more than just using

photographic technology, artists invented it (Parisian artist Louis Jacques Mande

Daguerre's invention of the Daguerrerotype machine, the forerunner of the camera, is a

perfect example).[3] Like their innovative predecessors, new media artists are writing

their own computer programs, creating their own scientific experiments, and building

their own robots in order to transcend the limits of the tools and materials they have

inherited. Jennifer Hall understands this distinguished history as evidence of the way

that *art* has affected *technology* instead of the other way around:

> I like to think about the artist having influence on the technology so that we
> are not consumers of it but we are creators of it. That's the entry point that I
> do all of my work from. [I]n previous decades we were the makers of the
> templates, the jigs, and the pigments …[W]e developed the [sculptural]
> casting techniques [which was] unbelievable technology at that point… [W]e
> came up with foreshortening in the Renaissance, pigments, seco, and a fresco;
> those are technologies that lasted through floods…How far back do you take
> it? I know artists that burn their own [computer] chips because they don't
> like buying their chips off the market. My grandfather used to carve down
> his paintbrushes and sometimes make his own…so they could have just the
> right edge on them. …[T]he decision to actually …make his own paintbrush
> was directly associated with what was the intention of the mark: what did he
> need to do as an artist?

Hall thinks that today as in the past it is appropriate for artists to create new

technologies to solve problems; invention and innovation is the rightful purview of art

and not of science alone. Art, she believes, can legitimately include the work of

computer science. Five of the seven artists interviewed in fact write their own computer

code; they believe it is at this technical level that successful new media artists --

particularly those in computer and network-based forms -- must learn their craft. As a

group they shun popular pre-packaged art programs because of the formulaic character

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[3] "A Thumbnail History of the Daguerreotype," by Kenneth E. Nelson. The Daguerreian Society, 1996.

of the art produced and the way it limits users' creativity. "The creative work requires software development, so you…have to get that to a certain point before you can even start visualizing things," explains Rebecca Allen. "So much thinking revolves around the structure of programming. I'm not impressed with artists [who] have great ideas but really know very little about the technology…[E]ither they're really dependent on the technology person to do a lot of what I think is the creative work, or they're coming up with the impossible or mediocre ideas." Allen, like Hall, sees a direct relationship between creative innovation and tool making: "[A] lot of artists [who] are really pushing their new art forms are also developing tools. So the tool building and the tool using is a kind of cyclical process. I find the tool building to be very much a part of the creative process in my work."

C. <u>The Enduring Need for Basic Skills and a Liberal Arts Education</u>

All of the subjects agree that technology alone does not guarantee the creativity required to make meaningful art. In their interviews, seven of ten distinguish between work that features flashy bells and whistles and work informed by powerful, creative ideas. [4] In so doing they echo Michelangelo's conviction described earlier. The subjects' descriptions of art driven more by technology than creativity and insight are as entertaining as they were varied: "gee whiz art," "visual ya-ya," and "techno-fetish cultural production" are just a few of the phrases they use. William Hays compares

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http://www.daguerre.org/resource/history/history.html.
[4] Two of the three subjects who did not speak directly to this question were known by the curators for work that clearly fell into the latter category.

computerized tools with paints to make the point: "What [technology] doesn't do is give you the capacity to create a better image. It takes an artist to create a better image. If I give somebody the best oil paints and brushes that the world has to offer, that doesn't make them a good artist, and a powerful computer doesn't make a good artist either. All it does is give them a really great tool."

Furthermore, the importance of distinguishing between special effects and serious art is something that artists in new media have learned from past fads and superficial forms. According to George Fifield, the early days of computer-based art furnish an example:

> In a lot of cases…very early computer art…was the work of the engineers who were working on this software generating what they thought was really spectacular. And they would call it art, but today, when you look at it, it's just completely boring. It's historically interesting, but nothing more. You then have to get to a point where an artist comes and is interested in the medium but sees past it to what [he or she] can do that really reaches into the human spirit in spite of the technology…Only recently…in the last ten years has two-dimensional [computer] work become really exciting.

In order to distinguish between what is truly innovative and what is momentarily in vogue, the subjects emphasize the need for continued mastery of the basics of art regardless of the medium. "On the computer, you need to know color, you need to know composition. You need all the same elements that you needed to do a good painting," explains Harriet Casdin-Silver. Rebecca Allen echoes the same conviction: "[V]isual artists have a class of things they are concerned about and still form, color, composition…are still needed to be thought about no matter what medium you're working in." Even Jennifer Hall, who felt constrained by her art school experience,

believes that traditional skills need to continue being learned and honed. In addition, she sees "the essential question" for an artist's work still to be an "intuitive response to the world…[Students] need to get…good cognitive and social and personal skills built in to be able to do that well, and that happens, I believe, still best in an art school."

Subjects also insist on as broad and full a liberal arts education as one can have in order to ensure that future artists will know how to use creatively whatever technology becomes available. Casdin-Silver explains that a liberal arts education is necessary to expose students to the enduring questions of life through philosophy, theology, and psychology, so that when students learn whatever medium they want to work with, they will have something compelling to say. "[I]f the artist [has] no statement to make, it doesn't matter if she is using the pencil or computer or laser…[A] student [needs] to learn how to deal with people and how to understand people, and to know as much about the world as possible."

D. 20th Century Tools in the Light of 19th Century Technology

According to subjects' statements, science and technology have both historically influenced *and* been influenced by the arts. The question remains, however, whether recent technologies are qualitatively different than those that have come before. How different a tool is the computer from tools invented more than a century ago? Seven out of ten subjects believe that computer technology's effect on art is not significantly different than the effect photography had on art in the late 19th century. The change that the camera wrought at that time was revolutionary. Photography made

reproduction possible without the physical act of drawing and rendered images far more realistically than had been possible with paint. In addition, the photographic images were reproducible for the first time on a mass scale (as lithographic prints had been a few years before), throwing into question the value of an "original" piece of work and making visual art a commodity for mass culture. The invention of the photograph thus ushered in what philosopher Walter Benjamin called "the age of mechanical reproduction." [5] His famous essay, originally published by the middle 1930's, was one of the earliest and most profound statements on the technology's implications for art. In it Benjamin explained that "for the first time in the process of pictorial reproduction, photography freed the hand of the most important artistic functions which henceforth devolved only upon the eye looking into the lens."[6]

The subjects acknowledged that the mechanized production of art has continued with the invention of film, video, and today's digital technology; they see the computer as continuing in kind the same mechanical reproduction that the camera began. Like the camera, the computer enlists the hand in mechanical movements (like typing, pointing, clicking, scrolling, etc.) rather than in artistic functions Benjamin described. Yet just as previous artists appropriated the lens as a means for poetic expression, so new media artists have harnessed the PC for artistic ends. Curator David Ross sees this

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[5] Walter Benjamin, "The Work Of Art in the Age of Mechanical Reproduction," in *Illuminations* (New York: 1977), pp. 217-251. The essay includes Benjamin's thoughts on the subsequent loss of authenticity and value of "the original" in art, the loss of aura, ritual and tradition in art making, the development of new kinds of aesthetic perception, and the resulting phenomena of mass culture.
[6] Ibid., p. 219.

continuity in the fact that the questions asked with regard to art in the computer age

differ little from those asked by 19th century artists:

> What we've seen in the translation of that question from mid 19th century to late 20th century is a successive pattern of new technologies that are each bigger, broader and more encompassing than the last. The question still hasn't changed from the question that artists themselves put forward in the work of art in the age of mechanical reproduction: "Now how do we define art? What is an artist's job?" With that…being the open question of the twentieth century, in a way, new technologies aren't that radical if you can step back and see it in context. Even the Internet and digital technologies [are] an extension and one more step; another extension of the same set of questions that have to do with defining artistic practice.

VIII. Change Amid Continuity

Just because artists' use of computers as tools in the digital age follows their

predecessors' own appropriation and invention of technology, however, does not mean

that art itself has remained constant throughout the years. On the contrary, some of the

subjects emphasized the changes that have occurred in art amid the continuity of, and

even because of, technological innovation. For them, the question of continuity and

change is not an either/or proposition. "[A]ll of art has been driven by technology,"

George Fifield explains, "[a]nd revolutions in art have been…to some degree…how

they've been driven. I think that art and technology are intricately bound. It's true that

new technological advances change art. The effect that oil paint had on painting is

profound." [7]

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[7] "[A]ll of a sudden you could paint an entire picture; you didn't start in the corner and work rapidly across like this because it dried as soon as you put it on a canvas or on the prepared surface. You could literally make an entire picture; it would be wet and you could paint all over it; that's a huge difference."

In words that echo Walter Benjamin, Benjamin Weil explains the same phenomenon using photography as an example:

> Once, painting — oil on canvas — was an ideal means of representing the world. When photography came, painting suddenly seemed less precise, and therefore less desirable, in a way. [I]t therefore had to evolve, to function at another level of representation. Every single technological change affects established art forms as it questions their relevance to the current times."

Yet even as Weil describes how changes to photography in the digital age exemplify the increased and new possibilities in art, he concludes, like Ross, that art remains unchanged in its ultimate goal:

> It is undeniable that the practice of photography has been affected by the advent of digital technology. Indeed, with a digital camera, one can take a picture and look at the result immediately. Editing is immediate, which changes the relationship to the image: it can be erased as soon as it has been taken. The same applies to film: with digital video, the whole process of making your film is completely different. The process is revolutionized by cameras that are so light that you can actually walk and take a film almost as if you were just filming with your eyes. This does not necessarily imply that the preoccupations and the fundamental intentions and interests of artists have drastically changed. However, they certainly are being affected by the changes brought by those technological evolution.

Weil sees continuity and change happening at the same time. He detects a profoundly philosophical and historical continuity within the technological and procedural change: "What is happening is that we regard painting as a concept and no longer as a medium, but rather as a technique. A video can be a painting. A digital animation can be a painting. In other words, painting is a linguistic structure or a set of goals in regards to visual art." Weil sees this state of affairs as "healthy," because the artists who are at the forefront of the exploration of new technologies "recognize that

they are not operating in a historical vacuum and need the continuum of history as a

valid background for their production." Weil sees the primary but predictable

difference in the contemporary materials with which artists today are working: "The

fact that artists may be using computers or any other production digital tools is nothing

surprising. It makes sense to use the most efficient means of communication to

comment on or represent the current state of the cultural landscape."

IX. Qualitative Changes in the Product, if Not the Process, of Art

In spite of the foregoing arguments, some of the subjects also make strong cases for

why computer and network-based technology *is* changing art as we know it. How can

subjects argue that technology is not qualitatively changing art and then assert that it is?

An explanation for this apparent confusion may lie in the sheer rates of change in the

power of technology itself. As has been observed by art administrator E. Andrew

Taylor, bodies of knowledge used to remain static enough for people to study and

understand them. Today, individuals are afforded that luxury less and less:

innovations come faster, communications occur over longer distances, and more people

collaborate to solve problems and discover new ones than ever before.[8] In the

meantime, artists are themselves left to determine whether new technology has

qualitatively changed their practice, a theoretical task that has traditionally been

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[8] "Pandora's Bottle - Cultural Content in a Digital World," by E. Andrew Taylor, Bolz Center for Arts Administration, University of Wisconsin. Unpublished paper presented at the Social Theory, Politics and The Arts 26th Annual Conference, Washington, D.C., October 13, 2000.

performed by critics and curators.[9] The artists who have taken up the challenge of

theorizing point to a) the rate of technological change; b) the freedom of the digital

interface; c) the computer's contribution as a collaborator; d) the thought process

required for programming code; e) the temptation to transcend the material with the

virtual with new technology; and f) new technology's aesthetic of interactivity. Yet

even if qualitative change does not extend to art or the artistic process itself, these

subjects say, it already extends to the institutions that exhibit, preserve, and sell art.

A. The Rate of Technological Change

   The first difference brought about by recent technology is speed. In the words of

George Fifield, "The breakthroughs are coming not every hundred years or every

decade, but now they're coming every couple of months." He, along with Rebecca

Allen, Jennifer Hall, and William Hays, admits to not learning the latest manufactured

versions of computer art programs thoroughly because of their short shelf life and rapid

obsolescence. Hall describes her experience in the classroom as a continuous series of a

thousand "introductions," and expresses envy of colleagues specializing in more stable

art forms and techniques. Because of the quick turnover of technology available on the

market and to her students, she has to revamp her syllabus approximately every 3 to 4

months: "[Y]our curriculum has to change every single semester," she says. "There are

new tools and new ways of thinking about it. It's very, very slippery."

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[9] At least one of our subjects remarked on the phenomenon, and recent literature bears it out. See "Introduction to net.art (1994-1999)," Natalie Bookchin and Alexei Shulgin (www.easylife.org/netart/catalogue.html, March-April,

In one sense, this rapid pace of change demonstrates the lack of control artists themselves have over the available technology; their attempts to master it reveal their reliance on (and vulnerability to) materials, tools, and markets that they themselves did not create. Hall's remarks are consistent with this fact: "I have a machine that I'm working on that is all of three years old, and nowhere can I find the operating system to get it to boot back up again because it crashed. This is hideous. This is absurd. Who got us on such a fast spin? Part of the responsibility I think we have…is to slow it down; qualitative versus quantitative on this treadmill of development. I think that there are issues of greed that got us going at this speed." In the tradition of artists who created technology to realize their visions, Hall argues that qualitative concerns should entail artists' design of computer hardware and software so that it becomes more attuned to creative needs than to commercial ends.

B. The Freedom of the Digital Interface

As for the technology itself, the subjects described its power and potential with enthusiasm. The digital interface enables them to transcend not only particular genres of art, but also constraints of size and other physical limitations. With digital technology, what is visual in 2-D can become sculptural in 3-D and then musical with no visible dimension -- all by pressing a button. "Once you get into this digital space," George Fifield says, "it doesn't matter whether you're doing music or sculpture or

1999. See also www.rhizome.org and www.walkerart.org/salons/eat for interviews with net artists on theoretical issues of network-based art.

video or photography; it all becomes one. [T]he same tools that a musician might use…
a sculptor can use. It all becomes interchangeable." To explain further, Fifield uses an
analogy of the neurological condition called synesthesia in which people may actually
hear colors. "The computer does [this] automatically. You can take a piece of musical
data, bring it into the computer, and …print it out as a three-dimensional object. You
can take a photograph and put it in the computer and you can turn it into a piece of
music." Recent inventions allow for "virtual" sculpting so artists can work in three
dimensions on the computer instead of two: haptic interfaces simulate on screen what
the artist does in real time through physical motion with robotic-like gloves. In some
ways, these inventions *return* digital technology to the physical realm while still
transcending its boundaries.

In addition, "save as" and "undo" features allow artists to alter a work of art an
infinite number of ways an infinite number of times without ever having to materially
construct the work at all. The digital storage and manipulation that is now possible
means that characteristics like size are no longer fixed. From the perspective of
computer technology (though not in physical production terms), a work can be
generated the size of a postage stamp as easily as a stadium poster. With the processing
power of modern computers, artists can create by tweaking Cartesian space without
being constrained by gravity or any number of normal limitations. As Hall remarks,
"When you don't have constraints in a formal world, you can ask lots of 'what ifs?'"

C. The Computer As Creative Collaborator

Because of its incredible power, the computer can be seen as a creative partner and collaborator instead of simply a tool. At least one of the subjects believes this indeed represents a qualitative change from traditional paints and brushes. According to Rebecca Allen, "[t]here's something very different about digital computers that separates them from machines that are mechanical. Part of it is that you just can't physically see how a computer works the way you can follow the workings of a mechanical device. Also, the sense that a computer may be intelligent, that it may even be smarter than you in some ways…[I]t is this illusion of intelligence and life that sets it apart from other machines." Allen also believes that the computer plays an integral part in her creative process. "[I]n certain types of art, the machine itself is a collaborator. I certainly see [my] computer [that way]. I'm always trying to understand the potential of digital technology, to understand what it can contribute, so that it performs a certain amount of the creative work...It's a different way to think."

The difference that this makes to the creative process is particularly evident in Allen's description of her work with artificial life forms. "I've added an additional issue of loss of control when working with artificial life, because as an artist I set up a number of parameters that define the aesthetics and behavior of artificial life forms, but then the artificial life behave in ways I wouldn't have imagined. This is called emergent behavior. It's a new way to think about the creative process –– the fact that you don't have complete, absolute control in the creation of your work."

Allen describes the programmed "autonomy" of the artificial life forms she creates, and the surprisingly unpredictable qualities that computer programming allows in her virtual worlds. These qualities, she says, demonstrates a change in the *interactivity* of new media art between artist and machine through the process of computer programming. As new media art becomes more interactive, Allen believes that artists will have to think very differently about the creative process. "[A]rtists who work with digital technology are often drawn to interactive art forms [that require approaching] the creative process in a very different way. Often there is no completion to interactive art, and it never truly takes form until there is interaction and intervention from people that are normally in the more passive role of art viewer." She explains how the open-ended nature of the creative process between artist and machine facilitates innovation: "[I]f you try to pre-plan too much, you're always just going to base it on older forms, or something you've already done, or some technology you're already familiar with. So this kind of mental state -- of leaving it open and letting things radically change in order to accommodate where the development -- is one of the biggest part[s] of the creative process; it can really push you into some new territory."

D. <u>The Creative Process of Programming Code</u>

The creative process that Allen describes taking place between the machine and the artist occurs principally in writing computer code. This process in fact might be the most significant difference between previous forms of visual imagery and new media art. To begin with, programming requires a level of proficiency in writing detailed and

complex commands that computers can process and follow. This task utilizes formal, linguistic, and logical skills like those necessary for mathematical problem-solving. These skills are ostensibly different from the concrete skills involved in the spatial and hand-eye coordination so typically used by traditional visual artists. Furthermore, computer culture has developed to emphasize the most abstract and formal ways of problem solving. To be sure, there can be many ways to program computer software, including strategies that successfully incorporate concrete ways of conceptualization reminiscent more of an artist's than a logician's skill. Despite this fact, most of the programs, equipment, and education have been constructed to favor the most formal and abstract thought processes. The result has posed difficulties for artists. Eager to explore the capacities of the computer, new media artists have tried to master the intricacies of hardware and software, only to discover incompatibilities with their ways of thinking and the tools' inaccessibility for their needs. According to the subjects, obtusely written programs and traditional interfaces more often obstruct than advance users' innovation.

Allen traces this problem to the fact that scientists have constructed much of the technology as they have seen fit for their own use, rendering it counterintuitive for artists in the process. She laments, "I've been really disappointed in the lack of usability of computers. I know enough about computers to know that they don't have to be that way. A very narrow group of people, primarily technical engineers, have been responsible for the design of machines that should provide an interdisciplinary and universal set of tools." She sees the problem manifest in the tension she experiences

between the computer's computing processes and her own problem-solving style. "All the years I've worked with this stuff and I still can't figure out new things without a system administrator or somebody digging deep…[I]t doesn't feel natural. It's not using my true self. I really have to struggle to learn it and get it… that's why I said I don't think it needs to be that way because I can see other ways to do it. But I have to deal with [the] technology the way it is right now."

Allen's work as an educator offers additional evidence of the struggle that artists have in entering the computer realm: "In this field, and I see this especially in teaching, some very creative people just can't get past the badly designed computer interface. This is excluding a lot of creative thinkers. But that said, I believe the computer can allow for new ways of thinking. It allows you to design complex systems, to develop procedures to generate creative work. Computers open up new avenues of expression. When trying to understand the technology, I seem to use different parts of my brain compared to the process of creating art."

In her study of "epistemological pluralism" in computer culture, Sherry Turkle of MIT has documented the situation described by Allen.[10] While the culture of computer programming gives the appearance that work proceeds along universally linear and logical methods, in reality, approaches can vary widely (and creatively). Overcoming the "built-in" biases and limitations intrinsic to the current technology is one of the challenges that motivates Allen to reclaim for artists what they have lost. "I have a

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[10] Sherry Turkle and Seymour Papert, "Epistemological Pluralism: Styles and Voices Within The Computer Culture," report from the Epistemology and Learning Group, MIT Media Laboratory, 1990.

strong concern because all of this technology infiltrating everyone's life is still designed by people who are in very specific fields: sciences, computer science, electrical engineering. I still feel [that] there needs to be much more input by a whole variety of disciplines… So that's a concern I have, too, just being a presence as an artist, to give another kind of perspective to how this technology develops."

   Jennifer Hall sympathizes with Allen's complaints. She sees the fact that artists are forced to conform their methods to those that have been built to suit engineers as an unfortunate reversal of the artists' position concerning technology. "[B]ecause these shifts are being made from the tools that we have made for ourselves, I think we also owe it to ourselves to make the choices about those shifts." She discerns wider cultural implications in artists' gaining creative and technical control over computer technology. "[It's] important for artists to understand that they need to be a part of the cultural fabric, and [for] the cultural fabric…to understand that culture becomes thicker, denser, and more interesting when people that think differently than those little boxes are sharing the same conversation."

   Taking back control for Allen and Hall means making their own tools -- a practice that several of the artists identified on the side of artistic continuity. But even as innovation and tool making continues in new media art, the tools used -- specifically computer code -- may be significantly different than those used by artists before. The testimony of the subjects indicates that the process involved in writing and manipulating code may in fact be qualitatively different from the skills required in the making of other forms of visual art. The "different ways of thinking" previously

described by Allen when an artist is involved in the hands-on work of computer

programming is just one case in point. The curators agree. They believe that

programming code will bring about art's next paradigm shift in the twenty-first

century, just as lithography and photography revolutionized art in the nineteenth

century.

Curator George Fifield believes that such a shift can only happen when new media

artists cease to depend on old media metaphors. His words echo William Hays' earlier

comments about the paint and brush symbols used in contemporary drawing

programs:

> [A]ll new technologies start by using as their interface metaphors of the
> previous technology…You look at the tools on the side of PhotoShop: every
> tool is a metaphor for a tool of a previous technology…paintbrush, pencil:
> this is all how we have to deal with technology when we first get it…The
> thing to look for in digital technology…is when the metaphors start to shift,
> and when artists start to work directly with the ones and zeroes with the code
> to make their art…Those are different metaphors but they're more direct
> metaphors; the metaphors that are dealing with the code, not metaphors
> without the previous technology.

And even though Hays himself doubts that new media art has brought about

qualitative change, he connects the monopoly that scientists have had on computer

technology with the delay in artists being able to make the revolutionary conceptual

shifts:

> They're still using the same terminology that's been used because they (I
> mean the designers of the software) haven't really found that new voice yet.
> It's still heavily based on the old one…[W]e're so completely dependent on
> our traditional means that we haven't even developed new means of
> interacting with the stuff…I am confident that it will happen that people will

31

come along…[who] will do things that will change digital media so that it really is a new means of expression and not just a different brush.

The guess among many of the subjects is that artists who can think "outside the box" built by technologists will more ably achieve the next revolution of art. Society may then see a qualitative change in art as well as technology.

That qualitative change may come sooner rather than later. Allen's difficulty in comfortably mastering advanced forms of computer programming may simply indicate a learning curve that is already being rounded by the next generation of young artists. Allen has noted evidence of this in her students.

Recently I've seen…younger artists who…quickly feel comfortable with programming and…the technical sides of things. I see a change in the past few years where…they're just around the technology more. [T]hey can pick it up a lot faster, even to the point where it's not unusual for a freshman to be teaching and training grad students…because there's that much of a gap in the kind of exposure they've had. And of course teaching the professors as well.

Hall's experience is similar:

When I see young freshmen coming into art school with the same skills as engineers I think that there's an important shift happening there. It used to be that a place like this had to bring in an engineer to work with an artist so that they could make their robot or their interactive multimedia piece. This new generation of artists is coming in totally technologically prepared to delve into this stuff without any fear…[T]here is truly, I believe, a renaissance of that kind of artist; they have claimed and feel comfortable enough with the technology that they can manipulate it and build it and make it as flexible as other mediums….[T]hat's going to shift things around a lot.

Web artist Michael Samyn epitomizes just such a shift. He demonstrates a facility with programming that could be a special gift or simply an earlier and more formative

experience with the medium. That people note his programming talent as unique often comes as a curious surprise to him:

> The work of an artist comes very natural to him/her. It's not very special. But…[s]uddenly the work created has meaning for a lot of people. And [they] think that the artist is a genius for being able to express such emotions or thoughts so well. But the artist did no such thing; he/she was just playing/working/etc... The most artistic thing in my work, that might differentiate me from somebody else, is my ability to "feel" whether an image, animation, interaction "works" better than other people seem to. This feeling is very natural to me and doesn't strike me as anything special. It's only when I see the lack of it in other works, that I realize that I have this "gift."

F. The Temptation to Transcend The Material With The Virtual

Samyn has embraced the computer medium only after having worked in other traditional venues. Younger students, however, may be far less attracted or even exposed to non-digital media as technology continues to revolutionize the way people communicate, educate, and artistically create. The subjects, especially those who teach, already note this trend in their classes. Jennifer Hall and Rebecca Allen point to the computer's hypnotic quality and its ability to seduce users -- particularly young ones -- into losing their physical sense of self. Hall and Allen believe that others need to be aware of the dangers in digitizing the art process at the expense of the body. Their descriptions identify the sixth characteristic that sets computer and network-based media apart from traditional visual art forms.

Allen's interest in the role that the human body plays as technology evolves derives from this tendency of technology to evade and supercede the physical. She cites with concern the "trend" in which "people [who] are really into this stuff [see] the body as

useless, this meat, and [conceive] of jacking directly into your brain. But I feel the body

is very important. I'm interested in keeping, understanding how to use people's

physical bodies in relationship to computers."

Hall describes similar concerns in relation to her students:

I'm actually working on an installation for kids between 4th and 8th grade, and its called "Virtual Body, Physical Body." It's addressing the very specific issue: where do people think they are today? Because we live in this incredibly pixilated [time]. Some of us are living on screen -- in the Internet -- and some of us are living in our physical bodies. [A]t that particular age, when [students are] growing [their] sense of self, where are they? Many of them are far more virtual than we are giving them credit for. They're dropping their bodies much younger; they're not making the interconnectivity between the two. So there are all these great worries, for me, for that age. I've always had this interest in the poetic relationship between the physical and the virtual, and I'm using the term virtual as in everything from virtual reality on a computer to cognition to the biochemistry of self. Where are we? Where are you? There's always this fundamental question for me.

Hall's observation recalls her commitment to the traditional arts curriculum:

[T]here is an intelligence in making something with your hands that a lot of kids don't have the way they used to have. Because of immersion [in new media], I will make the argument that it's because they're spending a lot of their time inside of data rather than inside their bodies. [T]hey are deep inside there somewhere…They're not learning about the finer points of fine motor skills; their fine motor skills are focused here and not at their toes anymore. There are going to be organic shifts in body because of that.

The remedy, she says, is in an open and forthright dialogue about both the

physical and social effects of technology:

[W]e [must] make sure to ask young people [who] are working with technology not to forget [their] heritage as an artist and as a body. Just as long as we keep talking about it, I think that we're going to be all right, but most people don't have the time to do that anymore; they just have to keep

making things, and they have to make them even faster than they ever did before. Nobody has the time to do the kinds of human things that we value so greatly. When we lose that in the art making process, what are we doing? The product, the process, the artist all become fragmented and much thinner than they should be.[11]

Millennium Arts Project Manager William Hays continues to concentrate on painting when he is not facilitating on-line art education with students precisely to avoid such fragmentation. He points to the tangible difference that the digital medium makes because of its *intangibility* when he accounts for his decision not to delve deeper into computer and network-based art.

> I think about doing digital art quite a bit…[O]ver the last year I've been exposed to some tools and I've learned how to use some programmed features that have made me much more interested in the possibility of doing it. But I haven't. I still love paint on my hands. I love the feel of paper. I love the fact that I can change my mind and scrap something off or wet it and wash the image off of a surface. I know you can do these things in digital art, or what you can do is you can do an electronic approximation of the same thing. But it *isn't* the same thing.

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[11] Curator Benjamin Weil spoke of the minimizing of physical involvement with more philosophical interest than concern: "I have this vague feeling that what may be happening is that the more technology is evolving, the less the hand is directly involved in the art-making process. When you look at [a painting of Jackson Pollock or] the process of making a painting, through the films…or through the photographs that Hans Manmoth made, you start realizing: '[I]s in fact the action of painting more important than the painting? Is in fact the performance of dripping paint over a canvas more important than the finished product? And is in fact this process more important because the trace of the hand is removed from the final product?' I really have this feeling that…there's a displacement of the locus of art…I don't know if future generations will not be looking at the photography or the films of Hans Manmoth as being more important to their understanding of the intents of Jackson Pollock than the painting."

G. The Aesthetic of Interactivity

The loss of corporeality caused by an unbalanced reliance on digital technology might soon be restored if technology itself can be made to engage people physically. Rebecca Allen's work in haptic interfaces that physically draw audiences into virtual space is one example; the aforementioned use of such technology to help artists virtually "sculpt" is another. There are, however, additional and perhaps qualitatively different levels of creative and inter-personal activity made possible by computer- and network-based platforms. Unlike other technologies used by artists in the past, a networked computer can serve as a vehicle of production, reproduction, distribution, and communication -- all at the same time. Such on-line capabilities facilitate feedback and even changes to a work of art from one user as easily as from a thousand. This newfound communicative potential is ironically made possible by the medium's disembodied, digital, and non-physical form.

1. Blurring the Line Between Artist and Audience

Computer- and network-based platforms lend themselves to a uniquely individualized, multi-sensory experience for users. As with film, the production of web art includes many parts, but instead of having a film crew, the artist has a single interface at his or his fingertips. Web artist Michael Samyn believes that this allows an artist "to become everything: a writer, a sound designer, an illustrator, and a programmer." His partner Auriea Harvey agrees. With a computer and the Internet, she says, "[y]ou've got your delivery media, your ability to make, to publish, to

communicate and receive feedback. What else do you need? It [is] an entire art world in a box." Thanks to network technology, the viewer can *also* play the role of writer, sound designer, illustrator, and programmer. The Internet allows free and complete access to others' work so that anyone can download a piece to alter, embellish, or otherwise incorporate it into their own. As a result, the Internet is challenging the concepts of originality and ownership of visual art more than ever before.

Some artists see this potential for exchange and mutability as a good thing in the evolution of art, particularly as it tears down traditional barriers that have separated art from viewers. According to Rebecca Allen, a new aesthetic of interactivity means that a piece is "never finished…unless there's interaction and sort of disruption from people outside of the artists' world." While interactivity is not a new aesthetic philosophy (it has been embraced by installation and other artists for decades) it can be exploited on the web to an almost unlimited degree. With the Internet, an exponentially larger world of potential art viewers and art *makers* is only a modem and search engine away. The web provides audiences with direct access to the art itself. William Hays states that this in fact might be "the only way that I see computers and the Internet changing art work…you create or you facilitate audience interaction with [an] idea or with [an] image, and you allow the audience to contribute in one way or another."

Curator David Ross explains the genius of the Internet in words that echo Samyn's and Harvey's: "[I]t is both a production and distribution system; it is multi-path from its origins. It overrides the notion of one-way communication inherent in most prior forms of mass media except for ham radio or early radio." He adds that the Internet's

37

inherent quality is "its sense of interactivity …so that the concept of reader and writer starts to shift…It's a mutually permeable wall. Reader/Writer. Artist/Viewer. You can be the artist one second and the audience the next. So some fundamental changes are taking place in the social relationships that art assumes." Harvey considers the interaction and "disruption" provided by other people to be an essential component to web art's uniqueness. She believes that interaction with a piece of web art "changes…the nature of what it is" from a visual piece of imagery to a veritable community in which contributors become bound to each other through the work that they have shared.

2. Objectless Art

With respect to computer and network-based art, not only does the concept of the original disappear -- so does the object itself. Computer-based art exists essentially in code, and network-based art, going one step further, exhibits on a "web" that has no physical location. Curator Benjamin Weil thinks that new media art's ephemeral form is a logical step in the evolution from impressionist painting to the Dadaist movement to conceptual art: "The lack of media stability [i.e. materiality] in a lot of current art production reflects the primary importance of the artistic process and intent, [and] a need for fluidity that supercedes the …static form. Perhaps this is because the world is moving so fast: a finished product would probably be as immediately obsolete as [an old] computer.   Art is no longer necessarily tied to a specific technique. Rather, it is closer to being a form of philosophy."

Such different ways of thinking have prompted five out of the ten subjects to consider code as a work of art itself. "I'm sure that in a few years time people will start realizing that a lot of programs -- computer software -- that are written are really artistic pieces," says Samyn. He adds:

> In the case of programming, the mere fact that [it] takes a lot of creativity and is not just the application of a set of rules is enough to call it art in my opinion. The art of software lies in the system and the structure, in the flow of the program: how the software responds to what you do with it, how it establishes a relationship with you and actually makes you have an emotional response.

To describe this phenomenon more fully, Samyn draws an analogy between what the web can create virtually and what architecture creates physically. "Maybe [web art's] beauty is similar to the beauty of architecture, in its way to [make] spaces where people immediately feel at ease or not. The ability of architecture to manipulate our emotions is tremendous. The effects software can have are similar." Samyn, however, distinguishes between code as art in its rendered, visual form and code as a written set of instructions. "While the code may be well written and interesting to read, I do not think that that is where the art experience happens. The art happens with the rendering of the code. A computer program that is not executed is like a video tape you don't play." Artist Karl Sims agrees: "Computer code is more analogous to the materials that one can build art with, rather than the art itself….[It] may help generate the experience but is not the experience itself."

H. The Implications for Museums, Galleries, and Markets

The dematerialized form that network-based art takes poses some of the most interesting questions about qualitative change in art, particularly from the point of view of traditional institutions like museums and galleries. How do you display something that has no physical form outside of a computer interface? What need remains for museum space when one can best view the art at home through a medium specifically designed for individual use? What functions do museums or galleries fill when artists can have direct access to an audience -- and a much wider one at that -- through the Internet? The subjects raised these questions in unison and agreed that many museums are failing to address them. Three issues stand out as the most significant: 1) the question of museum and gallery inclusion of web art; 2) standards and value of web art; and 3) economic remuneration for web artists.

1. The Question of Museum and Gallery Inclusion of Web Art

With a few notable exceptions, such as the Whitney Museum in New York, SF MoMA, and the Walker Art Center in Minneapolis, art museums have been slow, if not averse, to exploring and embracing new media art in general, and network-based art in particular. Two of the ten subjects cite the cost constraints incurred as curators grapple with highly technical apparatuses and elaborate installations. Four subjects acknowledge a resistance out of fear or a lack of understanding and training. George Fifield describes a recent meeting of new curators held at the Boston Museum of Fine Arts where an hour-long discussion revolved around the collection and exhibition of

objects. "I finally just raised my hand and said, 'Why are you talking about objects? The most interesting art I know is objectless.' They basically…said, 'We don't understand that; we can't talk about it.'"

Rebecca Allen believes that networked art forms have "questioned every aspect of how the art world has run itself." Even curators who support new media art forms are not sure how to go about their work in light of the new technology. "Traditional circuits of [art] dissemination, such as museums or galleries, are not quite ready for interactive art forms," admits Benjamin. "Institutions have to completely rethink [their work] so as to adapt it to these new forms. [Art] is no longer necessarily about contemplating, [but about] a visual experience: physically engaging with the work dramatically changes the experience of art." He cites as an example the 2000 Biennial exhibition at the Whitney Museum that included web art installations among its selections, yet failed to present them in an effective, interactive manner. Other subjects agreed with Weil that there is little use in trying to display web art on a terminal in the middle of a museum when audiences can experience it that way more comfortably and intimately at home.

The curators I interviewed -- all from institutions supportive of new media art -- suggested that museums, conservative by nature and resistant to change, need to question their relationship with technology and their role in society as a matter of survival. Both Benjamin Weil and David Ross spoke positively of new media art's influence in forcing museums to think about their mission in new ways, and of curators' own opportunity to influence the directions in which museums might go. Weil eloquently describes the questions that museums must currently consider:

Cultural forms that are being produced by the artists of current and upcoming generations are once again challenging the institution as a set of walls or a set of rules. The renewed interest in dematerialized art forms calls for a new approach to the function of the museum that may also apply to more traditional art. Can one still relate to the notion of collecting [art]? Can this notion be evolved and adapted to the idea of conserving an intent rather than an object? Is this approach closer to the documenting, archiving, and cataloguing of ideas? Does the museum extend its function by becoming a producer of cultural products, or does it remain purely a collector –– and conservator –– of artifacts? Does it seek to be a place where "live" experimental culture is experienced along side historical moments? These reflections are quite exciting to engage with, and it is quite exhilarating to have an opportunity to participate in this redefinition.

Ross and Weil see SF MoMA's role, for example, as a guardian of cultural history that needs to refrain from passing judgment while the history is in the making. Their efforts with new media art demonstrate how they have put their theories into practice: recent museum initiatives include an archival project of early web pages documenting the beginning of the digital culture, web art competitions like the Webby Award, and conferences that seek to create a dialogue about the effects of technology on the visual arts.

2. Standards and Value of Web Art

The web has caused other subjects to question whether they need museums and galleries at all. As traditional art critics and theorists have been slow to broach network-based forms, artists have declared freedom from experts' pronouncements of value and worth. They have furthermore exploited the web's capacity as both an artistic and communication medium by forming on-line communities through which

they publicize their work. As a result, the Internet has begun to subvert the authority of traditional institutional gatekeepers who have historically limited the editions and determined what was and was not valuable among art objects. On-line capabilities, in the words of David Ross, have "leveled the playing field between individual artist and art institution." Jennifer Hall agrees: "I can see how the artist doesn't need those venues as strongly any more. It's the same way in the commercial world: if you have a product, you can go out there and [sell] it on the Internet yourself."

This current state of affairs was foretold by the most prescient of artists back in the 1970's, according to George Fifield. "[Video artist] Nam June Paik said years ago that in the future, all artists will have their own television station…Today, this is true. Anyone can set up a website…[I]f you actually make interactive art using the fabric of the Web, what do you need a gallery for? What do you need a museum for? What's the purpose of the museum? [D]on't think that museums aren't grappling with this in a big way. Either they're ignoring it completely or they are [asking], 'What does the museum do?'"

The web artists interviewed were particularly outspoken about the end of the museum as we know it. "The modern art concept -- individualist genius, expressionist concept of art -- is dead," Michael Samyn believes, "and the whole gallery and museum aspect of it is also over."

Auriea Harvey agrees: "[W]e don't need that little niche world that is so very much unto itself and looks down on the rest of the world." For her, the ability of web artists to use and build upon each other's material freely makes curatorial prerogatives obsolete.

[I]t preserves itself, to a certain extent, without these issues of quality and what's worth preserving and what's not…That's the question artists have always asked when it comes to things like institutions' selection: why is one thing better than another? But more than that [it] is: why do we have to have those types of elitist classification? The thing about the Internet is that…you're able to get out of that mindset and to not think of it that way. It's so refreshing -- it's really lovely -- to be able to make up your own mind about what you want to look at and what you think is worth preserving, and to actually be able to preserve it yourself if you want to.

According to Harvey, these artists are wary of museums' attempts to define their genre. "The thing that the institution sometimes doesn't understand [is that] people on-line just think it hilarious that there's even something that they tried to call net art in the first place," she says. The curators we interviewed, however, take a different view. According to Weil, the preservation of web artists' work, or even its intent, is "a huge challenge" with which curators and artists are equally grappling, if only because on-line art "was never intended to last in the first place."   He acknowledges that many on-line artists are dubious of museum interest in preserving their work. He finds it ironic, however, that "while most of [the artists] are interested in keeping track of their experiments, they are as clueless as the institution is when it comes to practically dealing with these [preservation] issues."

Ross, too, understands web artists' ambivalence about the institutional art world, but doesn't believe that museums will soon become extinct. "[The artists] don't need us, but they do need us," he counters. "[I]t's not that [institutions like art museums, libraries, universities] are becoming unnecessary; it's that their definition is changing and what they are needed for is changing. We don't need [museums] to tell us what's

good and what's not, but we do need them to serve…as a locus for a discussion that might not generate in another way, or to bring together audiences from disparate parts of the community that might not find a common ground for meeting or for debate."

Three of the subjects expressed hope that such a debate will eventually provide a basis for standards in new media art in order to keep the genres from becoming indistinguishable from common forms of mass media and entertainment. SF MoMA's gathering of jurors for the Webby Award competition demonstrates how tentative and difficult the process of determining new standards can be. According to Weil, he and seven other judges from different fields and perspectives within the art world communicated by email in an attempt to assess the submitted works of web-art. Each ultimately confronted his or her beliefs about why one person's opinion on a work of art should be any more valuable than another's. Coming from different backgrounds and preferences in the arts, these jurors nevertheless created a "broad-based, hybrid decision" that invoked standards based on previous art forms.

The jurors eventually awarded the Webby Grand Prize for the work of Michael Samyn and Auriea Harvey, ironically the subjects who are the most critical about institutional rewards and determination of standards. Besides its successful utilization of the web's structure to create a seemingly endless experience for the viewer, what distinguished Samyn and Harvey's art, according to Weil, is its successful fulfillment of a quite traditional standard: their web sites were constructed around unfolding, growing, and profound narratives. Similarly, Ross believes that the standards used to

judge web art will be like those used for cinema; in either art form, he says, visual

innovation, good writing, and good concepts "will be highly rewarded."

3. *Economic remuneration for web artists*

For artists like Samyn and Harvey, who earn a living from their commercial web

design business, making money off their art is not a pressing matter. They even see

continuity between their art and their business because clients often look at their art and

request similar motifs for their corporate web pages. While they have more freedom

with their own projects, Samyn and Harvey enjoy the creative engagement with

contracted work as much as they do with their personal work. The line between them is

not hard and fast, they say. But what about work that is not corporately funded?

The question of how one actually sells network-based art remains unanswered.

Web artists have increasingly had their pick of shows and exhibitions in which to

compete for prize money, as well as a growing number of grants from a range of

institutions that include museums and pharmaceutical companies. The real resources,

however, remain in Europe, where governments fund the arts more liberally than in

America. International competitions like Ars Electronica give artists exposure *and*

money for their work.

The question of how to protect one's work on-line also remains open. Web artists

freely borrow material and ideas in what has been called "an economy of generosity"

because they are neither compensated for the work they do on the web nor hold

copyrights over its content. Some of the most *avant garde* web artists base their sites on

graphics seized or themes parodied from corporate sites. The companies in turn have

initiated lawsuits to protect their trademarked names and products from being

mistaken for or associated with the artists' imposter sites. In the case of such artwork

"perpetrated" by ®™ark and Etoy,[12] these corporations have so far been unsuccessful.

Because web artists currently have little to lose financially from the proliferation of their

work (and perhaps much more to gain from exposure), the generosity of visual images

and programming is likely to continue.

On the other hand, half of the subjects believe that these days are numbered: they

predict that market forces will eventually find a way to take advantage of the desires of

potential collectors. All three of the curators and two of the artists foresee a pay-per-

view system of compensation as the most likely way that web artists will be paid for

their art in the future. In fact, artists Harvey and Samyn have already launched such a

site featuring their graphic material. If the subjects prove to be right, such a system will

emphasize access more than ownership – the very principle upon which museums

operate today. The only difference will be that the artists, rather than the institutions,

will have curatorial control.

What, then, will happen when every artist has his or her own web site, and Nam

June Paik's prophecy is fulfilled? How will audiences know which sites they want to

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[12] ®™ark is a group of artists who organized themselves as a for-profit corporation in order to take advantages of the legal protections and loopholes that business enjoy. Their purpose, however, is "anti-corporate" and their existence and activity demonstrates their belief that corporations have "been elevated to the level of individuals, but without the same degree of responsibility." Their subversions include funding the exchange of voice boxes between GI Joe and Barbie dolls on the Mattel website, marketing water from coolers of Silicon Valley companies (hq20.org), and parodying websites of Mayor Rudolph Giuliani (yesrudy.com), George W. Bush (gwbush.com) and the World Trade Organization (gatt.org). Etoy corporation similarly parodied the eToys on-line toy business site, and were unsuccessfully sued by the company for their domain name.

visit? Will they be willing to pay any "entrance" fee required for viewing? As unique a

medium as the web appears to be, these questions constitute old dilemmas about the

need for curatorial filters that museums have traditionally supplied. In the words of

Karl Sims, the problem with the web becomes "how to find which of so many choices is

worth exposing yourself to." It also recalls the age-old problem of how to provide the

public with access while providing the artist with a livelihood. What will prevent on-

line art from going corporate? Will art "companies" form to buy out artists and their

sites only to successfully monopolize access to their work? Or will museums see this as

their purview, since even the most traditional of art institutions, like London's Tate and

New York's Metropolitan museums, are beginning to explore entrepreneurial

possibilities on-line?

   Such questions may only be answered as artists, curators, and their institutions

continue to negotiate the yet undefined boundaries of the Internet. The infrastructure

of the web itself, however, seems to militate against such developments. As David Ross

remarks, "Yes, there are issues of intellectual property and ownership that can be

protected and guarded, but it's an anarchic space and I think a lot of people will fight

very hard to maintain certain aspects of it as anarchic."

X. Conclusion

   As unique as the presentation, dissemination, creative processes, and forms of new

media art may prove to be in the future, the need for aesthetic and educational

standards will remain. While the skills required to make art may increasingly include

those of science or technology, the final products should continue to communicate to the soul as only art can. According to the artists and subjects surveyed here, this will be the result as long as a rich liberal arts tradition continues to inspire artists' imaginations, and the discipline of a fine arts education engages their hands. If these subjects' work is any indication, artists will be a force to be reckoned with in the creation, implementation, and interpretation of future technologies as they take back the tools from makers of pre-packaged and unintuitive computer programs alike.

The need for artists to be compensated for their work will also remain. The ways of the Internet and e-commerce will be different, but market forces themselves will not disappear. There is even a chance that as society continues to grapple with the effects that science and technology are having on everyday life, the work of artists who express both the accompanying senses of adventure and apprehension may become even more valued.

Perhaps it is only on the larger level of society that the question of art's continuity and change can be answered. As Benjamin Weil says, "I don't know that recent technologies affect visual arts. They affect culture…It's a cultural revolution. [I]t's affecting visual arts as a part of a larger cultural environment." If Weil is right, then a better question may be, "Is culture, is society, is *life* qualitatively different because of technology?" Finding out may just take a matter of time. Yet these are precisely the questions that the contributions of new media artists are posing. As this report has attempted to show, their work may have already provided some of the answers.