

*PROCESS: A VISUAL EXPLORATION OF*  
DIGITIZATION'S EFFECT ON THE ARTISTIC PROCESS

by

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As an artist, I am interested in how digitization will change the art making process, specifically in dealing with print and other material media. *Process* is an experiment. It is a visual, process-based quest to find out how such a shift may be affecting my world as a print designer, as well as an examination of how digitization may shape the future of art and art education.

This visual exploration of digitization's effect on the artistic process is fueled in part by the creative disconnection I have experienced when working digitally; while my visual sense has remained strong, adapting itself to the glow of the computer screen, my other senses have all but been numbed. Because all digital work is at its base a series of 1s and 0s, can the unique digital work of art exist? How has digitization changed the way we edit work, artistic or otherwise? With increasing access to sophisticated, easy-to-learn software featuring cookie-cutter filters and templates, who is the "real designer?" How much control do I actually have over my art if the creative process takes place within a programmatic framework? These are all questions that I address in "*Process: A Visual Exploration of Digitization's Effect on the Artistic Process.*"

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Just as the printing press in the fourteenth century and photography in the nineteenth century had a revolutionary impact on the development of modern society and culture, today we are in the middle of a new media revolution—the shift of all culture to computer-mediated forms of production, distribution, and communication. (Manovich, 19)

We are in the middle of a worldwide shift toward digitization, the consequences of which we are only beginning to realize. Digitization will affect all aspects of our lives, and especially—though it may come as a surprise to some—the creative process of the artist.

Art and design education commonly begins with a solid foundation in art history. While classical art focuses on content, iconography, and representation of ideas, one of the biggest shifts art history has witnessed has been toward the focus on and importance of the role of the medium; we now often consider the significance a specific medium may lend to a piece as nearly important—if not equally important—as the content of the work itself. In addition, process has come to play an important role in the significance of a work of art; the development of the artist's thinking and the creative steps that take place in the formation of a piece lend symbolism and significance to otherwise abstract and inaccessible works. As Manovich summarizes, modern art assumes “that content and form cannot be separated” (66), thus many modern artistic movements place emphasis on medium and process as integral to the meaning of the work.

If medium and artistic process are to be considered aspects equally definitive of an artwork as its content, then digitization poses some interesting new problems for our notions of modern art and the artist. Digitization is once again changing the dialogue

surrounding the role of art in our culture and will undoubtedly redefine the cultural 2  
role of the artist, as well. It is important to begin thinking about these changes now, while  
we are in the middle of this great shift, before we are so deeply involved in the digital  
world that we can no longer account for the subtle ways in which digitization has  
changed the artist and her artistic process. By thinking about these issues now, we can  
begin to engage in important dialogue regarding how digitization may change our future  
understanding of art's role in society and culture, as well as appropriate ways to construct  
art education. It is generally clear that digitization is already changing the way we  
communicate; what most interests me are the subtle, specific ways in which it is changing  
me, as an artist in between worlds, as well as my artistic process.

I have organized the following discussion into three sections. Section I provides  
background information about how I became interested in digitization's effects on the  
artistic process and highlights a few of the key concepts I find especially interesting and  
pertinent to the digitization discussion. Section II describes my goals and processes  
behind each piece in *Process* and how each work applies to current concepts involved in  
the "digital dialectic." Section III discusses the results of the project and the ways in  
which *Process* helped me to define my own relationship between digital and material  
media. Section III also provides general discussion about some of the ways in which  
digitization affects other disciplines, and how it may change the way we structure  
education, particularly fine arts education.

In the spring of 2001, during my freshman year at the University of Oregon, I was admitted to the Multimedia Department. I have long been interested in graphic design, and the Multimedia Department seemed the best place to pursue a well-rounded graphic design education, as it offered a curriculum of both digital and traditional art classes. Not only would I learn about graphic design, but I would also be exposed to a variety of other digital mediums, such as 3D graphics, digital animation, and web design.

After a short time taking multimedia classes, I realized that the combination of digital and traditional media I was so excited to explore would also create complex issues for me regarding the artistic process. I was learning traditional design history, art history, and drawing techniques, but I was also learning new design software, a tool with which I was much less familiar. I dreaded assignments involving the new software, and after completing a project, I felt I had only just begun to understand the tool's power. I had focused so much on learning the software, that I did not have time to successfully develop a design aesthetic within the work. My confidence in my artistic abilities suffered; I had always felt that I was skilled at drawing and design—why, suddenly, was I incapable of producing work that I was proud of?

Another question concerned me: why was I feeling so disconnected from my artwork, process and product alike? The answer to that question eluded me long after I began to feel comfortable with the software. I could not deny that the process I experienced creating art digitally was entirely different than the hands-on connection I felt with the traditional “pencil to paper” method.

While taking a letterpress class, I had my first exposure to some of the artists' books and medieval manuscripts housed in the Special Collections at the university's



Knight Library. The beauty of these works profoundly impacted me; as I explored the one of a kind pages of each artist book, I came to understand that the materials with which the books were created were not arbitrarily chosen, but rather added essential visual and tactile elements to the work, creating a rich, involved sensory experience. Not only was I reading the beautifully hand-rendered or letter pressed text and processing the distinctive accompanying images, but I was feeling the varied thickness and texture of the paper or parchment, smelling the old skins of the manuscripts, and physically exploring pages of artists books that interactively flipped open, popped up, separated into stand alone pieces, etc. While some of the interactivity resembled what I had experienced online or with digital interactive works, the material richness was unique to these physical, real-world objects. What would happen to pieces like these as the digitization of art creation and documentation gained increasing precedence?

After being introduced to the writings of Katherine Hayles in a class about Internet culture, I became interested in ideas about how digitization has and will continue to affect texts and typography, and how this might also apply to other visual arts. I began to research Walter Benjamin's theories on art reproduction, and Lev Manovich's ideas about "new media." I discovered that artists, theorists, and educators all over the world were thinking about and discussing many of my concerns about digitization's affect on art and artists. It would take my own personal exploration, however, to best understand what this new dialogue meant to me as an artist.

Ultimately, I wanted to explore digitization's effect on the artistic process specifically dealing with print media. As a hopeful graphic designer, my favorite area of design—and the area with which I am most comfortable—is that of print design. After designing digitally, I like having a finished, material product in my hands, and I feel a

sense of accomplishment unique to the print design process when my digitally 5  
created work is finally committed to a tangible surface. When working with materials, I  
enjoy the hands-on process of crafting unique and varied material solutions to new design  
problems, some of which arise out of the very materials themselves. The digital design  
process is very different from the material process, however, and through *Process* I  
hoped to explore the specifics of this design dichotomy.

In creating *Process*, I explored my relationship with digital design, not only by  
way of the actual designing processes, but also through visual and symbolic interpretation  
and representation of a few of the key design concepts digitization has put in question.  
For example, some pieces are heavily process-based, in that the concepts are explored by  
way of the art making methods themselves, while others are more representational of  
specific ideas surrounding the digital-material dichotomy.

By exhibiting my work in the LaVerne Krause gallery, I wanted to bring  
awareness to other students, artists and non-artists alike, about the issues surrounding the  
profound shift toward digitization our culture is experiencing. While my show focused  
specifically on the effects digitization is having on the art making process, the core  
concepts can be applied to almost all aspects of our culture; the move toward a more  
digital culture will affect the ways in which we define art, music, literature, history,  
politics, science, education, and so on, as well as the way we gain access to each of these  
subjects. While it is not my intent to delve into the debate over the definition of art, the  
shift toward digitization certainly adds a fascinating new component to this dialogue. I  
hoped instead to focus on the way these changes may affect individual artists and their  
own artistic processes, whether as visual artists, writers, or musicians, to name a few. By  
choosing quotations from people of varying professional backgrounds—artists,

professors, and philosophers alike—I hoped to highlight some of the key ideas much of the theory covered. The quotations acted as descriptors of the individual pieces, making abstract visuals more accessible to viewers, and engaging my audience in thinking about how the ideas might apply to their own individual experiences with digitization.

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### **Images in Code**

Because of the broad nature of the subject, I chose to focus in on a few key topics that not only greatly interested me as a visual artist, but that were also discussed by many of the authors engaged in present dialogue about the implications of digitization. Firstly, one of the greatest distinctions between digital and material artwork is the coded makeup of digital media. When we describe a work of art by its medium, we explain what the piece is made of: “oil on canvas,” “pencil on paper,” “acrylic on wood,” etc. We describe a digital piece as “digital photography,” “digital painting” or perhaps simply as a work that is “digital.” What, then, comprises the “digital” medium? Rather than inks, fabric, graphite, charcoal, etc., a digital file consists of bits of code and mathematical functions. Each and every computer image is comprised of a collection of individual pixels; an image’s dimensions, colors, and resolution are all defined by specific combinations of the numbers one and zero.<sup>i</sup> In *The Language of New Media*, Lev Manovich refers to digital work as “new media,” and discusses its numerical representation: “A new media object can be described formally (mathematically). For instance, an image or a shape can be described using a mathematical function” (27). Perhaps then, by saying a piece is “digital,” we are simply saying that the piece is a software program’s / printer’s visual interpretation of the digital code and mathematical functions that make it up. This concept has tremendous implications for a digital image’s individuality and identity as a

unique piece of art. Because digital artwork is comprised of bits of code, it is quickly 7  
and, theoretically speaking, identically reproducible. I can possess my own copy of a  
design file in multiple places: on my computer's desktop, on CD, and on my thumb drive,  
and I can also distribute copies of the file to someone else via e-mail, CD, etc. Each copy  
will be composed of the same "material" as the original. In contrast, if I were to try and  
reproduce a painting, for example, I could make a copy via scanner, photocopy machine,  
or camera, but these "copies" would really only be visual representations of the original;  
they would not be comprised of the original material. Even a painted reproduction may  
appear exactly the same as the first version, but it would be its own unique original. It  
seems—more so with digital files than with other mediums—that "Even the most perfect  
reproduction of a work of art is lacking in one element: its presence in time and space, its  
unique existence at the place where it happens to be," as renowned art theorist Walter  
Benjamin states in his famous essay, "The Work of Art in the Age of Mechanical  
Reproduction" (220).

Aside from issues of reproduction, digitization creates interesting questions about  
the role of an artwork's medium in the ultimate meaning of the piece. An artist often  
carefully chooses his/her medium based on the content of the piece, as different mediums  
inspire different interpretations of an artwork. With traditional media, I may create a  
material collage instead of a painting for a given work, because I may wish to comment  
on the fragmented nature of the subject, or highlight the redefinition of found objects, for  
example. Within the digital medium as it currently stands, some graphic-based software  
applications include features that attempt to recreate the appearance of material media, as  
with Corel Painter<sup>ii</sup>, an amazingly versatile program with a true-to-life painterly aesthetic.  
Other programs embrace a unique-to-digital style, as with vector-based programs.<sup>iii</sup>

Regardless, the work at its core is made up of code. Where does the digital medium stand in its contribution to a piece's meaning? Digitization questions the importance of how and why we choose different mediums for different pieces, and it may point to a move away from—or at least a revision of—Marshall McLuhan's idea that "The Medium is the Message [sic]."

When creating art digitally, artists also risk creating work that "gives itself away" through the easily recognized characteristics of the software with which it was created. It is common to see pieces created in Photoshop<sup>iv</sup> with multiple filter effects, and while it is possible to subtly incorporate such effects to create beautiful, transparent work, it is easy to misuse the filters through overuse, resulting in easily recognizable "filter-happy" Photoshop work. Interactive artist David Rokeby comments on this effect with earlier art software:

When the Apple Macintosh first came onto the market, the MacPaint program, which simulates, to a degree, the visual artist's basic tools, sent a shock wave through the creative community. For the first year, MacPaint-produced posters were everywhere, an apparent explosion of the freedom of, and possibility for, self-expression. But while the MacPaint medium reflected the user's expressive gestures, it also refracted them through its own idiosyncratic prism. After a while, the posters began to blend together into an urban wallpaper of MacPaint textures and MacPaint patterns. The similarities overpowered the differences. Since then, graphics programs for computers have become much more transparent, but that initial creative fervor that MacPaint ignited has abated. The restrictions that made MacPaint easy to use were also the characteristics that ultimately limited its usefulness as a medium for personal expression. One can look at the distribution

of a creative medium in the form of a software package as a subtle form of  
broadcasting. (144-5)

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While computer software allows for new design opportunities, it is also a programmed tool providing a limited framework from which many designers create “original” work.

### **Sensory Experience**

When working in the digital medium, an artist works with flat images comprised of code, using a mouse or stylus pad as the primary creative tool, while a flat screen displays the software’s interpretation of the changing code. This sensory experience is very different from the material art making process. Artists may experience, as I have, a sense of bodily disconnection from their work, due to the lack of sensory feedback coming from the computer mouse, keyboard, and monitor. As Rokeby discusses, this disconnection is directly related to the “nature of the [digital] medium:”

Computers are the greatest expression of man’s desire to control. They are a pure representation of authority. They are constructed of the utterly unambiguous “elementary particles” of presence and absence, on and off, one and zero.

Computers are a metatechnology, almost infinitely flexible and bristling with potential. In the face of this medium of absolute determination, artists often feel a kind of loneliness or claustrophobia. (151)

When drawing, I hear the varied scratching sounds of the pencil against the surface of the paper, I brush away the eraser shavings, I feel my fingers tighten or loosen around the pencil when varying pressure and stroke weight; while painting I smell the paints, sense the viscosity of the paint as I move the brush around the canvas, and may have stained hands days later. Creating art in these material mediums provides a rich sensory experience that many artists enjoy as an integral part of the artistic process.

respond—purposefully and accidentally—by leaving their own stylistic marks on the work. This changes in a digital setting. As Rokeby states, “In virtual environments, the dematerialization of the body has, indeed, already begun. The idea of the individual changes when the body loses its role or meaning, because our bodies are the experiential apparatuses that define each of our subjective points of view” (156). How do we redefine our subjective points of view as artists when working disembodied in a deterministic digital environment?

### **The Interface**

One of the biggest problems posed by digitization concerns the role of the computer interface itself in the art making process. It is impractical to think that working within a programmed interface will not significantly change the artistic process, and subsequently, questions arise as to how far the interface will in turn change artists themselves. Working digitally, an artist has new opportunities for quick editing of his or her work: one can delete, copy, paste, and “undo” components within a piece with one mouse click, and layers and histories allow artists to “go back in time” in the creation. The issue of interface transparency is one that many artists question in the creation of digital work, while some even embrace the computer interface as a critical component of their work, especially with interactive media. In any case, it is important to maintain awareness of the computer interface and its role in art making, which is becoming more difficult to distinguish as systems and software improve, or become increasingly transparent as art making tools. As Rokeby states, “If we are given a sufficiently virtual *representation* of freedom and personal autonomy within a limiting structure, we lose awareness of the artifice; we are unaware that we have adopted a belief system and its

attendant simplifications” (155). It is necessary to ask questions about the effects of 11  
the interface now, in the middle of the shift toward digitization, as we may be unable to  
recognize the consequences after we have immersed ourselves in digital culture.



I explored some of these key issues through six visual explorations—or artistic experiments—both digital and material based. While some of the work focuses on play with the process of art making, other pieces act more symbolically in portraying current concepts in the discussion of digitization. In creating a show, I responded to these issues through a medium I am passionate about, and, more importantly, I had the opportunity to share these ideas with the public. By incorporating quotations about key concepts from the authors I was reading, I was able to both describe each piece while simultaneously opening the ideas up to non-artists, as many of the quotations refer to media not necessarily specific to art. An artist's statement of concepts and about the work greeted viewers as they entered the gallery space (see Appendix—30), and I also provided a brochure including some of the pieces in the show, the quotation installations, and information about the artistic process behind each work. The show exhibited in the LaVerne Krause Gallery, in Lawrence Hall on the University of Oregon campus, from April 11-15, 2005.

Following is a discussion of the work in *Process*, divided into individual sections for each piece. Each section is introduced by the corresponding quotation installation from the show.

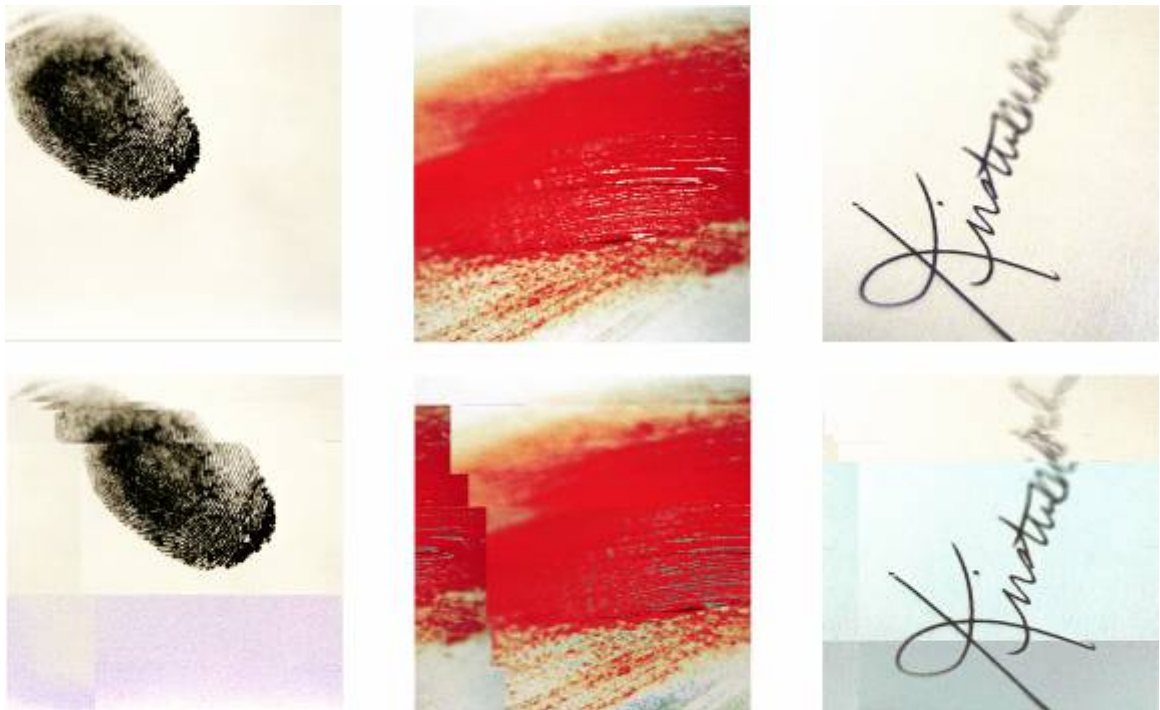
### **Artist's Mark Series**

The numerical coding of media . . . and the modular structure of a media object . . . allow for the automation of many operations involved in media creation, manipulation, and access. Thus human intentionality can be removed from the creative process, at least in part. (Manovich, 32; *Process* Quote Installation no. 1)

For the first series, three photos of varying “artist’s marks” were manipulated at the level of the images’ code, by way of a hex editor.<sup>v</sup> I photographed three examples of traces artists often leave of themselves in their work, whether intentional (the signature), accidental (a thumbprint), or a product of—and unique to—a given human/material media combination (an accentuated brush stroke). To clarify the latter example, a visible brush stroke serves to emphasize human authorship of a work. It is through these human traces that museum masterpieces establish greater connections with their audience. I may have read every book on Van Gogh’s masterpieces, but nothing compares to seeing one of his paintings in person; the individual brushstrokes created by the artist’s direct manipulation of a paintbrush seem to act as proof of historical events and the stories behind them, and they create a human link, not only with the painting, but with the rich history behind the painting.

After converting the photos to a digital format, the once unique and spontaneous marks were converted to code, a patterned collection of ones and zeros. I was curious about what would happen if the code sequence were played with, outside the realm of the common art software applications. By manipulating the images in a hex editor, I would be able to push my “hand” further into the digital editing process than an art program would normally allow, while working in a random, experimental way more akin to material media. I changed hexadecimal digits (the lower level representation of the images’ underlying binary code) individually and by way of global replacement commands. The results were interesting (fig. 1): changing the image’s code added noise to the photographs, altered colors, shifted blocks of the image over, and created small lines of missing information (small, colorless artifacts not present in the original photograph), creating new, remarkable and unintended visual relationships.

symbolically questioned the way digitization is changing the way an artist infuses herself into her work; many of the traditional traces an artist leaves behind on her work are impossible within the digital medium. This would leave the artist's style as the most telling trace of the artist behind the piece. But how does an artist establish pure and unique style within a programmatic framework?



**Figure 1: Photos before (top row) and after (bottom row) hex-editing**

### **“Drafts I & II”**

Different technologies of text production suggest different models of signification; changes in signification are linked with shifts in consumption; shifting patterns of consumption initiate new experiences of embodiment; and embodied experience interacts with codes of representation to generate new kinds of textual worlds. In fact, each category—production, signification, consumption,

bodily experience, and representation—is in constant feedback and

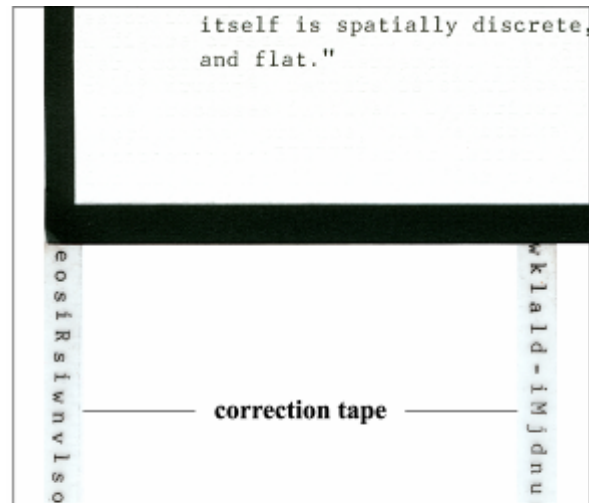
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feedforward loops with the others. (Hayles, 28; *Process* Quote Installation no. 2)

This series involved a contrast between the typewritten and inkjet printed page, ultimately addressing the ways in which digitization is changing the way we edit work, artistic and otherwise. The first page was covered with “blind-typed” words; layers of type were laid down without ink, or inked and then erased, leaving only the impressions of individual letters behind. Layered on top of the blind-stamped letters, the following quotation was typed:

In a literal sense, technologies of inscription are media when they are perceived as mediating, inserting themselves into the chain of textual production. Kittler identifies the innovative characteristics of the typewriter, originally designed for the blind not with speed but rather with ‘spatially designated and discrete signs,’ along with a corresponding shift from the word as flowing image to the word “as a geometrical figure created by the spatial arrangements of the letter keys” (here Kittler quotes Richard Herbertz). The emphasis on spatially fixed and geometrically arranged letters is significant, for it points to the physicality of the processes involved. Typewriter keys are directly proportionate to the script they produce. One keystroke yields one letter, and striking the key harder produces a darker letter. The system lends itself to a signification model that links signifier to signified in direct correspondence, for there is a one-to-one relation between the key and the letter it produces. Moreover, the signifier itself is spatially discrete, durably inscribed, and flat. (Hayles, 26)

This page was suspended on three strips of typewriter correction tape, filled with corrected letters, forming a nonsensical string of old mistakes (fig. 2).



**Figure 2: Drafts I & II (close-up)**

The next page was produced digitally, and included words manipulated in Photoshop in ways that would be impossible materially. This page, also quoting Hayles, was printed by an inkjet printer, on a clean, unimpressed page, and read:

How does this experience change with electronic media? The relation between striking a key and producing text with a computer is very different from the relation achieved with a typewriter. Display brightness is unrelated to keystroke pressure, and striking a single key can effect massive changes in the entire text. The computer restores and heightens the sense of word as image—an image drawn in a medium as fluid and changeable as water. Interacting with electronic images rather than with a materially resistant text, I absorb through my fingers as well as my mind a model of signification in which no simple one-to-one correspondence exists between signifier and signified. I know kinesthetically as well as conceptually that the text can be manipulated in ways that would be impossible if it existed as a material object rather than a visual display. As I work with the text-as-flickering-image, I instantiate within my body the habitual

patterns of movement that make pattern and randomness more real, more relevant, and more powerful than presence and absence. (26)

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The digitally produced page was suspended on three clean, unused strands of correction tape.

This series served to represent some of the ways in which digitization is changing the way we interface with the editing process as artists and writers. First, the “ghosted” text covering the typewritten page represents the “mistake history” of the materially produced page; an author or artist cannot as easily delete or erase a mistake committed with material media as she can when working with digital media. Even after the ink has been erased, an imprint has forever changed the physical state of the material medium, whether a product of lead type, pencil marks, or pen scratches. This fact forces the artist either to incorporate her mistake, or start over on a new piece of paper, canvas, etc. While the ease with which digital media allow us to edit work is extremely convenient and an increasingly indispensable feature to artists working digitally, it also keeps the artist from managing the incorporation of “mistakes”—adapting to unique situations and making the appropriate changes to a work—some of which may ultimately add to the beauty and quality of the finished piece. In “Draft I,” these “mistakes” have been preserved on the type-riddled correction tapes from which the materially produced page was suspended.

In contrast, the printed page can be edited innumerable times on screen before the work is committed to the material surface in its final, “perfect” form. It is important here to recognize new and exciting opportunities provided by the digital medium, as working with art software (while it greatly changes the editing process) allows for the artistic manipulation of text in ways that would be much more difficult—perhaps impossible—within traditional material processes.

When working digitally, we are more apt to hastily delete what we perceive as “mistakes” on the first pass; multiple draft copies have been reduced to a single, digital file edited many times over on screen, and records of a work’s creative development no longer exist, unless the user has saved the digital file as its own version each time the document has been changed. How will this change the creative process and resultant art and literature in the future? It has already changed the way I react to mistakes made during the creative material-based process; occasionally, when I commit an error while drawing or painting, my first psychological response will be to type “Ctrl-Z,” the keyboard command for “Undo.” Instead, I must incorporate the mistake or start over, a course of action I have begun to unlearn since working digitally. It is a strange, confusing experience.

### **“Hand-made”**

On the level of representation, [the computer image] belongs on the side of human culture . . . But on another level, it is a computer file that consists of a machine-readable header, followed by numbers representing color values of its pixels. On this level it enters into a dialog with other computer files. The dimensions of this dialog are not the image’s content, meanings, or formal qualities, but rather file size, file type, type of compression used, file format, and so on. In short, these dimensions belong to the computer’s own cosmogony rather than to human culture. (Manovich, 45-6; *Process* Quote Installation no. 3)

“Hand-made” addresses the coded nature of digital media and the way varied computer software programs interpret image information. I scanned in a watercolor painted image of a material process: a human hand, painting. I then opened the digital file

in a text-based program.<sup>vi</sup> The image, when opened in the “wrong” program, was displayed as a meaningless series of textual characters; the program is not designed to interpret image files, and instead interprets and displays the image’s code in the only way it can. I then superimposed this “mess” of text over the scanned image, deleting any parts of the scanned image surrounding text, and finally deleting the text, leaving the image behind in the textual form. This created an interesting effect for the large format print—when standing far away from the image, the image’s content is clear and cohesive, but when standing up close to the piece, the image’s composition of tiny, individual letters is revealed, much like the effect characteristic of a mosaic or impressionist painting (fig.3).

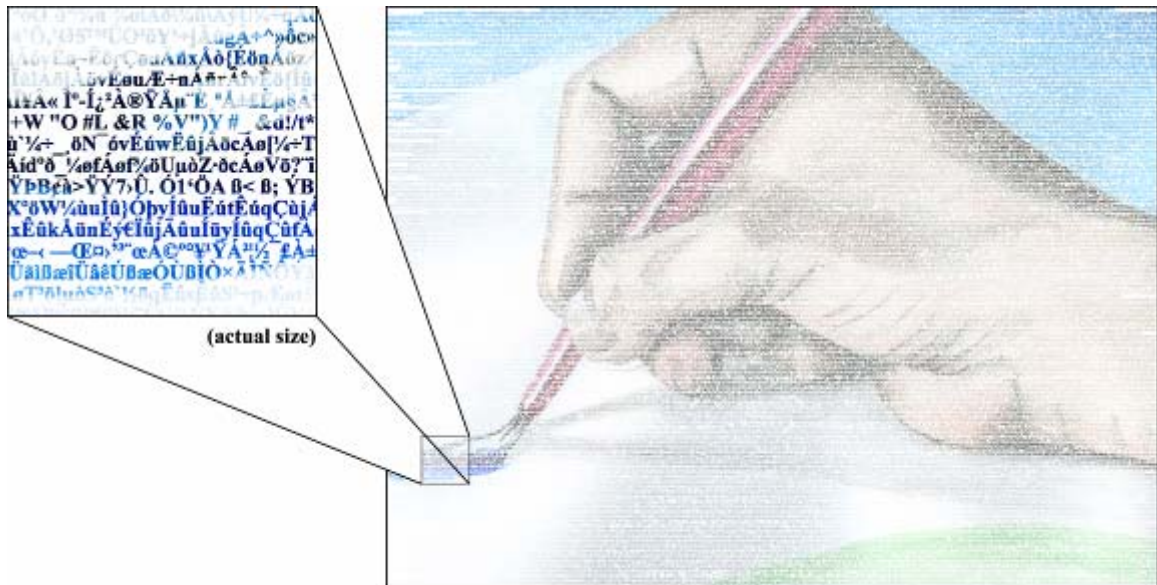


Figure 3: “Hand-made”

This piece, more representational than process-based, raises questions about digital language and the ways in which different computer programs work within their own limited framework. While the reinterpretation of information in varying software programs can inspire new and interesting artistic ideas, it also points to the limitations of the computer in terms of access; problems often arise when working digitally over varying platforms (Mac or PC), innumerable and ever changing software versions, and



basic software ownership. If I do not have present on my computer the software with which a given artwork was created, I cannot open the work. This has already limited me as an artist—I am often only able to work on certain projects on campus computers, as I do not own the appropriate software at home (often because I cannot afford it). While material artist's tools are expensive, economic and physical access to the tools is not as limited as with digital tools. 20

### **Pixel Series**

Digitization consists of two steps: sampling and quantization. First, data is sampled, most often at regular intervals, such as the grid of pixels used to represent a digital image . . . Second, each sample is quantified, that is, it is assigned a numerical value drawn from a defined range. (Manovich, 28)  
. . . These elements are assembled into larger-scale objects but continue to maintain their separate identities. (30; *Process* Quote Installation no. 4)

This series of digital and painted pixels focuses on the sampled, quantified coded nature of digital media: each and every pixel of a digital work is numerically defined. By zooming in on these pixels, I wanted to draw attention to the building blocks of a digital image, and in the process, revealed a series of colorful and aesthetically interesting pieces. Each digital piece was easy to create, taking only about six minutes.

In contrast, the digital pieces' acrylic painted counterparts involved a much more complicated process, as the paint for each square was hand-mixed and painted within pencil drawn guidelines. Each painted piece took approximately six hours.

By painting the pixel series, I took three pieces that were merely products of the computer's language, and reinterpreted them in three material-based, hand-made artworks. In the painted pieces, lines are not perfectly straight, brushstrokes are visible,

and colors are inconsistent (fig. 4). It would also be impossible to exactly reproduce one of the painted pieces with the original medium; they are each unique, original artworks. The unsteady human hand cannot produce the perfect, crisp squares of the digital pieces, but these very imperfections add life to the piece. The digital pieces seem more static, while the material based pieces seem to possess more movement and dimensionality, even as they are a collection of plain squares.

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**Figure 4: Digital pixels**

**Painted pixels**

Pixels are a typical, perhaps cliché, symbol for digitization, and while screen resolution has greatly improved since early computers, pixelated graphic elements and fonts are now used in design as retro fashion, often in science-fiction like references to concepts surrounding a digital future. When computers were first popularized, pixelation was an unavoidable characteristic of early screen resolutions. Pixels, though not as readily visible now as they used to be, are still what make up digital images, creating a new and interesting way to think about art composition. While traditional art forms like painting, printing (silkscreen, letterpress, etc.), photography, and so on, are all composed of smaller elements (for example, individual molecules or grains of powder in paints and

dyes, or the individual dots that make up the photographic image), the computer has quantified each of the individual “pixels, polygons, voxels, characters, scripts” in a structured, mathematical way compared with the random unique arrangement of traditional elements in material media (Manovich, 30).

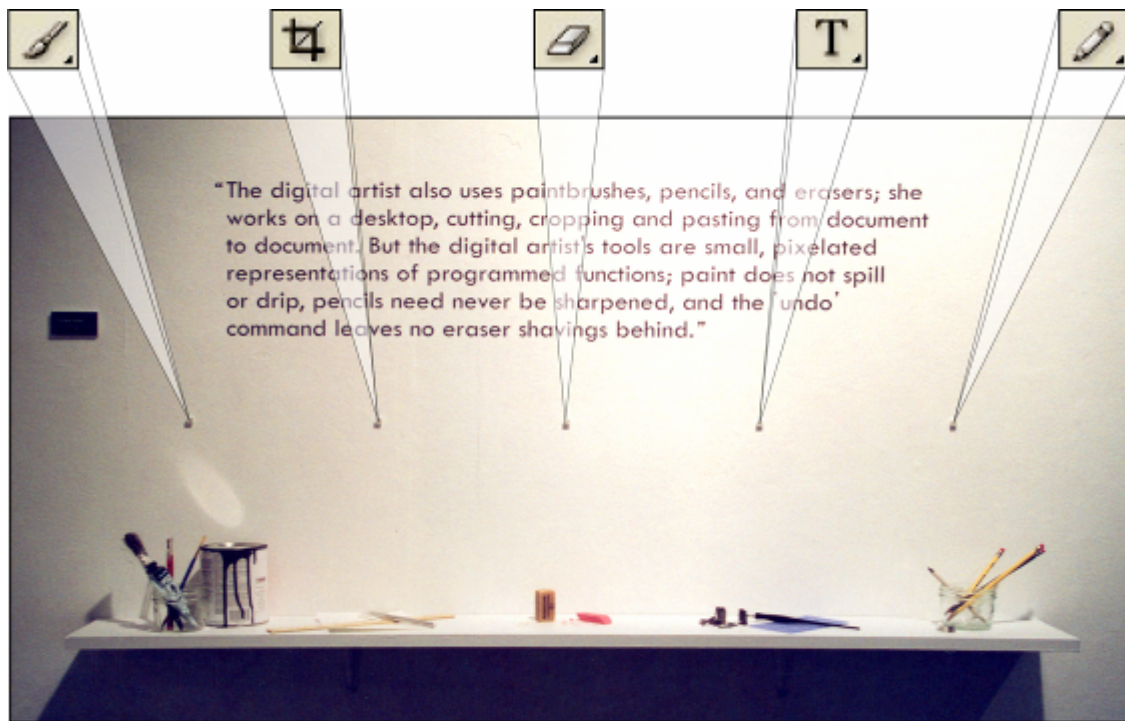
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### **“The New Toolbox”**

The digital artist also uses paintbrushes, pencils, and erasers; she works on a desktop, cutting, cropping and pasting from document to document. But the digital artist’s tools are small, pixelated representations of programmed functions; paint does not spill or drip, pencils need never be sharpened, and the ‘undo’ command leaves no eraser shavings behind. (*Process*; Quote Installation no. 5)

One of the greatest changes to the artistic process through digitization has been the move from material tools to the virtual tools of the computer interface. With “The New Toolbox” (fig. 5), I hoped to draw attention to the simplicity of these new tools, and engage viewers in thinking about how the disappearance of material tools might change various artistic processes.

On the wall, I placed a few of the individual tools from a standard art software toolbox (specifically from Adobe programs, although many of these tools can be found in most art software programs), displayed at their actual size, as they appear on screen. The digital tools displayed included the paintbrush, crop tool, eraser, type tool, and pencil. Below these digital representations of various artists’ tools, I placed on a shelf their material counterparts: a paint bucket and brushes; an exacto knife and ruler for cropping; two different types of commonly used erasers, surrounded by residual shavings; pieces of lead type used for letterpress, a calligraphy pen, and a letter stencil; and a jar of different types of pencils, a blending tool and a pencil sharpener.



**Figure 5: "The New Toolbox" with actual size digital tools**

Placing the material tools directly below their respective digital representations provided a sharp contrast between the rich physicality of the traditional artists' tools with the small, simple icons of their digital "equal." And yet it is also interesting to note how these simple, pixelated tool representations provide new creative opportunities that would not be possible with the material equivalent. Regardless, the simplification of the tools involved in art making will change the artistic process. As an artist, I welcome the no-mess, point and click convenience of these new tools. But I also sometimes miss interacting with the physical tools: kinesthetically sensing each tool's unique response to my direction, watching stroke weight vary with the pressure I apply, and feeling the paint between my fingers, then watching it swirl down the drain as I clean the brushes. The way in which digitization is simplifying the artist's toolbox will greatly change the physical experience involved in artistic processes.

The interface . . . determines how users think of any media object accessed via a computer. Stripping different media of their original distinctions, the interface imposes its own logic on them. (Manovich, 65; *Process* Quote Installation no. 6)

Finally, the artistic process is significantly affected by the digital interface. With “Layers of Meaning,” I wanted to focus on ideas surrounding the interface’s influence on the artistic process, by bringing a common art software element, the layer, into the physical world. In many commonly used art programs, such as Adobe programs Photoshop and Illustrator<sup>vii</sup>, the artist can compose on different layers, and layers can be organized via naming conventions, color coding, etc. Layers can be deleted, turned “off” and “on” (made invisible or visible), locked (so they are un-editable), consistent of variable transparency, and rearranged so that the content of one layer will appear behind or in front of the content of other layers. For many digital artists, this has become an indispensable feature, providing for easy design composition and editing. It is also a feature unique to digital art making; with most material media, layers of different mediums may be laid down on a surface, but once they are committed, there is no easy way to turn back and edit a layer beneath the topmost layer.

The piece consisted of transparent layers of images and text, hung by clips on fishing line, allowing for the possibility of re-ordering the layers. Visual content included quotations from Rokeby and Manovich, pixels derived from the pixel series, and a dismembered, semi-pixelated human figure (from an anatomical drawing). A variety of different media were applied to the transparent layers made of Dura-lar®: three different quotations were applied by way of photocopy transfer, colored pixels were ink-jet printed

on transparent sticker paper, a half-tone pattern consisted of acrylic paint, and the hands, upper body and head of a human male, were also applied via photocopy transfer.

Quotations from Manovich and Rokeby made up three of the layers. Rokeby comments on the effects of wrongly perceiving the computer interface as being transparent, specifically dealing with the creation of and experience with interactive art, though his thoughts directly apply to the ways in which the digital artist interfaces with art software throughout the digital art making process:

When an interface is accepted as transparent, the user and his or her world are changed; the transforming characteristics of the interface, no longer contained by a visible apparatus, are incorporated into the user and the user's worldview. (153)

Manovich also comments on the enmeshed relationship between interface and content:

The choice of a particular interface is motivated by a work's content to such degree that it can no longer be thought of as a separate level. Content and interface merge into one entity, and can no longer be taken apart. (67)

Manovich then goes on to point out the carefully programmed nature of computer software, and the consequence for the digital artist: "The content of an artwork is the result of a collaboration between the artist/programmer and the computer program" (67). These viewpoints effectively highlight the way in which software will change the artistic process. Layers as a favorite art program component shape how the digital artist devises and executes her creative vision. Considering the ease with which the digital artist can change individual layers, or delete "unnecessary" layers, again raises important questions surrounding the way digitization is changing the editing process. The artist has a less committal relationship with each layer, allowing for a certain artistic freedom, but also changing the creative editing process. A layered file can also be saved as such, allowing

for possible changes in the future. Therefore, an essentially brand new work can be created with a simple reshuffling of layer order and individual layer properties. This creates interesting questions surrounding the “one-of-a-kind” virtue by which we often value fine art.

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In portraying a disembodied human torso, I aimed to symbolize the physical disconnectedness I have felt when working digitally. I design, moving in and out of virtual layers, none of which will ever individually exist in the material world. Most of my body sits completely still in front of the computer screen, while my right index finger experiences most, if not all, of the physical movement involved in the creative process. My employment of an anatomical drawing was inspired by early memories of the layered anatomical representations in the Encyclopedia Britannica, comprised of individual anatomical systems (muscular, vascular, skeletal, etc.) printed on clear, plastic pages overlaying each other. These layers were rich in materiality; I loved flipping back and forth between the clear plastic sheets, feeling between my fingers the unique synthetic texture decorated with raised, colorful ink. These pages provided a fascinating visual and tactile experience relative to the surrounding pages of the encyclopedia.

Through the creation of these six pieces, and the production of the show, I learned a lot about my relationship with the artistic process, both digital and material. While I have grown quite comfortable working digitally since I first began five years ago, I still feel much less connected with my work than when working with traditional media. Rarely do I spend as much time on a digital piece as I do on material pieces, and part of this is due to the involved nature of working with multiple, messy materials. Working digitally, I never need to rinse brushes, wait for media to dry, restock depleting supplies, or worry about having enough physical space in which to work. But many of these inconveniences, which require extra time and careful planning, constitute the “labor of love” aspect of traditional art making. Perhaps this is one of the reasons I feel more connected to material work: simply because of the sheer amount of time and concern I have put into a work to ensure that the product ultimately and accurately represents the visualization I have so long carried around inside my head. Perhaps it feels “too easy” to create without the burden of materials. I believe the disconnection goes beyond this, however, and has to do with a natural human desire to use one’s hands to create. The hand has always been a symbol for man’s creative desire, witnessed in those first prints on the caves of Altamira, those early creative expressions of human existence. That the use of the hand in art making has nearly been reduced to a single index finger says something tremendous for digitization’s effects on the art making process.

Of course, it is important to note all of the opportunities provided by the digital medium. Working digitally, I am able to create work that would be impossible within a material medium. The digital medium has opened doors to artists, writers, and musicians who previously may not have as easily accessed their creative goals; a photographer need



not have access to a darkroom when she can take and process her photos digitally, 28  
and a musician can now record and mix her own CD rather affordably in her own home.  
Ever improving software provides new opportunities for play: radical experimentation  
with typography, image size, color and shape, and various filter effects often produces  
interesting, innovative end results, not previously considered with material media due to  
its limitations. LCD monitor stylus pads allow for pressure sensitive painting and  
drawing; larger format, more sophisticated laser and inkjet printers accept an increasing  
variety of surfaces, allowing for digital printing onto unconventional and synthetic  
materials; and ever-improving screen resolution allows for more life-like interaction with  
on-screen visuals.

And yet, much of the technology and software that has been, and continues to be  
developed is a digital reproduction of a material process, as with the stylus pad: the  
material process of drawing has been reproduced in a digital environment, where pixels  
replace graphite. As earlier mentioned, the digital workspace features “cut and paste”  
commands, a “desktop,” a “trash” or “recycle” bin, and organizational file “folders.”  
McLuhan states “Our official culture is striving to force the new media to do the work of  
the old . . . We approach the new with the psychological conditioning and sensory  
responses of the old” (94). This illustrates the fact that we have not yet begun to  
understand the great possibilities that such a shift will create, and cannot until we move  
beyond the “conditioning” of old. It also means we are in a prime position to evaluate our  
relationships with old and new media, which will aid us in thinking about how  
digitization might affect the future, especially concerning the way we structure arts  
education. As it stands, we seem to be struggling with the difficult task of ensuring equal  
training in skill and technology. While many digital art programs, as with the University

of Oregon's Multimedia Design program, still require basic design, drawing, and art history classes, software proficiency seems to be gaining importance in preparing students for the professional arena. The digital arts seem to be growing apart from fine arts. It seems that we now have to decide whether it is appropriate to keep these disciplines separate, or whether we should attempt to truly integrate them and maintain a double focus, teaching both a fine arts skills set, based in traditional (and therefore material) media, as well as the technological proficiency increasingly indispensable in an ever more digitized world. I believe that having a foundation in material media has helped me immensely in solving digital design problems. While it is sometimes easy to mask lacking skills with fancy software, the strong design sense that hands-on problem solving and a solid foundation in design history provides ultimately shines through in quality digital design. 29

One of my goals for *Process* was to engage non-artists in the digitization debate, as it is an issue that affects every discipline. As an example, Katherine Hayles has already raised a number of key issues surrounding digitization's effects on literature and the authoring process, from which questions about copyright will certainly emerge. According to some of the viewers' comments regarding *Process*, the effects of digitization already a concern for some, and I was successful in engaging audience members in thinking about their own personal relationship with digitization:

The question 'who is the real designer?' is a good reminder that we must remember diversity . . . (Anon., *Process* comment book)

. . . An excellent exhibit applicable to all in [Architecture and Allied Arts], including my architecture studio . . . where we are examining our process and media and its impact.

(Anon., *Process* comment book)

. . . These ideas need more solid representation, as I see them here. (Anon., *Process* comment book)

. . . It's a wonderful exploration of something that will have a profound—yet not entirely predictable impact on society. (Anon., *Process* comment book)

. . . The real question then, must be, once the human's creativity is removed from the creation, what are we left with? Where does the soul go, what can it do?  
(Anon., *Process* comment book)

Through the conceptualization and creation of *Process*, I came to a greater understanding of my personal relationship with material and digital media. As I did before the project, I feel more strongly connected to the material artistic process. While I am less physically connected to the digital process, I have developed an appreciation for the unique design opportunities it provides me. They are both important to me in their own ways, as they both enrich my overall experience as an artist. Working in the design profession, I may create solely on the computer, but I will also strive to find ways to nourish and incorporate my passion for the material arts. Throughout the lifelong process of defining myself as an artist, I will continue to question: how is digitization changing

human creation and perception, how it is changing the artistic process, and how is it      31  
changing me?

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<sup>i</sup> Digital information is stored as a series of bytes, each of which are made up of 8 bits, represented by digits of 1 and 0. This is called binary notation. For more accessible interpretation and manipulation, one byte of binary code is represented by two hexadecimal digits. Hexadecimal notation is a base-16 number system, which consists of a combination of numerical digits and letters, numbers 0-9, and letters A-F. It is easier to translate between a hexadecimal system (base-16) and a binary system (base-2) than would be possible between the binary system and the decimal system (base-10) we are more accustomed to. A Hex editor allows one to manipulate binary code via its hexadecimal representation.

<sup>ii</sup> Corel Painter <sup>TM</sup> IX, ©2004 Corel Corporation

<sup>iii</sup> Vector based programs deal with graphics whose lines are comprised of mathematical vector formulas, and can thus be infinitely scaled without pixelation, as opposed to non-vector based programs, which deal with bitmap images.

<sup>iv</sup> Adobe Photoshop 7.0, ©1990-2002 Adobe Systems Incorporated

<sup>v</sup> XVI32 HEX EDITOR (freeware), © 2003 Christian Maas

<sup>vi</sup> Microsoft ® Notepad Version 5.1 Copyright © 1981-2001 Microsoft Corporation.

<sup>vii</sup> Adobe Illustrator 9.0, © 1997-2000 Adobe Systems Incorporated

## WORKS CITED &amp; CONSULTED

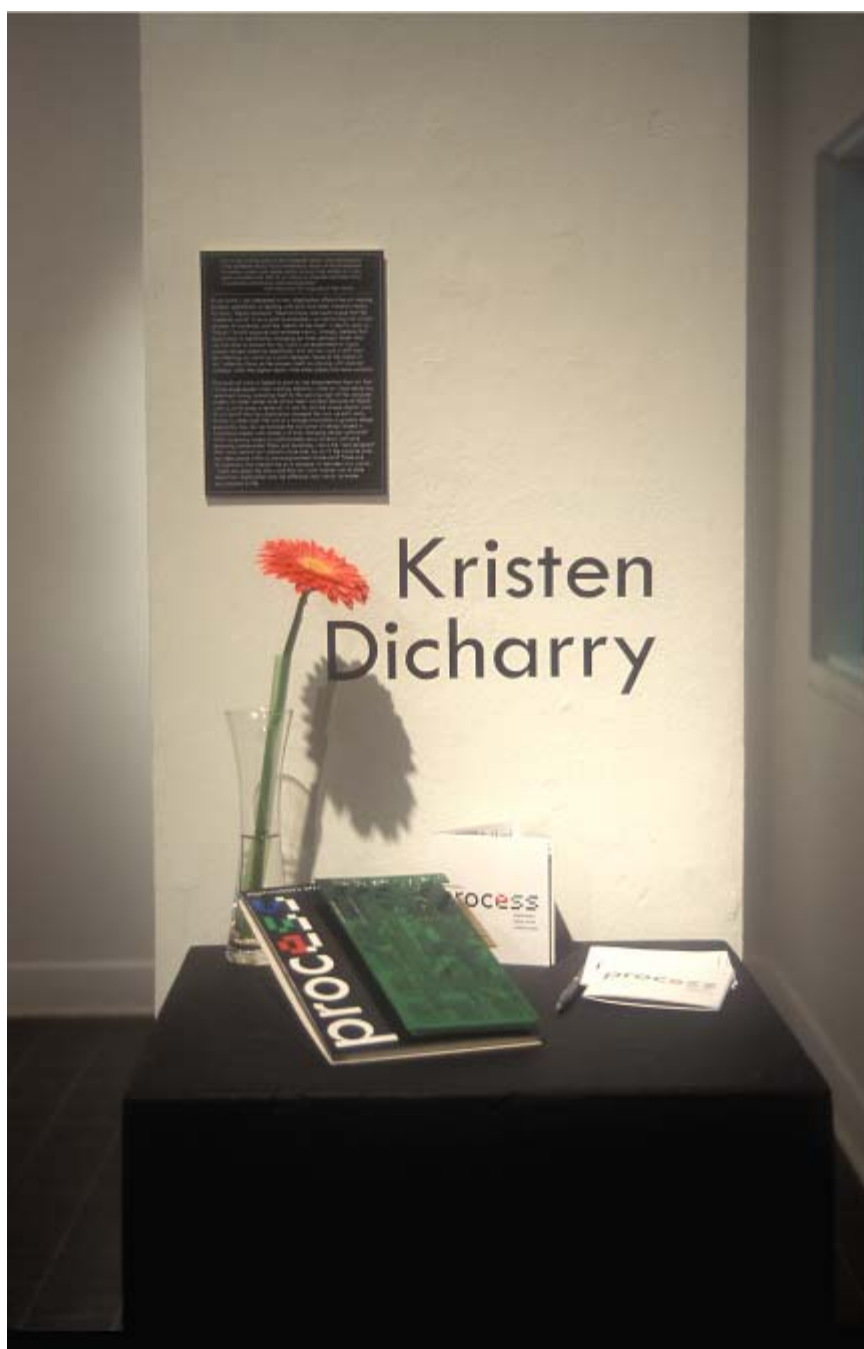
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## APPENDIX

**Artist's Statement**

As an artist, I am interested in how digitization affects the art making process, specifically in dealing with print and other material media. As many “digital dystopia” theorists have, one could argue that the “material world” is on a path to extinction; we are turning into virtual versions of ourselves, and the “death of the book” is nearly upon us. Though I hardly espouse such extreme views, I strongly believe that digitization is significantly changing our lives, perhaps faster than we are able to account for. My work is an experiment—a visual, process-based quest—to specifically find out how such a shift may be affecting my world as a print designer. Some of the pieces in this collection focus on the process itself, by playing with abstract concepts within the digital realm, while other pieces are more symbolic.

This body of work is fueled in part by the disconnection from art that I have experienced when working digitally; while my visual sense has remained strong, adapting itself to the glowing light of the computer screen, my other senses have all but been numbed. Because all digital work is, at its base, a series of 1s and 0s, can the unique digital work of art exist? How has digitization changed the way we edit work, artistic or otherwise? We are at a strange crossroads in graphic design education; how do we balance the instruction of design based in traditional media with mastery of ever changing design software? With increasing access to sophisticated, easy-to-learn software featuring cookie-cutter filters and templates, who is the “real designer?” How much control do I actually have over my art if the creative process takes place within a pre-programmed framework? These are all questions that interest me as a designer in between two worlds. I hope you enjoy the show, and that my work inspires you to think about how digitization may be affecting your world, no matter your passion in life.



Artist's Name and Statement, *Process* Comment Book, Brochure

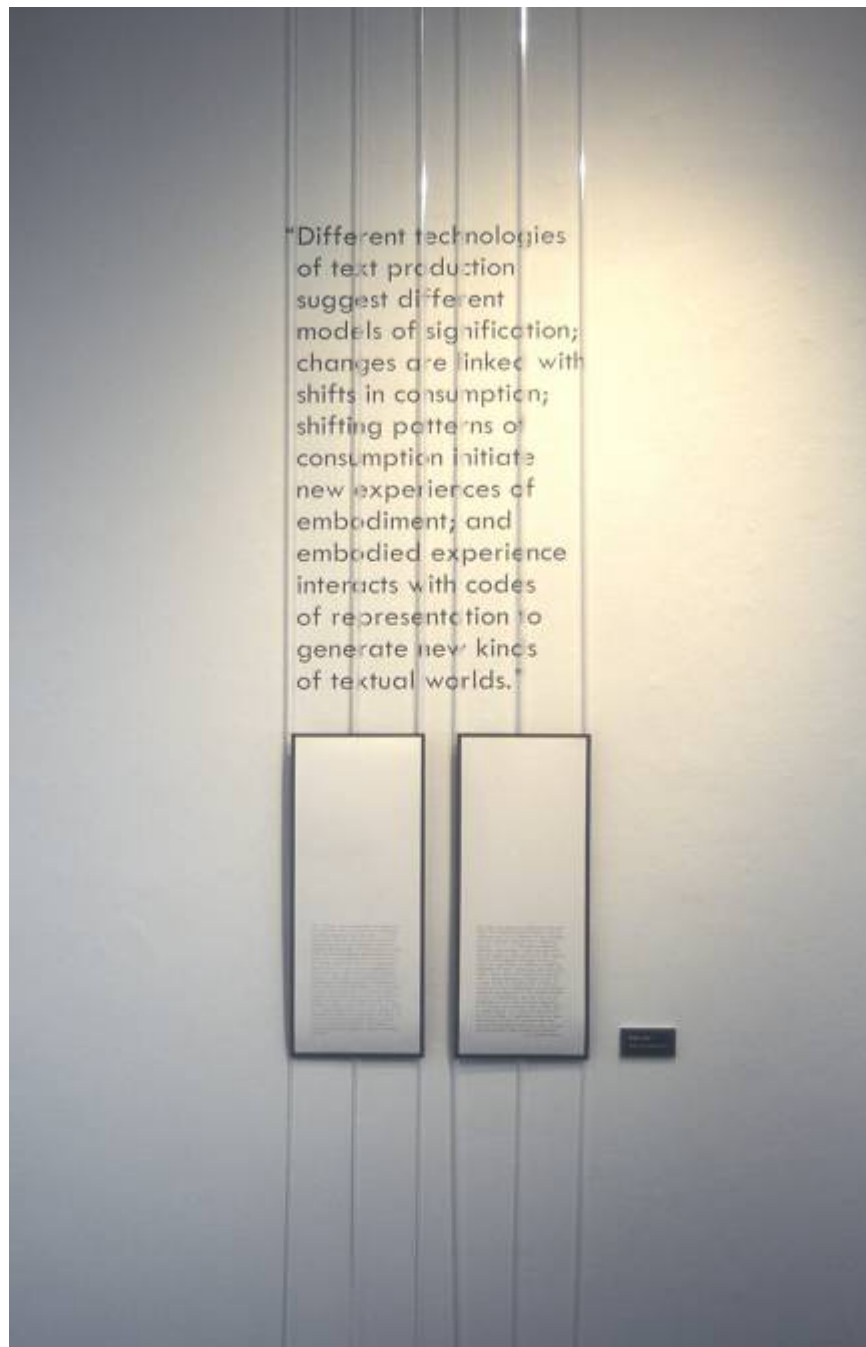


*Process Wall Title*

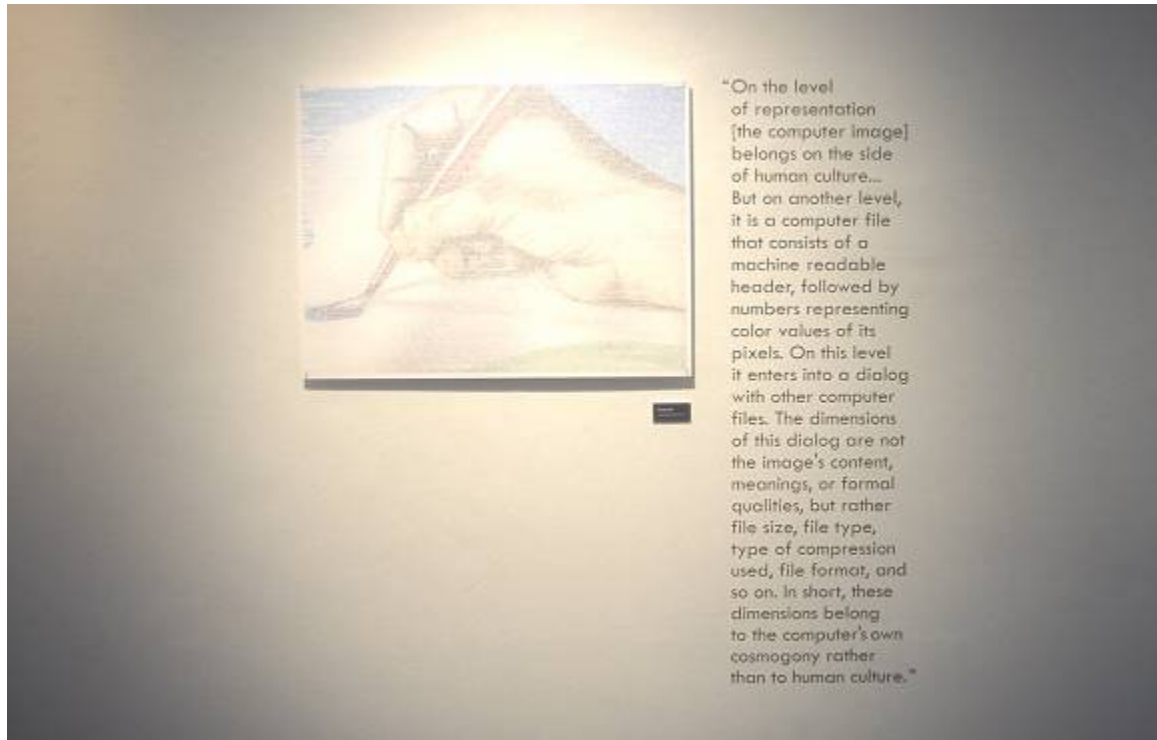




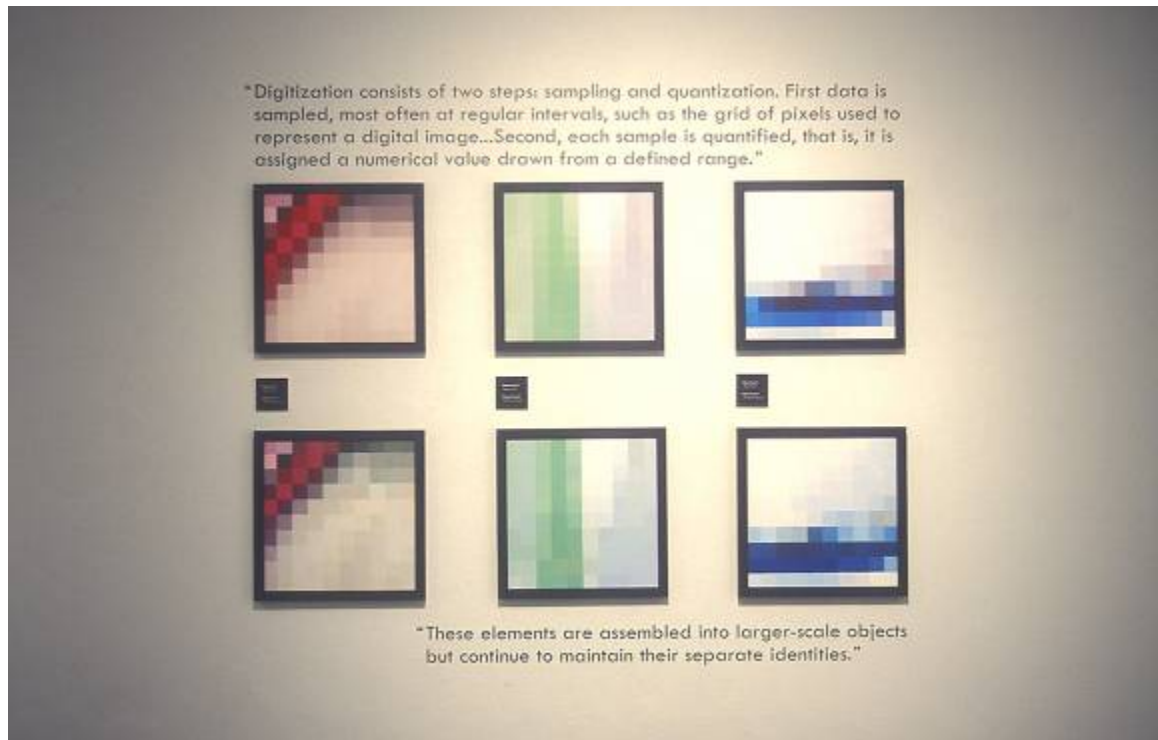
Series and Quote Installation no.1: “Artist’s Mark I, II, & II”



Series and Quote Installation no.2: "Drafts I & II"



Artwork and Quote Installation no.3: “Hand-made”

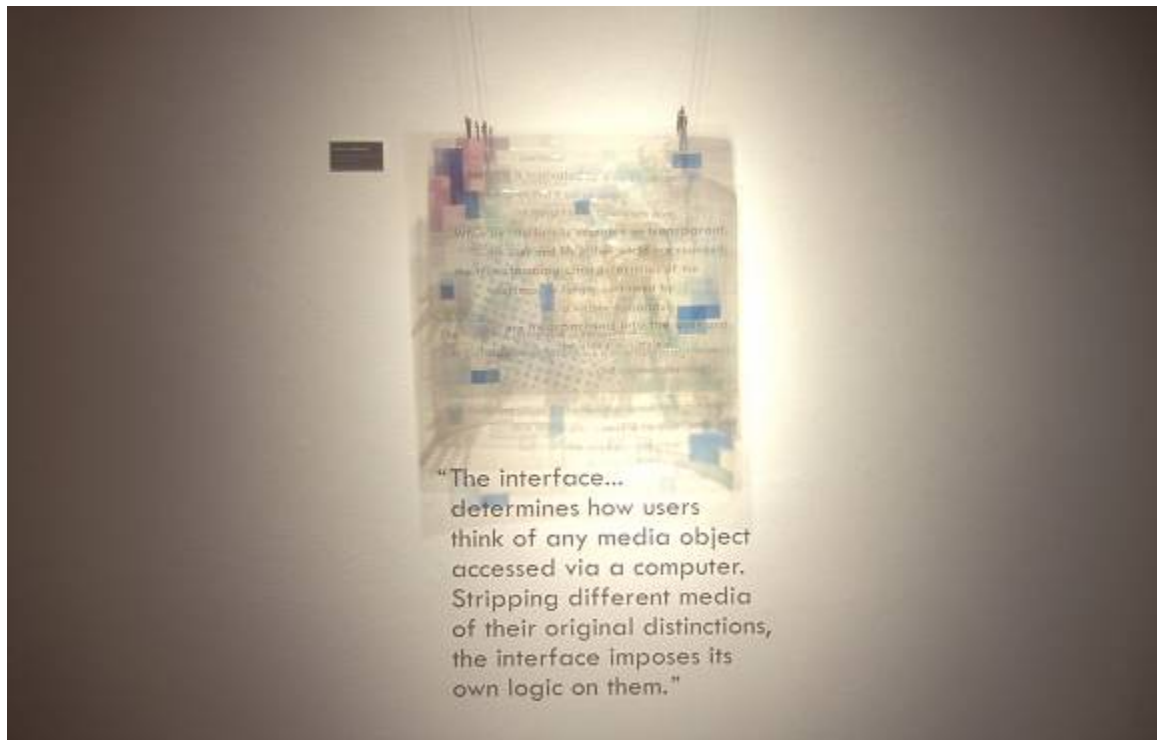


Series and Quote Installation no.4:

“Red Pixel I & II,” “Green Pixel I & II,” and “Blue Pixel I & II”



Artwork and Quote Installation no.5: "The New Toolbox"



Artwork and Quote Installation no.6: "Layers of Meaning"

