

The Education of a **COMMUNICATION** ~~Graphic~~ Designer

Limited
~~Third~~ Edition

An MFA Thesis

~~Edited~~ By

Dan Vlahos

Published
in Boston

~~Steven~~
~~Heller~~

~~ALLEN~~
ALLEN & UNWIN
NEW YORK

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of a COMMUNICATION DESIGNER

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A

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Abstract

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**The Education of a
Communication Designer**

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**Seven Speculative Projects in
Learning Experience Design**

ABSTRACT

THROUGH A SERIES of speculative projects and seven case studies, my thesis explores and evaluates new tools, systems, and heuristics for teaching and learning in the arts and beyond. Through these learning experience (LX) design-based investigations, I speculatively re-imagine and re-contextualize the relationship between learners, educators, and peers within a range of learning environments. Drawing inspiration from Professor Gunner Swanson's essay, "Design and Knowledge in the University and the 'Real World,'" all seven case studies are guided by a set of four interrelated themes: *communication*, *expression*, *interaction*, and *cognition*, which according to Swanson represent four broad areas that graphic design could bridge.

What is graphic design? Throughout this work I re-examine "graphic design" and place it in the broader context of "communication design"—a comprehensive field that posits a wider range of media, disciplines, technologies, and applications. Much of the research and inspiration for my thesis is derived from Steven Heller's anthology "The Education of a Graphic Designer," to which the title of this thesis alludes. By replacing "Graphic" with "Communication," I am largely acknowledging a personal shift from the strictly "graphic" (mainly designing visual artifacts) to a wider practice of designing experiences, interactions, and systems. While the experiences, interactions, and systems that I have designed all primarily focus on art and design education, one can easily imagine how these multimodal interactive learning techniques could be used as broader assistive learning tools, or as catalysts for interdisciplinary communication and collaboration.



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Introduction

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A Search for Graphic Design



INTRODUCTION



I

Introduction

Fig. 1: (Right) My studio around 2015 with various works from my first 15 years in practice. I used the image to promote and launch my freelance studio Dan Vlahos Design.

In the mid-1990s, my Haverhill high school art teacher, Susan Paradis¹, first suggested that I look at colleges that offer graphic design as a major. She recommended Massachusetts College of Art and Design (MassArt) in Boston, which was a mere 30 miles south of my hometown. On my high school campus there was a whole “wing” dedicated to the arts, and it was there that I felt most at home. I enrolled in all of the art and music classes I could find—experimenting with everything from photography to music theory to drawing. Even then, I wondered how my “interdisciplinary” interests in the arts might connect. I distinctly remember driving across town to my local library, flipping through the card catalog, searching for anything I could find out about *graphic design*. I remember being disappointed by the lack of available information; the few books I did find were mostly outdated. They frequently used the term “graphic arts,” not graphic design, and they rarely mentioned digital design, which I had begun exploring in high school. As I look back, I realize that these memories represent what was the start of a lifelong inquiry into “graphic design—what it is, who it’s for, and what possibilities it holds.

One of the wonderful things about being a graphic designer is that it allows you to engage with content of all types, and in many cases to rapidly familiarize yourself with the content, business or challenge at hand. It also allows you to closely collaborate with others in different fields, domains and disciplines. After completing my BFA in Graphic Design at MassArt in 2000, I went on to develop a portfolio of client work, largely focused on strategic branding in the automotive, architectural, and educational sectors. Of all the work I did over these first 15 years, the projects I enjoyed most were for clients in education. I fondly remember my first client in education: the Cambridge, MA-based group Educators for Social Responsibility, which was

1 Susan Paradis worked as a high school art teacher for thirty years and has illustrated over twenty books for children, four of which she authored. Her past students include the Grammy nominated American musician, filmmaker, and screenwriter Rob Zombie.



recently renamed *Engaging Schools*. Engaging Schools is a nonprofit organization that collaborates with educators in middle and high schools. The consultancy helps create a school-wide community of learning which integrates academic, social, and emotional development by offering professional development, research, and educational resources (“Engaging Schools”). For this first educational client I was simply asked to revamp their marketing materials, creating a color-coded brochure system for their various publications. Eventually, as I grew in my career, what started with the Engaging Schools catalog design grew to large scale projects as I began to engage with, and design for clients such as Harvard and Duke in the design of teaching and learning spaces. These experiences further fueled my expanding interest in the interplay between art, design, and education.

Through this work I saw first-hand the impact design can have upon physical learning environments and thus learning outcomes. Naturally this led me to wonder how other types of design, especially interactive design, could impact education—and with my increased interest in teaching—how interactive systems might be used in art and design education. In the case study for my *Lecturemate* thesis component, I describe the work and influence of Bruce Mau, a well-known Canadian graphic designer. Over the course of his career, Mau’s work and related collaborations broadened from his initial graphic design work in publishing into the fields of architecture, art, museums, and film (“Bruce Mau”). In the case study I describe how in Mau’s over 25 years in practice, his definition of [graphic] design continually expanded². Likewise, albeit on a regional scale, I too found that my definition of graphic design seemed to be continually expanding. These shifting boundaries of design, seemed to be coupled with the emergence of new media.

2 See further description on page 150.



In 2007, while working as an in-house designer at the Boston-based architecture firm Shepley Bulfinch, I was tapped to join a design team working on an experimental teaching and learning space at Duke University. Within a 24,000 sf, one-floor renovation, our design for the *Link Teaching and Learning Center* provided Duke with an innovative, technology-rich academic environment. This environment was later assessed (“Assessment”) to understand the impact of our physical and digital design interventions. My role within this interdisciplinary team of architects, technologists, and designers was to consider and guide the branding, communication, and digital media opportunities for the space. The proposed plans called for a large “media wall” which Duke hoped would help visualize innovative teaching and learning methods as well as the activity within the space. Neither Duke nor the architectural team had a sense of the content which would be most appropriate for such a media wall, and I was asked to include examples and ideas for programming the wall in my branding package. As I searched for relevant precedents in this area,

Fig. 2: (Below) Link Teaching and Learning Center at Duke University.



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I came across the work of Small Design Firm, led by MIT Media Lab graduate David Small. *Small Design* is described as, “An interactive design studio that specializes in information design, dynamic typography, and interactive art.” They write custom graphics software, build unique physical installations, and create enveloping media environments (“Small Design Firm”). Small’s firm had just recently completed a media wall project of similar scale and scope at the nearby Broad Institute in Cambridge. Below is a description of Small’s *CRX Display* project for the Broad.

Fig. 3: (Below) “CRX Display” at the Broad Institute, Cambridge, MA, 2007 designed by Small Design Firm Inc.

It consists of seventy-six LCD panels whose graphics are visible from both within the lobby and from the street. Exterior controls allow twenty-four hour access to the latest information on biotechnology and genetic research. Smaller controls can be used from the inside by visitors and school groups to locate, read and interact with articles that explain the





cutting edge research being pursued at the Broad Institute. The display becomes the intellectual heart of the lobby and activates the surrounding neighborhood, which includes MIT, research labs and residential areas. (“CRX Display”)

Inspired by Small’s project, and as self-identified dynamic media novice, I developed and presented three concepts for the media wall at Duke. All three concepts experimented with different ways to dynamically visualize the teaching and learning activity in the center using sensors and existing data. I would continue to follow and be inspired by Small and his firm’s interactive work for years³.

In the post-occupancy assessment of the *Link Teaching and Learning Center*, students and faculty at Duke singled out the “architecture and design concept” when asked what they liked best about the space (“Assessment”).

In the mid-2000’s design and “design thinking” began garnering greater attention as a way to create brand value and as process for problem solving and achieving innovation. With the monumental success of Apple’s beautifully designed iPod and iTunes software (and later the Apple iPhone), and with the rise of global design consultancies such as IDEO, leaders in business, academia, and industry were, and still are, becoming more interested in design. In 2004, Stanford University founded the *Hasso Plattner Institute of Design*, commonly known as the “d.school” — a “design thinking” institute. The *Institute* was co-founded by David M. Kelley, who is one of IDEO’s managing partners and a mechanical engineering professor at the school. The *Institute* integrates business, law, medicine, the social sciences, and humanities into a more

³ See additional references on pages 58–61.



Fig. 4: (Above) Apple’s first iPod music player, introduced in 2001.

traditional engineering and product design education (“Hasso Plattner”). The d.school and design-forward organizations such as Apple represent both the shifting role and increased value for design in academia and industry—an increased value that was even acknowledged in the formal assessment of the Duke Link.

TEACHING AND LEARNING

In 2009 I was contacted by Alisa Aronson, Coordinator of the Graphic Design Certificate Program at MassArt. Aronson asked if I would be interested in teaching an evening section of Graphic Design I offered through MassArt’s Continuing Education program. With little to no teaching experience, I was a bit hesitant. Nevertheless I met with Aronson, who encouraged me to sign on and provided me with some initial guidance. Aronson put me in touch with my former MassArt Professor Elizabeth Resnick, who graciously provided me with a sample syllabus and offered valuable advice on getting started. I believe it was Resnick who first suggested I also consult a book by legendary design writer Steven Heller entitled *The Education of a Graphic Designer*. *The Education of a Graphic Designer* was first published in 1998 and is now in its third edition (2015). The book contains a collection of essays, interviews, and course syllabi. Notably, the latest edition adds, “new essays [to] address how graphic design has changed into an information-presenting, data-visualization, and storytelling field rooted in art and technology.”

As I began teaching, I found that working at Shepley Bulfinch during the day and teaching a class at MassArt made for a wonderfully synergistic combination. Aronson also connected me with weekend volunteer opportunities to teach in Youth Design, a non-profit founded by Boston-based designer Denise Korn that empowers urban youth through design.



In my first few years of teaching, I often followed my syllabus like a script, with little deviation. However, as I became more comfortable in my role I realized that I was missing key opportunities to encourage individual learning, and so I began experimenting with more “responsive” teaching methods. I engaged in more more student-led conversation. I let students choose clients and projects (within frameworks) rather than assigning them. Perhaps most significantly, I began to actively encourage the expression of my students’ diverse cultures, attitudes, abilities and perspectives. I have come to embrace and celebrate the variety within the constantly-changing student body, and as a result I have found that over time the quality and creativity of the student work began to improve. As Chris Pullman so eloquently states in his essay *Thoughts on the Attraction of Teaching*, “Teaching also keeps you in touch with the culture as it changes. Each year a new crop of students carry the latest versions of what’s out there. Some things change, some things stay the same. And of course the most visceral aspect of teaching is the sensation of connecting with the

Fig. 5: (Below) Teaching in Youth Design’s Summer Academy program at MassArt.



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students, and those great moments when you can see the concept click and out comes a totally clear, totally original expression that knocks you out” (Pullman 97). After five years of teaching part-time, I came to wonder how I could meaningfully advance components of my teaching and also my interest in dynamic media. It was at this intersection of teaching, learning, and technology that I began conceptualizing projects I might undertake in graduate study.

Teaching part-time while working on primarily education-focused projects provided for a richer dialogue and more empathetic attitude towards my educational clients and their needs. In 2010, Shepley Bulfinch was asked to design an innovation lab for Harvard. Under the direction of Shepley Bulfinch architect Tom Kearns, FAIA, I was again assigned to an interdisciplinary team of designers to work on the project. The innovation lab was an experimental, design-driven project centered around collaboration and interdisciplinary entrepreneurship. The project would transform a former television studio (WGBH) into an innovation lab on a highly expedited

Fig. 6: (Below) The Harvard Innovation Lab in Cambridge, MA.





schedule, with just seven months from a workshop-based design process to the end of construction. As with the Link project, I was once again asked to consider environmental branding, communication, and media. The final branding strategy resulted in the development of a quirky “Hi” icon (the “H” for Harvard, the “i” for innovation), set within a Harvard-crimson colored square, and placed upon the facade of the building. This nondescript icon was largely inspired by software icons, but strategically the “Hi” mostly served as a response to the design brief which called for “a welcoming and un-Harvard mark.” Once again, in my branding package I also provided suggestions and guidelines for dynamic art and design. Collaborating with designer Jeff Grantz and projection artist John Powell, a series of dynamic media initiatives were proposed and developed.

The *Harvard Innovation Lab* project further deepened my interest in exploring the connections between teaching, learning, technology, and design. Around 2014 I began considering pursuing an MFA in either Interaction Design or Dynamic Media. While I still very much identified as a graphic designer, much of the work I was doing somehow felt like it no longer lived within the confines of “graphic design” as I had first come to conceptualize it. In early 2015 I applied to the *Dynamic Media Institute* “DMI” MFA in Design program at MassArt with a version of the same question I first had in high school: *what exactly is Graphic Design?*

CASE STUDIES AND COMMUNICATION DESIGN

In the spring of 2007 Steven Heller penned an article in *Eye* magazine entitled *What do we call ourselves now?*, which asked the question, “In a world of brand specialists and information architects, is it enough to call ourselves ‘graphic designers’

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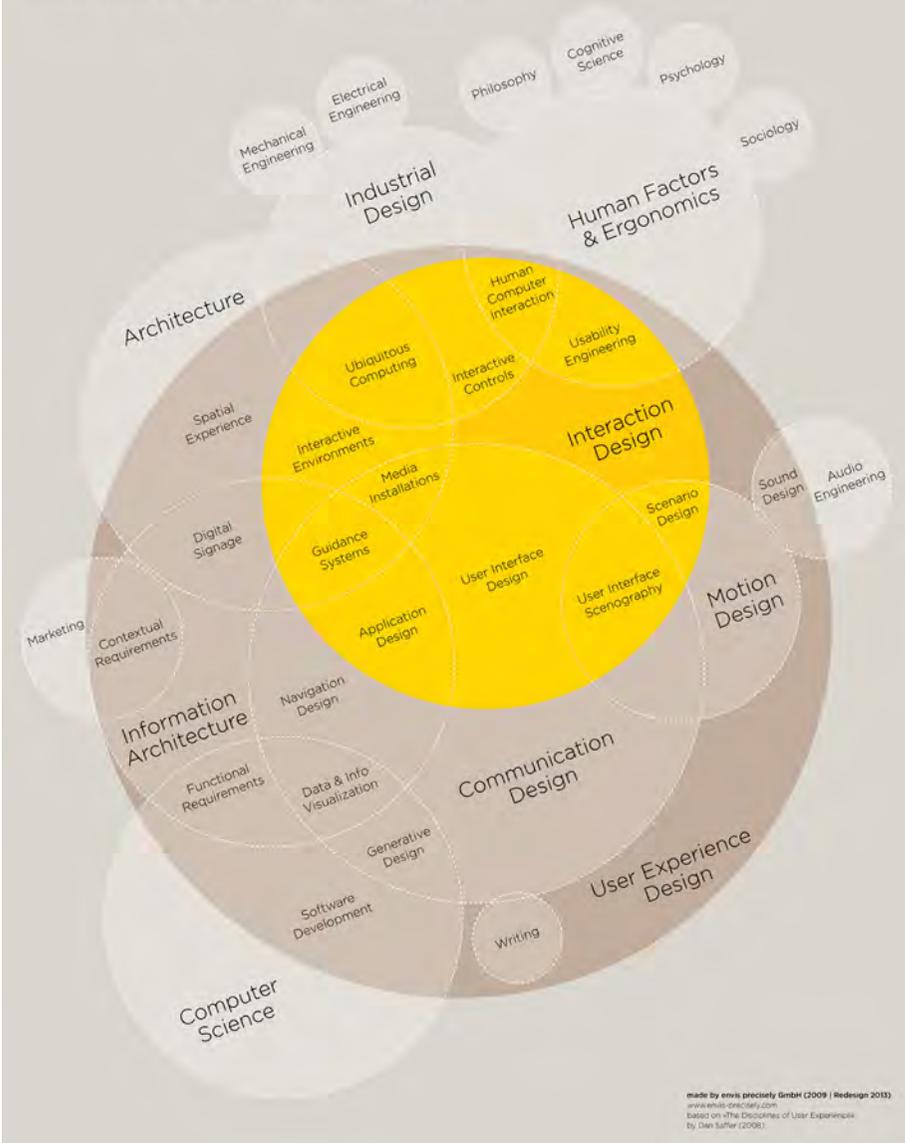
Fig. 7: (Above) American graphic designer, art director, art critic and author Steven Heller.

Fig. 8: (Right) “The Disciplines of User Experience Design” information diagram by Dan Saffer and design by Thomas Gläser.

without sounding overly specialized or obsolete?” (Heller “What do we”). Heller goes on to describe how it was W.A. Dwiggins who first coined the term “graphic design” in a 1922 Boston newspaper article, although as a term and profession, graphic design did not achieve widespread usage until after the Second World War. Before graphic design, “commercial artist” and later “graphic artist” were the accepted labels for one who performed the interrelated acts of drawing, comping, and laying out text and images. Heller states that, in modern times, the term “graphic design” is now becoming obsolete, citing his intentional exclusion of the term in his co-founding of the School of Visual Art’s MFA *Designer as Author* program. To further his point, since 2007 we have seen even more subsets of the graphic design profession. These include user experience design “UX” and interaction design “IxD,” which are both emerging and growing rapidly. Regarding the term “graphic design,” I have begun to develop a slightly different perspective than Heller. I see graphic design as a visually focused modality, perhaps alongside other modalities (dynamic, audible, experiential etc.) that collectively contribute to the design and experience of *communication*. “Communication design,” which is a term that is also growing in use, could be seen as a broader umbrella discipline with many subsets or “concentrations,” among them graphic design. This semantic position informs the working title of this thesis document: *The Education of a Communication Designer*, which of course is a play on the title of Heller’s anthology. The subtitle of my thesis reflects my focus on exploring the possibilities for, and the implications of, applying this expanded practice of communication design to the design of learning experiences.

I should note that Heller’s view of “graphic design” as a restrictive term is not universally supported. When James

The Disciplines of User Experience Design



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Fig. 9: (Above) The entrance to RISD's Graphic Design department in Providence, RI.

Goggin earned his Master's degree in graphic design from the Royal College of Art (RCA) in 1999, he was also in the midst of fighting the department's decision to rename itself. "They wanted to call themselves 'Communication Arts and Design,'" but Goggin was emphatically interested in keeping graphic design as its name. "Graphic design isn't restrictive," said Goggin. "It's interconnected with other fields. The inherent scope of it is always open" (Chang). Such loyalty to the term "graphic design" is often celebrated as dedication to the discipline, and defended with the assertion that the term is flexible and can evolve over time. According to John Caserta, professor and current department head at RISD, "Graphic design is a relative term, not an absolute. So our curriculum has to help define and move along with it. It's a living medium, and we won't give up on it" (Chang). Like Caserta, I am reluctant to give up on my beloved profession, and yet the term "graphic design" has long been the subject of debate. As Katherine McCoy stated in 1998, "The field did not exist at the beginning of the [20th] century, and still there is little agreement on the proper nomenclature. Are we graphic designers, graphic artists, commercial artists, visual communicators, communication designers, or simply layout men and pasteup artists?" (Heller, "The Education" 13)

In my *Thesis Seminar I* class, Professor Joseph Quackenbush encouraged me to consider the context of graphic design education, and to research the work of design educators such as Meredith Davis, Professor Emerita of Graphic Design at NC State College of Design. In her essay *Interdisciplinarity and the Education of the Design Generalist*, Davis states that, "the context for design practice has changed over the last decades and that design education is long overdue for rethinking curricular and pedagogical strategies" (Davis 20). Going further, in 1994

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professor Gunnar Swanson of East Carolina University authored a call to reconsider graphic design more broadly as a “Liberal Art.” Swanson writes:

We must begin to believe our own rhetoric and see design as a *integrative* [emphasis added] field that bridges many subjects that deal with communication, expression, interaction, and cognition. Design should be about meaning and how meaning can be created. Design should be about the relationship of form and communication. It is one of the fields where science and literature meet. It can shine a light on hidden corners of sociology and history. Design’s position as a conduit for and shape of popular values can be a path between anthropology and political science. Art and education can both benefit through the perspective of a field that is about expression and the mass dissemination of information. Designers, design educators, and design students are in a more important and interesting field than we seem to recognize (Swanson 38-39).



Fig. 10: (Above) Meredith Davis, Professor Emerita of Graphic Design at NC State University.

With this in mind, I set about developing a series of experiments and projects that attempt to respond to the more integrative field that Swanson prescribes. The seven projects that I developed in DMI are all fully documented as case studies and project analyses within this book. Each project is also documented in 3-5 minute video abstracts. Notably, the last three of these seven projects form a thesis “trptych” of speculative work which together provide a cogent analysis of

assistive, augmented, and interactive multimodal learning tools for graphic design education. All seven projects, in different ways, explore the four subjects that Swanson lists above: *communication, expression, interaction, and cognition*. These are the “common threads” between all of the projects I’ve worked on during my time in DMI. Moreover, these four broad categories represent areas which I hope to continue exploring into the future.

THESIS PROJECTS AND TEACHING

On a warm New England day, early in the summer before my second year in DMI, I received a call from Professor Quackenbush, who chairs both the undergraduate graphic design program and the DMI graduate program at MassArt. He asked if I would be interested in engaging in on a one-year, full-time teaching position within MassArt’s graphic design program. At first I was hesitant, as completing my MFA seemed daunting enough on its own, and yet this seemed like an ideal way to gain first-hand exposure to the pedagogical topics I was interested in researching. Quackenbush assured me that I would receive mentorship, guidance, and support from senior faculty. Furthermore, he encouraged me to use the opportunity to research, experiment, and learn as an imbedded graduate student–educator.

In *Design Research: Methods and Perspectives* by Brenda Laurel, there is an excerpt by Peter Lunenfeld that describes three interconnected modes of design research. Simultaneously teaching, learning, and designing in my final year allowed me to touch on upon all three of the research modes described by Lunenfeld below in nearly equal measure:



There have been numerous attempts at defining what design research is and how to identify its methodologies, from Lázló Moholy-Nagy at the Bauhaus in the early 1920s, to Henry Dreyfuss's seminal study *Designing for People* in the 1950s, to the Royal College of Arts' Sir Christopher Frayling in the 1990s [Moholy-Nagy 1969, Dreyfuss 1955, Frayling 1993]. To draw from the most recent, Frayling identifies three key modes of design research: research into design, research through design, and research for design. Research into design includes the traditional historical and aesthetic studies of art and design. Research through design is project-based, and includes materials research and development. And finally, research for design is the hardest to characterize, as its purpose is to create objects and systems that display the results of the research and prove its worth. (Laurel 11)

Designing *Critiquemate*, *Lecturemate*, and *Studiomate* involved collaborating with, surveying, and observing my graphic design students. I also benefitted from interviews and collaborations with faculty, administration, and staff at the college. My triptych of theoretical design education software attempts to equally aid graphic design students and graphic design educators. The speculative software directly approaches three interconnected learning components of art and design education: *the studio*, *the critique*, and *the lecture*. Much like my first four project case studies, these software systems strive to augment [not replace] in-person interactions and dedicated

4 Countless times I've heard designers cringe at having to use the term "user" on design projects.

5 See pages 176–177.

physical spaces. The value of this trend towards more open physical arrangements is often predicated on the hope for increased collaboration. Having worked in both open studios and closed office spaces for several years, I tend to think collaboration is more often than not a product of the culture rather than of the space itself. Moreover, with these last three projects I am entering a territory best described as "learning experience design," a term that may have been coined by Connie Malamed, a learning experience designer, in 2015 ("Learning Experience Design"). Learning experience design or "LX" provides for a wonderfully more-focused alternative to "UX" or user experience design⁴.

Paradoxically, and for some controversially⁵, these last three projects encourage teachers to learn and students to teach. Using sound, motion, drawing, text, and graphics in both physical and virtual spaces, I am exploring new ways for people to learn, teach, express, and participate. So while my thesis title somewhat provocatively swaps out Heller's "graphic" and replaces it with "communication," I imagine this shift does not require an abandonment of graphic design. On the contrary, my call is for greater solidarity and interplay between various modes of communication, and as a byproduct I imagine a more robust and cogent future body of research. With these seven projects I have gained a foothold into areas that are ripe for further inquiry: learning experience design, the expanding field of graphic/communication design, and perhaps most significantly an examination of technology-enhanced multimodal learning experiences in art and design education.

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01

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Case Study 01



ISABELLA

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A Dramatized

Digital Personification

-

2015



01

Isabella: A Dramatized
Digital Persona
-
2015

In this assignment I was challenged to investigate the ways dynamic media and digital technologies can help enhance the museum-going experience at the Isabella Stewart Gardner Museum. My proposal involved creating a screen-based, motion- and sound-activated likeness of Isabella Stewart Gardner (1840–1924), the gregarious founder of the museum. Founded in 1903, the Isabella Stewart Gardner Museum is located in the heart of Boston’s Fenway neighborhood, just footsteps from MassArt, the Museum of Fine Arts Boston, and Boston’s Longwood Medical area.

My self-defined goals for the installation were to create additional interest in the museum, to educate and entertain museum visitors, and to explore the use of dynamic media in traditional museum settings. I also wanted to avoid using phones, tablets, kiosks or touch screens, to keep the focus on the visually rich physical environment of the Gardner museum. Instead, the temporary installation I conceptualized called for the insertion of high-definition screens placed on walls within five galleries throughout the museum. To help mask their identity, the screens are placed in ornate gilded frames that match those found on surrounding works. The screens initially display still images of various Venetian tapestry patterns, of the kind beloved by Gardner. Each of the five galleries would also be equipped with sound and motion sensors which, upon activation, trigger the appearance of *Isabella*, a digital personification of Gardner played by an actress who appears on the framed screen. Using contextual data such as visitor location and proximity to certain works, *Isabella* presents visitors with a series of comments and questions, some provocative, some entertaining and some educational. *Isabella* can even “listen” to and have short conversations with visitors as they make their way through the lavish museum.

Fig. 1: (Right) Interior view through door towards the East Wall of the Titian Room. Photo: Sean Dungan



My wife and I live walking distance from the museum and I consider it one of Boston's hidden treasures. It was the first art museum I brought my son to when he was born almost two years ago, but my connection to this museum goes even deeper.

In a chance encounter in 1997, I met Anne Hawley, the *Norma Jean Calderwood Director* of the Gardner Museum from 1989 until 2015. Anne had commissioned my girlfriend at the time, a fellow design student at MassArt, to custom-design clothes for her. Anne arranged for a fitting in her Brookline home and my girlfriend asked if I could drive her to the meeting. I agreed, and on a warm spring day we drove out to Anne's home. The first thing I noticed as we approached Anne's home were the wonderful gardens and landscaping. I parked the car and we both approached the front door. As we got to the door we were greeted by an energetic poodle who jumped excitedly as we approached. Then Anne appeared. Without introduction she picked up the little dog, placed it in my arms, and ushered my girlfriend into her home. The poodle and I, left standing on the front porch, came to understand that we would

Fig. 2: (Below) Isabella Stewart Gardner, 1888.

Fig. 3: (Below Right) Anne Hawley, 2015. Photo: Olga Khvan



be spending quality time together that afternoon.

Thinking back on the encounter I began to wonder if Hawley, as the director of the museum, had taken on the dramatic persona of the museum's founder. It is well documented that Gardner created much fodder for the gossip columns of the day with her eclectic tastes and reputation for eccentric behavior. This memory helped to shape the core of my concept for enhancing the museum-going experience: the idea of digitally incorporating the persona of Gardner.

As part of our initial research we were asked to read *Museums Morph Digitally: The Met and Other Museums Adapt to the Digital Age* by Steve Lohr, published in The New York Times in 2014. The article describes how museums are being redefined for a digital age. "The transformation, museum officials say, promises to touch every aspect of what museums do, from how art and objects are presented and experienced to what is defined as art," states Lohr. While museums were initially slow to adapt, they are becoming more adept at using digital media and showcasing digital art. Lohr states further that

Fig. 4: (Below) Colleen Stockmann, assistant curator for special projects at the Cantor Arts Center at Stanford University. Her research project, A++, built along with Jean-Baptiste Boin, a Ph.D. candidate in electrical engineering and an expert in computer vision, combines image-recognition technology and computer graphics with art history expertise, resulting in the interactive museum of the future. (Lohr) Photo: Max Whittaker for The New York Times



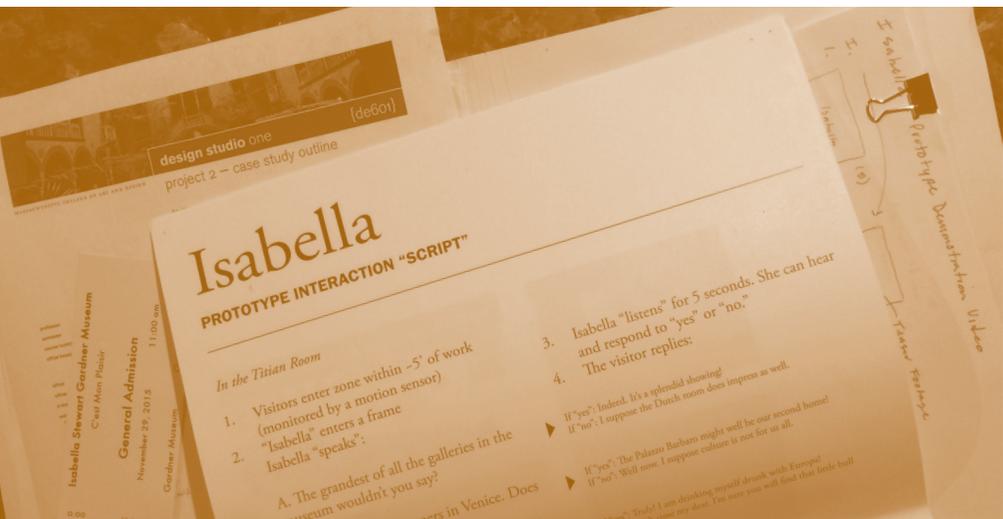
“Museum curators and administrators today...often sound like executives in media, retailing, consumer goods and other industries. They talk of displaying their wares on ‘multiple platforms,’ and the importance of a social media strategy and a ‘digital first’ mind-set.”

APPROACH

Following this research I challenged myself to think about how I could digitally enhance a museum experience without resorting to the use of a smartphone, touchscreen, earphones or any other devices that are common in today’s museums. In my experience, these interventions can help inform, but can also detract or distract from the museum-goer’s experience.

The project outline stated that, “For centuries, museums represented a remarkable form of information dissemination, a place where people could go to see physical objects in real time. Those features became something of a liability in the digital age when users are accustomed to searching, finding, sorting, and filtering information in multiple formats instantly.”

Fig. 5: (Below) Sketches, several draft scripts and multiple visits to the museum informed my creative process and ultimately my concept.



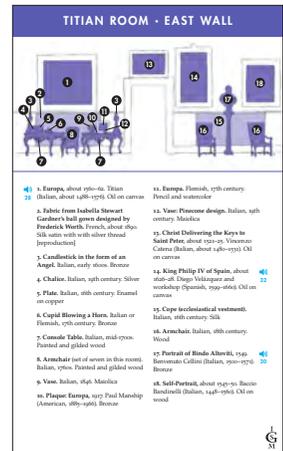
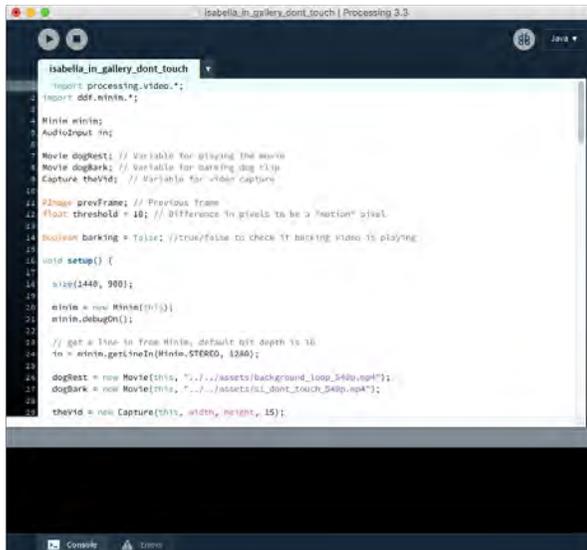
In my sketching I attempted to move beyond increased access to information. I theorized that museums will need to find creative ways to engage a generation of experience-hungry visitors who are increasingly looking to understand artifacts through interactive and entertaining contexts. Reflecting on the project brief, I was motivated to explore dynamic media based approaches that felt human or even emotional, reverting to the most basic forms of communication: storytelling and conversation. The final deliverable for this project called for a 3–5 minute video abstract or prototype demonstration showcasing the concept of our proposed solution. My final deliverable took the form of a 4-minute prototype demonstration video that also documented my technical and creative process.

INTERACTION

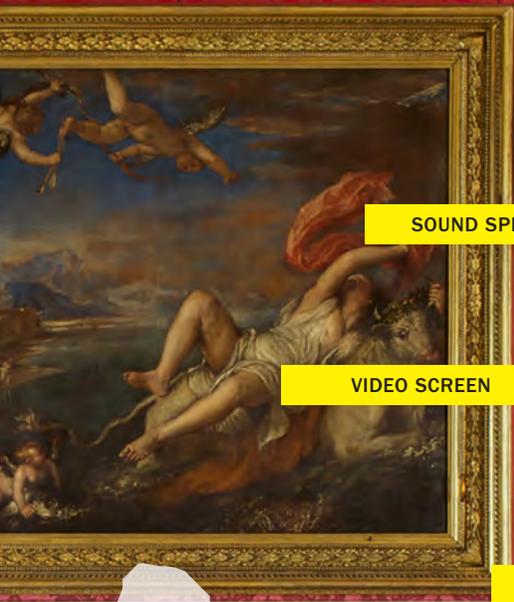
Isabella Stewart Gardner’s will strictly outlined stipulations for the support and maintenance of the museum and its collection, including that the collection and its installation could not be significantly altered. My proposed installation honors those

Fig. 6: (Below Left) Initial motion-and-sound sensing code base test sketch using Processing.

Fig. 7: (Below Right) Room guides from the Gardner Museum that were used in planning the locations of my interactive works.







SOUND SPEAKER



VIDEO SCREEN



MOTION SENSOR

SOUND SENSOR



PARTICIPANTS

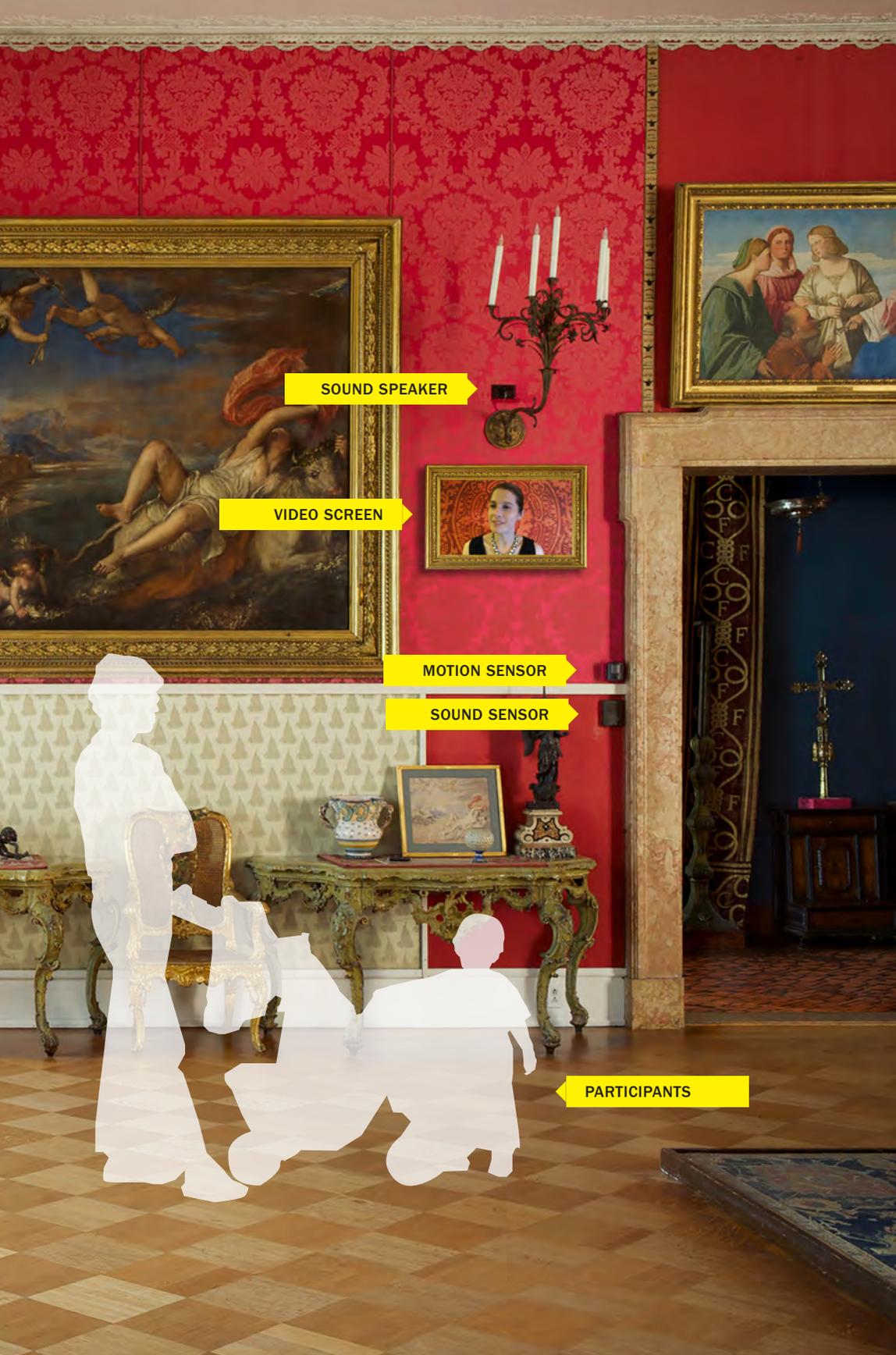


Fig. 8: (Previous Page) Digital mockup of *Isabella* in the Titian room.

wishes and, to a certain degree, would leverage this permanent placement of the museum's artifacts by monitoring any movement near their location with sensors. As a museum visitor approaches a work or designated zone, one of several of these sensors would trigger a media event in the software, prompting *Isabella* to enter the screen and begin a conversation with the visitor. These pre-programmed conversations would provide a balanced mix of educational and entertaining content. *Isabella* may ask a visitor if they appreciate a certain work. The system then "listens" for a response and then triggers an appropriate response from *Isabella*. For instance, once she is into a conversation *Isabella* may share with visitors a personal story about nearby works.

My research for this project took two parallel tracks: on works in the museum and on the persona of Gardner herself. This research helped me to determine thoughtfully what *Isabella* would say and when she would say it. My museum research delved into the history of works found in the Gardner Museum, including how and when they were acquired, and how Gardner





herself personally curated the spaces. My research focused especially on the Titian Room which was featured in my video abstract. The Titian Room is considered by many, and as is accounted by Gardner herself to be, “the grandest of all the galleries in the museum.” This room captures Gardner’s love of Venice, where she spent many summers.

Titian’s *Europa* (FIG. 9) dominates the room, and most of the other works exhibited here are associated in some way with this painting. It was purchased by Bernard Berenson on behalf of Gardner in 1896 for a world-record price (20,000 pounds¹ plus Berenson’s commission of 5 percent) (Saltzman 77). When the painting arrived in Boston, Gardner excitedly wrote: “I am drinking myself drunk with Europa and then sitting for hours... thinking and dreaming about her. Every inch of paint in the picture seems full of joy.” These narratives were directly included in *Isabella’s* script with the overarching goal of having her comments be the right mix of accurate, informative, educational and entertaining. In a sample exchange, to a visitor *Isabella* says, “Admiring Europa? Every inch of paint in the

Fig. 9: (Below Left) Titian (Tiziano Vecellio), *Europa*, 1560-62, Oil on canvas, 178 x 205 cm.

1 In reality Gardner was deceived by this price as seven thousand out of 21,000 pounds (or some 30 percent) of the Titian’s price amounted to profit; and of that, 5,000 pounds went to Berenson.

PERSONIFICATION (noun)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. the attribution of human nature or character to animals, inanimate objects, or abstract notions, especially as a rhetorical figure. 2. the representation of a thing or abstraction in the form of a person, as in art. 3. the person or thing embodying a quality or the like; an embodiment or incarnation: <i>He is the personification of tact.</i> 4. an imaginary person or creature | <ol style="list-style-type: none"> conceived or figured to represent a thing or abstraction. 5. the act of personifying; the attributing of human qualities to an animal, object, or abstraction: <i>The author’s personification of the farm animals made for an enchanting children’s book.</i> 6. character portrayal or representation in a dramatic or literary work. <p>source: dictionary.com</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Fig. 10: (Above) John Singer Sargent, *Portrait of Isabella Stewart Gardner*, 1888, Oil on Canvas

picture seems full of joy wouldn't you say?" If the visitor answers yes, *Isabella* responds with, "Truly! I am drinking myself drunk with Europa!" and if a visitor answers no, *Isabella* responds with, "With time, my dear. I'm sure you will find that little bull charming." Both comments build upon actual statements made by Gardner ("Isabella Stewart Gardner Museum"), with granular detail. Visitors come away understanding rich details, such as Gardner's odd affinity for a white bull that appears in the Europa painting. This research into Gardner added depth and authenticity to my interactive personification of *Isabella*.

Gardner was an American art collector, philanthropist, and in her time was one of the foremost female patrons of the arts. Gardner had a "zest for life," an energetic intellectual curiosity and a love of travel. She was a friend of noted artists and writers of the day. The Boston society pages called her by many names, including "Belle," "Donna Isabella," "Isabella of Boston," and "Mrs. Jack." Her surprising appearance at a 1912 concert (by what was then a very formal Boston Symphony Orchestra) wearing a white headband emblazoned with "Oh, you Red Sox" was reported at the time to have "almost caused a panic", and remains in Boston one of her most talked about eccentricities (Powers and Driscoll 37).

The art direction of the *Isabella* digital personification was informed and inspired by the celebrated *Portrait of Isabella Stewart Gardner*, (FIG. 10) a life size oil on canvas found in the Gothic Room of the museum. For the portrait, Gardner sat for John Singer Sargent, (1856-1925) during his visit to Boston in January of 1888. He was paid \$3000 for the portrait, which was exhibited to great acclaim at Boston's St. Botolph Club. The work also inspired gossip and legend: someone jokingly titled it "Woman: An Enigma," while others believed that the sensuous

display of flesh deliberately echoed the scandal recently created by Sargent's *Madame X*. Gardner herself said that she rejected eight renderings of the face until she was satisfied. Gardner's husband Jack seems to have asked his wife not to publicly show the portrait while he was alive, and indeed the portrait was placed in the Gothic Room, which remained private until Gardner's death. When placed in the gallery, surrounded by altarpieces, stained glass, and religious statuary, the sacramental quality noted by nineteenth-century reviewers is even more pronounced ("Portrait of Isabella Stewart Gardner").

Beyond its history, I chose this work for its distinctive background imagery. Sargent placed Gardner before a striking Venetian brocade pattern. In my research I found detailed documentation on the pattern, and was able to faithfully replicate it as a background in my many video captures. Below is an excerpt from *Dress History: New Directions in Theory and Practice* (Nicklas and Pollen 121) which mentions the pattern:

It is an unusual full-length frontal likeness showing her standing, dressed in a clinging black gown with deep décolletage standing before an ornate Venetian or Middle Eastern textile, the pattern of which forms a halo-like effect behind her (Ormond and Kilmurray 1998: vol 1, 210-11)(Plate 14). Gardner's pose, with her hands clasped before her, and the use of exotic textile as backdrop, invite comparison with the two portraits of the young Princess Mary Stuart of England, painted by Anthony Van Dyck around 1640 when he was the court painter to Charles I, works now in Hampton Court and the Museum of

Fig. 11: (Below) Venetian Brocade Pattern: Modern Lee Jofa Printed Cotton Velveteen Textile. The print used on Lee Jofa's velveteen, shown below, is reminiscent of woven Renaissance silk velvet patterns. Photo: Sara Lynne Moffatt



01

Fig. 12: (Below) My wife Meredith playing the part of "Isabella." Meredith enters the frame from the side and is filmed in front of a Venetian brocade pattern in the style of Sargent's original portrait.



Fine Arts that Gardner or Sargent may have seen during visits to Britain. Isabella Stewart Gardner liked to claim descent from the royal Stuarts, had relics including silk and lace, purportedly parts of a dress once worn by Mary Stuart, and for Christmas eve mass she is said to have adopted costume influenced by a portrait of the Queen (Carter 1972: 3-4). The collaborative nature of Sargent's painting is further suggested by the story, possibly apocryphal, that when the painter declared his wish to use a piece of the Venetian brocade on the wall of his London studio as background, Gardner replied that she had the other half in her collection. Sargent shared Gardner's enthusiasm for Oriental silks and clothing and used these as studio props in other paintings (Ormond and Kilmurray 1998: vol. 1, 210). Whatever the velvet's source, it is clear that



both artist and sitter understood the iconic power of exotic textiles.

I was able to obtain a high-resolution scan (FIG. 11) of a nearly identical venetian brocade pattern. I then printed this pattern on a large-format printer at roughly the same scale as the pattern used in Sargent's portrait. This print was used as the backdrop of my video takes, performed by my wife Meredith, who donned a black dress identical to Gardner's. Each take starts with footage featuring just the backdrop, which—when seen in the gallery—is set on a continuous loop. Once a sensor is triggered the software that drives *Isabella* pulls from a database of these pre-recorded video clips. When a museum visitor triggers a sensor, the background loop is replaced with a video clip featuring *Isabella*. *Isabella* enters the screen from either side, (FIG. 12) turns and faces the participant and begins speaking. Having Meredith enter the frame from the sides added a spacial quality to the screen, akin to seeing a figure appear from behind a window.

Fig. 13: (Below) Testing my Processing software sketch at a local daycare, using a dog puppet, motion and sound sensors.



01



To initially test a series of motion-triggered video loops I used Processing, a flexible software sketchbook and a language for learning how to code within the context of the visual arts. In the development of my *Isabella* prototype, Processing was an invaluable tool. Built into Processing are libraries used to obtain and display video and sound. In order to work through code iterations and video techniques quickly and efficiently I used a hand-puppet as a stand-in for Gardner. A final code base was simultaneously developed in my *Elements of Media* class. With each software version I was able to achieve greater capability and exactness until I had code that sensed motion, and sound, and then used those inputs to trigger specific video loops. I tested my prototypes in class and (using the hand-puppet) before a group of children (from ages 1-3) at a local daycare (FIG. 13). At the daycare I placed a dog bowl in range of a motion and sound sensor. Before the bowl I placed a laptop running a video loop of the dog puppet looking around the room. When the children triggered one of the sensors the dog would begin barking at them. The children were so fully immersed in the experience that they wanted to pet the on-screen dog and nearly destroyed my prototype.

I had initially proposed ten or more locations for the installation, but after testing my software and visiting the museum I reduced the number of locations to five (FIG. 14). The locations for the installation were chosen based upon several factors including the amount of floor space and wall space, but especially the contents of the room and the works' personal connection or significance to Gardner.

The design, development and refinement of the *Isabella* project followed an iterative approach whereby prototypes were developed early on, and with each version the interactions become increasingly nuanced. For instance, much of the project



is dependent on the nuances of human conversation. Pauses (such as between questions and answers) had to be adjusted several times before the timing felt “normal.” For my next prototype, interactions were tested using a projected mockup of the Titian room (FIG. 16). After each round of video takes, group feedback prompted a series of refinements to the “script” helping to strike the right balance between educational and entertaining. This form of feedback and editing felt more akin to processes used in film, animation or character development than design.

For the final prototype, each interaction needed to be filmed carefully in turn to maintain continuity between the linked video loops. This was done to avoid having Isabella’s head “jump” positions between linked sequence video clips, which would take away a bit of the “magic” of her appearance and to dynamic responses. I had first seen this technique used successfully in an interactive project called *The Subservient Chicken*, which was a viral webpage for Burger King created by The Barbarian Group around 2004. On the webpage, a man in

Fig. 14: (Top to Bottom Left) East wall: Titian Room, West Wall: Dutch Room, East wall: Blue Room, West Wall: Yellow Room, Lobby

Fig. 16: (Below Top) Mockup of an interactive, promotional website.

Fig. 15: (Below Bottom) Testing a prototype using a projected simulation of the Titian room.

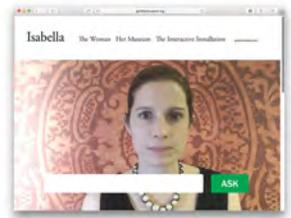


Fig. 17: (Below) Elmgreen & Dragset, *Drama Queens*, 2011, Performance.

2 Elmgreen and Dragset's screenplay features a cast of [remote controlled] iconic 20th-century sculptures. As each piece takes its moment in the spotlight, *Drama Queens* embarks on a satirical and insightful take on the shifting nature of art and its relationship with institutions. ("Elmgreen & Dragset")



a chicken costume performed a wide range of actions based on a user's input, showing pre-recorded footage and appearing like an interactive webcam when really it was all prerecorded in hundreds of takes. There were in fact more than three hundred pre-recorded commands that *The Subservient Chicken* responded to though text input that allowed a visitor to feel like they were actually telling the chicken what to do ("The Subservient Chicken").

Once the overall concept for *Isabella* was formulated, I began to think about how the promotion of the exhibition could also employ dynamic media. I again explored using my digitally personified *Isabella* on the museum's website promoting the installation, this time even more akin to the interface used on *The Subservient Chicken* site. My proposed site featured a search field style text box where users could ask the web version of *Isabella* questions. Again, the users input would trigger videos to be pulled from a database of pre-programmed pre-recorded videos. In this way the promotional material would mirror the actual installation. Beyond this, the code produced for the installation and website could be repurposed as an educational toolkit and posted for download on the Gardner Museum website, along with programming tutorials, tips and tricks.

CONCLUSION

The *Isabella* project gave me the opportunity to explore an iterative process and develop an immersive educational experience. This was my first attempt at researching and conceptualizing a large-scale, comprehensive interactive installation. The project helped me consider the nuances of creating digital experiences for physical spaces. It has fostered a growing interest in how to design experiences that provoke interest, curiosity and engagement.



Moreover the project required the development of an entertaining persona and narrative that would reveal educational insights about the art. A project that shares similar concerns and approaches might be *Drama Queens*² (fig. 17) by Elmgreen & Dragset. Projects of this type are more akin to developing a screenplay or character than graphic design.

In the *Sophomore Studio* class I taught the following semester we invited MassArt alumnus Dave Schlafman to give a workshop on these very topics. Schlafman, along with Matt Karl co-founded the four-time Emmy-nominated animation studio Cloudkid, which in late 2015 announced that it was ceasing operation to begin working with a robotics start-up called Jibo (FIG. 18). “Jibo is a perfect fit for our team,” Karl and Schlafman wrote. “It enables us to explore innovative ways of telling stories and building experiences no one has seen; represents a fun and thrilling creative and technical challenge; and gives us the opportunity to work with literally some of the smartest people in the world. Most of all, we’ll be building a fucking robot” (Amidi)!

Fig. 18: (Below) Prototype of the Jibo robot, a social robot for the home.



In the workshop, Dave and the faculty hung poster-sized prints of everyday household objects and asked student teams to develop new features, but more interestingly, distinct personalities for the objects. One student team, assigned an office chair, named it Janet and gave it the personality of a caring professional assistant that reminds its user to get up and take stretch breaks. In this scenario the “Janet” chair becomes as much about wellness as seating, expressed through the wellness- focused, caring persona of “Janet” a voice-based interface built into the chair.

In this way, Schlafman made a case that the future of interaction design lies less in slick visual interfaces like the ones we’ve seen in films such as *The Minority Report*, but is actually more akin to the processes used in development of rich personas for animated films. Herein lies the curious reason why a world-class robotics group sought an *animation* team to lead *design*. These notions support my broader thesis exploration into communication design, which is tracing our response [as graphic designers and design educators] to the continuous broadening of our communication capabilities. The project has also led to my increased interest in voice-based digital interactions, especially within educational contexts.

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02

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Case Study 02



METAPIECES

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An Interactive Abstract

Art Making Table

-

2015



MetaPieces: An Interactive
Art Making Table
-
2015

MetaPieces is an interactive touch-screen table that engages participants in the deconstruction and abstract reconstruction of digital images of well-known paintings in Western art.

MetaPieces not only encourages museum visitors to view art, but also to create art. This 42” by 24” touch-screen table is also connected to a high-end printer, allowing participants to print their work and to leave with a self-generated “souvenir” in the form of abstract art.

MetaPieces was completed in my *Design Studio I* class, and was one of the first two projects I completed in the Dynamic Media Institute (DMI) program. The project revealed my early interest in exploring and developing ideas focused around experiential education. It also affirmed my interest in bridging physical and digital spaces.

In 2012 I attended a free DMI lecture at MassArt entitled “Designing for Experience” by renowned designer David Small. David Small completed his Ph.D. at the MIT Media Laboratory in 1999, where his research focused on the display and manipulation of complex visual information. He began his studies of dynamic typography in three dimensional landscapes as a student of Muriel Cooper, founder of the Visible Language Workshop and also a MassArt alumna (1951). Small later joined the Aesthetics and Computation Group under the direction of John Maeda. His thesis, *Rethinking the Book*, examined how digital media, in particular the use of three-dimensional and dynamic typography, will change the way designers approach large bodies of information.

I remember being struck by how Small’s work seamlessly blended digital experiences with physical spaces. Moreover, his notion of designing systems, interactions, and experiences (largely educational) challenged my view of what a graphic designer could do and produce.

Fig. 1: (Right) Abstract geometric composition created with *MetaPieces*.





*Fig. 2: (Above) Muriel Cooper, (1925–
May 26, 1994)*

*Fig. 3: (Below) Small Design Firm,
Touchscreens, Washington, DC, 2016,
Digital Interface. Photo: Yasmine El
Mansouri*

Below is an excerpt from the lecture abstract (“DMI Welcomes David Small”):

Participation and interaction radically change the role of the graphic designer. Powerful experiences are as much about doing and engaging as they are about seeing and feeling. The designer, who once may have drawn inspiration from film, theater and dance, now must become a serious student of each of these arts and more in order to pull together all of the many parts that constitute experience. Understanding how space, environment, mood, and audience shape our perception will enable designers to effectively communicate.

We must develop a design practice that is aware of context and responsive, that simultaneously encompasses multiple displays and people, and that uses new technology to create fluid





experiences with information. Designers are also facilitators of social engagement and must address human behavior and relationships.

With *MetaPieces*, I began to grapple with these issues head on, specifically focusing on how to introduce interactive educational content within a communal physical space such as gallery or museum.

My experience creating *MetaPieces* paved the way towards further exploring interactive multimodal learning environments. Multimodal learning environments use two or more different modes to deliver content. Going further, an “interactive multimodal learning environment” is one in which user experience depends on the actions of the learner. In short, the defining feature of interactivity is responsiveness to the learner’s actions during learning (Moreno 310). When *MetaPieces* is placed within a traditional art museum context, visitor learning is not only supported by viewing, but also by thoughtfully selecting source works and collaboratively manipulating them

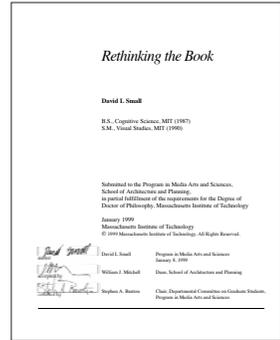


Fig. 4: (Above) *Rethinking the Book*, 1999 Thesis by David Small

PARTICIPATION (noun)

1. an act or instance of participating.
2. the fact of taking part, as in some action or attempt: *participation in a celebration.*
3. a sharing, as in benefits or profits: *participation in a pension plan.*

INTERACTION (noun)

1. reciprocal action, effect, or influence.
2. *Physics.*
 - a. the direct effect that one kind of particle has on another, in particular, in inducing the emission or absorption of one particle by another
 - b. the mathematical expression that specifies the nature and strength of this effect.e conceived or figured to represent a thing or abstraction.

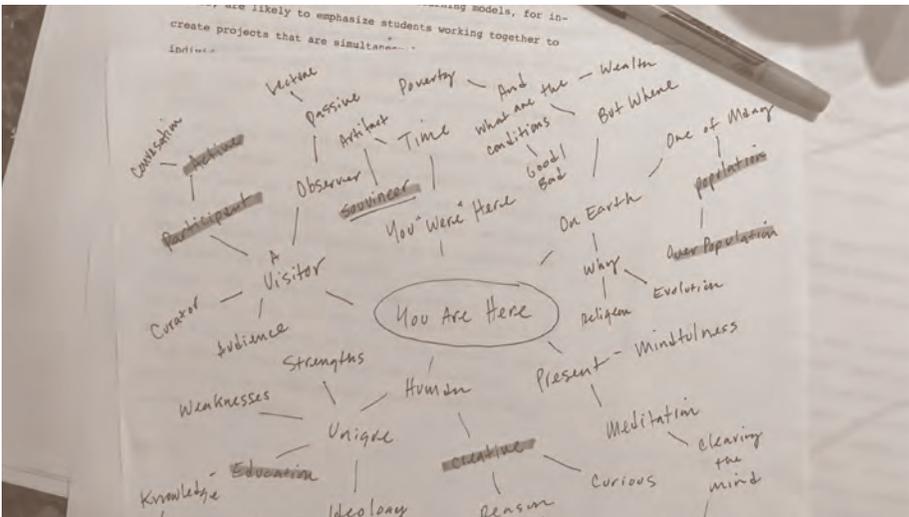
Fig. 5: (Below) Mindmap brain-storm sketching around the concept “you are here.”

Fig. 6: (Top Right) Poster for the Oscar-nominated feature length film, *Exit Through the Gift Shop*.

through touch. Thus, the “Meta” in *MetaPieces*, could best be attributed to the emerging notion of *metamodernism*.

“Metamodern learning models, for instance, are likely to emphasize students working together to create projects that are simultaneously self-expressive for each individual member and also an adequate self-expression of the group, however diverse its viewpoints and subjectivities may be” (Abramson).

The prompt for the assignment which resulted in the creation of *MetaPieces* was to thoughtfully respond to the phrase “you are here,” and to develop a solution that demonstrates ways in which dynamic media can be used to create rich and engaging user experiences. We were encouraged to follow a design process that moved from analysis, to synthesis, to mapping and finally taxonomy. Our Professor, Joseph Quackenbush, encouraged us to think broadly about the final form of the project and to explore its feasibility through prototyping. The final deliverable for the project called for a video abstract, showcasing both the design process and final product.



APPROACH

In my early brainstorming and research I became increasingly interested in the contemporary notion, and the historical background, of the souvenir. Looking back through my project sketches I found a mindmap-style sketch that traces a direct connection from “you are here” to “you were here” to “the souvenir.” I became progressively interested in examining the role of the souvenir as a physical artifact that commemorates a visit to a physical place. More explicitly, I began to question the role and significance of the souvenir in the context of an art museum, as is exemplified in the title of the 2010 British documentary film *Exit Through the Gift Shop*.

As I continued sketching and researching, I began to imagine an artifact that could be more memorable and rewarding than a symbolic token purchased after the experience. I sought to replace the practice of leaving a museum with a souvenir that is a reproduction of an artist’s work (such as a refrigerator magnet or a pack of notecards) with the idea that one could leave the museum with a work of one’s own creation.

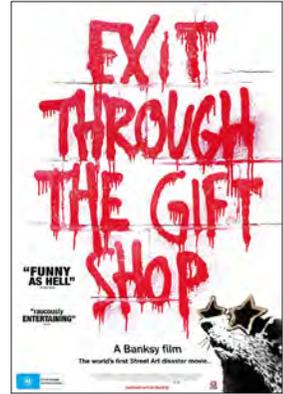


Fig. 7: Brass souvenir of the Eiffel Tower placed over the Eiffel Tower
Photo: Michael Hughes



Fig. 8: (Below) Cards from 250 Masterpieces in Western Painting placed on the floor of my studio as I carefully selected artwork for MetaPieces.

I dug even deeper, questioning the often contemplative role of the museum itself, and simultaneously attempting to clarify what a souvenir is and why it exists.

A souvenir is defined as “a thing or memento that is kept as a reminder of a person, place, or event,” and the root Latin, *subvenire* translates more closely to the phrase, “occur to the mind.” While working on this project I toured with a group of out-of-town visitors through the nearby Museum of Fine Arts Boston. In the context of thinking about my project I became more aware of how passive visiting the art museum can be. The focus of the visitor experience seems to be on “consuming” the art, with limited opportunity to understand its making or its context. In an institution that celebrates human creativity, expression, and craft there seemed to be little room to creatively engage outside of formal classes and workshops.

These observations led me to explore the possible connections between the limitations of “the souvenir” and further opportunities for creative engagement within the museum. In *Souvenir as Art*, an article by Sandra Marceland published





through the AIGA, Marceland states that, “the souvenir is universal” and interestingly that “souvenirs have been excluded from serious cultural dialogue.” Marceland goes on to say, “Transcending time and travel, souvenirs can also be art.” With this in mind, I strove to effectively play off the Marceland’s title “Souvenir as Art” and explore visitor-created art as the souvenir.

Fig.9: (Below) Early wireframe sketch of the touch table interface.

INTERACTION

MetaPieces is designed for installation in an art museum or gallery. Ideally, the source artworks used in *MetaPieces* would be culled from the museum’s own collection. For my prototype, the works were selected from *250 Masterpieces in Western Painting*, a boxed card set that provide a survey of Western art history from the 1440s to 1960s. I chose works that would lend themselves to visual simplification and abstraction. Each work, when “converted” is broken into small geometric “pieces.” Participants first select the source artwork, then press a button to convert it into these pieces. The pieces are flat, vectorized-geometric forms with a simplified color palette drawn from an

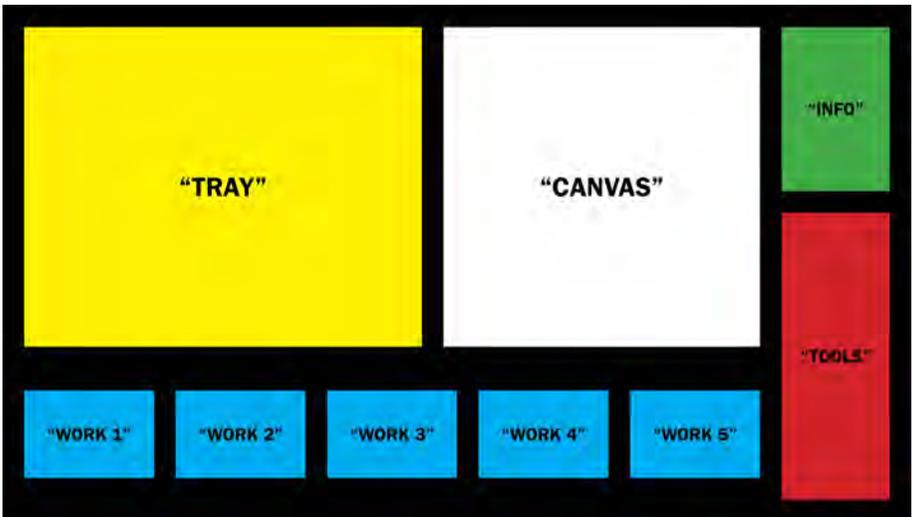


Fig. 10: (Below) Adobe Color CC color picking tool.

1 This extraction of a simplified color palette is a technique I have used in my work as a graphic designer to choose accent colors for my layout. I would use the eyedropper tool in Photoshop to retrieve the color coordinates from photos and then import them into my layout. With Adobe Kuler (which was recently rebranded Adobe Color CC) this process was eventually automated.

algorithmic color scan of the original work¹ (FIG. 10). These simplified versions of the originals are pre-made by the designer (FIG. 12). When a work is converted, the system replaces the original on-screen image of the work with the pieces, which are coded to be scalable and movable via touch.

The interface for *MetaPieces* is divided up into three areas: the gallery, the tray, and the canvas. To get started, a user selects a painting from the gallery area on screen and the system asks if the user would like to convert the work into pieces. When a user clicks “yes” the work is converted or “flattened²” into a simplified group of colored geometric shapes. The user then has the option to add those shapes to the tray area where they can be manipulated on the touch screen to create new artwork. Once the geometric shapes are added to the tray they are effectively “ungrouped” and can then be dragged, scaled, rotated and repositioned to create new, abstract-geometric compositions.

The large scale of the *MetaPieces* interface allows for multiple users (up to 6) to work simultaneously from a single

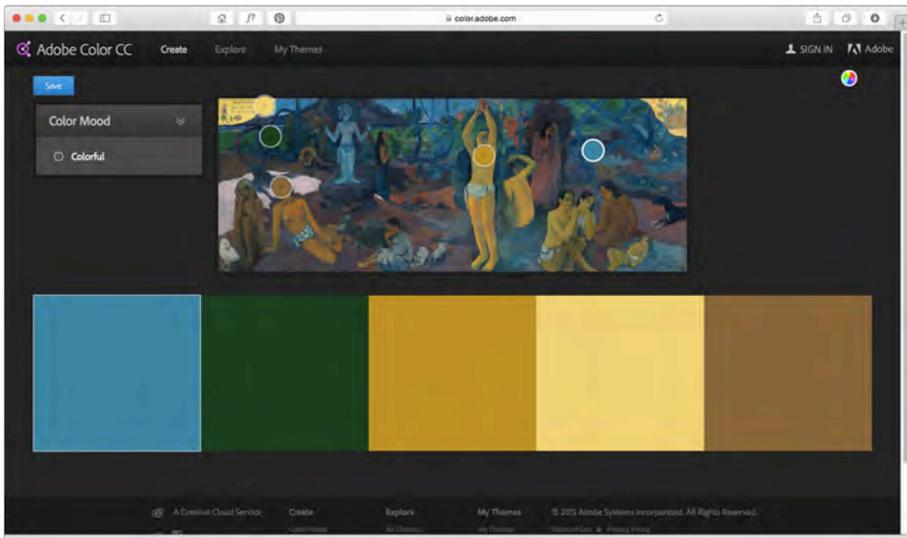
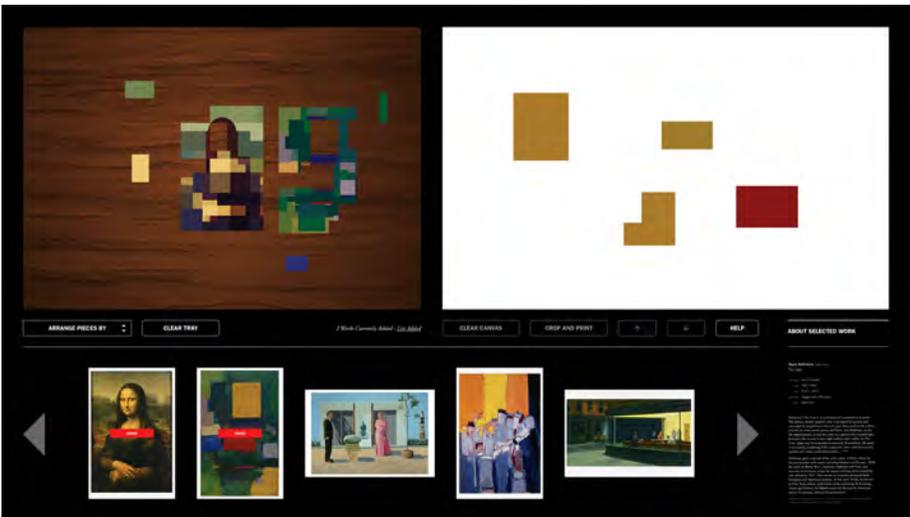


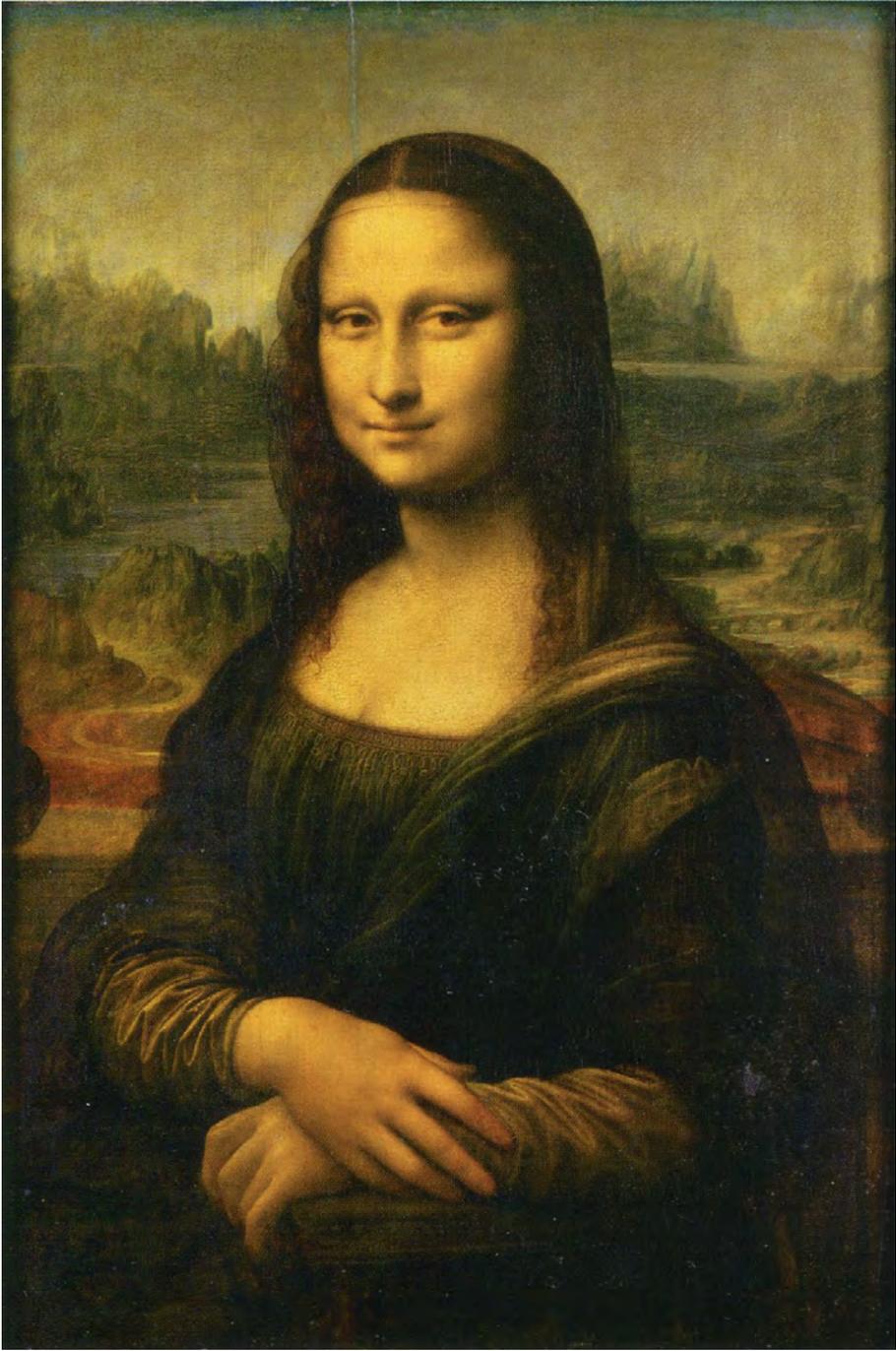


Fig. 11: (Left and Below) The MetaPieces touch table interface with three main workspaces.

2 I became more interested in a “flat” aesthetic when I encountered the book *flatnessisgod* by Ryan McGinness in 1999. The book “presents a thorough exploration of the second dimension. The pages contain paintings, basic design studies, image and type experiments, logo developments, layouts, graffiti converted into corporate logos, art haiku, and mistranslated text from Japanese candy (McGinness).

3 The concept of “grouping” and “ungrouping” is also derived from visual design processes and is often a feature included in layout software.





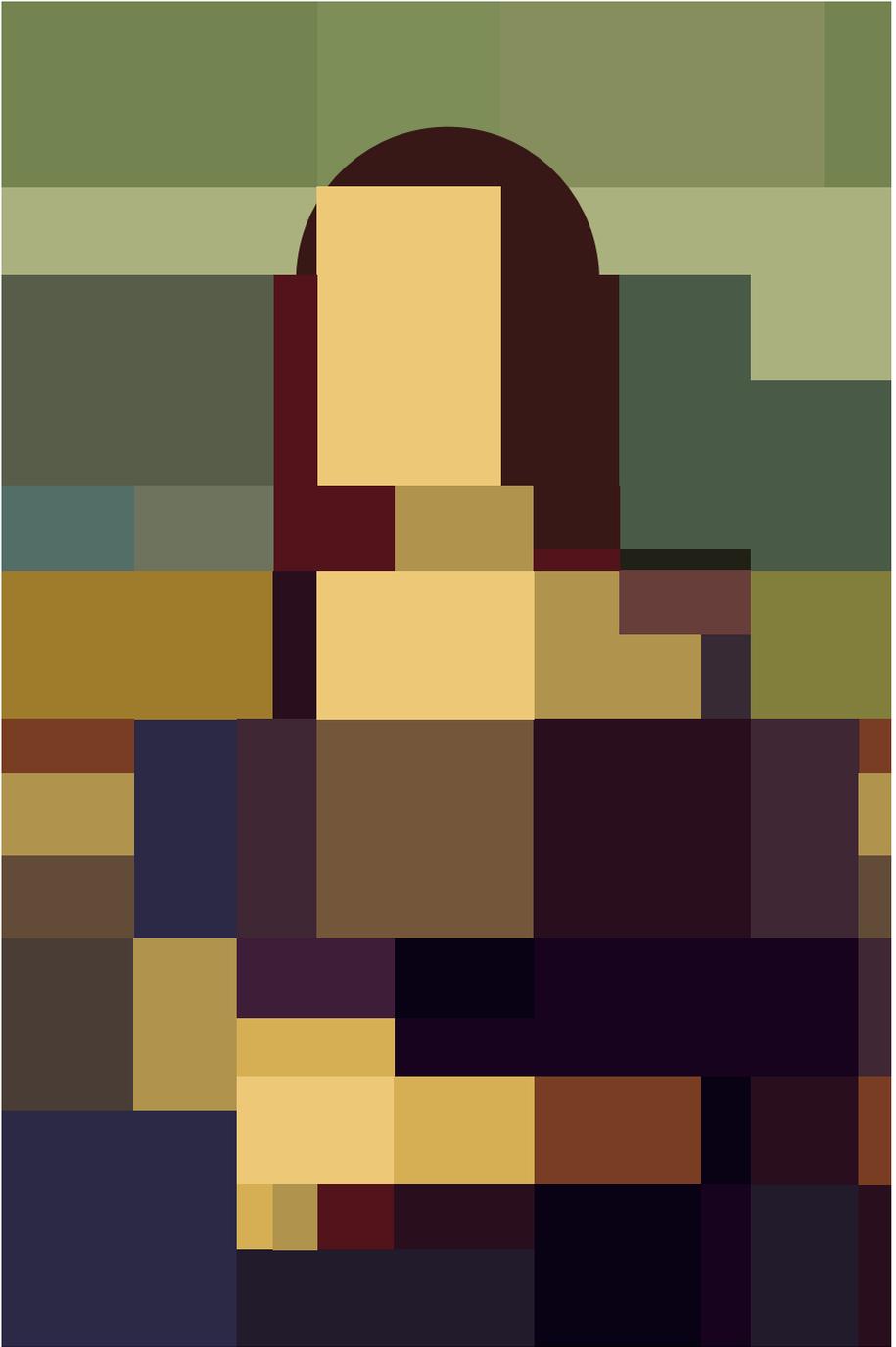


Fig. 12: (Previous Page) Example of converted original [Mona Lisa] into flattened pieces.

Fig. 13: (Below) Page from *Geometry of Design* by Kimberly Elam featuring a geometric analysis on vellum atop the *L'Intransigant* poster by A.M. Cassandre (1925).

Fig. 14: (Right) Screen shots of the *MetaPieces* table with a composition in progress.

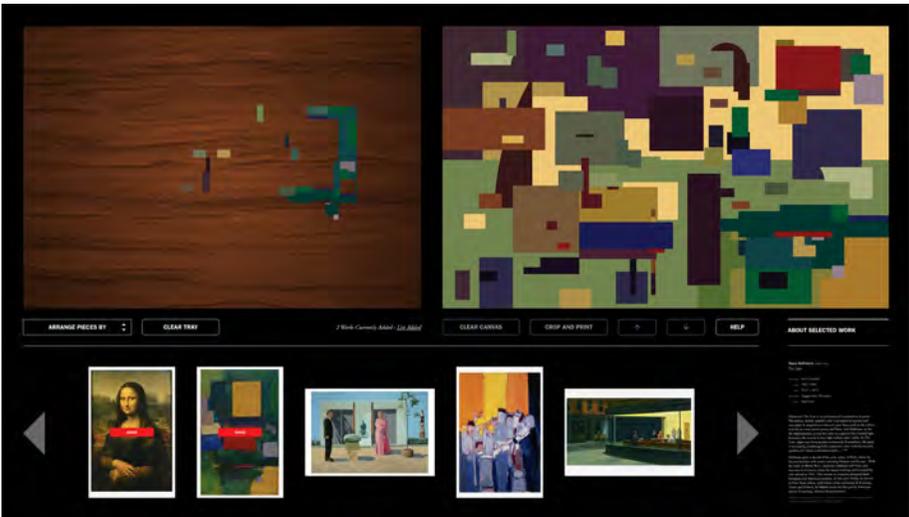
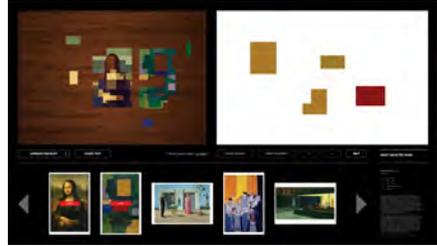
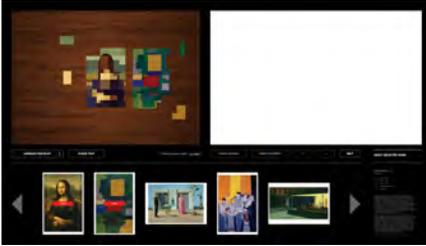
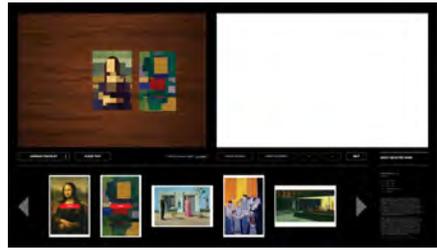


work. To create a composition, selected shapes are moved into an area called the “canvas,” which constitutes the largest area of the interface. Within the canvas users can compose, edit, and crop the pieces they choose to create a unique abstract work.

When designing *MetaPieces* I was challenged with how to thoughtfully approach the deconstruction of the original works into reusable geometric pieces large enough to be manipulated and repositioned via touch. In *Geometry of Design* by Kimberly Elan I found an indispensable resource. In the book, (FIG. 13) Elam provides deep insight into how artists and designers approach composition, geometry, and proportion. In the introduction, Elam states that, “The purpose of *Geometry of Design* is not to quantify aesthetics through geometry but rather to reveal visual relationships that have the foundations in the essential qualities of life such as proportion and growth patterns as well as mathematics (Elam).

Elam’s book provided a methodology for how to thoughtfully approach the geometric deconstruction of each artwork. The book contains a series of geometric grids, printed on vellum overlays and placed over the original works. In similar fashion, I used the gridlines in my layout software to visually dissect the source works into simplified geometric shapes. In particular, I looked closely for golden sections and other classic proportions described in Elam’s textbook. Through direct conversion and manipulation of these geometric pieces, a participant using *MetaPieces* receives an indirect lesson in composition, proportion, and color theory.

In designing the *MetaPieces* experience, I also hypothesized that participants would find the objective of creating an abstract work freeing and less intimidating than any expectation of realism. In his 2013 book *The Shape of Design*, Frank Chimero states that, “An improvisational structure allows us to



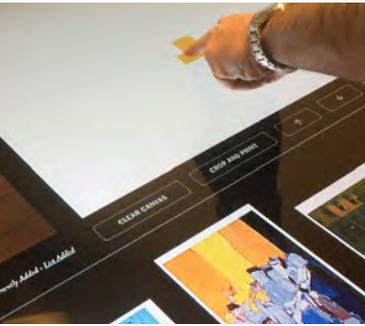


Fig. 15: (Above and Bottom Right) User testing MetaPieces touch table user interface concepts.

Fig. 16: (Top Right) Reviewing laser printed test prints.

get to work, because we no longer need to know precisely where we are going—just choose a direction and trust the momentum. All we need to know are the rules of the game” (Chimero 42). This simplification of the painterly to the graphic could also be seen as a nod to minimalism. In *Minimal Art: A Critical Perspective* Frances Colpitt states that, “Issues of process determine how and of what the work of art is to be made. The radicalness of Minimal Art is partially due to a complete rethinking of process issues which Robert Mangold characterized as ‘loss of identification with the process of making art, rather a stronger emphasis on the piece; frustration with painting as a medium for advanced art; adaption of industrial-commercial techniques and materials’” (Colpitt). Or perhaps even more apt is John Maeda’s notion that, “Simplicity is about subtracting the obvious, and adding the meaningful” (Maeda 89). The meaningful, in my mind is not the work itself but participants’ experience of producing it.

In creating this experience I also considered a range of technical and user experience issues. Using research collected from interviews and user tests with classmates and students, I grappled with how much creative control I should give to the user, as well as how much time a participant would require to create a substantial composition. This testing provided valuable insight as I began designing a user interface.

Through my design process, I was able to quickly iterate various user experiences and user interface prototypes using cut paper. Also of consideration were the optimal form factor, interface, and technologies that would best suit my goals. Ultimately, through the development, iteration, and testing of various-sized wireframe user interface elements, I settled on the form factor of a large interactive table. The table could either be a large-scale touch screen or a digitally projected interface.



The touch table interface I proposed would be supported by a software system such as Microsoft *PixelSense* (formerly called Microsoft Surface). Like an oversized touchscreen tablet, *PixelSense* is a large scale interactive surface-computing platform that allows one or more people to use touch and manipulate digital content simultaneously.

To conclude their experience and create a souvenir, participants are given the option to crop, print, and share their creations. The system also allows the user to share a digital version of the image through email or social media. For printing I'd propose the museum could house a low-cost, environmentally-friendly 11" x 17" solid-ink ("Solid Ink") laser printer right in the gallery. The museum could optionally hold workshops on ways to transfer the laser print onto canvas, or almost any other material using a gel medium (a method my students use often to create mockups).



4 DMI alumnus Nicole Tariverdian now works at RLMG as an associate producer and design researcher. She has worked on interactive media exhibits for projects including the National Postal Museum, The Tech Museum of Innovation, and the Canadian Museum of Immigration.



CONCLUSION

Because *MetaPieces* was one of my earliest DMI projects, there is much more I would be interested in researching were I to continue to work on it. During my research I found several precedents which examined similar ideas (in addition to that of David Small). One such work was the *MEA Artists' Choices Table* exhibited at the MFA Boston in 2010. It was designed by Richard Lewis Media Group⁴ and Tactable. Below is a description of the project from Tactable:

The *Artists' Choices* multi-touch table allows visitors to create images in the manner of four 20th century painters (Georgia O'Keeffe, Edward Hopper, Charles Sheeler and Ralph Coburn). This 64" by 40" surface, situated in the middle of a 20th century gallery in the Boston Museum of Fine Art's new American Wing, displays six work stations and a shared work portfolio. Seated as if around a coffee table, visitors make compositions alone or with others. They also learn the background of each artist, exploring biographies and key works. Visitors select one of four activities: choosing O'Keeffe allows visitors to scale and crop elements as O'Keeffe did in many of her works; choosing Hopper allows visitors to move elements into and around Hopper's Room in Brooklyn; choosing Coburn allows visitors to re-arrange replicas of the 35 small canvases that make up *Blue White Green*; and choosing Sheeler allows visitors to layer and color photographic transparencies as Sheeler



did. When complete, the visitor's creation can animate off the workstation, grow to fill the entire table (a dramatic moment!) and then settle in a shared public portfolio. ("MFA Artists' Choices Table").

Fig. 17: (This Spread) Photos of the Artists' Choices multi-touch table at the MFA Boston, 2010. Photos: Leonardo Bonanni

In an interview following its installation, Jenna Fleming, the MFA's manager of new media, discussed the balance that new media must strike within a space that is cherished for quiet contemplation. "We've tried really hard to create balance, knowing that for most everybody who comes here, the museum is a respite." She goes on to say, "The goal that we had, based on visitor research that we had done, was to keep the touch screens very close to the artwork, so they become part of the experience of looking at the artwork. It's a place for contemplation and relaxation, and it would be sort of inappropriate if we created this video arcade" (Edgers).

Around the same time, the MFA replaced its standard audio tour system with hundreds of iPod Touch devices featuring details about art objects, explanatory films, and assorted bonus material. I would presume that I am not alone in feeling like the last thing I want to do in an art museum these days is fiddle around with another handheld mobile device. In that sense, I find touch tables, and other more immersive interactive content, to be more stimulating, appropriate, and engaging.

I hypothesize that the *MetaPieces* experience would be particularly compelling to children and young adults, who would not only enjoy interacting with the system, but would also benefit from the visual literacy components embedded within the experience. The legendary architect Le Corbusier once said, "Geometry is the language of man," and he went on



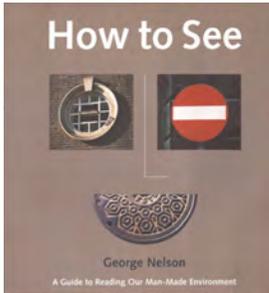


Fig. 18: (Above) Cover of *How to See* by George Nelson. In 2007 the book was updated with a new graphic layout by the legendary Boston designer Chris Pullman, who managed Nelson's graphic design office in the 70s.

Fig. 19: (Right) *Hanging a framed test print in my home.*

to say, “He has discovered rhythms, rhythms apparent to the eye and clear in their relations with one another. And these rhythms are the very root of human activities” (Le Corbusier 72). This sentiment is echoed in the Introduction to *How to See* by George Nelson. In making a case for visual literacy, Nelson says, “And so it turns out that if we really want to see the physical environment within which we spend most of our time, we do have to understand something about design and the design process. In other words, seeing and design are related, just as seeing and thinking, seeing and feeling are related” (Nelson xviii).

Looking back, I believe one of the reasons I particularly enjoyed developing *MetaPieces* was that it so wonderfully blended what are often my more separate personal roles as an artist, designer, and educator. Like so many others who have progressed through the DMI program, I have become interested in blurring the line between these three disciplines. This project gave me the confidence and insight to begin using dynamic media, not just in design work, but also more directly in my art and in my teaching.

In summary, *MetaPieces* attempts to both subvert and support the often passive experience of viewing art in an engaging, educational, and rewarding way. Participants engage in interactive multimodal learning about composition, art history, color, and form through the self-selection and manipulation of source imagery. When there are multiple participants, visitors also come away with an understanding of a collaborative creative process, of consensus, and perhaps even critique.

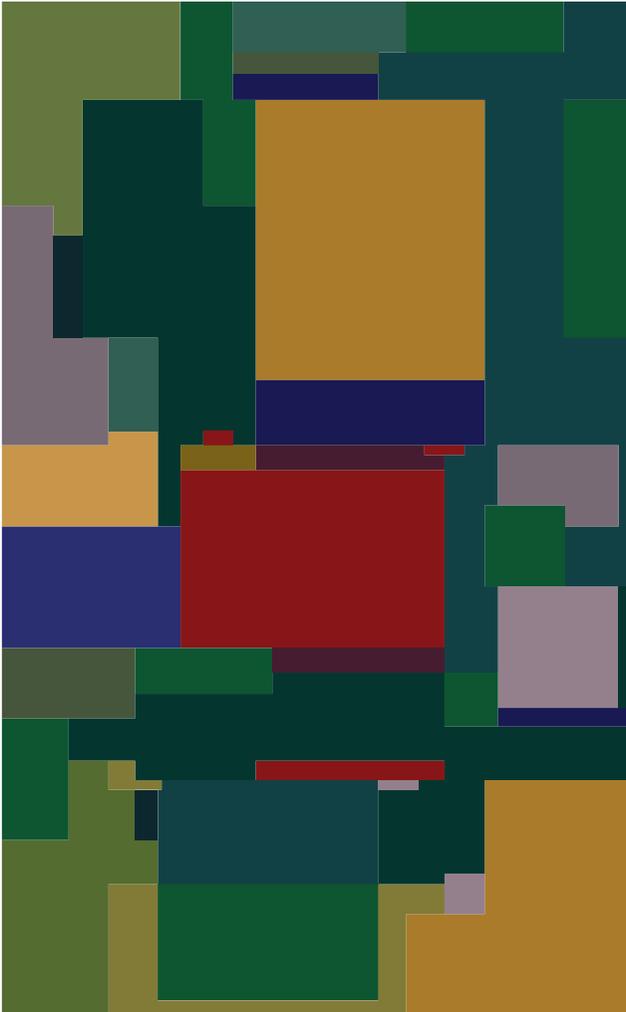
Moreover, *MetaPieces* encourages gallery visitors to both view and create. Users leave with a limited edition, framable, self-generated souvenir in the form of abstract art. While



printing becomes the primary output for the user, there is more room for investigation around what I could do with the resultant database of user-generated artwork that would be created over time. This is perhaps where the “meta” in *MetaPieces* becomes increasingly more interesting: using dynamic media to engage users in the participatory development of new work, new contexts and new systems for creativity, learning and expression. This sentiment was wonderfully captured in an email Frank Chimero once sent to Liz Danzico, the co-founder of the Interaction Design program at the School of Visual Arts (Chimero xi):

I see a platform and it tells me two things: first, other people’s contributions are important. Second, the world is not done. Wow. If I want to believe anything, it’s that.





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03

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Case Study 03



FINGERING RANDOMIZER *for* Bb TRUMPET

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An Interactive

Multimodal Learning

and Performance Environment

–

2016



Fingering Randomizer
for Bb Trumpet: An
Interactive Multimodal
Learning and Performance
Environment

-

2016

- 1 The upper-case “B” in Bb is the key and the little “b” stands for flat.
- 2 This list includes non-intention, indeterminacy, chance operations, the *I Ching*, improvisation and notation.
- 3 Indeterminacy is a composing approach in which some aspects of a musical work are left open to chance or to the interpreter’s free choice. John Cage, a pioneer of indeterminacy, defined it as “the ability of a piece to be performed in substantially different ways” (“Indeterminacy”).

Fig. 1: (Right) Early setup and testing of the Fingering Randomizer in the DMI Studio.

One of the most surprising and challenging projects I completed while in the Dynamic Media Institute was a custom-coded software interface I designed exclusively for trumpet players. The project required me to learn a new programming language (Processing) and forced me to pick up an instrument I had not played in over 15 years. For the user (or performer) my *Fingering Randomizer for Bb^b Trumpet* brings together elements of chance, time, learning, and musical expression. With my *Fingering Randomizer* project I prototyped an interactive multimodal learning and performance environment for trumpet players.

This project was completed in my *Design Studio II* class under the direction of Professor Jan Kubasiewicz. The prompt for the project was to create “a musical instrument for John Cage,” and provided in the design brief were a list of tropes² associated with Cage. John Cage was an American composer, music theorist, writer, philosopher, and artist. Cage was a pioneer of indeterminacy³ in music, electroacoustic music, and non-standard use of musical instruments. Cage is perhaps best known for his 1952 composition 4’33”, which is performed in the absence of deliberate sound; musicians who present the work do nothing aside from being present for the duration of time specified by the title (“John Cage”).

The *Fingering Randomizer* software is inspired by the chance-controlled music of Cage. The *I Ching*, an ancient Chinese classic text which advises the reader to consult the text randomly (based on chance numbers) became one of Cage’s preferred composition tools (“John Cage”). A common way many consult the *I Ching* is by flipping three coins, with the resulting numbers⁴ determining what section is read (“How To Consult The I Ching Oracle”). After watching YouTube videos of people utilizing this method, I wondered: could the

Fig. 2: (Below from Left to Right) Shaun Smith (now a Director of Bands for Methuen Public Schools in Methuen, MA), myself, and Steve Rheame in a jazz performance at Festival Disney World around 1996.

4 This is done by assigning a value of three to any coins that are heads, and two to any coins that are tails. Rolls will add up to 6, 7, 8, or 9. After each flip the value is recorded, six times to create a hexagram. The meaning of the hexagrams are found in the *I Ching*.

three-coin method could be applied directly to the problem of creating a musical instrument for Cage? In my sketching I took this idea a step further by mapping the heads or tails of the three coins to the up and down positions of a trumpet's three valves. Within days I was off to Rayburn Music, a Boston-based music shop that specializes in the rental, sale, and repair of musical instruments, where I acquired a student model Bb trumpet. I then headed to my studio at MassArt to begin experimenting.

Growing up in the Boston suburb of Haverhill, I was deeply fortunate to have access to a world-class music education program that was integrated into the city's public school system. Through the school's music program I was to be trained on the trumpet by multiple graduates⁶ of the renowned Berklee School of Music. These instructors ingrained in me a lifelong passion and appreciation for music, and in my case for the trumpet. In middle-school I was introduced to the music of the Canadian jazz trumpet player Maynard Ferguson and to the works of Cuban jazz trumpeter, pianist, and composer Arturo Sandoval.





When I was young, these musicians became my personal heroes. Years later, in May of 2000, I had the rare honor of seeing these two legendary musicians perform together at the Berklee School of Music Performance Center. The show lasted a full three hours, and from their thunderous response, the crowd obviously still hadn't had enough (Lerner).

Coincidentally, the *Fingering Randomizer* was not my first music-oriented project developed under Professor Kubasiewicz. During my undergraduate studies at MassArt, I developed *The Color Piano Project* for my senior degree project under his advisement. The project culminated with a series of sample visualizations and diagrams used to demonstrate the concept of applying the common color spectrums (in RGB and CMYK) to musical notes. The technique employed tints (for higher notes) and shades (for lower notes) to musical octaves and motion/height for the dynamics (volume and duration). In his own research, Professor Kubasiewicz is concerned with the contemporary notion and origins of "Audio-visibility." Through this research, Kubasiewicz maps the concept of "complementary

Fig. 3: (Below) *The Color Piano Project, Multimedia, 2000.*

5 These instructors included Joe Leary and Joe Gori. The two graduated from Berklee together in 1979 (Vartabedian).

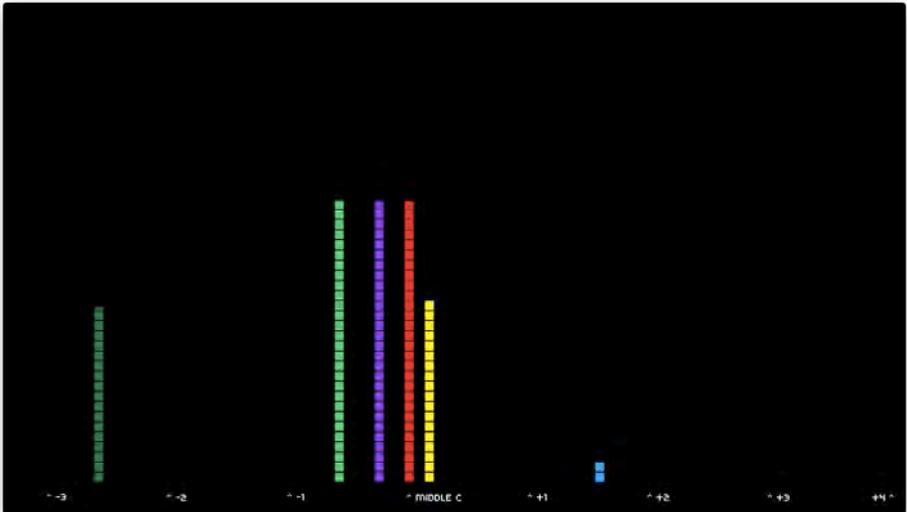
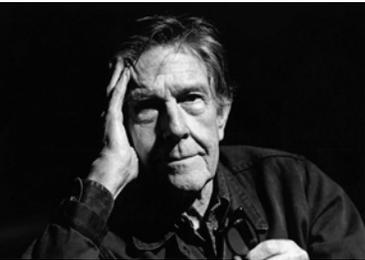


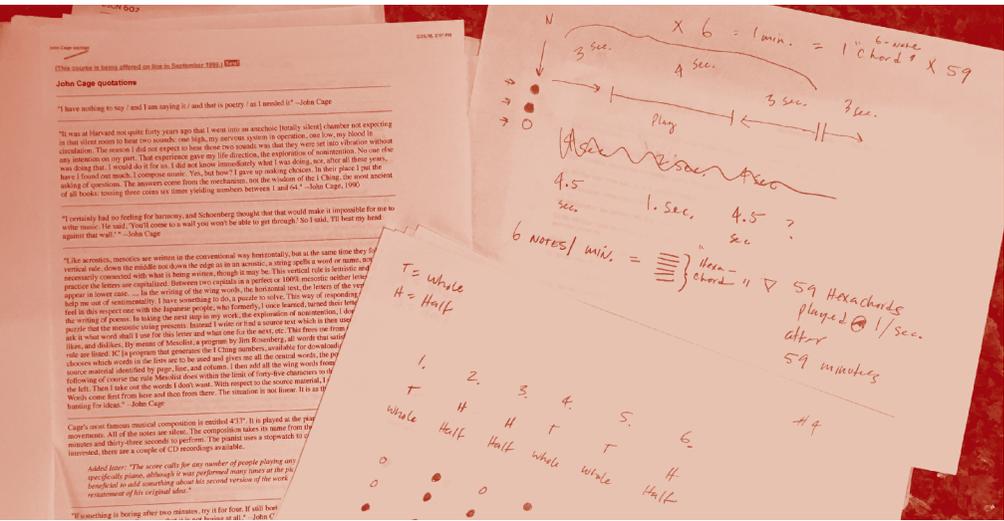
Fig. 4: (Below Top) John Cage (1912-1992) an American composer, music theorist, writer, philosopher, and artist.

Fig. 5: (Below Bottom) Initial sketches and research material on the writings and work of Cage.



relationships of sound, image, text and motion as the languages of communication, in the context of design education” (Kubasiewicz). In his paper “Sound—Image—Text—Motion: An Overview of Audiovisual Explorations,” Kubasiewicz reveals his interest in the writings and work of John Cage:

Stimuli in the domain of sight and sound make up the core of human experience. Consequently, vision and hearing are the most involved modalities in multimedia communication. John Cage wrote about vision and hearing as the “public senses” (Fetterman 21). “We have eyes as well as ears, and it is our business while we are alive to use them” (Cage 12). Indeed, relations of vision and hearing, both as a sensory experience as well as a linguistic expression, evoke multiple questions within multiple theories and histories of communication and media.





When I was an undergraduate, Professor Kubasiewicz also introduced me to the work of Keith Jarrett, an American jazz and classical music pianist. In 1973, Jarrett began playing totally improvised solo concerts, and it is the popularity of these concert recordings that made him one of the best-selling jazz artists in history (“Keith Jarrett”). The spontaneity of Jarrett’s improvised solo concerts was yet another influence realized in my *Fingering Randomizer* project.

I was fortunate enough to see Jarrett in September 2005 at Carnegie Hall, where he performed his first solo concert in North America in more than ten years. The performance was released a year later as a double-CD set, *The Carnegie Hall Concert*. After the intermission Jarrett tried a quiet, hymn-like piece. During this quieter performance, the concert was somewhat derailed by the background noise of members of the audience coughing. As Jarrett, somewhat famously, hates the sound of coughing, he stopped the hymn, glared, waited and sneered, “Where’s the coughing now?” before resuming with a brief coda (Pareles). I found it interesting that both Jarrett and

Fig. 6: (Below) Pianist Keith Jarrett who is known for his hours long, totally improvised solo concerts. Photo: Rose Anne Colavito / ECM Records



Author: [illegible] Date: [illegible]

Fingering Randomizer for Bb Trumpet

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Project: [illegible]

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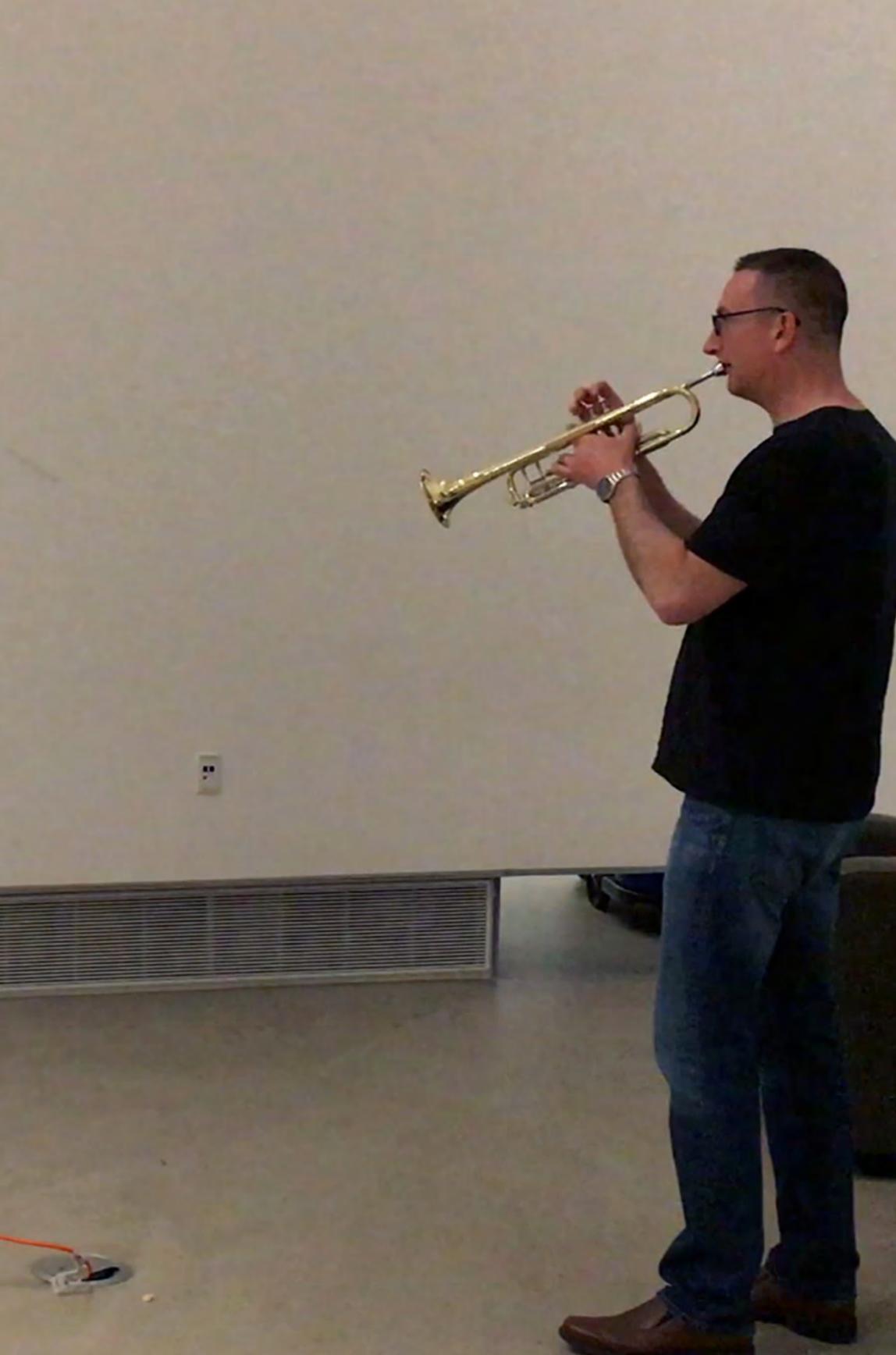


Fig. 7: (Below Top) Screen shot of the *Guitar Hero* videogame.

Fig. 8: (Below Bottom) Interface for version 1.0 of my *Fingering Randomizer for Bb Trumpet* and (Right) interface with coins flipped, corresponding valves pressed and possible note value displayed.



Cage embraced spontaneity in their work but only Cage “appreciated” sounds created outside of his own intention. As my *Fingering Randomizer* project was meant to be in the spirit of Cage, all the performances were recorded in public spaces, with any ambient noise or interference welcomed.

APPROACH

Unlike popular music video games, such as *Guitar Hero*, which use fake instruments and a simplified musical interface, the player of the *Fingering Randomizer* sees traditional music notation and interacts with the system using a real trumpet. I imagined such a system would be best used in public, where the player becomes both a performer and, by proxy, and educator.

The performer begins by launching a custom-designed software interface that presents as its main interface: three coins (pennies) aligned with the three valves of the trumpet viewed in profile. Once the system is started the three pennies spin, with the software set to randomly stop each penny on either heads or tails. If the penny lands on heads, the system then displays the





corresponding valve of the trumpet to the down position. Once the pennies are done spinning and the valves are in position, on the left of the interface the performer is presented with the resultant musical notes that are possibly played in that fingering. On average, an intermediate trumpet player can play up to five notes with the same fingering,⁶ and in some cases the same exact note can be achieved with different fingerings known as alternates.⁷ The alternates are marked with an asterisk while the pure tones are unmarked.

In the upper right hand corner of the interface is a numerical counter (FIG. 8) set in large, white, sans-serif type. After the pennies spin, valves depress, and musical notes appear the counter begins counting down from 10 (by default). When the counter gets to 3 the numbers turn yellow, warning the performer that the system is about to record. When the counter reaches zero the system begins recording in high quality audio for four seconds (by default). In musical terms this would be considered 4 “beats” or a whole note played at 60 beats per minute. In those four seconds the player can choose to play any

6 This is achieved by a player altering her embouchure. The embouchure is the use of facial muscles and the shaping of the lips to the mouthpiece of woodwind instruments or the mouthpiece of the brass instruments. The word is of French origin and is related to the root bouche (fr.), ‘mouth’. (“Embouchure”)

7 These alternate fingerings rarely are in tune, unless there is a deficiency in the player’s fundamentals, the horn or the mouthpiece.

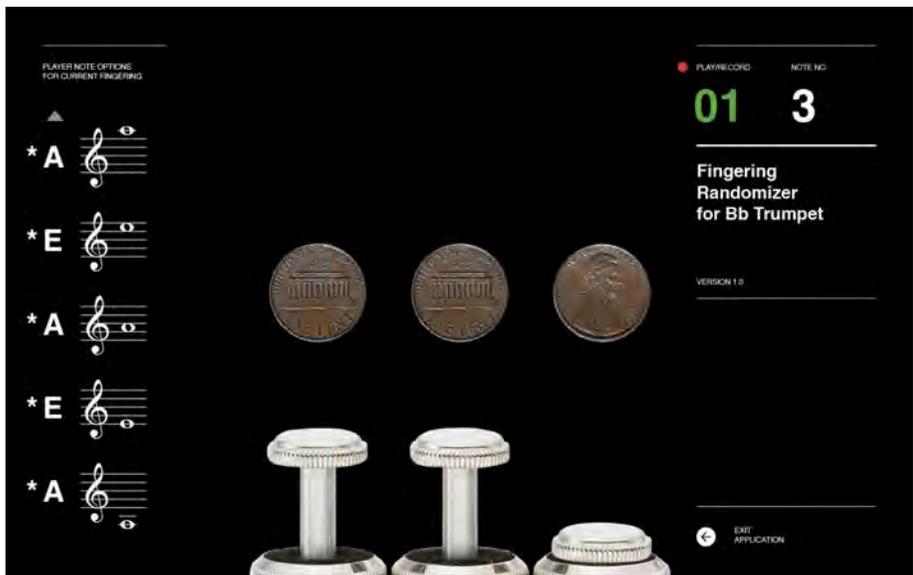


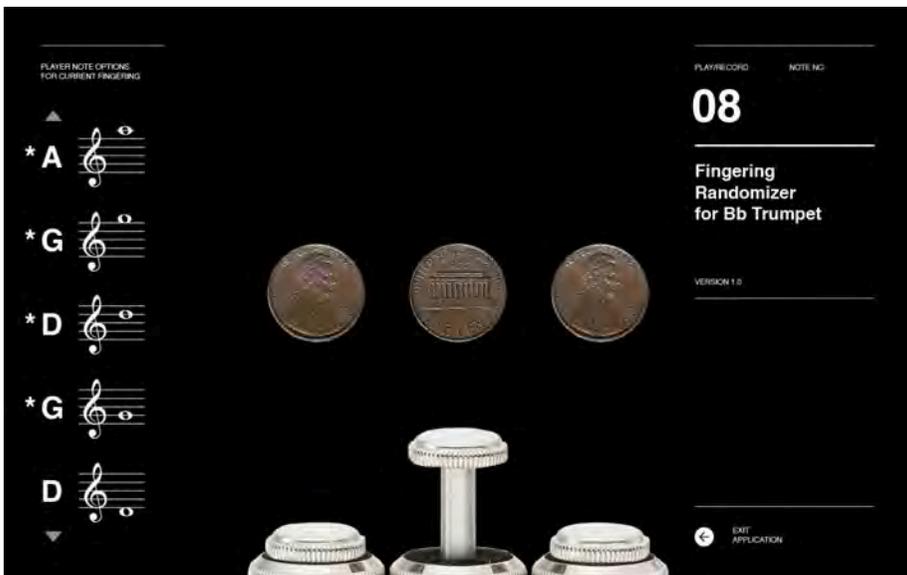
Fig. 9. (Below and Detail Right) Showing note options available while the first and third valves are pressed. Notes with an asterisk next to them signify an “accidental” (a note that can be played more accurately with another fingering).

note within the fingering range displayed, and in my testing I even “split” the the whole note into two different half notes played within the same fingering.

After the system records, the counter is reset and the coins commence their randomized spins once again. This occurs until the performer quits the application. While the software is running it places each timestamped, 4-second audio file in a folder on the computer.

INTERACTION

The software for my *Fingering Randomizer* project was created in my *Elements of Media II* class with DMI Alumnus Alison Kotin and with help from MassArt’s Associate Director of Academic Technology Services, Fred Wolfink. Built in Processing, the software uses several “libraries” that make working with audio and video much easier. One such library is called Minim. Minim is an audio library that uses the JavaSound API to provide an easy-to-use audio library for people developing in the Processing environment (Minim).



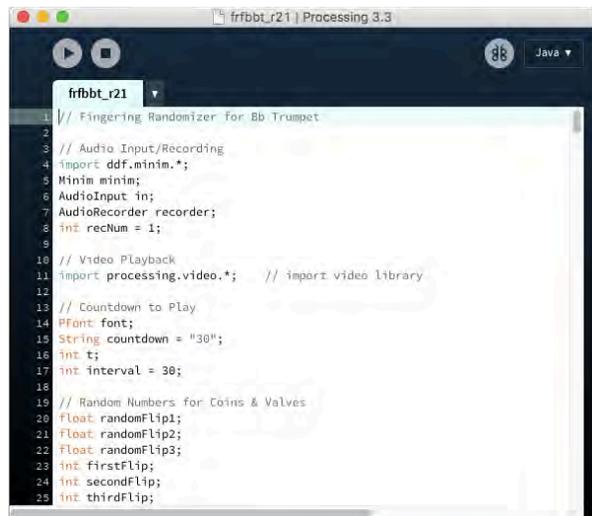
PLAYER NOTE OPTIONS
FOR CURRENT FINGERING



Fig. 10. (Below) Processing sketch using the Minim library.

With my professional background in print design and strategic branding, the idea of coding my own software from scratch seemed both daunting and compellingly exotic. When it came to the coding of my *Fingering Randomizer*, the biggest conceptual milestone came when I started to think of my software as executing commands over time. Once I started to think that way, I could program the software to count down from a number and tell it to do various tasks at specific timepoints. For instance, I could start the coins spinning and subsequently tell them to randomly stop after 10 seconds.

When it came to generating random numbers for my software it was suggested that I meet with MassArt's Hubert Hohn. Hugh was an early pioneer of computer art (as opposed to digital graphics) and had once helped John Cage use computer-generated, random numbers in his work. Hohn warned me that when it comes to generating random numbers a computer can actually be too "precise" to be considered random. This, in fact, was a fear Cage had in working with Hohn's software generated numbers. To address this, Hohn suggested



```

frfbbt_r21 | Processing 3.3
1 // Fingering Randomizer for Bb Trumpet
2
3 // Audio Input/Recording
4 import ddf.minim.*;
5 Minim minim;
6 AudioInput in;
7 AudioRecorder recorder;
8 int recNum = 1;
9
10 // Video Playback
11 import processing.video.*; // import video library
12
13 // Countdown to Play
14 PFont font;
15 String countdown = "30";
16 int t;
17 int interval = 30;
18
19 // Random Numbers for Coins & Valves
20 float randomFlip1;
21 float randomFlip2;
22 float randomFlip3;
23 int firstFlip;
24 int secondFlip;
25 int thirdFlip;

```



that I use simultaneous or multiple number generators to effectively offset this risk. So while it would have been easier to simply code for the eight possible fingerings on a trumpet (telling the computer to pick a number 1-8) I reverted back to my original idea and let the computer randomly pick a one or a zero for each of the three pennies/valves. The results of those three variables then tells the software which notes to display.

Once I got my software working, I experimented with various approaches to recording in my studio. One of the great advancements occurred when I experimented with “layering” consecutively recorded notes. I eventually layered six randomly-assigned, consecutively-played notes to create a six-note chord. I have come to call these hexacords (after the hexagram which is a six stacked horizontal diagram also used to randomly consult the I Ching). I set out to find a unique acoustical venue to record my hexachords and found it in MassArt’s new *Design and Media Center*, designed by Ennead architects. The vastness of the DMC buildings atrium creates a lasting echo with hauntingly beautiful tones. My hexachords received rave reviews in

Fig. 11. (Below) A six note cord or “hexacord” in Apple’s GarageBand audio software.



Fig. 12: (Below) MassArt's new glass-enclosed Design and Media Center.
Photo: Richard Barnes



both my *Design Studio II* and *Elements of Media II* classes. Based on the sound that was produced, Fred Wolfink suggested that I check out the work of Stuart Dempster. Stuart Dempster is a trombonist, didjeridu player, improviser, and composer. Here is an excerpt from a review of *In The Great Abbey Of Clement VI* which he first released in 1979:

The Great Abbey of Clement VI features Dempster performing on trombones, didgeridoos, and plastic sewer pipes. Using the acoustics of the abbey as part of the processing, he creates vast minimalist atmospheres and huge walls of sound. He uses computers and high-tech mics and boards to enhance the process. The sound design is meticulous and the performance is flawless. Dempster's engineering and mixing expertise are important facets of the soundscape. This is a very deep disc with complete individuality. It will appeal to fans of Oliveros, Jeff Greinke, Brian Eno, David Borden, and Robert Scott Thompson. ("In The Great Abbey")

Much like in Dempster's work, the hexachords produced with my *Fingering Randomizer* software felt at once minimalist and atmospheric. I believed the next step would be to explore more of the performative aspects of the software. My hexachord recordings, conducted after-hours in the DMC, seemed to attract the attention of passers-by. Part of this interest, I imagine, was due to the fact that I projected the interface on a large, publicly-facing wall. While I did not set out for this recording session to become a performance, it took on a passive-interest quality, as you might see in a New York subway.



In October of 2016, I exhibited my *Fingering Randomizer* interface as part of a gallery installation at the DMI 15th Anniversary Retrospective Symposium. In MassArt's Doran Gallery alongside with several other exhibiting DMI students I live-performed and recorded a performance as part of the *Prototypical Prototypes* show during the symposium's closing reception. The notes recorded during the session were manually placed over a hip-hop audio track⁸ in real time. The resultant audio track was used as the background music in my video abstract for the project. Overall the performance was a success, but if repeated I would collaborate with a DJ, rather than man the recording station myself. Also, it was suggested that I look into live-performance recording software such as Ableton Live which is described as "software for creating musical ideas" (Live).

Fig. 13: (Below) Stuart Dempster performing in 2015. Photo: Jonathan Vanderweit

⁸ 40° a Risoul, Pt. 2 by DJ Pone. Pone is a disc jockey and French composer whose real name is Thomas Parent. player's fundamentals, the horn or the mouthpiece.



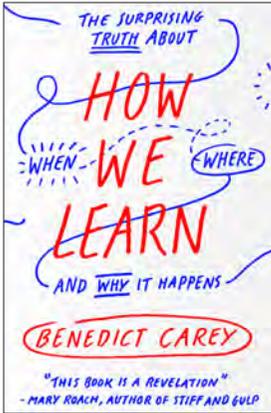


Fig. 14: (Above) *How We Learn* by Benedict Carey. Cover: Zak Tebbal

CONCLUSION

As I gathered feedback on the project it became clear that the educational components of my *Fingering Randomizer* software should not be overlooked. In using the software one gets active training in musical theory, gaining an understanding of notation, sequence, timing, and performance. In *How We Learn* by Benedict Carey there's a chapter entitled, "Learning Without Thinking." In it, Carey describes how grand master chess players can often compete, and win, against computers that can consider more than 200 million possible moves. Carey's analysis of chess players could not be more applicable to my project. In the 1960's, Adriaan de Groot, a psychologist who was also himself a chess master, observed that chess masters could do one thing novices could not: memorize a chess position after seeing the board for less than five seconds. One look, and they could reconstruct the arrangement of the pieces precisely, as if they'd taken a mental snapshot (Carey 177). In my short time using the *Fingering Randomizer* to construct chords, the chords themselves became more pleasing and expressive. In this way I was, as Carey describes "learning without thinking."

Carey then goes on to talk about the work of Dr. Eleanor Gibson, an American psychologist who, along with her husband James, was able to move beyond the typical behaviorist (stimulus-response) understanding of learning:

In 1969, Eleanor Gibson published *Principals of Perceptual Learning and Development*, a book that brought together all her work and established a new branch of psychology: perceptual learning. Perceptual learning, she wrote, "is not a passive absorption, but an active process, the the sense that exploring and



searching for perception itself is active. We do not just see, we look; we do not just hear, we listen. Perceptual learning is self-regulated, in the sense that modification occurs without the necessity of external reinforcement. It is stimulus oriented, with the goal of extracting and reducing the information stimulation. Discovery of distinctive features and structure in the world is fundamental in the achievement of this goal.” (183-184)

Fig. 15; (Below) “Homages to Stuart Dempster,” 2016, Bb Trumpet and New Media Live Performance at the DMI 15th Anniversary Retrospective Symposium. Performed in the Doran Gallery as part of the Prototypical Prototypes show.

In short, Carey claims that Gibson helped us understand that the brain doesn't solely learn to perceive but rather perceives to learn. “It takes the differences it has detected between similar-looking notes or letters or figures, and uses those to help decipher new, previously unseen material. Once you've got middle-C nailed on the treble clef, you use it as a benchmark for nearby notes; when you nail the A an octave higher, you use that to read its neighbors; and so on.” With my *Fingering*



Randomizer this notion of perceiving to learn is activated. Within a few days of using the software I would see the fingering and had the possible notes memorized. This was interesting in that it is the opposite of how I initially learned to play the trumpet (by seeing the note and then needing to memorize the fingering).

In summary, this project started as a simple, open-ended call: to create a musical instrument that reflects the life and works of the American composer, music theorist, writer, and artist John Cage. My solution is not an “instrument” in the traditional sense, but can be viewed as a dynamic instrumental tool that promotes learning, participation and expression. Additionally, in creating my own software I have come to think differently about my role as a designer and educator. In an interview with Michael Rock, Rob Giampietro, reflecting on the role of the computer, once exclaimed, “What had the most expressive potential, far beyond working within the constraints of consumer software or allowing that software to default to preset standards, was for designers to create the software itself. To build the tools. To write instructions” (Rock 61).

One of the hallmarks of Cage’s work was his use of chance. In creating a software interface for trumpet players that is “consulted” via chance, my project makes the process of learning more active, spontaneous and participatory. The user is provided with an opportunity to further learn a musical instrument, and along with it the musical scale, chord composition, note selection, and optionally performance. The project additionally led me to think more about participation as one of the threads I could explore further in my work. As I subsequently developed new DMI projects, I sought not only to create dynamic systems for learning, but also systems that would explicitly bring people together to learn from each other. This led to further research around peer learning, knowledge sharing, and other forms of active learning.

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04

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Case Study 04



THE PERFECT CHARACTER

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A Typographic Film

Character Creation Tool

-

2016



The Perfect Character:
A Typographic Film
Character Creation Tool
–
2016

In my *Design Seminar II* class I was challenged to develop a comprehensive research paper and lecture that traced the transition of an object, service, industry, or field (discipline), from its analog form to its digital form. This well-known DMI research project is often referred to as the “Digital Analogs” paper. In particular, we were asked to ascertain what was gained and lost in this transition, and to imagine what the future holds for both the digital and the analog aspects.

My response, *Typesetting and Page Layout: Technological Shifts and Effects from 1985–2015*, examined the technologies that have driven and changed how we compose individual characters into words and lines of text. This research, along with a *Type Design* class that I was taking concurrently, directly inspired this next project: *The Perfect Character: A Typographic Film Character Creation Tool*. This theoretical prototype was completed in my *Design Studio II* class—the final deliverable for which took the form of a five-minute video abstract describing the project and highlighting its core concepts and features.

The prompt for the project, as presented to us by Professor Jan Kubasiewicz, was to “remake” *The Perfect Human* (1967), a 13-minute short film by Jørgen Leth. Kubasiewicz added the following constraints: 1) Remake *The Perfect Human* as a participatory narrative 2) Design and prototype our version as an interactive experience 3) Upgrade the content to fit the world of 2016) Explore complex relationships of the story and the storytelling.

After watching the original film several times, I began to discern key attributes that I could appropriate into my project. The original film depicts a man and a woman interacting within a seamless white background. There’s little in the way of a narrative, sequence, or story, but rather the actors are portrayed as subjects, whose actions are described and questioned in detail

Fig. 1: (Right) Opening sequence from “*The Perfect Human*” by Jørgen Leth, 1967.

A man in a dark suit and white shirt stands against a dark background. He has a bright, glowing aura around his head and shoulders, suggesting a powerful or idealized figure. The text is overlaid on the lower part of his torso.

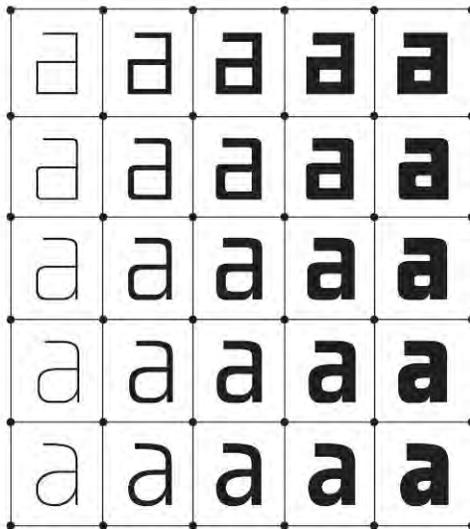
**DET
PERFEKTE
MENNESKE**

by an anonymous narrator. The narrator often repeats his lines in a monotonous, and overly-logical account of what the viewer is observing. In the first few lines the narrator states, “We will see the perfect human functioning,” and then he dryly asks “What kind of thing is it?” Soft background music, comprised of slow-modern violin and oboe tones, adds an ethereal quality to the piece. The music, the sparse white background, and dry narration were all key elements that made their way into my version, albeit with contemporary twists upon each.

While doing research for my “Digital Analogs” paper, I stumbled across a now-defunct format for font-files called *Multiple Master*. In the mid-to-late 1980s, Adobe’s PostScript font technology took hold, leading to “an international boom in PostScript type design and development” (Pffiffer 63). Along with this high-quality font format, the first readily available font design software appeared for personal computers. One of the most prominent was Fontographer, which enabled independent designers¹ and small studios to affordably design and release high quality typefaces in PostScript format. “Not

1 Zuzana Licko of Emigre Fonts, typifies this new typeface designer. Her first fonts were designed for low-resolution technology, then were converted to companion high-resolution versions as the technology progressed (Meggs, 471).

Fig. 2: (Right) *AF Generation Typeface*, a font family designed by Dirk Wachowiak and generated with the first with the *Multiple Master* system that provided for the transitions mathematically.



since the age of metal type had there been such a prolific period of type development (Piffner 63).” In 1992, while continuing to look for ways to further advance PostScript technology, Adobe developed an innovative font format dubbed the aforementioned Multiple Master.

Multiple Masters gave users more control over the appearance of their typefaces and revived such honored typographic techniques such as optical scaling. The fonts were awkward to create and relied heavily on host applications, however. “Multiple Master never had good support in applications,” admits David Lemon, who helped write the specifications for the format. “You had to manually adjust it. It looked too scary to people.” (Piffner 65)

The Multiple Master font software that Lemon refers to often took the form of a series of “sliders” that let the user adjust various parameters of the typeface. The sliders could, for example, allow a designer to precisely choose a typeface weight somewhere between bold and demi. In a typeface with weights ranging from heavy to thin, this allowed for nearly infinite weights in-between. Instead of limiting a font to eight preset weights, for instance, the computer would examine the eight weights drawn by the type designer and then interpolate² what the typeface would look like between these weights. This idea of using sliders as inputs for altering typographic form became the basis for how users would engage with *The Perfect Character*.

In developing my concept for the *The Perfect Character*, I wondered if I could further examine personality metaphors between humans and typography. As is the case with many



2 When producing large type families with multiple stroke weights, a certain degree of automation is not only agreeable (as a way to avoid tedious work), it may even be necessary (for making it feasible at all to generate such a huge number of fonts). Interpolation is a common method for generating intermediate weights between two basic values. (de Groot)

Fig. 3: (Above) Zuzana Licko (born Zuzana Ličko, 1961) is a Slovak-born American type designer known for co-founding the graphic design magazine Emigre and for creating early digital typefaces.

3 See “Typecast: the voice of typography” the 2009 thesis topic of Kara S. Fellows at University of Iowa. (Fellows)

4 Type casting is a technique for casting the individual letters known as sorts used in hot metal typesetting by pouring molten metal into brass moulds called matrices. It was the invention of efficient metal type casting that was Gutenberg’s most important invention. (“Type casting (typography)”)

graphic designers, when selecting typography I often think about the aesthetics of the typeface in terms of personality and voice.³ As the project brief suggested that our remakes should be “participatory,” I considered a concept where users could quickly design their own typographic character. This single glyph would then be dynamically inserted, or “cast,” in a motion graphics video created in the style of Leth’s *The Perfect Human*. At first it seemed far-fetched, but the more I considered it in relation to my Digital Analogs research, the more appealing the concept became. In a play on words, the notion of physically casting type, or “type casting⁴” has been around since the time of Gutenberg. Moreover, I was inspired by the idea of providing a user with an educational experience around type design. The user designs a typographic character, and then, as a sort of “reward,” has it star in a simple animated film.

APPROACH

The next phase of my project development involved writing a script for the short video in which the user’s character would appear. What would the character do? And what would my narrator say? I obtained a transcript of the original film and proceeded to mark it up with my own notes. As much as possible, I tried to remain light-handed in my adaption of the original script. To help visualize the alterations I was making, I designed a document that let me view the original text and my edited version side-by-side.

In the original script there are a series of narrated lines that refer to body parts of the actors. “And here, a foot,” the narrator for exclaims. In *The Perfect Character* I used nearly identical narration, (FIG. 4) using the above example by calling out and cropping into the “foot” of the serified “H.” This provides for light-hearted educational lesson around typographic anatomy.

Fig. 4: (Below) Script for The Perfect Human (Left) and (Right) my modified script for The Perfect Character.

"The Perfect Human" (1967, Jørgen Leth, 13 min)

00:00 Film Starts

01:34 Narrator: Here is the human, here is the human. Here is the perfect human.

01:41 Narrator: We will see the perfect human functioning.

01:45 Narrator: We will see the perfect human functioning.

01:49 Narrator: How does such a number function?

01:54 Narrator: What kind of thing is it?

01:56 Narrator: We will look into that. We will investigate that.

02:01 Narrator: Now we will see how the perfect human looks, and what it can do.

02:06 Narrator: This is an ear.

02:09 Narrator: And here is a pair of knees.

02:14 Narrator: And here, a foot.

02:15 Narrator: Another ear.

02:19 Narrator: Here is a eye.

02:21 Narrator: Look at this human's eye.

02:29 Narrator: Then a mouth.

02:31 Narrator: A mouth, and another mouth.

02:38 Narrator: Look, the perfect human moving in a room.

02:42 Narrator: The perfect human can move in a room.

02:47 Narrator: The room is boundless, and radiant with light.

02:51 Narrator: It is an empty room.

02:53 Narrator: Here are no boundaries, here is nothing.

03:11 Narrator: Walking. Running. Jumping. Falling.

03:18 Narrator: Look, now he falls.

03:28 Narrator: How does he fall?

03:30 Narrator: This is how he falls.

03:36 Narrator: Look, how she lies down.

03:38 Narrator: How does she lie down?

04:25 Narrator: Yes, there he is. Who is he? What can he do?

04:33 Narrator: What does he want?

04:35 Narrator: Why does he move like that?

04:39 Narrator: How does he move like that?

"The Perfect Character" (2016, Dan Vlahos, ~5 min)

Film Starts

Narrator: Here is the character, here is the character. Here is the perfect character.

Narrator: We will see the perfect character functioning.

Narrator: We will see the perfect character functioning.

Narrator: How does such a letter function?

Narrator: What kind of thing is it?

Narrator: We will look into that. We will investigate that.

Narrator: Now we will see how the perfect character looks, and what it can do.

Narrator: This is an ear.

Narrator: And here is a pair of knees.

Narrator: And here, a foot.

Narrator: Another ear.

~~Narrator: Here is a eye.~~

~~Narrator: Look at this human's foot.~~

~~Narrator: Then a mouth.~~

~~Narrator: A mouth, and another mouth.~~

Narrator: Look, the perfect character moving on a screen.

Narrator: The perfect character can move on a screen.

Narrator: The screen is boundless, and radiant with light.

Narrator: It is an empty screen.

Narrator: Here are no boundaries, here is nothing.

Narrator: Walking. Running. Jumping. Falling.

Narrator: Look, now it falls.

Narrator: How does it fall?

Narrator: This is how it falls.

~~Narrator: Look, how she lies down.~~

~~Narrator: How does she lie down?~~

Narrator: Yes, there it is. What is it? What can it do?

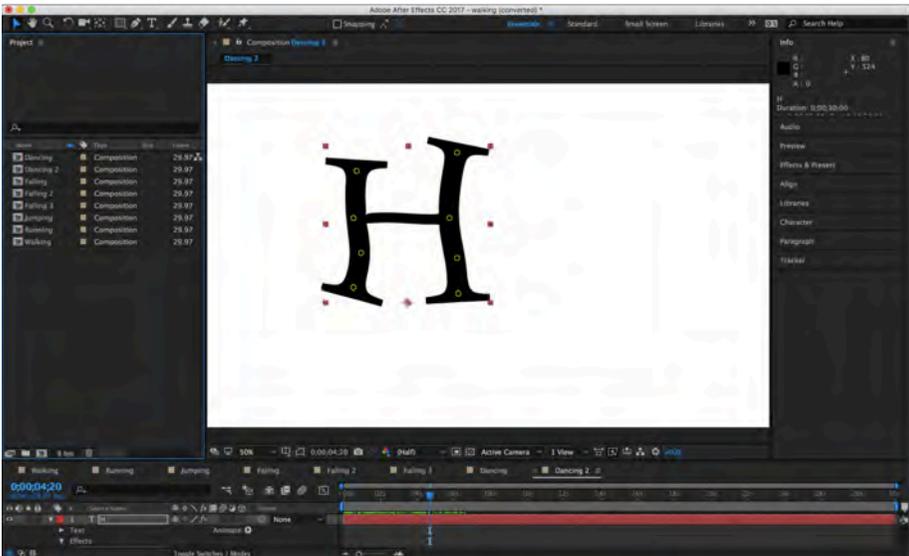
Narrator: What does it want?

Narrator: Why does it move like that?

Narrator: How does it move like that?

In considering the motion of the typographic characters I also looked to the original film, taking note of how the actors moved and how they were composed within the frame. Using Adobe After Effects, I experimented with various ways to have the typographic characters mimic the movements of the original characters in the film. For advice and support in this endeavor, I turned to Philip Gedarovich, a DMI alumnus who focuses on motion graphics. Phil suggested that I take advantage of the “puppet tool” in After Effects. Using the “puppet tool,” (FIG. 5) I placed multiple “pins” into my typographic characters (I used an “H” in my prototype). In After Effects the “pins” act like anchors that you can use to pull and move shapes between frames. Once I placed the pins on the my “H” I could specify how it should move and when. My type would then pull and twist along the screen. This technique gave me intricate control over my animations, and soon I had my “H” running, jumping and dancing (as occurs with the actors in the original film). After Effects became the tool that allowed me to simulate the dynamic “output” of my system for the video abstract.

Fig. 5: (Below) Using the puppet tool to in Adobe AfterEffects.

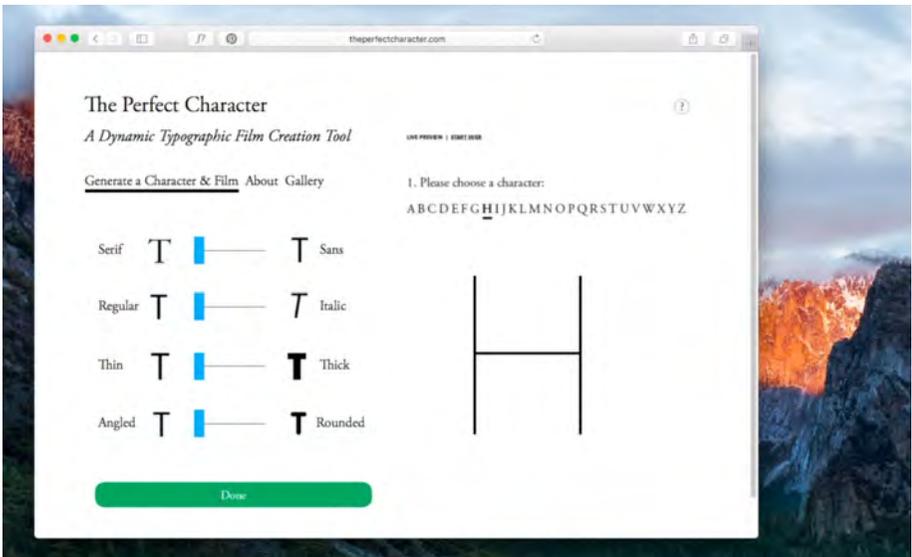


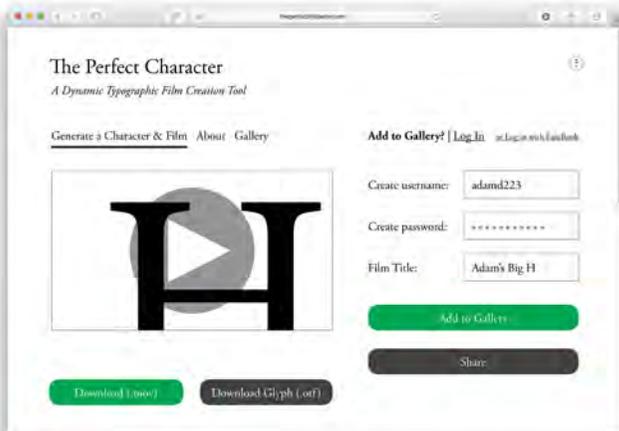
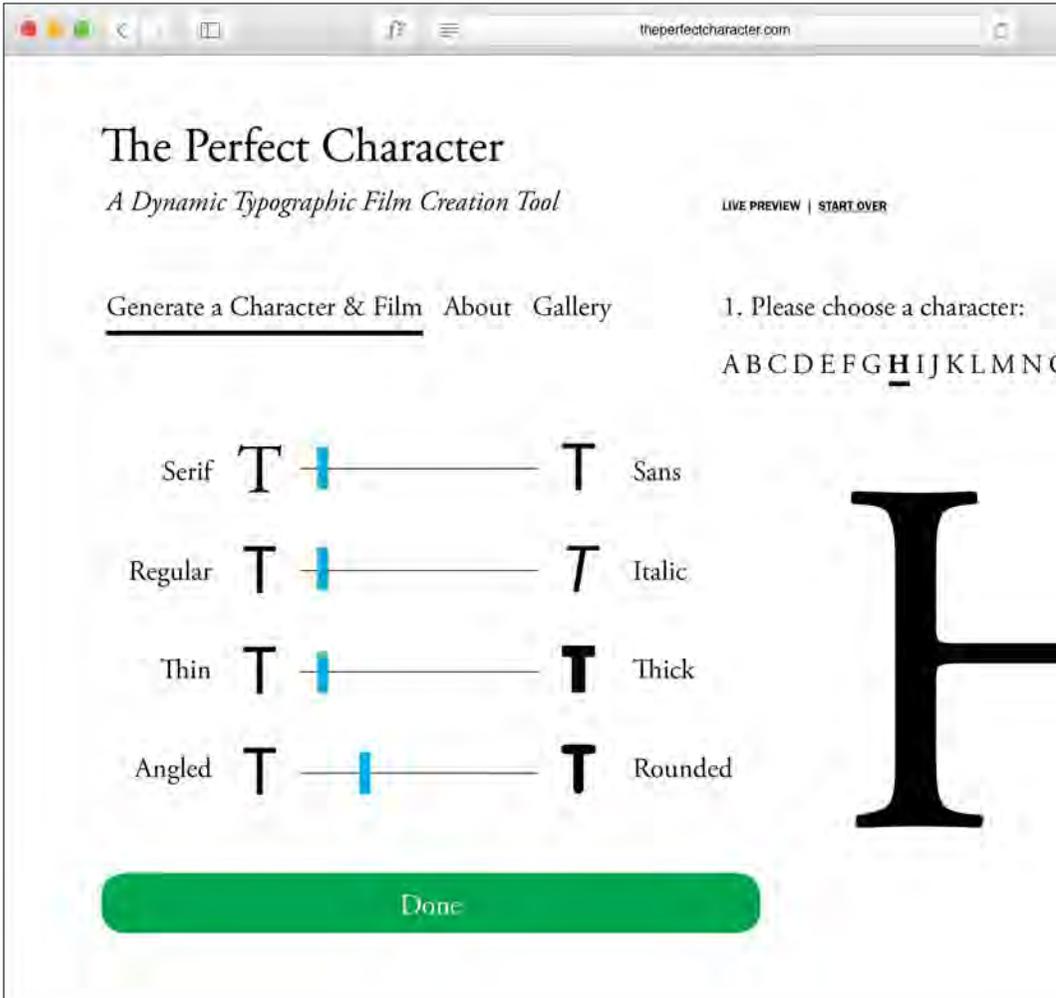


Inspired by the original Multiple Master font software, I next sought to mock up an interface that would allow my users to customize their own characters. As part of this process, I needed to choose a number of design parameters to include as options. After testing various controls and adjustments, I decided upon four sliders: one that transitions between a serif and sans serif; one that transitions between regular and italic; one that changes the thickness of the strokes; and lastly a slider that changes the overall type form from angled to rounded.

I reached out to my younger brother, Jeff Vlahos, for assistance in developing a web-based graphical user interface (FIG. 6). Jeff, who is also a MassArt graphic design alumnus, works as a front-end web designer. I asked Jeff if he would help me prototype the slider-based interface and guide me in creating a functioning simulation of the software. I would capture these interface assets in my video abstract. Together, we designed a landing page with the requisite four sliders. We then programmed one of the sliders to adjust the weight of my “H” from thick to thin. Finally, we registered the web domain

Fig. 6: (Below) Front-end design mock up of the web interface.





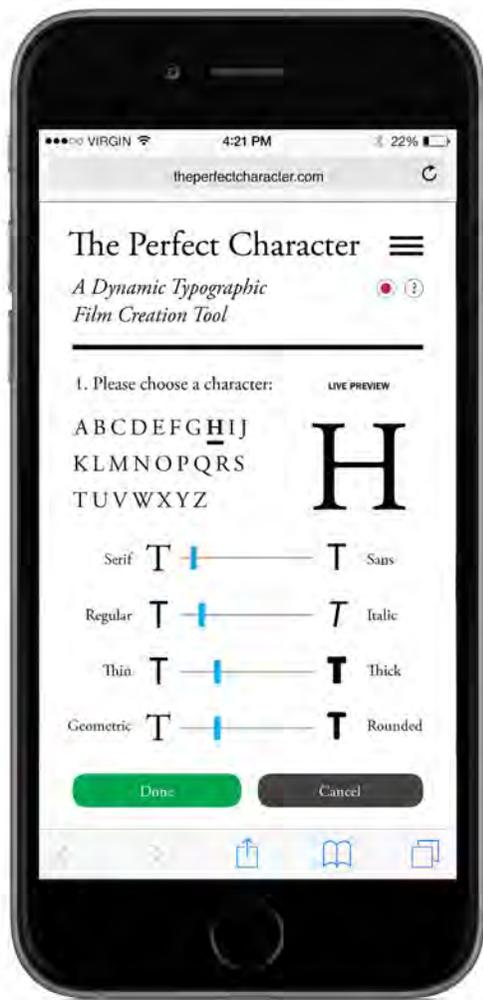


Fig. 7: (Previous Page) Interface mockups for The Perfect Character web application and mobile app.

Fig. 8: (Below) My brother Bill Vlahos (DJ Wild Bill) working on the soundtrack in his Salem, NH based production studio.

Fig. 9: (Right) My own Multiple Master like exploration of the “H” that stars in my video abstract.

thepfectcharacter.com, where we uploaded the finished prototype, and screen-recorded the content needed to demonstrate the user “input” of my system.

Next, I wanted to find a way to reinterpret the very 1960s background music (as the project called for “2016” interpretation). To work on the audio portion I traveled to the music production studio of Bill Vlahos, my older brother, in Salem, New Hampshire. Bill is best known locally as *DJ Wild Bill*. As a dance music DJ and remix artist, Bill’s music can be heard almost every Saturday night on one of Boston’s largest FM radio stations, Kiss 108.

For this project, I told Bill that I wanted to update the 1967 soundtrack to 2016, and perhaps give it a “hip-hop vibe.” During our remix production session we spent the first hour or two sampling instrumental sounds from the original soundtrack. Once we had a selection of a dozen or so samples, we recomposed them into a sequence that still “felt” like the original but had a more catchy musical phrase, or what Bill called “a hook.” Once we had our new instrumental track,





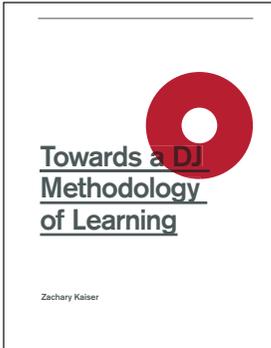
we layered on more contemporary sound components one at a time. First, we added some deep bass, then an upbeat hip-hop drum sample, then we hit the keyboard and added some synths. Lastly, we layered in some turntable scratches. I presented my revised track in class the following week to great acclaim.

In addition to the remixed music I created a new narrated voiceover using my modified script. To match the hip-hop style of the music, I digitally distorted my voice, making it sound intentionally “glitchy.” In some cases my voiceovers are even replayed in reverse.

With my remixed soundtrack, reinterpreted voice-over narration, and my After Effects videos in hand, I began the process of stitching together the final video. At the start of my video abstract, and because my version was so conceptually tied to the original, I deemed it essential to show a short clip of Leth’s film from 1967. Next, after a short introduction, the viewer was shown my 2016 version featuring the animated “H.” Lastly, I walked the viewer through the process of how a unique character is made, using the website prototype to help tell the story visually. I then screened a rough cut of my video in my *Design Studio II* class.

The critique I received was more akin to what you might see at an animation studio such as Pixar. The bulk of the feedback was concerned with the movement of my character. Did its “arms” reach up high enough to exaggerate the fact that it was jumping? Should it jump off the screen or remain in the frame? Did the movement of the character “feel” true to that of the original actor? Did it sync up well with the new music? The bulk of these aesthetic concerns felt more rooted in film than in traditional graphic design. In my time within DMI I have come to embrace this “antidisciplinarity.” Indeed, this is a hallmark of the DMI program itself, and is also a way people





describe the nearby MIT Media Lab (Ito). In their essay *Type on Wheels*, Professor Kubasiewicz and Professor Brian Lucid reflect on the changing requirements and vocabulary of motion graphics design.

In the past few decades the communication design profession and its supporting educational programs have been required to shift their focus - and vocabulary - to remain relevant and appropriate in the context of new technologies. Fixed becomes fluid, passive becomes responsive, and what was once composed must now be choreographed. In the same spirit of these Platonic dichotomies we should recognize the necessary shift from Kinetic Typography to Dynamic Media Communication. (Kubasiewicz 147)

When it all came together, *The Perfect Character* felt appropriately more akin to a 2016 hip-hop video than a 1960s art film. My classmates encouraged me to not underestimate the informal educational components of creating the character itself. This perspective was reinforced when Professor Kubasiewicz encouraged me to consult the 2013 thesis of Zachary Kaiser. In *Towards a DJ Methodology of Learning*, (Fig. 10) Kaiser makes the case that, “the most powerful learning experiences are, indeed, creative, in that the learner engages in an act of creation. While playing a DJ set is one example of such a learning experience, writing an engaging and thoughtful research paper is another” (Kaiser).

In his thesis, Kaiser refers to the work of Dr. Mitchel Resnick at MIT. Dr. Resnick heads up the Lifelong Kindergar-

ten research group where he and his students experiment and develop tools and ideas around creative learning. Kaiser refers to Resnick's diagram of creative learning as a "spiral"-like process that includes five steps that repeat indefinitely. (FIG. 11) These steps are: *imagine, create, play, share* and *reflect*. *The Perfect Character* leverages this learning process and engages users just enough that they might consider doing more something more advanced. That "more" in this case might be type design, motion graphics, or even character design.

INTERACTION

For the final version of my project I conceptualized a web application hosted on theperfectcharacter.com. Visitors to the site are guided through the process of creating a custom typographic character, or "glyph," first by selecting an upper-case character (A-Z) and then using the four sliders to edit the type form. The characters they create, and the actions used to create them, are recorded and used as inputs for a dynamically generated video. The narration, music, and character position

Fig. 10: (Left) Zachary Kaiser's 2013 DMI Thesis, "Towards a DJ Methodology of Learning."

Fig. 11: (Below) Dr. Mitchel Resnick's diagram of creative learning.

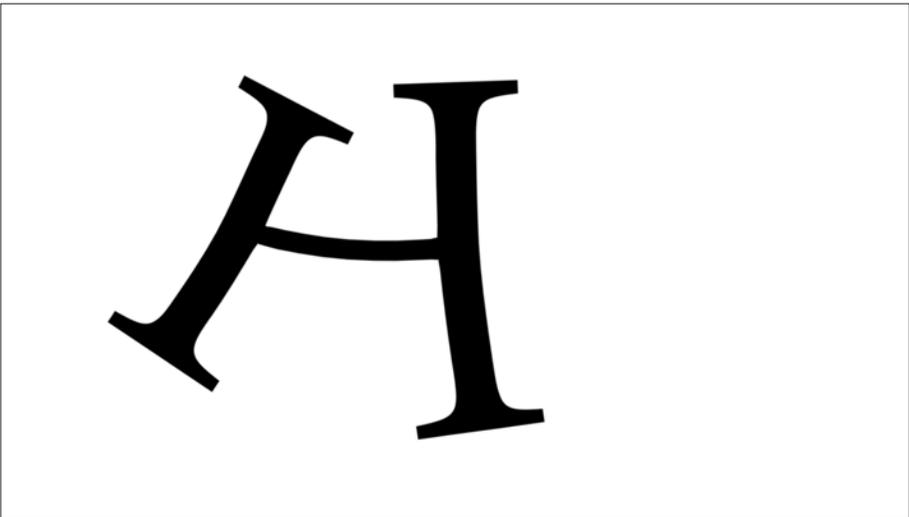


Fig. 12: (Below) Dancing sequence from original film and dancing "H" sequence as seen in my video abstract.



remain the same for each user's video, but the character itself, and how it morphs throughout the film, depends on the actions of the user during the design process.

Once users are finished designing the character, they click "done" and a video is dynamically generated. The video can then be viewed, downloaded and shared on social media. Users can also export and save an OpenType font file of the character they designed. Once the file is installed on their system they can use it in almost any software program. In theory, advanced users could return to the site and create and export numerous characters. They could then group them together to make a typeface using a type design program such as RoboFont. Once users are finished with a character, they can also add their video to a gallery of typographic films created on *The Perfect Character* website. The gallery tracks how many times a video is watched and allows users to rate other people's videos.



CONCLUSION

Through their interactions with *The Perfect Character*, participants actively learn more about typography and its morphology. Using a simple, slider-based interface they also learn about the basic anatomy of type. The project anticipates the future role of automation in graphic design, and posits a future where communication designers will design tools and systems for others to design their own stories, aesthetics, media and communication.

Dynamically generated video is becoming increasingly more common. Facebook, Google, and others are already using user-generated content to dynamically generate time-based narratives. In 2010, Google Creative Lab and Chris Milk collaborated to create *The Wilderness Downtown*, a project used to promote the Google Chrome web browser. The Wilderness Downtown is “an interactive HTML5 short created with data and images related to your own childhood. Set to Arcade Fire’s song *We Used to Wait*, the experience takes place through choreographed browser windows and utilizes many modern

Fig. 13: (Below) “*The Wilderness Downtown*,” an interactive film by Chris Milk, 2010

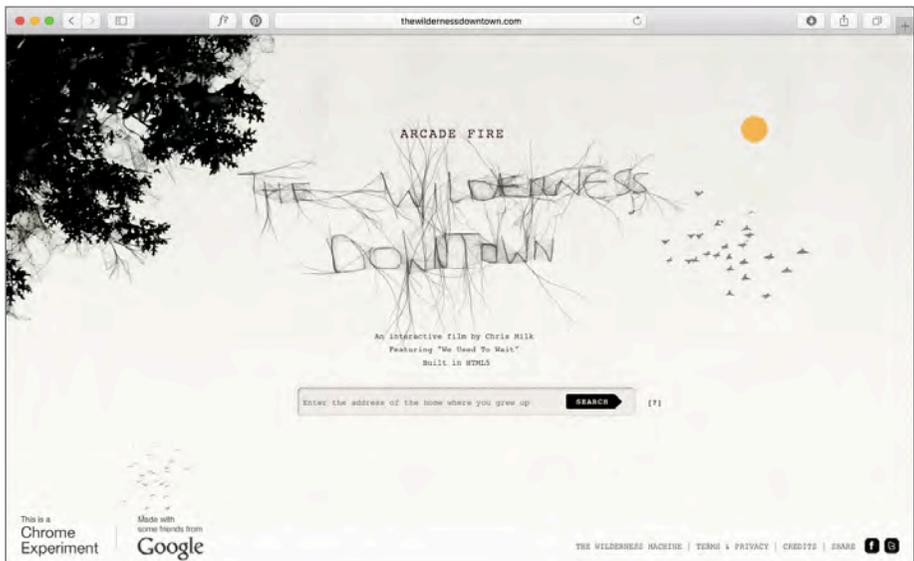


Fig. 14: (Below) *Metaflop* typeface creation tool by Swiss designers Marco Müller.

browser features” (“The Wilderness Downtown”).

My project also builds upon the typographic and learning interests of prior DMI students, most notably Lauren Bessen (2006). Below is a portion of her thesis abstract from *Visualizing Visuality: Interactive Tools for Visual Literacy*:

To become literate, and articulate in the domain of images, to be competent in understanding the nature and structure of visual messages, is to be keenly aware of one’s vision. It also means mastering a common set of terms attached to what one sees and creates. Attaining this comprehensive understanding of visual form is the task of a design student. Drawing on analog pedagogical precedents, this thesis sets out to examine the ways in which dynamic media can be used as a unique aid to vision, a means to impart greater insight into the designer’s vocabulary. (Bessen iii)





With her two interactive tools, *RandStudio* and *LetterForm*, Bessen investigates how using motion and the principles of interactivity to visualize information can complement traditional approaches to teaching visual literacy. Much like *The Perfect Character*, Bessen's *LetterForm* project is an interactive tool that illustrates typographic terminology and allows students to explore the elemental formal properties of type.

As for my original inspiration, the *Multiple Master* fonts, I am certainly not alone in wanting to re-explore these ideas; in fact Adobe recently announced that, "variable fonts are coming"⁵ while interactive websites such as *Metaflop* and *Prototypo* promise to allow users to design their own typefaces in just a few clicks. In the case of *Metaflop* the user interface is largely governed by sliders. In 2015, FastCompany described the site in these terms:

Created by Swiss designers Marco Müller and Alexis Reigel, *Metaflop* isn't just an easy online tool for creating simple typefaces, it's also a great tutorial on a lot of the terminology of type design. If you've ever read about typeface terms like ascenders, cap heights, overshoot, descenders, and contrasts, there's no better way to figure out what these terms mean than by using a slider to change their variables and see how it changes a typeface in real time. (Brownlee)

Having studied type design⁶ I know first-hand that the learning curve can feel unnecessarily steep when the creative process begins with staring at an empty page (in the type design software, or even in a sketch book). With tools such as *The*

- 5 With OpenType Variable Fonts, type designers will be able to design and sell a font that flexes for designers and readers in the same ways that the type designers intended. With variations possible across 64,000 axes, the options are endless. ("Variable Fonts are Coming")
- 6 With the Brooklyn-based MassArt alumnus Nick Sherman.

Perfect Character, users can engage more quickly and directly with type forms by adjusting just a few options and parameters. In summary *The Perfect Character*, like many of my other DMI projects, encourages participation, creativity and active learning. Designing it required a range of skills and collaborations, from music editing to animation, interface design to script writing. The project set into a motion a self-perceived change in personal identity, from a graphic designer to perhaps something a bit broader.

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05

-

Case Study 05

-

Educational Software System

Component 1 of 3



CRITIQUEMATE

-

A System for Exploring Critique
Methods and Managing Feedback

-

2016



The Perfect Character:
A Typographic Film
Character Creation Tool
-
2016

Thesis Project I is the first of two classes designed to provide a supportive context for the development of the “project” component of the DMI thesis. The goal of the MassArt MFA thesis in design is to identify, research, and solve a communication problem using dynamic media in order to make a meaningful contribution to the design discipline. Ideally the thesis advances a new point of view, which is further developed through contextual research. The “thesis” consists of two inseparable components - the “thesis project(s)” and the—here presented—“thesis document.”

At the start of the 2016 fall semester, my *Thesis Project I* advisor Professor Jan Kubasiewicz asked me to consider two questions without censoring myself. The first question was, “What does your work bring into focus?” and the second was, “What does your work not bring into focus?” To this end, Professor Kubasiewicz encouraged me to develop a freeform list of words used to describe details of my creative process, interests, and work. He then directed me to look for patterns, connections, and hierarchies in the words, and to “map,” or diagram, my thought process. In one exercise, I reassembled words from the original lists to create a series of “knowingly provocative questions.” The majority of these questions centered around graphic design (or communication design) education, and in particular the constantly shifting identity of the graphic design profession itself. I began to wonder how design educators have responded, and are continuing to respond, to these increasingly fast-paced shifts. In support of this line of inquiry I was encouraged to attend the 2016 AIGA Design Educators’ conference held at Bowling Green State University. At the conference, I participated in a range of workshops, lectures, and discussions centered around graphic design pedagogy and practice. The conference opened my eyes to some of the more

Fig. 1: (Right) Group critique in MassArt’s Undergraduate Graphic Design program. Photo: Courtesy of MassArt



TG

1 PechaKucha is a presentation style in which 20 slides are shown for 20 seconds each (6 minutes and 40 seconds in total).

common topics and concerns facing design educators today.

In particular, there were two sessions that left a lasting impression and directly led to the first of my three interrelated thesis projects: *Critiquemate*. The first of these sessions was a presentation by Tyler Galloway, Associate Professor of Graphic Design at The University of Kansas. In his PechaKucha¹ style presentation entitled “Ten Methods of Critique,” (FIG. 2) Galloway dove directly into ten different critique processes. In practical terms, Galloway addressed various priorities in critique situations, such as economy of time, equity of time, participation, criteria-driven critiques, and more. After introducing each method, Galloway offered its strengths and weaknesses to facilitate easy selection based on project or classroom needs. As an example, Galloway presented a critique method he labeled “the imposter” in which he assigns a student to present another classmate’s work as if it were his or her own. According to Galloway, “They then have to think quickly by interpreting their classmate’s intentions on the fly. This reveals the audience’s take on the work, rather than what the student had hoped to communicate.” As a newer design educator I was struck by the variety of the critique approaches presented, having personally employed only one or two different types of critique methods in my own classes.

The second session that inspired *Critiquemate* was entitled “Technology in the Classroom: Improving Critique through Online Tools.” This presentation was given by Anne Berry, a professor at the University of Notre Dame, and by Tiffany Roman, a doctoral candidate in Instructional Systems Technology at Indiana University. Berry and Roman were quick to point out that, regardless of class size, time remains a significant hurdle for instructors and students involved in peer review. As their session description noted, “Critiques can last

Fig. 2: (Right) Tyler Galloway’s presentation “Ten Methods of Critique” from the 2016 AIGA Design Educators’ conference.

1 the authority figure

[traditional professor-led critique]



address issues as i see fit
time-efficient
the criticism is perfect :)



positions the professor as the
holder of knowledge of good and evil

2 time for timer

[timed presentations, timed feedback]



egalitarian use of time
teaches students to be
succinct in presenting work



puts undue emphasis on timing,
particularly for presentations

3 the writer

[simultaneous written critique, often timed]



super fast – everyone critiques
at once
students have a written record
of feedback



a pain to read if i count critique
participation toward a grade
student's comments may go
uncorrected

4 the imposter

[present a classmate's work as your own]



students have to think on their feet
first-glance interpretation of one's
work
the work speaks for itself



analysis may be shallow
details may be missed
author's intentions may go unspoken

5 the sticky note vote

[criteria-based sticky notes on projects]



focused first impressions
visually rewards strong work
fast



may be a popularity contest
herd mentality for voting

6 mom jeans

[present as if you're explaining your work to your mom]



focuses on clear language
forces students to think about
average audience members
distills work down to its essence



may miss designery nuances

7 crit crit

[criteria-based presentation and comments]



focuses students' attention on
specific design issues



may not cover all basic aspects of
the design problem/solution

8 the kriss kross

[critique first, then present the work]



reveals multiple interpretations
of the work
author can clarify after comments



may put the author on the defensive

9½ the multi-chain

[presenting and critiquing in a linear order]



more opinions about the work



10 the selfie

[critiquing one's own work]



forces student to critically evaluate
their own work



favorable bias may impede
meaningful criticism

2 Metacognition is, put simply, thinking about one's thinking. More precisely, it refers to the processes used to plan, monitor, and assess one's understanding and performance. Metacognition includes a critical awareness of a) one's thinking and learning and b) oneself as a thinker and learner (Chick).

3 Critical Design takes a critical theory based approach to design. This kind of design uses design fiction and speculative design proposals to challenge assumptions and conceptions about the role of design in everyday life. Critical design was popularized by Anthony Dunne and Fiona Raby through their firm, Dunne & Raby ("Critical Design").

for hours resulting in mental fatigue and disengagement when one is not speaking or having his or her work critiqued." Berry and Roman went on to describe a research project called *Critique*, a pilot-project to deploy and analyze a free, cloud-based tool used for online critique. The initial phase took place at three large private and public universities during the fall 2015 term. According to Berry and Roman, student and instructor surveys revealed positive perceptions of the Critique tool, claiming that it, "saved time, resulted in higher quality feedback, better quality projects, and a written record of feedback for reference" (Berry and Roman 17). Moreover, Berry and Roman's project builds upon recent research that validates the use of online tools to facilitate both higher quality peer feedback, and higher quality work (Geilen and De Wever). Further, it has been shown that online tools of this type can promote self-reflection and metacognition² (Ozogul et al.).

Critiquemate conceptually combines the ideas presented in these two sessions: a focus on varying critique methods and on digital critique tools. With this in mind I conceptualized the goal of designing user experiences and software interfaces for an integrated web and mobile application using a critical design³ based inquiry. My final deliverable took the form of a five-minute video abstract that reveals the interfaces, interactions, and use-cases proposed for *Critiquemate*.

APPROACH

Conceptualizing and designing *Critiquemate* while teaching full-time proved to be highly beneficial. Much of my research took the form of primary interviews and short surveys with students, (FIG. 3) colleagues, and fellow graduate students. In a 15-question, anonymous survey handed out to students, one of my more directed questions was, "What tools or information

Fig. 3: (Below) Completed student questionnaire in preparation for designing Critiquemate.

Critiquemate Interview Questions

For Students

1. When are critiques most helpful?
in the beginning stages of drafting a project.
2. When are critiques not helpful?
in the final stages of a project.
3. Can you list 3 different formats of critique that you've experienced?
1. Large group (whole class) 2. Small group 3. 1 on 1 (with professor)
4. How do you keep track of time during a critique?
(Sometimes) keep a timer going
5. How do you best prepare for a critique?
Have all your work ready to display.
6. Should critiques be more critical or more constructive?
Definitely a balance. Too much criticism might frustrate the artist without also being helpful.
7. What resources are available to those who want better critiques?
Meet with other professors for outside feedback.
8. How do you encourage honesty in a critique?
9. How do you build trust among critique participants?
Point out specific positive aspects AND what needs improving.
10. What amount of time is best for a critique?
10 min per person
11. Who should talk more in a critique, the instructor or participants?
Participants
12. How does the person being critiqued typically record the feedback they received?
on a notepad, or directly on work.
13. When do critiques go badly?
Vague criticism, no helpful tips to fix problem
14. Can you think of a critique success story?
15. What tools or information would make the critique process better or more effective?
For large groups definitely keep a timer going. Maybe only have a certain few comment.

Fig. 4: (Below) User persona based on MassArt Assistant Professor Martha Rettig.

would make the critique process better or more effective?” To this question, and as testament to the relevancy of this project, one student simply replied, “Submit opinion online.” At first I viewed responses such as this to be humorous or perhaps naive, but as I unpacked them through further student interviews, I began to take these ideas more seriously. In many cases, I audio-recorded the interviews, and then later transcribed them into text using a tool called *Trint* (trint.com). Trint creates and maintains a link between the original audio to the transcribed text, highlighting the corresponding text as the recording is played. Interestingly, and perhaps based on my own multimodal analysis of the responses, I decided to include similar audio transcription of classroom feedback into text as a core feature in *Critiquemate*.

When I began to develop user personas for my video abstract, I based them (with permission) on actual colleagues and students (typically user personas are fictional). The video abstract unfolds by telling the story of Martha Rettig, an Assistant Professor in the Graphic Design Department at





MassArt. In our departmental meetings I noted that Martha would frequently ask about different ways to approach classroom critiques. Usually, a more senior faculty member would then chime in and provide some useful suggestions based on class size and project type. In my video abstract, Martha uses *Critiquemate* to seek out alternative methods of critique based on a set of criteria she has chosen for her specific class and project. One of *Critiquemate*'s two main functions is to serve as a database for educator-contributed critique methods. Thus, after searching *Critiquemate*, Martha is presented with relevant critique method suggestions from participating design educators around the world.

The second main function built into *Critiquemate* is more student-focused. Specifically, *Critiquemate* simplifies the process of collecting and managing feedback. My student persona was based on Annie Viggh, a Junior at MassArt in my *Graphic Design II* class. In my video abstract Viggh is seeking a better way to manage the feedback she receives both inside and outside of class. Students such as Viggh are already using a

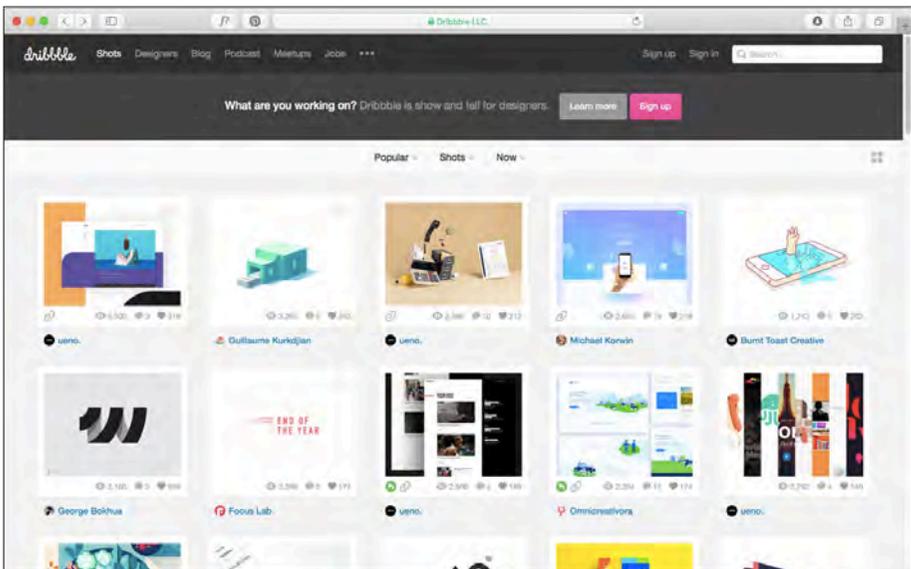
Fig. 5: (Below) User persona based on Annie Viggh, a Junior in my Graphic Design 2 class.



Fig. 6: (Below) *dribbble.com* a community site for designers to share work and get feedback.

combination of tools to solicit outside-of-class feedback. These tools include a host of online portals and wikis employed by design faculty, emails to instructors and fellow students, and emerging websites such as *Dribbble* (*dribbble.com*), which bills itself as “show and tell for designers.” On Dribbble, designers can post work and receive feedback from other creatives around the world within minutes. In my initial research I found that many of my students are using Dribbble, Behance, and even social media sites to gather additional feedback on projects before or after the work is shown in the formal classroom critique. Right now, these tools are largely disconnected from the feedback students receive from instructors in the classroom and peers in the studio. *Critiquemate* presents a valuable opportunity to collect, view and manage feedback from both virtual and physical spaces in one place.

Although my *Critiquemate* project remains speculative, I was encouraged to test my user experience and interface ideas with potential users. While enrolled in *Thesis Project I*, I found complementary support in two elective courses, *Designing*





Interactive Experiences with DMI Alumna Stephanie Kane, and *Contemporary Pedagogy* with Professor Beth Balliro. Under the guidance of these two professors, I was able to develop and test my Critiquemate concepts in ways that grounded my efforts in research-based best practices. For instance, Professor Kane recommended that I print paper versions of my early wireframe interface concepts to test them. I then had outside testers mock-click on a series of sheets while giving them various objectives. This was a quick way to work out flaws in both the user experience and with the user interface. This research and testing led to an interest in exploring the broader landscape of assistive technology tools in education, which are often used for students with learning disabilities. This concern is further revealed in *Lecturemate*, which, together with *Critiquemate* and *Studiomate* (described in subsequent chapters), comprise a triptych of speculative software applications designed specifically for use in undergraduate art and design education.

Fig. 7: (Below) Early “wireframe” mockup of Critiquemate.

CRITIQUEMATE

HOST A CRITIQUE HOST A CRITIQUE

CLASSES OR GROUPS

VIEW CLASS/SECTION: GRAPHIC DESIGN 2

SAVED PROJECTS: 10 THINGS PROJECT [EDIT]

CREATE A NEW: PROJECT [CREATE]

FIND A CRITIQUE METHOD

NUMBER OF STUDENTS: 16

PREFERRED GROUP SIZE: 4 X4

NUMBER OF INSTRUCTORS: 2

TIME PER STUDENT: 10-15 MINUTES

PROJECT TYPE: BROCHURE

FEEDBACK TYPE: VERBAL

FORMATS

- FULL CLASS CRITIQUE
- GROUP CRITIQUES
- INDIVIDUAL CRITIQUES
- DESK CRITIQUES
- PIN UP WORK
- USE PROJECTOR

26 RESULTS FILTERED BY: BEST MATCH

STUDENTS	CONTRIBUTE	CRITIQUE METHOD	RATING	CONTRIBUTOR
FIRSTNAME LASTNAME, MAJOR, YEAR		THE DOUBLE BACK	★★★★★	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION
FIRSTNAME LASTNAME, MAJOR, YEAR		10 STICKIES	★★★★☆	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION
FIRSTNAME LASTNAME, MAJOR, YEAR		REVERSE PRESENT	★★★★☆	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION
FIRSTNAME LASTNAME, MAJOR, YEAR		TABLE TALK	★★★☆☆	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION
FIRSTNAME LASTNAME, MAJOR, YEAR		TWO THEN GROUPS	★★★☆☆	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION
FIRSTNAME LASTNAME, MAJOR, YEAR		CONCEPT FIRST	★★★★☆	PROFESSOR FIRSTNAME LASTNAME, INSTITUTION



Fig. 8: (Above) *Critiquemate* mobile app welcome screen.

Fig. 9: (Right) *Critiquemate* mobile app “host a critique” section.

INTERACTION

Critiquemate is designed for use either on the web or through a companion mobile application. Educators, once they are logged into *Critiquemate*, can search for and select a critique method for specific classes, projects, or students, and can further filter the results by group size and total time available for the critique. A list of suggested critique methods is sorted in real time. The critique methods posted to *Critiquemate* would be contributed by design educators from institutions across the world. Each critique method can be rated and reviewed by users, making it easy to find a method that meets a specific classroom need. Design educators contributing to *Critiquemate* can post written descriptions and video demonstrations of various critique methods they’ve tried. Once a suggested critique method is selected by an educator, a notification is sent to the students in the class, letting them know that a specific critique method has been chosen and scheduled for a particular class meeting.

In student mode, students can use *Critiquemate* to manage and track the feedback they receive on all of their projects, across all of their studio courses. In a project-based portal, students can post images of projects and get feedback from instructors and peers before, during, and after the actual critique date. Students and educators can opt to receive notifications of feedback immediately, hourly, daily or weekly. When a student receives a helpful suggestion, he or she can make the change before the actual critique date, thus potentially elevating the conversation in class.

Critiquemate is designed to store feedback from the actual in-class critique as well. Using the *Critiquemate* app, students can record or upload audio or video recordings of their critique. The audio is automatically transcribed into text for easy annotation and review at a later date. The *Critiquemate* companion

CRITIQUEMATE

I WOULD LIKE TO:

HOST A CRITIQUE

CLASSES & PROJECTS

[reset filters](#) | [more options](#)

VIEW CLASS/SECTION:

TYPE 3 S1

STUDENTS:

15

PROJECTS:

AMTRAK APP

MEDIUM:

UI/UX

STUDENTS

[more options](#)



ANNIE VIGGH



JULIA MURPHY



CONNER MCCORMICK

1 FIND A CRITIQUE METHOD

STEP 1 OF 3

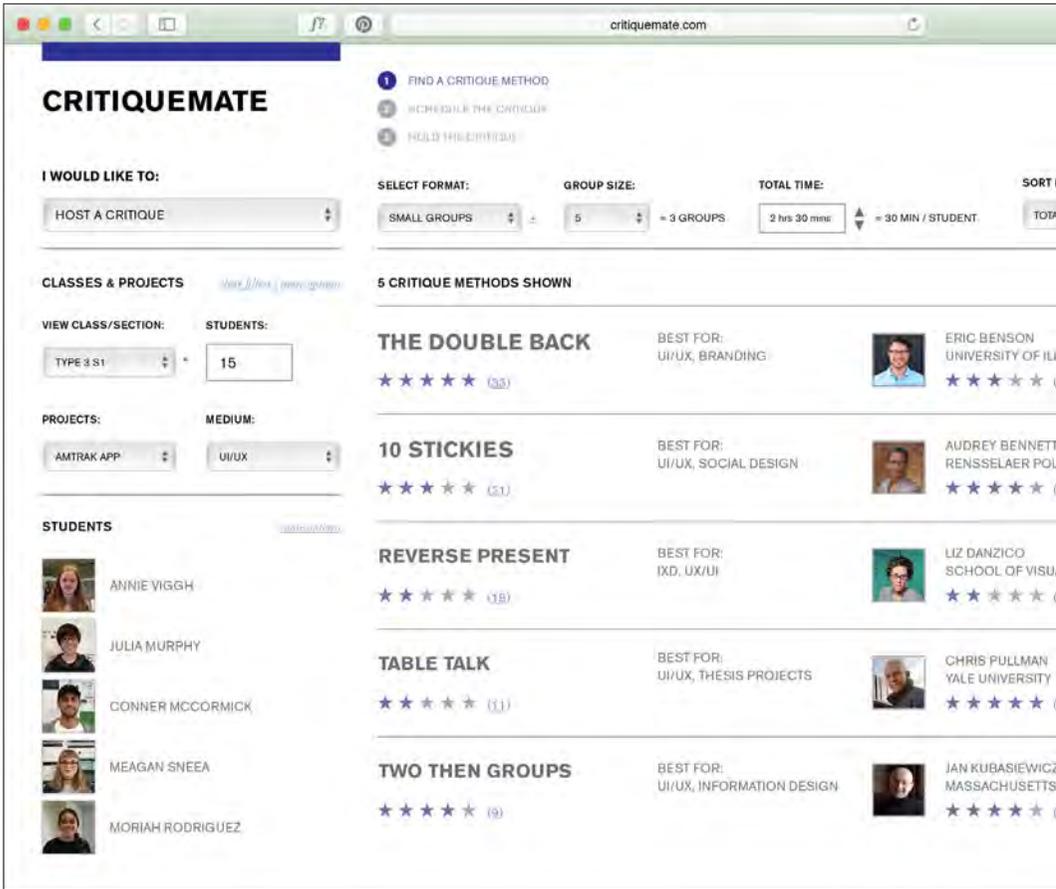
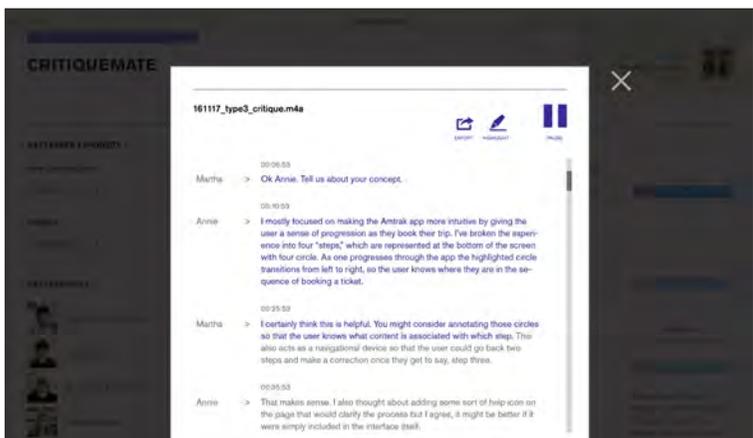
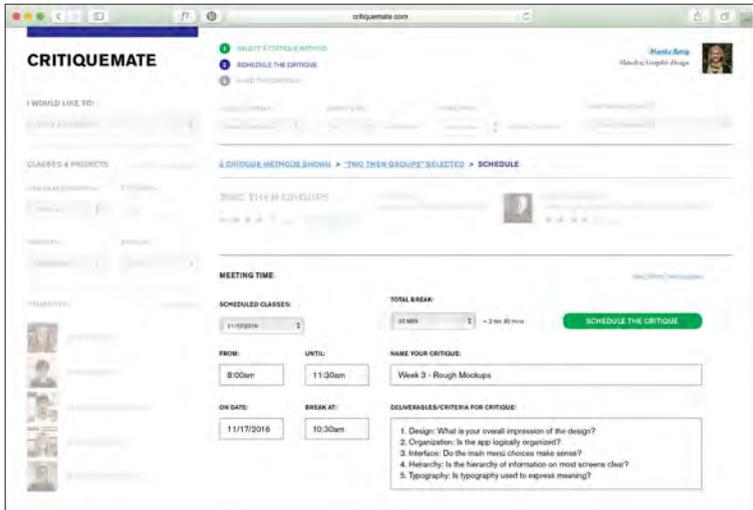
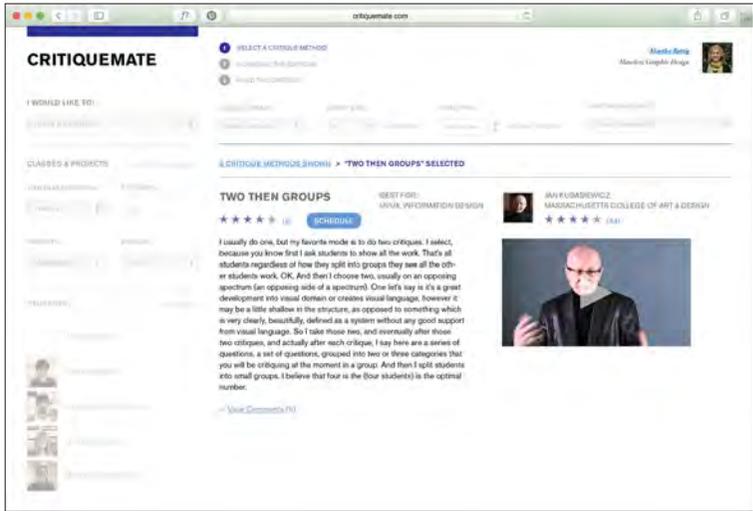


Fig. 10: (Clockwise from Top Left) "Host a Critique" section with filtered results. "Critique method overview" page. Scheduling a critique with Critiquemate. Audio transcription feature and (Near Right) mobile app audio capture feature.





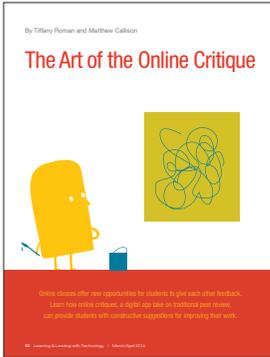


Fig. 11: (Above) “The Art of the Online Critique” by Tiffany Roman and Matthew Callison, as published in the March/April 2014 issue of *Learning & Leading with Technology*.

app even includes a built-in media capture feature, which saves recordings directly to the project being critiqued. This frees students from having to take notes during the critique, allowing them to focus on their presentation, and on listening. With a timeline-like feature, *Critiquemate* would make it easy for design students and design educators to see how projects are improving (or not) over time and over multiple rounds of feedback and edits.

Finally, *Critiquemate* seamlessly integrates with its two companion programs, allowing educators to conclude critiques by creating follow-up meetings between individual students using *Studiomate* and to assign relevant lectures using *Lecturemate*.

CONCLUSION

For better or worse, my own critique methods and ways of fostering peer criticism are very much a product of my own past educational experiences, as I assume is true for other design educators. I am not alone in acknowledging this, and also in acknowledging the deficit of this practice in terms of proper training in effective critique methods and tools. The following is an excerpt from *Ten Ideas for More Effective Critiquing* by Mario Estioko, John P. Forrest, Jr. and Gwen Amos.

Most of us acquire a critique style through our own school experience. We remember those days of putting our work on a wall, waiting for judgment. After presenting our piece, the instructor would usually give verbal feedback and we’d comment where appropriate. Most of us who went through this were never given any formal instruction about the practice. We somehow were supposed to know what



it was we were doing by instinct, though we no doubt tried to follow our instructor's example in talking about the work. We probably assumed that since they were successful in the profession, they must be right in their pronouncements. Furthermore, we never thought to question the manner in which they conducted the practice. They were critiquing; it was what it was. Herein lies the problem. Nobody has set down guidelines for classroom critiquing. "It's important to acknowledge that there is no good definition of "art critique"—no model, no history, no guide." (Elkins 112). It's an activity that is common to any studio class, no matter the discipline, yet styles and approaches can range dramatically. And this is simply because the practice of critiquing has been passed down through a sort of unregulated osmosis. (Estioko et al.)

4 "An increasing number of students with learning disabilities are attending postsecondary institutions. To meet the educational demands of these students, support service providers will likely rely on assistive technology" (Day and Edwards 486). Students who process better visually might choose to view the video later on, while those who process better verbally might opt for the transcribed feedback.

It is important to note again that I began to view *Critiquemate* as more of an assistive technology rather than standard software application. In this way, the project does not attempt to replace physical experiences but simply to augment them. *Critiquemate* aims to build upon in-person critiques by helping to simplify and organize the critique process. Information and feedback are centralized, leading to less distraction and information redundancy, and to greater accessibility⁴. Online critiques offer new opportunities for students to give each other feedback, with perhaps the greatest advantage being that of catering to asynchronous schedules. In *The Art of the Online Critique*, Tiffany Roman and Matthew Callison suggest that



online critiques improve the quality of student learning, and this is even beneficial at the K-12 level. “Based on our extensive experience working as K-12 teachers at the elementary, middle, and high school levels, we feel confident that online critiques are a welcome alternative to traditional discussions and could potentially serve as an innovative platform for professional collaboration and development among educators at all levels” (Roman and Callison 15).

After presenting *Critiquemate* at my 2016 fall end-of-semester review, I was contacted by Fish McGill, a DMI alumnus also teaching at MassArt. Fish had recently been experimenting with using online surveys as a tool for critique in his Sophomore introductory design classes. McGill calls these online surveys “Digicrits” and he designs them to include written responses and rankings (1-10) on various criteria. Much like *Critiquemate*, McGill uses his *Digicrit* to augment traditional forms of classroom critique. Emerging design educators such as McGill, and the team that developed the Critique research project, are not alone in wanting to explore new tools that blend the physical and the digital. In *Designing Design*, Kenya Hara states that, “Today’s designers are beginning to realize that endless possibilities for design lie dormant not just in the new situations brought on by technology, but also in the common circumstances of our daily lives. Creation of novel things is not the only creativity. The sensibility that allows one to rediscover the unknown in the familiar is equally creative.” Hara’s statement strikes a chord as I reflect on the process of designing *Critiquemate*, particularly regarding rediscovering the unknown in the familiar. As a part-time instructor, I had given hundreds of critiques before really questioning my approach.

Hara goes on to say that, “Design is the vocation of taking both old and new media, favoring neither, putting them into a



cross-disciplinary perspective, and making full use of all.” (Hara 434-435) As I attempt to design a system that blends the virtual with the physical, I again find Hara’s assertions about rediscovery refreshing in the context of my *Critiquemate* project. I suppose it’s true that, “sometimes you don’t know what you don’t know,” but given the interest and dialog emerging around critique at both the AIGA conference and within the graphic design department at MassArt, I get a sense that this is a topic ripe for reexamination. For this generation of educators, the summary below puts things into perspective:

Critiquing in the fifties, though centuries advanced from the European master-apprentice system, perpetuated use of an authoritarian style, do-as-I-do form of instruction. Half a century later, postmodernism, MTV and the information age has emboldened students to become more inquisitive about feedback on their work, and less likely to simply accept pronouncements originating from the lecturer. With this evolution of the teacher-student relationship to our present day, the need for understanding critique from the educator’s point-of-view becomes crucial. The underlying call to action is this: What are we doing in regard to critique in the classroom and how can we make it better? (Estioko et al.)

Critiquemate responds to these questions and envisions an integrated platform that attempts to help students and educators gain new information and stay organized. Moreover, it attempts to streamline the transfer of knowledge, in many



Fig. 12: (Left) Fish McGill’s DIY online critique system, “Digicrit” which uses Google forms.

Fig. 13: (Above) Legendary American graphic designer Paul Rand delivering a desk critique at Arizona State University in 1995, a year before his death at the age of 82.

5 Also called the “Conscious Competence Matrix,” the “Learning Matrix,” or the “Four Stages of Learning.”

cases, from people who have it and may not even realize they do to those who may not even realize the gaps in their knowledge. This kind of knowledge transfer and acknowledgment was described in the 1970s by Noel Burch, an employee with Gordon Training International. Burch developed what’s called the “Conscious Competence Ladder⁵.” It helps us to understand our thoughts and emotions during the sometimes-dispiriting learning process. The model highlights two factors that affect our thinking as we learn a new skill: consciousness (awareness) and skill level (competence). According to the model, we move through the four levels as we build competence in a new skill: from 1) unconsciously unskilled (we don’t know that we don’t have this skill, or that we need to learn it) to 2) consciously unskilled (we know that we don’t have this skill) to 3) consciously skilled (we know that we have this skill) to 4) unconsciously skilled (we don’t know that we have this skill, it just seems easy) (“The Conscious Competence Ladder”).

While designing *Critiquemate* I embraced my dual position as both an educator and graduate student doing research. I have found a wonderful synergy in this dual capacity, which is perhaps best expressed in this quote by Paulo Freire: “There is no such thing as teaching without research and research without teaching (Freire).” One obviously informs the other. I would go further to suggest that teaching, researching, and designing (which is itself a form of applied research) creates an robust platform for unearthing possible solutions to long-held challenges in teaching and learning; in this case the design critique. With *Critiquemate* completed I set forth the goal to apply this three-pronged process to two additional facets of art and design education: the lecture, and the studio.

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06

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Case Study 06

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Educational Software System

Component 2 of 3



LECTUREMATE

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A Multimodal System for Viewing
and Understanding Lectures

-

2016



Lecturemate:
 A Multimodal System
 for Viewing and
 Understanding Lectures
 -
 2016



Fig. 1: (Above) The Harvard Graduate School of Design's Gund Hall in Cambridge, MA.

Fig. 2: (Right) Screen capture from Bruce Mau's 2012 GSD Class Day Lecture video.

Upon completion of *Studiomate* and in consultation with my thesis project advisor, Professor Jan Kubasiewicz, I began to pursue a second, similar speculative software system with a pedagogical focus on prospective tools for design students and design educators. As I began developing the concept for this second software component I once again found myself re-examining graphic design, as a term, a field, and a skill. As a graphic designer who has worked closely with Boston-area architects for the bulk of my professional career, I became acquainted with Harvard's Graduate School of Design, or the "GSD" as it is called informally. Interestingly, I noticed that many of my colleagues who had earned their architectural degrees at the GSD used the term "graphics" when describing a graphic designer's role on the project. While I tried to not take offense, they were perhaps unknowingly lopping of the "design" in graphic design. The GSD offers degrees in architecture, urban planning, and related design disciplines centered around design for the built environment. I had always wondered how or why graphic design, now one of the most prominent design disciplines, is not offered within this prominent graduate school of design. Intrigued, I scoured the GSD website and leveraged my professional network for any trace of graphic design content that I could find associated with GSD. In this pursuit I stumbled across a 2012 *GSD Class Day Lecture* given by the internationally renowned graphic designer Bruce Mau ("Mau"). As I watched the video, two questions surfaced in my mind. First, why was the GSD interested in Bruce Mau's work, and second, what message would Bruce Mau offer to architects in his lecture? In his talk Mau remarks upon his observation that, "everything is communicating whether we like it or not" and "in a context where everything communicates everything must be designed." Mau set up a studio in Toronto and for 25



HARVARD UNIVERSITY
GRADUATE SCHOOL OF DESIGN

years worked with people, businesses, governments and institutions who asked him to design more and more of what they were doing. Mau went on to say “this was an expansion of my definition and practice of design” and that “collaborators wanted to explore what would happen if I applied my way of design to the mandate of an institution or the experience of a football stadium, the strategy of a business school or the vision for the future of the country.” I believe it was this broadening of design’s scale and scope, along with Mau’s unique perspective on design as communication that intrigued the architects.

That said, it was in fact not the Mau lecture itself, but the process I used to “decode” it that led to *Lecturemate*, the second component of my thesis triptych. *Lecturemate* is a multimodal voice-and-touch controlled software system that augments the viewing of academic lectures.

Inspired and informed by *Trint* (trint.com), a tool that I used to transcribe research interviews into text on my *Studiomate* project, I began to think about the different modes of media and analysis which I could use to decode Mau’s lecture.

Fig. 3: (Below) MetLife Stadium which was designed in part by Bruce Mau Design.



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I first experimented with the video's subtitle text. Using a website that extracts subtitle text from online video, I extracted and then reassembled the text, audio, and video from Mao's lecture. I then set up my own video playing system using Processing but with one key adjustment: I would made the subtitle text selectable so that as I was watching the video, I could easily "pull" words and phrases from the subtitle text and set them aside for follow up. The words I set aside began to take on the shape of a hierarchical text-tree diagram. Once collected, I then did follow-up research on several of the words, phrases, and concepts Mau had described in his 30-minute lecture. I looked up words I did not understand, as well as people, places and ideas I had never heard of. During this process I also began sketching my own free-form diagrams on paper, attempting to make broad connections between the communication design concerns of Mau, and the environmental design concerns of the architects. It was at this moment that I knew I had found question driving the second of my three thesis components: *how can assistive technology aid in lecture*

Fig. 4: (Below) Trint.com. A web-based transcription tool currently in beta.





Fig. 5: (Above) Raymond "Ray" Kurzweil (b. 1948) is an American author, computer scientist, inventor and futurist.

Fig. 6: (Below) Students working in the MassArt Library computer lab.

viewing and comprehension? From that point forward, the focus of my research became exploring the variety of assistive technology tools which are available to students while reading, writing and watching lectures, whether it be in class or on video. As with *Critiquemate*, I wanted to focus my efforts within the context of art and design education, examining and addressing the specific needs of visual, creative, and project-based learners.

APPROACH

To start, I was curious to explore the kinds of assistive learning tools that are used at art and design colleges such as MassArt. I reached out to Leslie Everett, who works in the MassArt library and oversees training and support for assistive learning technologies, which are available by appointment to students with specific learning needs and challenges. While teaching at MassArt, I have worked with many students who have learning challenges and receive various forms of assistance and accommodation: most often, more time to work on projects, tests and

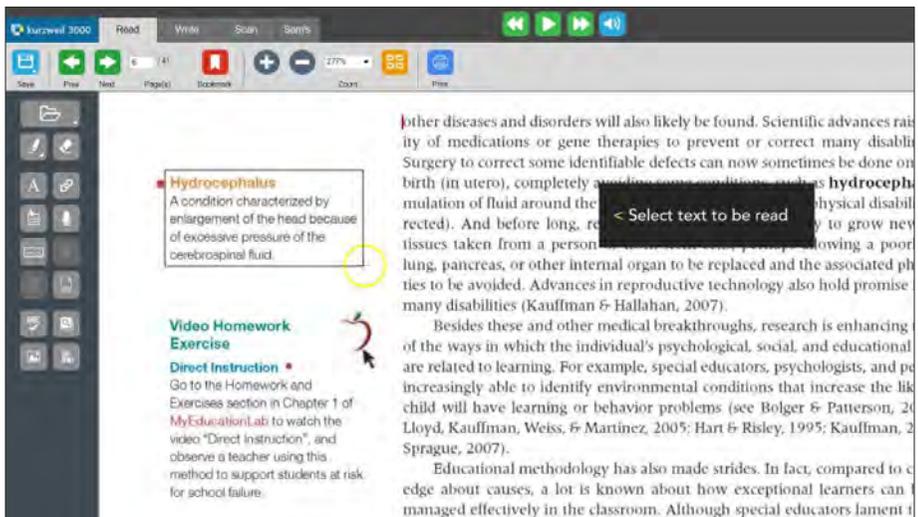


written assignments. The MassArt library has two workstations dedicated to assistive technology. The stations are equipped with three software packages that address certain specific learning needs. The first piece of software is called *Kurzweil 3000* and is produced by the Natick, Massachusetts-based corporation Kurzweil Education. Kurzweil Education was founded in 1996 but the roots of the company extend back to 1976¹ and to the introduction of the world's first reading system, the *Kurzweil Reading Machine* ("Company History"). Kurzweil software offers many features including text-to-speech in multiple languages, text-to-audio, digital highlighters and sticky notes, vocabulary study guides, a graphic organizer, word prediction, and a talking spell checker. Kurzweil software can be tailored to unique individual needs, with deep support for learners with learning disabilities ("Kurzweil 3000").

The second assistive learning software package available at MassArt is called *Read&Write*. *Read&Write* allows students to "hear" web pages and documents read aloud to improve their reading comprehension. It also provides text and picture

1 Though the company was formed in 1996, its text-to-speech software dates back to the 1970s, when Dr. Raymond Kurzweil developed his first Kurzweil Reading Machine, a device that could scan and speak text.

Fig. 6: (Below) *Kurzweil 3000* software interface.



dictionaries to help identify unfamiliar words, and word prediction to help develop writing skills (“Read&Write”). *Read&Write* is designed to improve confidence and understanding for struggling readers and to help students and employees with dyslexia or other literacy challenges.

The final software package available in the MassArt library is *NaturallySpeaking: Speech Recognition Software* in the Dragon suite of tools by Nuance Software. Dragon software is used for voice transcription in many professional sectors, from healthcare, to law enforcement, to education. *NaturallySpeaking* uses a minimal graphical user interface; for example, dictated words appear in a floating tooltip as they are spoken. The software has three primary areas of functionality: voice recognition in dictation with speech transcribed as written text; recognition of spoken commands; and text-to-speech: speaking text content of a document (“Dragon *NaturallySpeaking*”).

As described, the three software packages available in the MassArt library focus largely on reading, writing, and comprehension. While these systems convert text to audio, and audio to text, there is virtually no use of *video*. Also, knowing first-hand the habits of visual learners, I wondered if there are systems that use sketching or free-hand note taking, or if software exists that can assist specifically with lectures?

In my impromptu analysis of the Bruce Mau lecture, I found that having to constantly pause the video (by clicking a pause button) was rather disruptive. I would pause, select the text, arrange it, and then resume the video, oftentimes forgetting where I left off. This led me to wonder if any of the assistive educational software was designed to use voice-controlled interactions rather than a typical graphical user interface. Thus, in the next phase of my research, I examined a range of products and literature available around educational tools for

Fig. 7: (Below) English text transcription of Bruce Mau's 2012 Class Day Lecture.

Transcript

English (Automatic Captions)

0:06 good afternoon my name is Paul Merrill i'm graduating 2012 mark one I would
0:19 like to welcome everyone to the 2012 GSD class day lecture this year we are
0:25 honored to have Bruce male founder of Bruce smile design and the massive
0:28 change network as our speaker mr. mouse career has spanned for over 30 years he
0:34 was the recipient of the american institute of graphic arts metal in 2007
0:39 and honor given to individuals in recognition of their exceptional
0:43 achievements services or other contributions to the field of graphic
0:48 design and visual visual communication also he founded the Institute without
0:52 boundaries in 2002 as a postgraduate program that seeks to achieve social
0:57 ecological and economic innovation the Institute's first project was an
1:03 exhibition titled massive change which led to a publication and the
1:08 establishment of the massive change network that focuses on the power and
1:12 possibilities of design
1:15 additionally Bruce male design has worked with coca-cola to establish a
1:20 cohesive long-term vision to guide the company's future sustainability
1:24 sustainability business and culture through the live positively program mr.
1:31 mal was featured as the expert on sustainability design in the 11th hour a
1:36 full-length feature documentary film which his firm also designed and
1:41 produced titles credits and animated information graphics
1:46 furthermore he has co-authored a book the third teacher which puts forward 79
1:50 ways in which schools designed today can be ready for tomorrow's world the book
1:55 examines the relationship between the physical environments in which kids
1:58 learn and the knowledge insights abilities enjoys the gain is incomplete
2:03 manifesto for growth first written in 1998 as an outline for his beliefs
2:08 strategies and motivations that guide his own firm has become a guide for
2:13 others to use their creativity as a means to make a positive impact
2:17 in the world Mr mouse career is evidence of his commitment to the understanding
2:23 of the design profession the work of his firm and the Institute without
2:27 boundaries addresses one of the most important aspects that is often
2:31 overlooked by designers the fact that as designers we are responsible for
2:36 searching and confronting the problems of the world while the same time we have
2:41 the ability to an obligation to fix them on behalf of the 2012 graduating class
2:47 please help me in welcoming Bruce mount
2:57 thank you i'm really thrilled to be here
3:04 my heart's pounding
3:07 I got some jokes to tell you it always makes me nervous and I'm here to talk to
3:14 you about the power you now have as designers the power design the power to
3:21 analyze and creates to visualize the future to shape the world to provide
3:26 leadership to design I want to explore what that power can mean and what you
3:33 can accomplish with your power
3:35 I'll address the responsibility that comes with it and the urgent need
3:39 I have for your help the urgent need of the world has for your talent and energy
3:45 and power to design everyone making a class day speech i'm assuming starts
3:52 with I'm honored to be here i'm also honored to be here deeply honored i want
3:58 to thank the students for inviting me here and congratulate all of you and
4:04 your parents on this extraordinary achievement and also to recognize teen

auditory, visual, and kinesthetic learners. In each category I found a whole host of tools that cater to the specific needs and educational challenges facing today's learners. In *Assistive Technology and Learning Disabilities: Today's Realities and Tomorrow's Promises* Rena B. Lewis provides a succinct definition and scope of assistive technologies:

Assistive technology can be broadly conceptualized as any technology with the potential to enhance the performance of persons with disabilities. As defined by the Individuals with Disabilities Education Act Amendments of 1997, assistive technology is "any item, piece of equipment, or product system ... that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" [Part A, Sec. 602 (1)]. Assistive technology offers a wide range of alternatives. It includes both "low" technologies and "high"-tech devices, and it incorporates technologies designed specifically for people with disabilities as well as generic technologies developed for use by the general public. It is a mistake to think too narrowly about assistive technology; the entire technology spectrum holds promise for individuals with learning disabilities (LD). Although computers are the technology most often associated with this population, there are many other potentially valuable tools available. (Lewis 16)

With this definition in mind, I sought out tools that, in the same spirit of *Critiquemate*, augment and assist physical classroom experiences rather than replace them. For *Lecturermate*, this concern for learning in both physical and digital spaces focused my research on two particular areas of assistive technology: tools that help with listening, and tools that help with organization and memory. At the intersection of these two categories I found the use of “smart pens.” A smart pen records and links live audio to what a person writes using the pen and special paper. A smart pen enables the user to take notes while simultaneously recording someone (e.g., a lecturer) speaking. The user can later reviews her notes, whether handwritten text or diagrams, in the context of the original lecture (“Stanberry”). Another technology concept I found relevant and extremely interesting is called “Dynamic Text Leveling.” Oftentimes academic texts or lectures can be filled with complex vocabulary that is above a student’s comprehension level. For these situations, Dynamic Text Levelers build in text-adjusting features. Through the use of a slider, the software automatically

Fig. 8: (Below) Dynamic Text Leveling demonstration.

DYNAMIC TEXT LEVELING (technology)

Original

I had called upon my friend, Mr. Sherlock Holmes, one day in autumn of last year, and found him in deep conversation with a very **stout**, **florid**-faced **elderly** gentleman with fiery red hair. With an apology for my **intrusion**, I was about to withdraw, when Holmes pulled me **abruptly** into the room, and closed the door behind me.

After Dynamic Text Leveling

I had called upon my friend, Mr. Sherlock Holmes, one day in autumn of last year, and found him in deep conversation with a very **heavy/brave/strong**, **flowery**-faced **old** gentleman with fiery red hair. With an apology for my **invasion**, I was about to withdraw, when Holmes pulled me **suddenly** into the room, and closed the door behind me.

source: donjohnston.com/snap-read/



Fig. 9: (Above) Lecturemate app welcome screen.

Fig. 10: (Below) Livescribe 3 smartpen and notebook, designed to bridge the analogue and digital gap.

simplifies complex words down to a level that students can read fluently. The difficulty level is selectable so students can adjust the vocabulary complexity of their reading passages to levels they can feel comfortable with (“Snap&Read Universal”).

After discussing this contextual research with Professor Kubasiewicz, we began to form a vision for an interactive multimodal learning environment, designed specifically for dynamically viewing and analyzing a lecture. According to the modality principle of instructional design, the most effective learning environments are those that combine verbal and non-verbal representations of knowledge using mixed-modality presentations (“Moreno and Mayer”). With *Lecturemate*, I began to see an opportunity to “slow down” and contextualize the lecture-viewing process by providing selectable subtitle text along with interactive tools that encourage the viewer to define, diagram, and sketch while listening to the lecture.

INTERACTION

Lecturemate would be available as a web application and mobile device application for use on smartphones, tablets, and smart televisions. The system would sync up with smart pens such as the Livescribe² which are used on paper, or *Lecturemate* users could write on a digital tablet in tandem with an Apple Pencil (released in late 2015) or similar device. Much like its sister application *Critiquemate*, *Lecturemate* would include a built-in media capture feature, but instead of capturing critiques it would allow educators to live-record lectures, workshops, and demonstration for students to review and follow up on at a later date. Students could then generate time-stamped bookmarks and notes on the tablet, sketching and diagramming while watching the lecture, either live or later on video. As with *Critiquemate*, I speculate that the benefits of this approach

would largely be organizational (having your notes, references, and sketches organized and contextually tied to a time-stamped lecture) but also conceptual (seeing your own notes replayed while re-watching the lecture).

Students using *Lecturemate* would have the ability to select words and phrases, and then would have the option to save, bookmark, define, or diagram them. One of the more daring ideas set forth with *Lecturemate* is the ability to control the video play action with voice commands, and I further proposed that the viewer also have the option to select, define, and even move (diagram) text with voice commands. In testing this feature, I must admit that giving step-by-step commands to my television or other devices with voice commands felt both awkward and slow. That said, if I were to take this project further, this is an area I would enjoy examining through a controlled design research study. The question I would put forth is: even though such voice-based interactions may be slower and may offer less control, would they provide a benefit to some users in terms of memory, accessibility, understanding,

2 The Livescribe paper-based computing platform consists of a digital pen, digital paper, software applications, and developer tools. Central to the Livescribe platform is the smartpen, a ballpoint pen with an embedded computer and digital audio recorder. When used with digital paper, it records what it writes for later uploading to a computer, and synchronizes those notes with any audio it has recorded ("Livescribe").



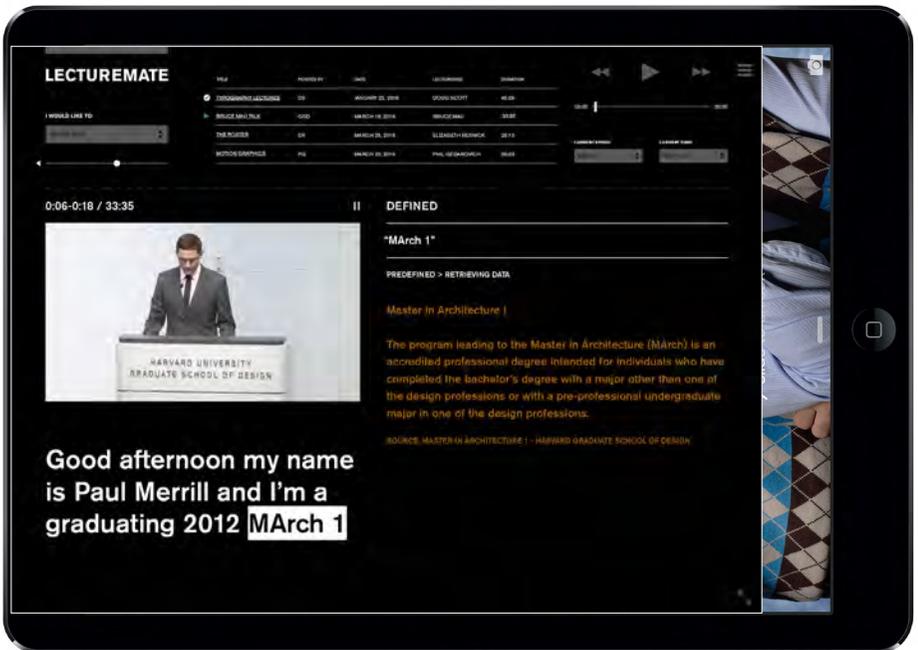
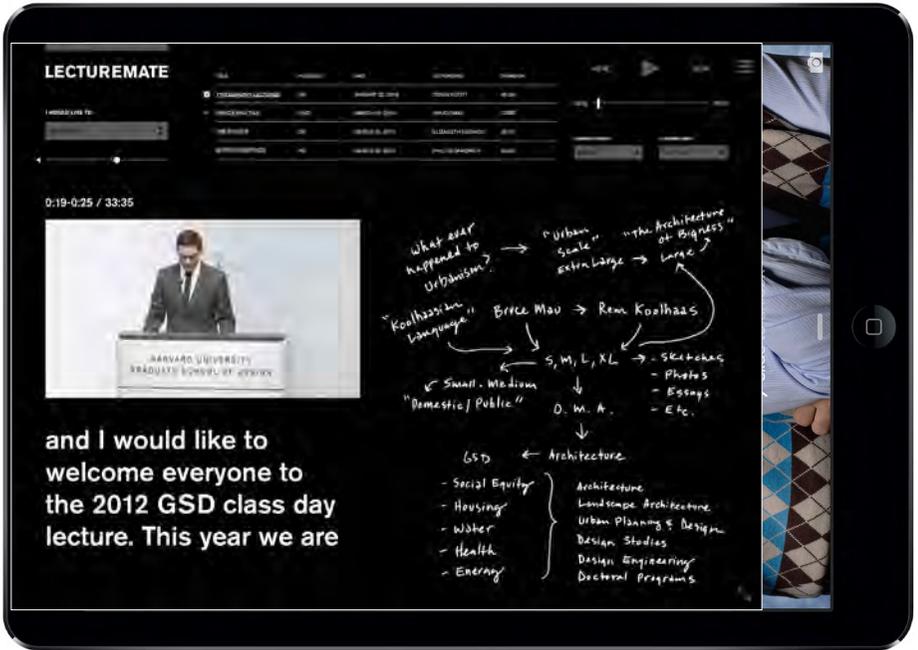


Fig. 11-12: (Above) Freeform note taking and (Below) text selection and "define" feature.

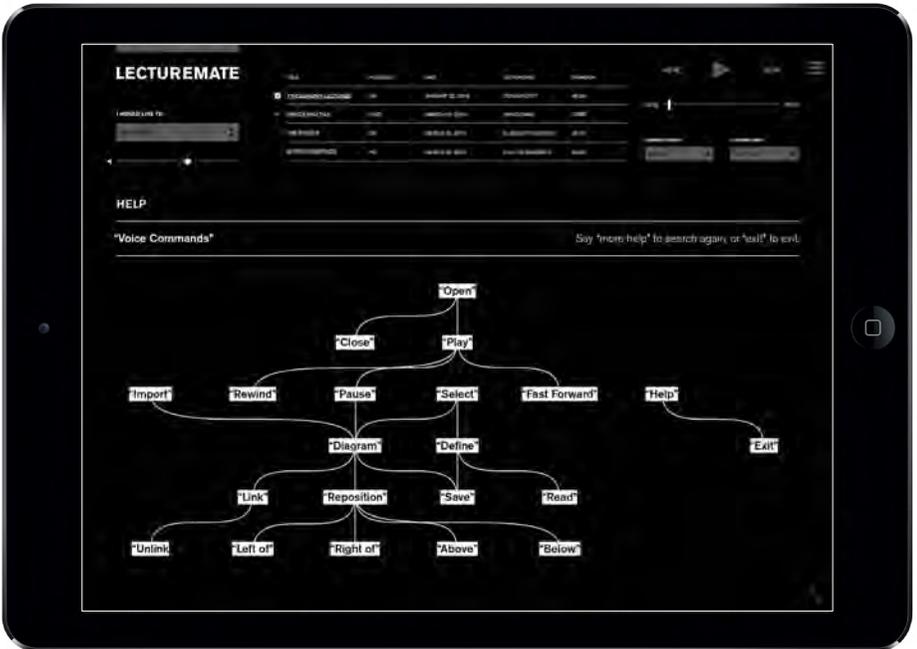
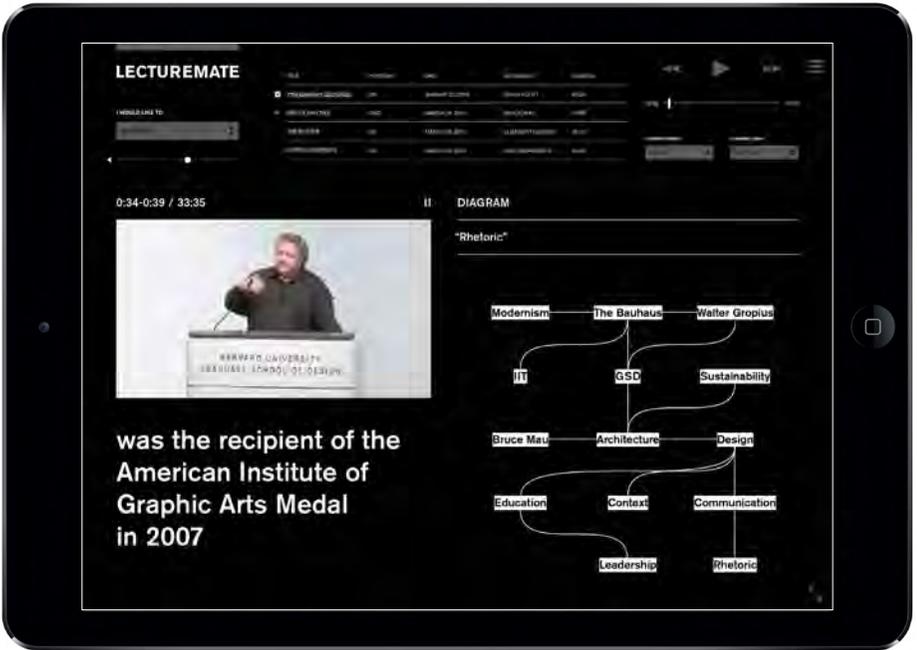


Fig. 12-13: (Above) Tree diagram feature and (Below) showing voice commands in tree diagram format.

and retention? My perhaps far-fetched theory is that digital interactions which more closely mimic human conversation might inherently provide some advantage in terms of recall of information.

To use the language of interaction, Lecturemate explores the boundaries between “lean forward” and “lean back” media. Put simply, in lean forward media receivers “lean forward” to interact and actively control the flow of information. In lean back media, on the other hand, viewers can “lean back” and receive information in a passive manner (Katz). With the introduction of the iPad (2010) and the tablet computing generation, a hybrid of lean forward and lean back media seems to be emerging. The initial advertising for the Apple iPad literally showed people in a middle mode between “lean back” and “lean forward,” (Fig. 15) a mode in fact which positions the tablet on the user’s knee (Basulto) while they recline, with a single hand controlling the screen. And just as Lecturemate imagines a future where voice controlled interactions might be more common (or at least less awkward), the proliferation of

Fig. 15: (Below) Outdoor advertisement for Apple’s iPad.





these voice-controlled devices seems to be taking root. Amazon recently had a surprise hit with the Echo smart speaker. On Christmas Eve of 2015, the voice-controlled Echo was one of the top five items ordered. Amazon's Echo was followed by the introduction of Home, a competing voice-controlled smart speaker from Google (Levy).

CONCLUSION

On December 13th I attended the 2016 *AIGA Boston Fellow Awards Celebration* at Northeastern University. The award recognizes designers who have made significant contributions within the Boston design community. One of the honorees was Doug Scott. Scott has given more than 250 lectures on the history of design, including a recent lecture series on typography here at MassArt. While Scott is truly a gifted historian, designer, and educator, the technology he uses in his lectures has changed little since he first started in 1978. Scott still prefers to use a carousel style, bulb-lit, mechanical slide projector. On one hand, some might argue that this format is arguably more effective than using the computers, in that it eliminates distracting transitions often used in PowerPoint (or even worse, Prezi). On the other hand I wondered how a lecturer like Scott could respond to a new generation of designers who are more used to watching TED Talks and YouTube videos. It would be interesting to see what effect a system such as *Lecturemate* would have on learning outcomes if used by a great design lecturer such as Scott.

Lecturemate could provide assistive technologies that cater to visual and auditory learners who need to “process” and visualize information to remember and make sense of it. Educators could use *Lecturemate* to record and distribute lectures to students. Students could then “dig deeper” into the subjects and material on their own time. Out of my three



Fig. 16: (Above) Amazon Echo voice-controlled smart speaker.

Fig. 17: (Below) 2016 AIGA Boston Fellow Doug Scott.





Fig. 18: (Above) Lecturemate's media capture feature.

Fig. 19: (Right) Testing the Lecturemate iPad interface.

speculative applications, *Lecturemate* was perhaps the most far-fetched and worthy of additional research, both contextual and applied. For me, *Lecturemate* provided a pathway towards learning more about the use, legislation, and effectiveness of assistive technologies. Encapsulating this is an excerpt from *Assistive Technology for Postsecondary Students with Learning Disabilities* by Sheryl Day and Barbara Edwards:

Assistive technology is a tool for making the learning environment more accessible and for enhancing individual productivity. Assistive technology that enables individuals with learning disabilities to compensate for reading, organization, memory, or math deficits are available and are increasingly more affordable. The use of assistive technology in postsecondary settings may enable students with learning disabilities to express themselves at levels commensurate with their intelligence. Federal legislation has been enacted regarding assistive technology use at the postsecondary level, and the advantages of assistive technology have been reported; however, the effectiveness of specific devices has not been empirically documented. Some barriers to the use of assistive technology are dissolving; however, educational service providers at the postsecondary level must be prepared to continue addressing issues related to assistive technology, such as making reasonable accommodations; providing grievance procedures to mediate conflicts among faculty members, students with

WELCOME BACK!

LECTUREMATE

I WOULD LIKE TO:

SELECT TASK

TITLE	POSTED BY	DATE	LECTURER(S)
<u>TYPOGRAPHY LECTURES</u>	DS	JANUARY 22, 2016	DOUG SC
<input checked="" type="checkbox"/> <u>BRUCE MAU TALK</u>	GSD	MARCH 18, 2016	BI
<u>THE POSTER</u>	ER	MARCH 25, 2016	ELIZABETH RESNICK
<u>MOTION GRAPHICS</u>	PG	MARCH 25, 2016	PHIL GEDAROWICH

GO



Fig. 20: (Above) Design: The Invention of Desire by Jessica Helfand.

disabilities, and assistive technology service providers; and ensuring equitable access in the testing environment for students with learning disabilities. (Day and Edwards)

Beyond this, one of the more salient concepts explored with Lecturemate is arguably the uncommon idea of using technology to slow down, rather than to speed up. In *Design: The Invention of Desire*, Jessica Helfand supports this concept rather eloquently. Helfand states that, “In the end, patience, as John Ruskin once observed, is nobler than beauty, probably because it is so much more difficult to achieve. It takes 250 milliseconds to blink but a lifetime to understand what you see; no matter how much you yearn to speed things up - connection speeds, bank transactions, the postal service, your adolescence - does it really matter?” She goes on to say, “We benefit as a species from so many things, but being in a hurry is not one of them.” Coming from a seasoned design educator such as Helfand, this quote seems especially fitting. When I initially watched the Bruce Mau lecture, it was not the available technology that drove me to slowly pick apart his words, but rather my own interest. Herein lies the even more fascinating challenge for a newer design educator. How do you help students to get beyond the surface and help them to “dig deep?”

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07

–
Case Study 07

–
Educational Software System

Component 3 of 3



STUDIOMATE

-

A Peer-to-Peer Help System
for Studio Communities

-

2016



Studiomate:
A Peer-to-Peer Help System
for Studio Communities
-
2016

1 The Critical and Creative Thinking (CCT) program at the University of Massachusetts Boston provides its students with knowledge, tools, experience, and support so they can become constructive, reflective agents of change in education, work, social movements, science, and creative arts (“Critical & Creative Thinking”)

Studiomate is the final software component within my triptych of speculative thesis projects. The concept for *Studiomate* began with an anecdotal insight provided by Luanne Witkowski in my first undergraduate graphic design faculty meeting as a full-time professor. According to Witkowski, who is the Studio Manager for Communication Design students at MassArt, “Students who work in the studio are generally more successful than those who do not.” I immediately wondered if there was more to Witkowski’s statement. Specifically, how or why are these students more successful? With her comment in mind, I put together a one-page, 12-question survey and distributed it to the Communication Design students who work in the 9th floor studios. Included in the survey were questions aimed at determining when the students most often work in the studio and why, and what if anything they would change. The students were also asked to describe what they felt they were “good at,” and what they felt they could use help with. It was these last two questions that revealed a deeper insight. In reviewing the completed surveys, I identified a nearly equal pairing of students with skills that they identified as proficiencies, and students who needed help with those same skills. I then wondered: how often do these student peers with complimentary skills, working in the same studio, find each other? According to communication design students, they do help each other, but the process of knowing who knows what is very much “word of mouth.”

To gain more insight into student studio habits, I interviewed Witkowski, who has been the Communication Design Studio Manager at MassArt for over 15 years. She is also a part-time instructor in the Critical and Creative Thinking program¹ at University of Massachusetts Boston. Witkowski encouraged me to think more broadly about how I was

Fig. 1: (Right) *Communication Design Studios at MassArt.*





Fig. 2: (Above) MassArt Communication Design Studio Manager Luanne Witkowski.

defining studio space. Here is an excerpt from our interview:

In the *Critical and Creative Thinking* program at UMass, we've been exploring the idea of what studio is, and for whom. And so, a studio isn't just for artists or musicians, or dancers. The arts have always been afforded the luxury of studio time. However, everybody has studio time in their lives. And so [now] we are defining it [more broadly] ... it could be a science lab, it could be a gym. It's wherever you go to do your work, but not necessarily your job. So this is the place where we incubate. This is a place where we explore, and [where] we play. In many of the places where we do our jobs these days, they are beginning to recognize and appreciate the idea of studio space or studio time. So even these new work spaces where you can rent an office space, like those co-working spaces, are really in a way shared studios. (Witkowski)

As I was examining these concepts, Robert Hamill, a Graphic Design Senior interested in user experience design, developed a deep interest in peer mentorship and in my project. Hamill and I remained in touch and he would later assist me in developing a working mobile application based on my research.

APPROACH

With the support of Professors Jan Kubasiewicz and Stephanie Kane, I began developing hypothetical user personas based on the results of my studio survey and contextual research.

Fig. 3: (Below) Completed student questionnaire in preparation for designing Studiomate.

#18

MassArt Communication Design Studio Survey

Name: [REDACTED]

Male / Female / Neutral .

Major: *Illustration / sculpture*

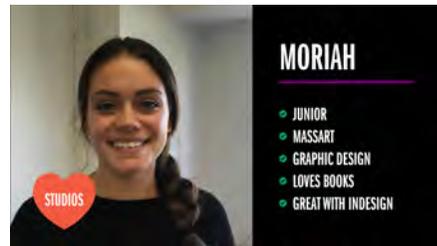
Year: *Senior*

1. About how many projects are you working on right now?
3
2. Are you more productive working in the studio or at home?
STUDIO! (I have one for both majors)
3. What is one skill that you have that would be valuable to others in the studio?
Paint color (I give advice there a lot)
4. What is one skill that others in the studio have that would be useful to you?
Computers + printing
5. On average how many days a peer week do you work in the studio?
7 days
6. On average how many hours per day do you spend in the studio?
6-8 hrs
7. What is one thing you would change about the studio?
cleaner lounging areas (to take a break)
8. What is one thing you would not change about the studio?
Being around others who are making
9. Does working in the studio make you feel more creative?
Yes!
10. Do you work in the studio mostly during the day or mostly at night?
Both but mostly night
11. What software program are you best at using?
Adobe Photoshop + Indesign
12. What software program could you use some help in learning?
everything else

Fig. 4: User scenarios based on two of my Graphic Design 2 students, Chris Pawlowski and Moriah Rodriguez.

I imagined a design student who, for instance, might be skilled in using layout software such as InDesign, and another student who is seeking some training or troubleshooting with that same software. Once again I found great synergy between my undergraduate teaching role and my DMI research. With permission, my final Studiomate personas were based on two of my sophomore students, Chris Pawlowski and Moriah Rodriguez. I composed a user scenario where Pawlowski needs help using InDesign and Moriah is adept with InDesign. In this scenario, the real trouble is that they do not know of each other because they work on different sides of the studio. This imagined scenario even makes its way into my *Studiomate* video abstract, proving to be a good way to introduce the concept of a peer-to-peer learning application in a studio setting.

Stephanie Kane encouraged me to research interface approaches for products that also require matching, whether of people or of time-limited resources. One such service that I used to help conceptualize Studiomate was Zipcar. Zipcar is the world's largest car sharing service, giving members





convenient access to vehicles located in cities, airports and campuses all over the world. Zipcar allows members to reserve cars by the hour or day, all for one rate (“Car Sharing”). The reason I chose Zipcar is because the interface presents a similar use case as *Studiomate*, whereby a set of time-limited, varied resources are available for use within a local community. Zipcar sorts car availability by two major categories, time and location. Location provides a list of your desired locations, while time provides a list of nearby cars that are available within the time frame you have selected.

Taking my cue from Zipcar, I began to visualize *Studiomate* as an internet and mobile application that would use proximity, availability, and relevance as central concepts. I imagined that *Studiomate* would connect learners and teachers who work within close proximity, preferably in the same building, lab or studio. It would also attempt to find matches between people with similar schedules or availability. This research led to a more focused positioning of *Studiomate* as a peer-to-peer help system within a studio community.

Fig. 5: Zipcar.com, a web application for finding and booking cars with the American car-sharing company Zipcar.

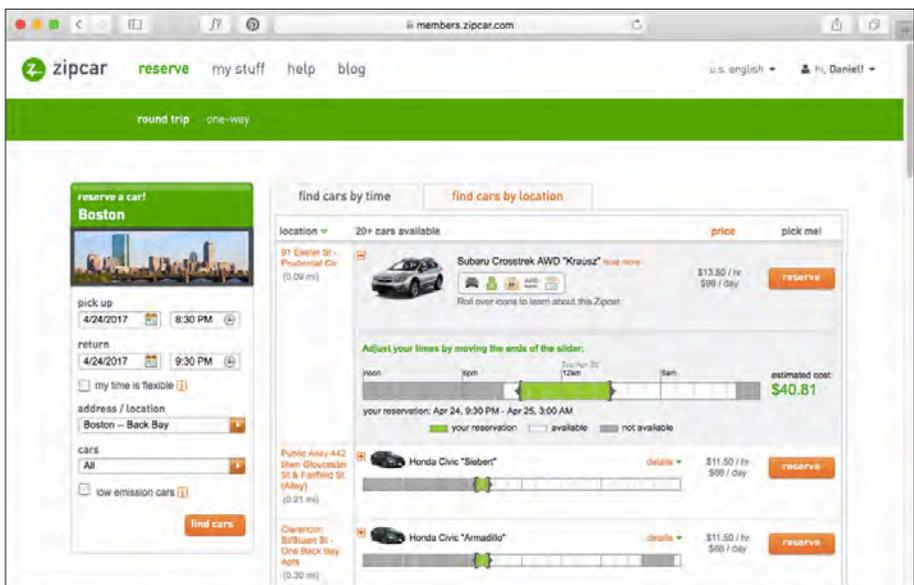
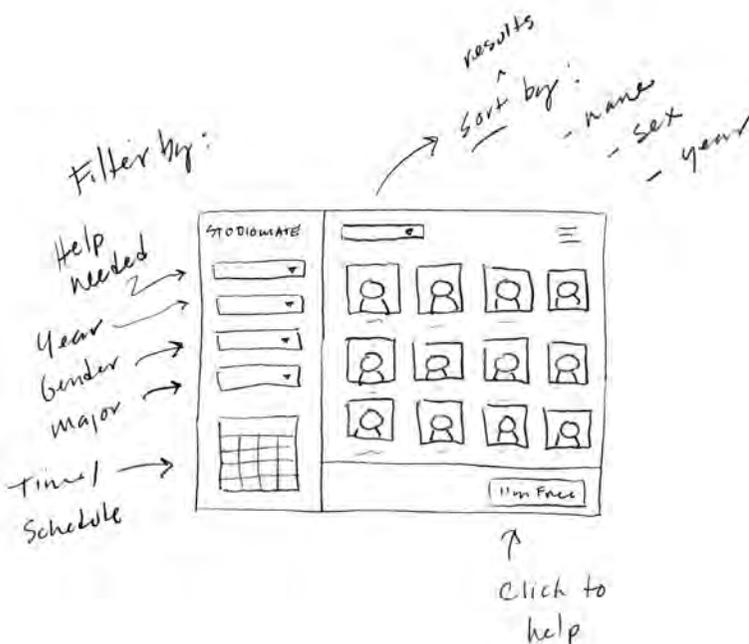


Fig. 6: Early thumbnail sketch for the Studiomate web interface.

With user personas, interviews, and interface research in hand, I began to develop wireframe mockups of my user experience. Again Stephanie Kane encouraged me, and others in her *Designing Interactive Experiences* class, to test our wireframes and to obtain early feedback on the design. After several rounds of testing I began refining the design, adding color and better typography to a more developed layout. At the same time, I began examining more formal research on peer learning and teaching (also referred to as cooperative learning). While there are certainly many benefits to peer learning, it also raises concerns among some educators. Below is an excerpt from *The Benefits of Peer Learning*, an article by Maryellen Weimer, PhD.

Peer learning gets troublesome for many faculty due to the idea that students are teaching each other. Isn't that our job? Students aren't paying all those tuition dollars to learn from other students and they aren't shy about saying as much. Students are paying to be taught





by experts. If we're not the ones teaching, we sometimes feel guilty ... What stands alongside those concerns is all sorts of evidence documenting that students can and do learn from and with each other. It's something they seem to understand intuitively, if not explicitly. When students have a question about something that's happening in a course, who do they ask first? Most of the time, it's not the professor. They talk to another student who answers the question, offers advice, shares information, or registers an opinion. That dynamic means that students are regularly learning from other students. (Weimer)

Fig. 7: Wireframes used to further develop and test the user experience flow and interface.

Weimer goes on to remind us that students feel safer going to a peer than to the professor. "Peers are equals, fellow learners. Professors know so much more that it can be intimidating." Moreover, there is a growing body of evidence that peer



studiomate.com

STUDIOMATE

I NEED HELP WITH:
SELECT HELP NEEDED

- FIND A HELPER
- PROPOSE A MEETING
- RECEIVE CONFIRMATION
- PROVIDE FEEDBACK

[LIST VIEW](#) | [HEADSHOT VIEW](#) | [STUDIO VIEW](#)

MEETING TIME *reset filters | more options*

FROM: 6:30pm UNTIL: 7:30pm

ON DATE: 11/25/2016 or BY DAY: DAY OF WEEK

FILTERS *reset filters | more options*

GENDER

MALE FEMALE NEUTRAL

MAJOR

GRAPHIC DESIGN ILLUSTRATION

RANK

FRESHMAN SOPHOMORES JUNIORS SENIORS STAFF



ANNIE VIGGH



JULIA MURPHY



ELYSSA IACOBELLO



BRENDA FARIAS



CZARINA SHARTLE



CONNER MCCORMICK



ALEXANDRA PACHECO



AMENDA WONG



SERENA MICHAUD

STUDIOMATE

I NEED HELP WITH: EQUIPMENT NEEDED

MEETING TIME: FROM: 6:30pm UNTIL: 7:30pm ON DATE: 11/25/2016 BY DAY: DAY OF WEEK

FILTERS: GENDER: MALE, FEMALE, NEUTRAL MAJOR: GRAPHIC DESIGN, ILLUSTRATION RANK: FRESHMAN, SOPHOMORES, JUNIORS, SENIORS, STAFF

EQUIPMENT NEEDED

COMPUTER

WHO WILL BRING EQUIPMENT

CHANGEMAKER/WORKSHOP

4:00 5:00 6:00 7:00 8:00

SOFTWARE: INDESIGN

FRIDAY, NOVEMBER 25, 2016

MORIAN RODRIGUEZ
GRAPHIC DESIGN
JUNIOR

Note: You will receive a confirmation once your appointment is confirmed. Your qualifications/ preferences can be updated in settings.



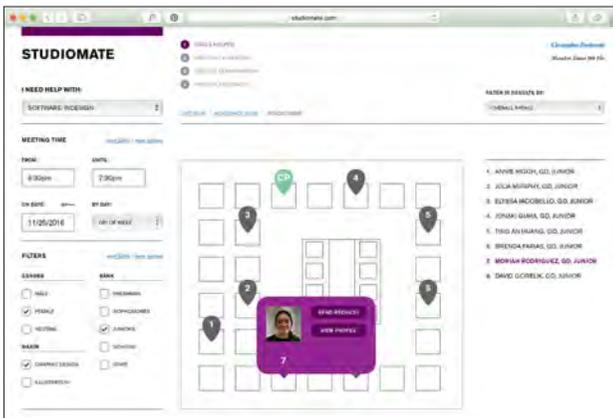
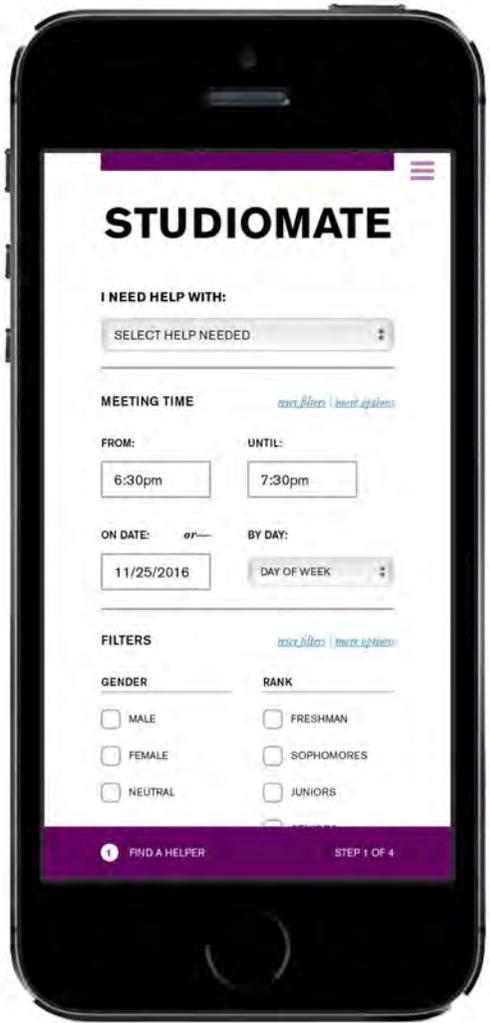


Fig. 8: (Previous Page) *Studiomate Phase 1 interface design schemes.*

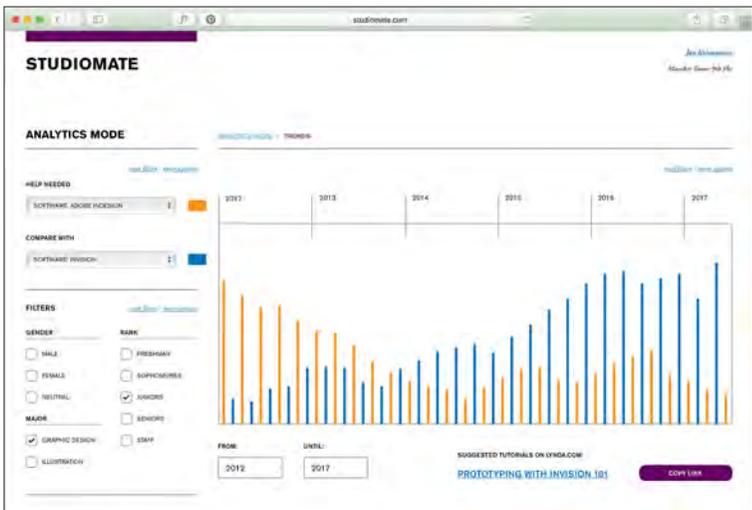
Fig. 9: (Below) *Studiomate administrative analytics mode.*

Fig. 10: (Top Right) *Studiomate Phase 1 mobile app welcome screen.*

Fig. 11: (Bottom Right) *Photo with our Studiomate app developer Dominic Laudate.*

learning and teaching is extremely effective for a wide range of goals, content, and students of varied levels and personality types (McKeachie and Svinicki 193). In my own experience, I have found that one of the best ways to learn something is to teach it. That said, as is mentioned earlier there is still a pervading fear in higher education that peer learning can and will lower educational quality.

This research directly informed many of the features I envisioned for *Studiomate*. Notably, I envisioned administrative analytics capabilities (FIG. 9), whereby educators and administrators could view a sortable database of “help requests.” This data could help educators to understand and address the shifting interests and broad needs of students. A design educator, for instance, would have insight into concepts that students are struggling with, or into the types of design software which students are interested in using, at which levels, and for what types of projects.



////////////////////

INTERACTION

Like *Critiquemate* and *Lecturamate*, *Studiomate* was developed as speculative software and visualized in an approximately three-minute video abstract. But, unlike the first two projects, *Studiomate* has entered into a second phase of research and development. In a class called *Designing Mobile Applications*, and under the direction of Professors Martha and Pascal Rettig, a slimmed-down version of *Studiomate* was refined, coded and submitted to Apple's iOS app store. For this second phase, I am teamed with Robert Hamill, who is helping to further the design, and Dominic Laudate, an undergraduate Computer Science major at Wentworth Institute of Technology who is doing the coding.

In the video abstract, I demonstrate the ability of *Studiomate* to connect a person who needs help with a peer who can provide it. At the core of my Phase One interface is the "I need help with" menu which contains a programmable list of topics. In the abstract, I use the MassArt's Communication Design "CD" studio as a setting for this peer exchange. The



Fig. 12: (Bottom) MassArt Graphic Design students in a peer learning session.

Fig. 13: (Right) Help request notification sent by Studiomate.

CD studio is full of graphic designers and illustrators, so the topics programmed by the studio manager and the sharable skills offered by the students reflect the particular interests of the CD studio.

Once users initiate a search for peer support, they can further filter results by major, gender, year, and proposed meeting time. They can then sort the matches by name, peer ratings, and other criteria with the results shown in real time. *Studiomate* users can browse potential helpers in three view modes: headshot view, list view, and studio view. Each view displays a user rating for the available peer teachers. I envision the ratings as similar to five-star seller ratings on eBay or product reviews on Amazon.

When a user finally chooses a peer instructor, a notification is sent to the instructor asking if he or she is available for the meeting, asking for a time and location that works best. If approved, a notification is sent back to the user who made the request and the meeting is set. *Studiomate* allows users to log in at any point to cancel or reschedule a meeting.





Verizon

4:12

Friday, October 14

MESSAGES now

759-73

Hello Moriah. Your studiomate Chris needs some help with InDesign. Could you meet on 11/25 from 6:30pm to 7:30pm? Reply Y to accept, N to deny or click this link for more info: [studio.mt/1Ms42](#)

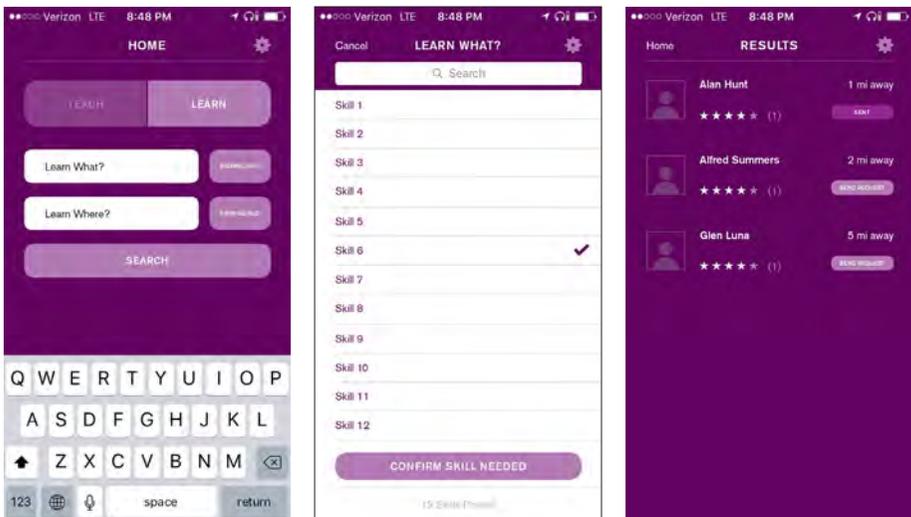
Slide for more

Fig. 14: (Below) Simplified Phase Two Wireframe layout for *StuDiomate*.

2 The term was coined and defined by Frank Robinson in 2001, and was further popularized by Steve Blank and Eric Ries (“Minimum Viable Product”).

For Phase Two of the project, the Rettigs encouraged our *StuDiomate* mobile app team to scale features down to what they called a minimum viable product or “MVP”². In software development, the minimum viable product possesses just enough features to gather validated user feedback to inform about the viability of the product and its continued development. An MVP allows the mobile app team to gather insight into the user experience without the risks and increased costs of adding more advanced features.

For our MVP, my team scaled down the existing app interface to focus on two essential components of the *StuDiomate* user experience: teaching and learning. In the first version of our *StuDiomate* mobile application, users can contribute to a database of searchable skills to be learned. Users who would like to teach can also designate their desired meeting places, which then allows other users to search for mentors in close proximity. One of my teammates recently suggested we adopt the tagline, “Your next door mentor,” which captures the essence and simplicity of our stripped



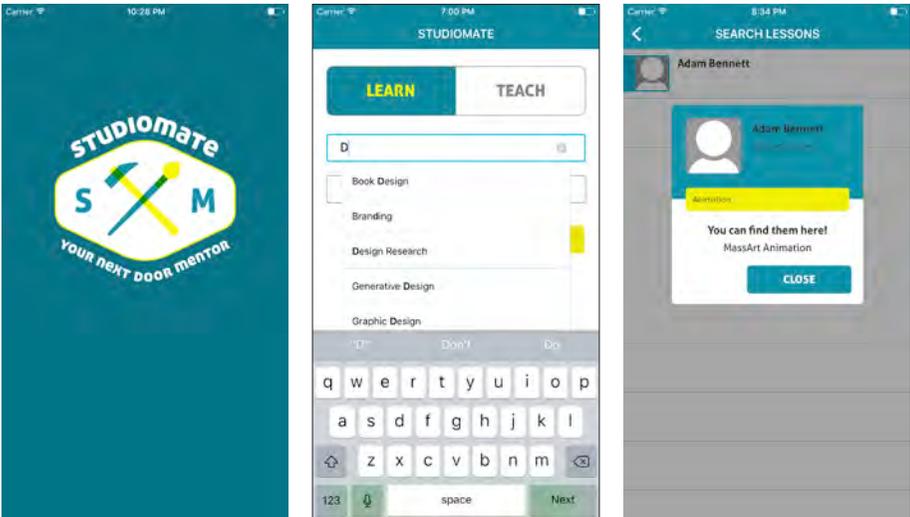


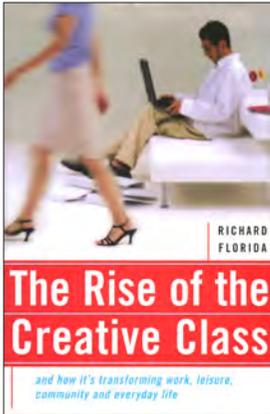
down application. Necessarily, for this MVP we had to forego many of the features I had imagined in my video abstract. For example, the actual scheduling of the meetings and the meeting locations would be left to the two users to complete over email; this prototype version of *Studiomate* focuses solely on making initial matches between teachers and learners. On May 2, 2017 our submission to the Apple App Store was approved and *Studiomate* can be downloaded for free on iOS devices.

CONCLUSION

While it would be a mistake to assume that everyone benefits from the same types of learning exchanges, I've always enjoyed one-on-one, in-person exchanges. For me, this format provides a focus, intent, openness, and clarity that is often lost in other teaching and learning formats. In my graduate studies, I have had many of these one-on-one sessions with my thesis advisors and consistently walk away with new insights, helpful feedback, and focus. I've also been fortunate to have one-on-one project support, on a monthly basis, from my younger brother Jeff,

Fig. 15: (Below) Studiomate 1.0 submitted to Apple's iOS App Store.





who is also an alumnus of MassArt's undergraduate Graphic Design program. Jeff has become a talented front-end web designer, with coding skills that far exceed my own. As a faculty member in the Graphic Design department, I often direct my students towards online tutorials such as those offered on Lynda.com. But, in my experience, what seems to take me a day on Lynda is accomplished in an hour-long, in-person session with Jeff.

Studiomate comes at a time when creativity, design, collaboration, and interdisciplinary interaction are increasingly coveted cultural and pedagogical qualities in both academia and industry. In 2002, Richard Florida released the national best-seller *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community, and Everyday Life*. In his book, Florida traces a fundamental theme that runs through a host of seemingly unrelated changes in American society: the growing role of creativity in our economy. Below is a summary from Florida's website:

Millions of us are beginning to work and live much as creative types like artists and scientists always have. Our values and tastes, our personal relationships, our choices of where to live, and even our sense and use of time are changing. Leading this transformation are the 40 million Americans – over a third of our national workforce – who create for a living. This “creative class” is found in a variety of fields, from engineering to theater, biotech to education, architecture to small business. Their choices have already had a huge economic impact. In the future, they will

Fig. 16: (Above) *The Rise of the Creative Class* by Richard Florida.

determine how the workplace is organized, what companies will prosper or go bankrupt, and even which cities will thrive or wither.

In this context, as Witkowski initially suggested, the notion of the “studio” and thus my proposed social-dynamic-media teaching and learning system becomes infinitely more flexible.

In our *Mobile Application Design* class, the Rettigs encourage us to do competitive research for our apps. Most of the applications in this space cater to STEM (Science, Technology, Engineering and Math) subjects, and specifically to students who are looking for help preparing for exams. Also, many of the apps, such as a more popular one called Prentis, are designed and directed towards paid tutoring. As our branding suggests, we are positioning the *Studiomate* app to the “creative class” that Mr. Florida describes. By doing so, we are asking our users to share their knowledge and, importantly, their skills, and to do so for free under the assumption that this will help foster strong creative communities. In this way we are also helping to shift the pedagogical dialogue from STEM to STEAM (the A is for Art and Design). STEAM is a movement championed by the Rhode Island School of Design (RISD) and has been widely adopted by institutions, corporations, and individuals. The objectives of the STEAM movement are to transform research policy to place art and design at the center of STEM, encourage integration of art and design in K–20 education, and influence employers to hire artists and designers to drive innovation (“What is STEAM”).

Amid a growing cadre of online learning platforms, *Studiomate* promotes physical meetings between two individuals within a proximal community. I theorize that the quality of these interactions, and the relationships, connections, and



Fig. 17: (Above) Prentis mobile app in the iOS App Store.

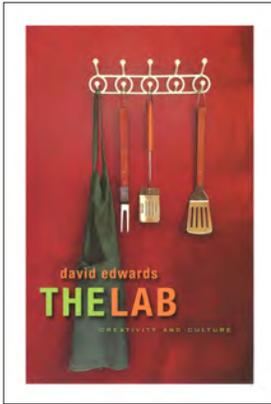


Fig. 18: (Above) *The Lab: Creativity and Culture* by David Edwards.

Fig. 19: (Top Right) *The Ten Faces of Innovation* by Tom Kelley.

Fig. 20: (Bottom Right) *Group Genius* by Keith Sawyer.

culture that they reinforce, would be enough to drive the reciprocity needed to make *Studiomate* work. As testament to this, and just as Robert Hamill and I began talking about a collaboration on *Studiomate*, a group of Seniors in the Graphic Design department stepped forward and contacted the department chair to start an official peer-mentorship program in the department. Thinking back to my own time as an undergraduate at MassArt, I am struck by how much I learned from my peers. I am reminded of Steven Cotroneo, an upperclassman who everyone “knew” could help them with their design work, learning new software, or technological troubleshooting. Cotroneo now leads a small design agency in Stoneham, MA, and frequently hires MassArt alumni. In the old days, you just had to be “in the know” to know about Cotroneo, but with *Studiomate*, these next-door mentors would be much easier to identify.

In her review of the 2010 book, *The Lab: Creativity and Culture* by David Edwards, Paola Antonelli, Senior Curator of Architecture and Design at the Museum of Modern Art says:

When artists and scientists come together, cheeks get rosier, voices go up a few notches, eyes sparkle. They are eager to learn from each other. Just as David Edwards maintains, true innovation cannot happen without culture, and it is time for this millennial truth to become a pillar of our educational system.
(back cover)

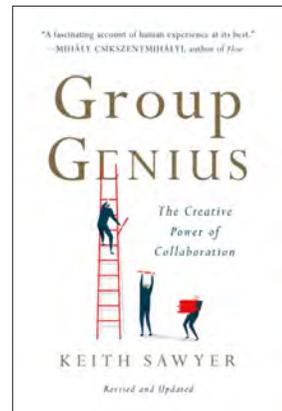
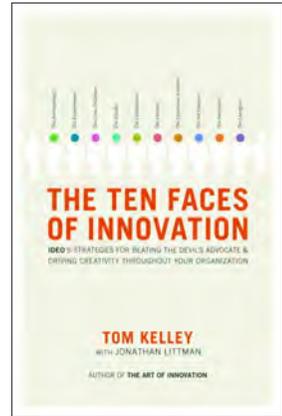
One gets the sense that Edwards would appreciate *Studiomate*. His book contains chapters on innovation, altruism, and “creative bands” upon which Edwards states that, “We create



best, and longest, when working with others who challenge, encourage, and generally help us better articulate and develop ideas” (Edwards 153).

In *The Ten Faces of Innovation*, Tom Kelly, of the celebrated design consultancy IDEO, describes the roles of “the cross-pollinator” and of the “collaborator” as two of ten broad roles that he suggests can drive creativity throughout organizations. In the book, Kelly states that most companies he consults with with talk about cross-pollinating across organizational lines and “blasting through the silos,” although in practice many of them have trouble doing so (Kelly 70). I postulate that social and dynamic media could help break down these boundaries. With *Studiomate* I am experimenting with the idea that when it comes to learning something new, one might start by using a technology-mediated system to help seek out people nearby for help. Beyond this, I believe *Studiomate* might help foster increased overall creativity. While it may seem axiomatic to designers, in *Group Genius* Keith Sawyer states that, “Collaboration makes the mind more creative.” Furthermore he states that:

Working with others gives you new and unexpected concepts and makes it more likely that your mind will engage in the most creative types of conceptual creativity—combining distant concepts, elaborating concepts by modifying their core features, and creating new concepts ... Collaboration brings distant concepts together; it makes each individual more creative; and, most important of all, the emergent results of group genius are greater than those any one individual could think alone. (Sawyer 124-125)



3 Learning experience design may have been coined by Connie Malamed, a learning experience designer, in 2015 (“Learning Experience Design”).

Working on *Studiomate* has introduced me to emerging concepts and dialogue around peer teaching and learning. Once our mobile application is released, I am excited to explore these concepts further and to gain further understanding through the user feedback we will receive. As with *Critiquemate* and *Lecturemate*, this last project has shifted my role as a graphic designer who merely organizes information to one that considers how we manage and transfer knowledge. Unlike the experimental case studies that came before them, these three speculative projects occupy a new space at the intersection of experience design, interface design, information architecture and instructional design. I propose the terms *knowledge architecture* [as opposed to information architecture] or *learning experience design*³ (LX) [as opposed to user experience design] to describe the process of conceptualizing and designing these projects.

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Conclusion

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A Comprehensive View



CONCLUSION



C

Conclusion

In the fall before I applied to DMI, my former MassArt design history professor, Professor Emeritus Al Gowan, sent me an early copy of his book, *Victor Papanek: Path of a Design Prophet*. Papanek (1923–1998) was a pioneer of socially and ecologically responsible design. In reading Gowan’s manuscript, I came across Papanek’s famous quote, “Design has become the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself).” This led me to ask myself, “If I were to more broadly explore and share the power of design, where would I start, and how would I approach it?” At the time I was also becoming more interested in design education, and specifically how graphic design as a profession was continually shifting and expanding in the information age. These were the driving questions and concerns that led me to pursue an MFA in dynamic media design at MassArt.

Nearly two years later, as I near the completion of my studies in the DMI program, I am now reflecting back on the questions and concerns that originally brought me here. Aristotle held that there were three basic activities of humans: *theoria* (thinking), *poiesis* (making), and *praxis* (doing). Corresponding to these activities were three types of knowledge: theoretical, the end goal being truth; poetical, the end goal being production; and practical, the end goal being action. DMI has afforded me the time, space, and support for all three of these activities and knowledge types. The program’s rare pedagogical combination of experimenting, theorizing, making, writing, and testing has allowed me to unearth deeper questions, and this has led to the development of both speculative and applied solutions.

In the past two years, I have produced numerous experimental projects, including a series of seven in-depth case studies that explore the intersectionality of design and learning. Again,

Fig. 1: (Right) Working with Martin Duff, an exchange student in my Typography II class at MassArt.



my work became particularly inspired by a passage written by Professor Gunnar Swanson of East Carolina University, who proclaimed that, “We must begin to believe our own rhetoric and see design as an *integrative* [emphasis added] field that bridges many subjects that deal with communication, expression, interaction, and cognition.” These four interconnected areas described by Swanson (communication, expression, interaction, and cognition) became the four interconnected “themes” I explored in the context of my DMI research. These themes are the common thread that unifies all of the projects described in this book.

In my case study for *The Perfect Character*, I quote a 2013 essay by MassArt Professors Jan Kubasiewicz and Brian Lucid which states, “In the past few decades the communication design profession and its supporting educational programs have been required to shift their focus—and vocabulary—to remain relevant and appropriate in the context of new technologies” (Satalecka 147). This statement encapsulates the ongoing shift that I also find deeply fascinating, wherein Kubasiewicz and Lucid allude to a broader “communication design” profession. Of equal, if not greater, significance to my DMI research is their inclusion of, “its supporting educational programs.” Examining and imagining responses to these shifts in graphic design education became the focal point for my research and work in DMI. My DMI projects have largely focused on the design of learning experiences and, more specifically, on the possibilities offered by new technologies. I chose to further narrow my focus on teaching experiences in art and design education.

With each project and case study presented in this book, I have considered not only what is gained through the use of dynamic media in these learning experiences, but also what is potentially lost. For instance, while *Studiomate* emphasizes the



potential benefits from peer-to-peer learning, there is well-founded concern¹ that, without serious consideration, such informal learning could overall erode the quality of individual learning and educational institutions. In the case of *MetaPieces*, I acknowledge the concern that interactive learning elements in museums, if left unchecked, could degrade the contemplative atmosphere of traditional art museums². With each project, I have been afforded the time, space, and support to process each project within the full framework of Aristotle’s three ideals: thinking, making and doing.

1 See pages 176–177.

2 See page 75.

All seven projects present opportunities for further development. How, for instance, would *Isabella* play out if it were actually installed in the Gardner museum, and what production challenges would I face in mounting such an installation? Beyond these project-specific questions, I have become more curious to understand the pedagogical structure of the DMI program itself. Later in their MOTYF essay, Kubasiewicz and Lucid describe the DMI program as “anti-disciplinary” (Satalecka 152). This is indeed reflected in the program’s wide variety of student backgrounds, research, media, and projects. This plurality and dynamism (the students bring forth the challenges, contexts, and content), and in particular how it connects to the education of a 21-century communication designer, is what first attracted me to the program, and what is most exciting to consider further as I depart. If anything has changed, it is my view towards, and excitement about, the role of the design educator as a facilitator or “designer” of learning experiences. Guided by this interest, I have accepted an offer for a tenure-track position teaching graphic design at Merrimack College. It is Merrimack’s commitment to developing more interdisciplinary studies, and in the process creating an *Interdisciplinary Institute*, that first drew me to this

position. Below is a summary of the Institute and some of its objectives:

The Interdisciplinary Institute at Merrimack College embraces the potential for new knowledge, new ways of understanding, and new insights on complex questions that can come from integrating the theoretical and methodological approaches of more than one field of study. To address the pressing and complicated questions of the 21st century, the work of this institute combines the research approaches, skills, and perspectives of such fields as visual and performing arts, history, philosophy, psychology, sociology, economics, women's and gender studies, biology and many others. The Institute similarly embraces work that recognizes the importance of intersectionality (the way in which various political, social, and cultural identities shape experience and knowledge) and social justice. ("Interdisciplinary Institute")

I believe my DMI thesis—and its broad research focusing upon communication, expression, interaction, and cognition—has positioned me well to contribute to Merrimack's *Interdisciplinary Institute*. Moreover, my new position will allow me to explore Professor Swanson's notion of design as a integrative field that bridges many subjects. Also of interest at Merrimack is their *Center for Excellence in Teaching and Learning*. With my growing interest in education and learning experience design (LX), I hope to seek support for further research into creative

environments, multimodal interactive learning and assistive learning technologies: all topics I just touch on briefly in my case studies.

Before writing the book on Papanek, Professor Gowan was just finishing a tour for his book *Shared Vision: The Second American Bauhaus*, which chronicles his experiences in the design department at Southern Illinois University. While there, he studied with Buckminster Fuller and Harold Cohen, who in 1955 brought László Moholy-Nagy's Bauhaus philosophy south from Chicago to Carbondale. In the introduction to Professor Gowan's book, John Cataldo, who first hired Gowan to teach at MassArt in 1976, remarks "I hired Gowan because we agreed that a comprehensive view of design must be nurtured to fight the increasing specialization that the field seemed to be taking. That vision, that animated [Gowan's] career and my own was born in Carbondale." In some ways the views and interests that have led me to pursue a graduate degree were actually shaped long ago in places like Carbondale and then much later at MassArt and DMI. Moreover, I believe the "comprehensive

Fig. 2: (Below) Photo following a graphic design teaching demonstration at Merrimack College.



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3 A wicked problem is a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. The term was coined in 1973 by Horst Rittel and Melvin M. Webber. (“Wicked problem”).

view” that Cataldo cited can now be extended further beyond core design disciplines and into even more domains.

Design is now being called on to address the increasingly complex, or “wicked³,” 21st-century problems we face. While my work at DMI focused largely upon the design of learning experiences, I am excited to see how I can further use design education, dynamic media and interdisciplinary education to address the many challenges that lie ahead.



CONCLUSION | WORKS CITED

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