2017 Conference Proceedings

Edited by Andre Murnieks and Rebecca Tegtmeyer

MODE

Motion Design Education Summit

ROUTLEDGE

A **Focal Press** Book

About MODE'17

From The MODE Organizing Committee

The Ohio State University, University of Notre Dame, Kent State University, Michigan State University, California Polytechnic State University, Indiana University, and Brigham Young University jointly present the 3rd MODE Summit. This event brings together motion design educators from different areas of expertise to present work and discuss motion and how it enhances, affects, changes messages, meaning, and communication. The conference takes place in Columbus, Ohio, 07-09 June 2017 at The Ohio State University and the Wexner Center for the Arts.

MODE gathers design professionals, educators and students who specialize, research and teach in the area of motion design. We see this event of particular interest and relevance to graphic design, visual communication design, typography, cinema, theatre, animation and storytelling. Together we explore the growing field of motion design and the need for scholarly driven literature and examples to support and challenge educators.

We feature papers that explore different aspects of Motion Design education and practice. Upon acceptance, the work is destined to be part of a peer reviewed anthology of motion design materials published in the conference proceedings. Keynote speakers for the conference may also be featured through editorial reviews by the MODE organizing committee in a second edition of these proceedings.

The 1st MODE Summit took place at the University of Notre Dame in South Bend, Indiana in May 2013. The 2nd MODE Summit was held in in Dublin Ireland at the Royal Irish Academy and O'Connell House in June 2015. Conference attendees came from a wide range of academic institutions and international locations. We are building on the momentum created in 2013 and 2015, as motion design educators continue to discuss, share, and examine the field collaboratively.

Call for Proposals

Add your experience and expertise to the discussion on motion design. How do you use motion as a method for the dynamic delivery of information, storytelling, education, persuasion, motivation, interaction, entertainment, expression and ephemera? Papers and presentations pertain to one of the following areas of motion design:

Practicing

Professional case study of effective motion design work(s) for corporate, institutional, philanthropic, collaborative or artistic intent.

Teaching

Detailed descriptive summary of innovative pedagogical strategies, philosophies, curriculum, and outcomes pertaining to motion design education.

Theorizing

Scholarly academic paper on history, critique, research, analysis, processes, application of motion design.

Visualizing

Presentations on strategies or best practices in using motion to translate data into a visual form that enables understanding or affords decision making.

Projecting

8x8 extended abstract and rapid-fire series of 8-minute presentations on an intriguing, motion-related, boundary-crossing topic.

Motion Design Education (MODE) Summit

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PAPER CATEGORY: THEORIZING

Between Film and Writing: Long-form Hybrid Storytelling in Digital Space

Dimitry Tetin

State University of New York at New Paltz

Abstract: The relationship between text and moving image in digital long-form interactive features and other emerging hybrid formats, its effect on the construction of meaning and the structuring of the narrative is constantly evolving as technology develops more immersive ways of storytelling.

This paper will examine the contexts and implications of the evolution of text, image and motion in digital long-form storytelling. It will survey the following areas within this hybrid medium: relationship between viewing and reading, the role navigation, rhythm, editing, and loops play in generation of meaning within the structure of the narrative. It will also discuss the accessibility of the medium as designers are starting to successfully self-publish their own media-rich narrative works online.

Understanding shifts in function of basic storytelling tools and contexts will help practicing designers, journalists, content-creators and students use emerging technology to advance new ways of combining text, image and motion in online spaces.

Keywords: animated GIF, film essay, interface design, long-form, loop, motion typography, multimedia, narrative

Introduction

"Snow Fall: The Avalanche at Tunnel Creek" was published by the *New York Times* in 2012. It was written by reporter John Branch and featured a multi-chapter narrative integrated with full-width video, photography, animations, and informational graphics. It received more than three million page views and won a Pulitzer Prize in Feature Writing for its "deft integration of multimedia elements" (Romenesko, 2012). It was widely praised as a prototype for the future of successful online journalism (Sonderman, 2012), but also derided for distracting the readers with too many multimedia "bells and whistles" (Manjoo, 2013). Although the *New York Times* has produced the most highly visible and sophisticated long-form interactive features, publications like *Pitchfork, Washington Post, ESPN, Complex, Sports Illustrated, Wired*[1] have also published long-form digital stories, contributing to the emergence of this hybrid format. Platforms like Medium and Atavist[2] provide access to templates that open the creation of similar experiences to the general public.

The majority of discussion around this emerging format has focused on the high production costs of creating graphics, videos, and custom scrolling behaviors (Sullivan, 2013); whether the format is an unnecessary and passing design trend enabled by advances in web technology (Manjoo, 2013); or the technical concerns of how authors and designers achieve the "immersive" (Kearney, 2017) and "cinematic" experience of the interactive features (Sonderman, 2012).

The goal of this paper is to unpack the definition of "cinematic" in the context of digital long-form storytelling. It will examine the relationship between active reading and passive watching that is integral to the experience of long-form stories. Specifically, it will look at how content is communicated visually through the relationship of text with still and moving images and use of motion in scroll-behaviors, autoplay video and loops.

Moving while asleep: a distant precedent

Although long-form digital packages vary in design, they usually share common attributes: generous white space, well-considered typography, scroll-based behaviors, photography and video that spans

the full-width of the browser window. When discussing the design of long-form stories at the *New York Times,* Graphics Director Steve Duenes talked about the integration of "multimedia video and motion graphics in ways that made them feel like they were part of the body of the story, and not just side bars." (Greenfield, 2012) The publication uses full-width visuals that break apart the single column of text, avoiding segregation of text and image common to the majority of publication's articles in the context of the web (Figure 1).

Figure 1: Side-by-side comparison of a layout of a regular New York Times article with the first page of Snow Fall. Source: Sonderman, 2012.

Integrating images into the flow of a single column of text that is characteristic of contemporary web design was used by British designer Richard Hollis in 1972 to translate the content of John Berger's TV Show, *Ways of Seeing,* into book form (Figure 2). Berger's documentary discussed the way ideologies that are part of traditional aesthetics of Western culture shape how we look at art in the contemporary era. The format of the show consisted of Berger either addressing the camera directly or talking to the audience through voiceover while relevant images were shown on screen. For inspiration Hollis relied on a book *Commentaries* that collected scripts and stills from documentary films of Chris Marker, designed and published ten years earlier by the author (Marker, 1966). Discussing the influence of Marker's design, critic Rick Poynor quotes Hollis: "As you read [Commentaires] you knew exactly what was being talked about. It was a substitute for description: instead of talking about something, you show the objective visual evidence. That's how I wanted to do *Ways of Seeing,* rather than have images by the side or text followed by a page of images." (Poynor, 2014)

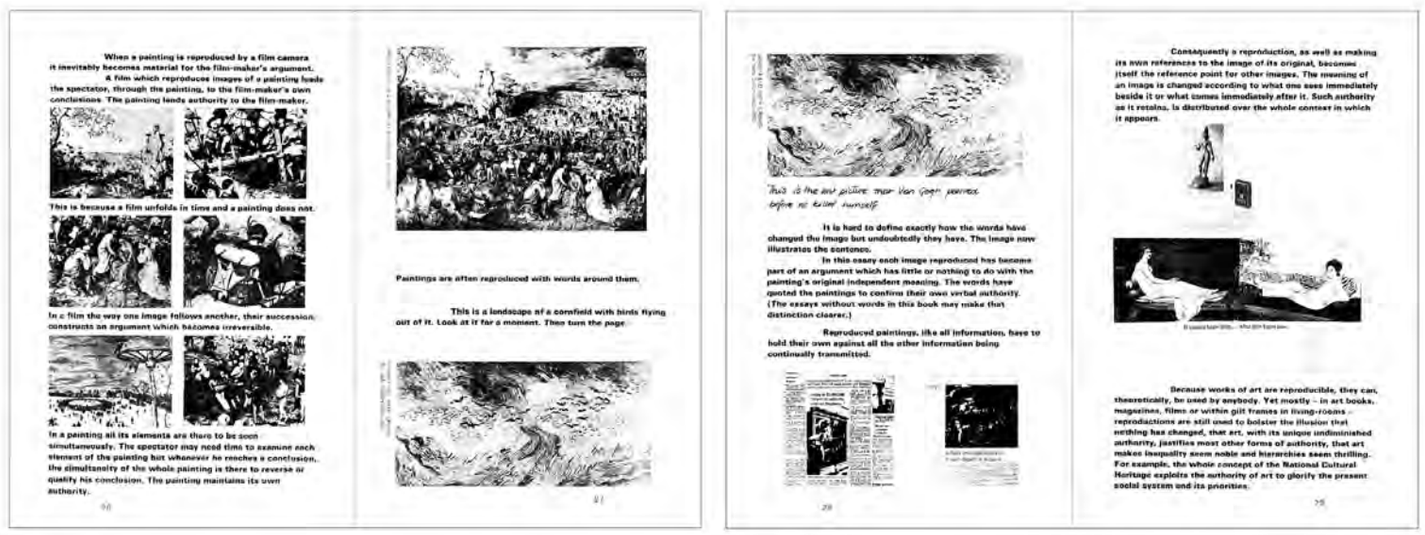

Figure 2: Spreads designed by Richard Hollis for John Berger's Ways of Seeing. Source: Berger, 1972.

Chris Marker's body of work can be interpreted as a constant interrogation of how text and image work together to construct meaning. He is one of the best known practitioners of the film essay—the genre that exists between literature and film. Although

similar to documentary films, the narrator of the film essay does not just offer an objective description of what the camera is seeing, but presents an independent voice that speaks with weight equal to the images and sound, the traditional storytelling tools of film. The film essay often features narration over long takes of footage that match the slow meditative thinking of the author as they pursue their line of inquiry through imagery and language.

Marker's *Sans Soleil,* the most well-known representative of the film essay genre, opens with a shot of passengers aboard a ferry speeding across the water—most of them in various states of falling asleep, as the author begins his meditation on what it means to remember in the early digital era. (Marker, 1982) The passengers carried by the ferry in the film are analogous to Marker's audience, lulled to a state of wakeful sleep with the visual beauty and slow pace of the images while being relentlessly moved along by the language of the narrator (Figure 3).

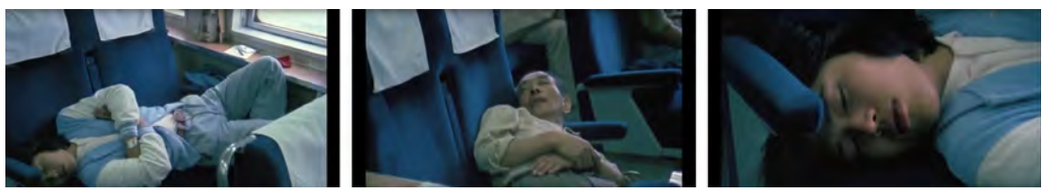

Figure 3: Stills from Marker's *Sans Soleil:* "Rich and hurried Japanese take the plane, others take the ferry: waiting immobility, snatches of sleep … He liked the fragility of those moments suspended in time: those memories whose only function being to leave behind nothing but memories." Source: Marker, 1982.

While the film medium can be characterized by its oneiric quality, the immersive experience of watching a film essay —at once active and dream-like—is similar to interacting with digital long-from stories online. The strong parallel between the use of visuals and language in the film essay and long-form digital narratives is reinforced by Duenes of *New York Times,* who says the goal of "Snowfall" was to "find ways to allow readers to read into, and then through multimedia, and then out of multimedia. So it didn't feel like you were taking a detour, but the multimedia was part of one narrative flow." (Sonderman, 2012)

Navigating long-form

Stories like the *New York Times'* "Snowfall," "A Game of Shark and Minnow," (Himmelman, 2013) and "Jockey" (Bearak, 2013) feature a unified narrative that drives the reader through the story. The primary engine of navigation through the story is scrolling down, but there is also a fixed index at the top of the browser to help access different sections of the stories. Although there are several paths that a reader can take to navigate the text and access the multimedia, there is an intended sequence that determines the order of the elements and the way scroll-based interactions are timed. Content is generally exposed, its verticality acting as a timeline, used by the reader to navigate through the story. In majority of time-based media like film, video, broadcast and music the timeline is exposed during the editing of the work, but is concealed while the piece is being played.

Writing at the beginning of the 21st century, multimedia theorist Lev Manovich, defined a "new media object" as consisting of "one or more interfaces to a database of multimedia material." (Manovich, 227) The interface of the long-form stories (scroll, index) is constructed to mirror the traditional structure of a linear narrative that helps the reader navigate from the beginning to the end. In contrast, the reading and interaction experience is fundamentally non-linear in *Scaled in Miles,* an interactive visualization from Fathom Information Design that gives readers access to information about almost 600 of Miles Davis' collaborators over the course of more than 400 recording sessions (Figure 4). Although it is possible to navigate the information from the first session to the last, the interface gives the option to access the historic information and audio of the recording based on the name of the collaborator or through search terms. *Scaled in Miles* is closer to what Manovich calls a "hypernarrative" — an interactive narrative that is the "sum of multiple trajectories through a database." Long-form packages from the New York Times and other publications are truly a hybrid between interactive hypernarratives and traditional linear narratives because they aggregate a number of different interactive features like graphics, video, data visualization and sound into the flow of the narrative.

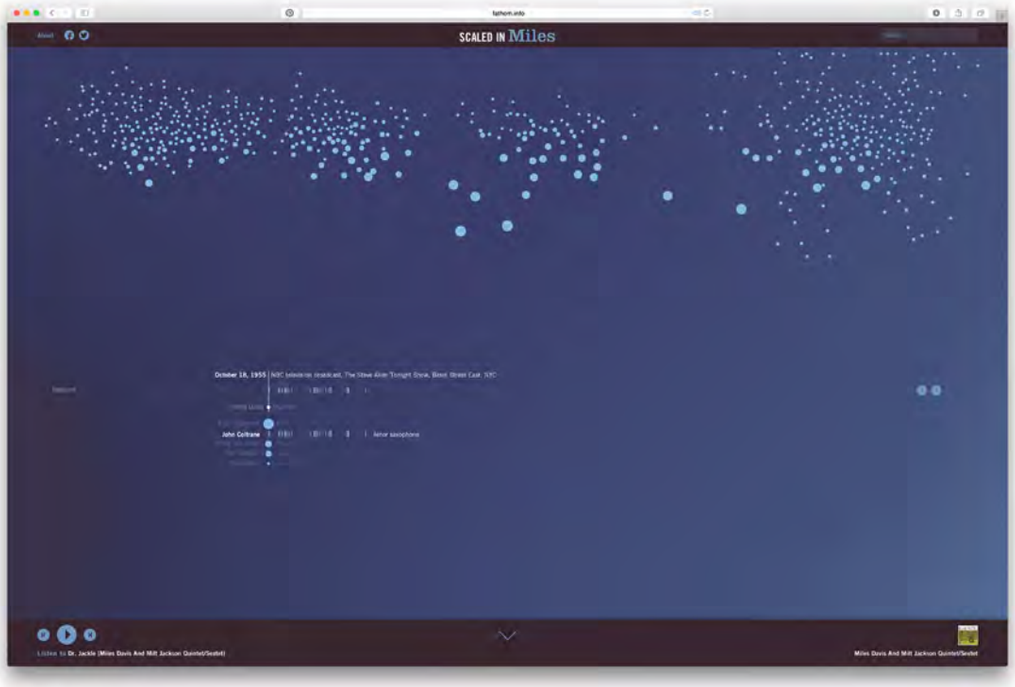

Figure 4: Interface from *Scaled in Miles.* Source: Fathom, 2014.

Rhythm and editing in long-form

In BBC's long-form feature about Brazil's Cristo Redactor, "Arms Wide Open" (Bowater, Mulvey, Misra 2014), beautiful full-width establishing shots alternate with lengthy passages of text and smaller photographs in a two-column layout, establishing a sense of rhythm that is much closer to a presentation of a magazine rather than a motion graphic or a documentary film. In print and online long-form the reader is more actively engaged in the act of reading. Writing about the difference between broadcast and print typography, designer, writer, educator Michael Worthington summarizes: "... [In broadcast] the story is being read to us, in a particular voice and in the latter [print] we are doing the reading ourselves." (Worthington, 39) The meaning of the story in long-form is communicated primarily through the act of reading, different from film and video where it is generated by the action in front of the camera and the sequencing of shots in the edit. (Tarkovsky, 117)

The typography in many online narratives still moves: paragraphs of text appear at the bottom of the browser and disappear at the top, blinds wipe off to reveal the type in "Mind Control," a profile of Janelle Monáe (Batttan, 2013), pull quotes animate like computer code in "Daft Punk: Machines for Life," (Dombal, 2013), labels fade on and off on maps in "A Game of Shark and Minnow" by NYT (Figure 5). Animation is restrained and carefully timed to facilitate the reading of the narrative and avoid disruption. The timing can break down and interfere with the reading as was the case in *Pitchfork's* "Glitter in the Dark" (Snapes, 2012) where users have to scroll through an overwhelming strobe-like sequence of photographs of Natasha Khan while reading the story. Although arranged in a similar layout to "Glitter," the reading experience of profile of Mac Demarco "Mannish Boy" is more manageable because of the constraint of the slow motion cinemagraphs that accompany the text (Figure 6).

Figure 5: Typographic animations in pull quotes and labeling text in: "Mind Control," "Machines for Life," and "A Game of Shark and Minnow." Source: Batttan, 2013, Dombal, 2013, Himmelman, 2013.

Figure 6: Sample layouts from "Glitter in the Dark" and "Mannish Boy" by *Pitchfork.* Source: Snapes, 2012, Minsker, 2012.

Loops and meaning in long-form

Looping animations are often used within the body of long-form stories by the *New York Times* and *Pitchfork*. In "Snowfall" the wind blows across the crust of snow, in "A Game of Shark and Minnow" a man is shown standing at the bow of a boat as it speeds toward an open sea. These animations, placed at front of the package, open the stories and contribute to the "cinematic" effect of the narratives. They are also criticized for distracting readers from the story, and autoplay video is condemned on the web for its association with ads (Sternberg, 2013). Videos in the above stories do much more than contribute a "cinematic atmosphere." Motion adds another layer of meaning, communicating a sense of place that emphasizes the main themes of the stories. The opening screen of "Snowfall" could have been a still photo but the animation adds a sense coldness and desolation that enriches the package. *Pitchfork's* purposeful animations of Demarco and Monáe communicate the musician's personality to the readers through slight gestures and facial expressions, not only seducing the reader with technological "bells and whistles" but helping them form a stronger emotional connection with the subject and the story.

The looping GIF has been an important storytelling device on the web since the end of the 20th century (Johnson, 2015). In addition to a myriad of contexts that GIFs inhabit, they have become instrumental in translating television content to the web. The Tumblr page of *Tonight Show Starring Jimmy Fallon* is updated daily with captioned GIF sequences that communicate the comedy through the movement of the host and his guests and concise language in the lower third of the frame (Figure 7). Manovich sites the loop used in Edison's Kinetoscopeas as an early precursor to the narrative cinema. It was because of maturation of the cinema and its alignment with the Western model of linear progression through life that the loop was "banished to the low-art realms of the instructional film, pornographic peep-show, and animated cartoon." (315) Besides the internet, the loop has reasserted itself as a dominant driver of the narrative in video games where the character has to participate in a series of loops in order to gain knowledge and advance through the story. One quality that is often attributed to looping animations is that they are hypnotic (Alexander, 2011) and engender passive viewing: the reader scrolling through a Tumblr page reenacts the role of a character in a video game moving through the narrative by passing through a series of loops. Typography in narrative GIFs has to remain static to communicate what was said during the scene while the looping animation tell the story through movement. The rhythm of active reading that alternates with dream-like effect of images moving through animation or scroll is a defining characteristic of online narratives as well as the interface of social networks. Although it is similar to ideas of rhythm and pacing in sequential page design or film editing, it is defined by simultaneous reading and watching images move. The delicate balance of the temporary user-controlled stillness of print and the motion of images is key to this hybrid medium. Taking control of the reading experience away from the audience by animating typography using techniques from broadcast would upset this delicate balance.

Figure 7: Animated GIF translating broadcast content to the web. Source: T*onight Show,* 2016.

Kinetic typography that translates the experience of hearing language into visual form using scaling, choice of typeface, panning and rotation, that could bring a visual dimension to a podcast would be an absurd treatment for a long-form story. Animation in long-form digital stories is closer to the work being done in the field of interface animation, adding to the "feel" (Head, 8) and emotional engagement of the story, helping to tie experiences together by creating a consistency of elements including motion, layout, color scheme and typography.

Production costs and conclusions

It is important to mention production concerns in the context of discussion of long-form packages. The high level of production has been a consistent part of *The New York Times* brand has resulted in the dismissal of their long-form stories as too expensive to produce, especially in the context of shrinking newsrooms (Manjoo, 2013). While in many cases interaction with the story relies on code to translate user actions to behaviors on screen, enough tools exist for anyone interested in creating long-form digital content to do it without a large team. For example, a template platform like Atavist is designed for writers and publishers to create deep, media-rich content with embeddable maps, tables, charts, full-width video, audio, parallax scrolling, slideshows.

Designers Jessica Hische (Hische and Essmaker, 2012) and the team of Jessica Walsh and Timothy Goodman (Walsh and Goodman, 2013) have launched successful projects in the long-form format with small groups of collaborators. Both use scroll-based interactions as a tool to communicate change that took place over time in stories of courtship. The success of both projects is important because it is an example of designers self-publishing their own media-rich narrative works online. In particular, "40 Days of Dating" was translated from long-form to "older" formats like the book and broadcast in a reversal of publishing model used by book publishers and film studios. It is likely that publishers like the *New York Times* and brands (Kearney, 2016) interested in using the long-form format to engage their audiences will continue to contribute to innovations in the medium. However, contemporary designers and illustrators with training in visual design, narrative construction, animation and web design are uniquely positioned to take advantage of the hybrid medium of long-form digital storytelling to publish their own content and contribute to development of the medium.

While digital long-form's predecessor, the film essay, faded away due to postmodernism's preference for a multitude of points of view in favor of a singular perspective of the auteur, (Lopate, 253) the medium is positioned for future success precisely because it offers a unity of vision, purpose and voice in the time of cacophony of content competing for the reader's attention. As web-based user-interaction technology continues to develop, understanding the balance between reading and viewing that is at the root of this hybrid medium will remain paramount in the development of long-form digital content.

Notes

1. Editor of Matter, Bobbie Johnson, maintains an excellent list of stories in this format at docs.google.com/spreadsheet/ccc?key=0AnWYxsUNHS4FdGVYMnpkdGdTNTU0RS1SX-zktcnZwRWc&usp=sharing. All of cover stories from Pitchfork are collected at pitchfork.com/features/cover-story/

2. Medium.com is a blog host that was developed by Twitter co-founder Even Williams. It launched in August 2012, as an alternative to Twitter's 140-character maximum. Atavist.com is a publishing platform that focuses on publishing, design and paid distribution of long-form content on the web.

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Author Biography

Dimitry Tetin is a graphic designer with a multi-faceted design and teaching practice. He earned his BA in literature, ecology and evolutionary biology from the University of Chicago. An interest in semiotics and critical theory led him to study typography and visual communication at the School of the Art Institute of Chicago, where he received his BFA. He spent three years working as an Art Director at the Chicago Tribune before moving to the East Coast and earning his MFA at RISD.

Prior to moving to the Hudson River Valley to teach and do research at SUNY, New Paltz, he lived in New York freelancing independently and with studios like Trollback+ Company, Whitehouse & Company, and C&G Partners, while teaching at the Rhode Island School of Design and Parsons the New School for Design.

He works independently and collaboratively on publication, web, identity, motion, signage and wayfinding projects for clients in the commercial and not-for-profit sectors. Through his experimental publishing practice, Metrodogs Publications, he seeks to engage public and personal archives to create narratives that examine how interaction with space and language plays a role in conceptualizing places and histories.

PAPER CATEGORY: TEACHING

The Animated Poster: Extending the Typographic Gesture through Motion

Jillian Coorey and Aoife Mooney

Kent State University

Abstract: The poster has been a vehicle of communication for over 200 years. Serving as a form of advertisement, posters have been used to promote products and events, political parties, calls to action and as an artist/designer medium. A critical part of design's history and discourse, the poster maintains its significance today. However, as digital screens become a prevalent part of our society, the role of the printed poster has shifted (Lupton). With the emergence of interactive environments and screens, the poster is no longer a static entity. While designers have long been using techniques to mobilize the flat plane, creating the illusion of motion and depth, motion offers the ability to engage an audience through a time-based experience.

Within design education, posters continue to be a prevailing teaching tool. In an Advanced Typography course, comprised of upper-level and graduate students, a poster assignment explored the relationships between typography and imagery. After designing two posters, one utilizing type as image and another creating a dialogue between typography and imagery, students created a short animation based on one of their designs. Posed with the question, how can motion transform the traditional poster, students considered how this medium enhanced or altered their message for the viewer. The printed and animated posters were exhibited simultaneously, providing viewers with a multisensory experience.

This paper will present a brief history of the poster, discussing how digital formats have allowed designers to think beyond print, extending historical precedents in expressive typography and concrete poetry through the animation of traditionally implied gestures. Case studies from an Advanced Typography course will be presented showcasing students interpretation of a moving poster.

Keywords: typography, animated posters, design pedagogy

A Brief History of the Poster

Possessing the ability to persuade, inform, convince, and prompt, among others—the functions of a poster are limitless. "Posters are barometers of social, economic, political and cultural events, as well as mirrors of our everyday lives" (Müller-Brockmann 12). While primitive versions of 'posters' can be traced back to announcements and proclamations painted on Roman walls, it was the invention of the printing press that provided the decisive foundation and propelled the visual culture and development of posters. Following the invention of printing, in 1477 Churches throughout England used poster notices to inform the public. Publishers, governments, doctors and communities soon followed suit as this new medium provided an accessible way to communicate (Müller-Brockmann 26).

Posters over the decades are reflective of the techniques and methods designers incorporate into their practice. Movements evolve when a designer challenges the precedent, experimenting with unique approaches. In the book, *The History of the Poster*, Müller-Brockmann categorizes new theories and practices into the following: the graphic experiment, the photo-technical experiment, the printing-technique experiment and the material-technique experiment. Under the graphic experiment, among other techniques he lists, the "presentation of spatially continuing forms—kinetic, film-like principles" (p 208).

Designers, photographers and artists have long sought to bring the passage of time and motion to the static two-dimensional page (Lupton 215). During the late 19th and early 20th century, artists analyzed the page, using it as a means of expression. Stéphane Mallarmé's poem, *A Throw of Dice Will Never Abolish Chance*, 1987 (Figure 1), expressed the visual and semantic potential of page design. Futurist artist Filippo Marinetti coined the term "words-in-freedom" regarding free arrangements of words on a page. He saw space and meaning so intimately connected, as is expressed in his design for the cover of *Zang Tumb Tumb*, 1914 (Figure 1). Driven by speed and tempo, the posters of this movement reflect the

artist and designers goal to transform the linear format of the printed page. This was accomplished through ornate typographic compositions, expressive symbols and various materials such as colored paper, ink and metal (Andel 110). Following advances in photography, posters of the 1920s combine photography and words in unique ways, also known as 'typo-photo', a term conceived by artist-designer László Moholy-Nagy. These works demonstrate progress and motion on the printed page through layering, cropping and overlapping (Figure 1).

Figure 1: From left to right, works by Mallarmé, Marinetti and Moholy-Nagy displaying techniques artist-designers were using on the printed page.
Source: Andel 2002.

Posters today

A critical part of design's history and discourse, the poster maintains its significance today—yet, it is no longer a static entity. Technological advances of screens and interactive environments have provided designers with the ability to integrate motion. Motion provides the ability to engage an audience through a time-based experience. Designer Erich Brechbuhl states, "A poster is a poster but the animation acts like a fifth color or special type of printing" (qtd. in Colombi).

Götz Gramlich, a German graphic designer, explores how animation adds another layer of meaning in his posters designed for Herbstzeitlose (Autumn Crocus), conveying the transition from summer to fall (Figure 2).

> In the animation, the letters peel away one by one from the surface to which they have been affixed, revealing their black undersides. Tucked into these corners are bits of information about the event. In the screenprinted version, the static image features each letter partially turned down, with faint black dots forming shadows behind the full letterforms. (Condell 2015)

In an interview with Gramlich, he comments on the status of the poster today stating we it is time for designers to consider the animated poster. Gramlich states, "We have more and more screens on everything and I have not seen good, intelligent executed visuals. I think if animation is used wisely it could be another layer that underlines the strong idea behind the poster."

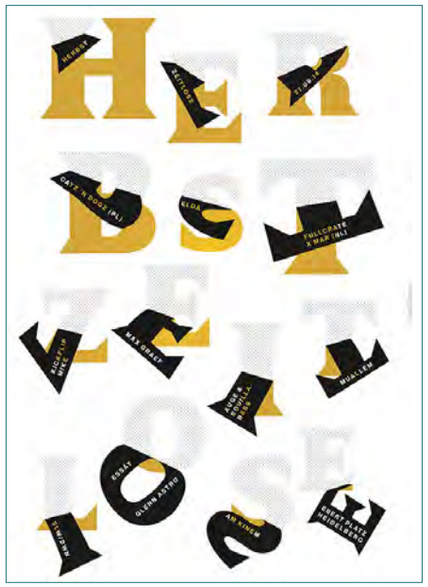


Figure 2: Posters by designer Götz Gramlich. The left shows the screenprinted version and the right a screen shot of the animated version where the letters peel away revealing additional content. Source: http://www.gggrafik.de/

The Assignment

This paper focuses on a poster project assigned in two Advanced Typography courses within the School of Visual Communication Design at Kent State University. The classes consisted of 27 junior, senior and graduate-level students. The course investigates the communicative, structural and aesthetic aspects of typography. Projects build on students previous experiences, enhancing skills for shaping verbal messages utilizing type.

The first part of the poster assignment, *Type and Image Poster,* explored the various relationships between type and imagery. Students were tasked with designing two posters that created a dialogue between typography and imagery using methods studied in class. After completing readings from the book, *Type, Image, Message: A Graphic Design Layout Workshop* by Nancy Skolos and Tom Wedell, the techniques of separation, fusion, fragmentation and inversion provided a springboard for type and image generation.

The second part of the assignment, *The Animated Poster*, challenges students to think beyond the traditional 2D printed poster. After having selected one of their designs, students created animations, taking into consideration how this medium could enhance, change or alter their message to the viewer. With the added element of time, they were instructed to pay attention to the pacing and introduction of elements.

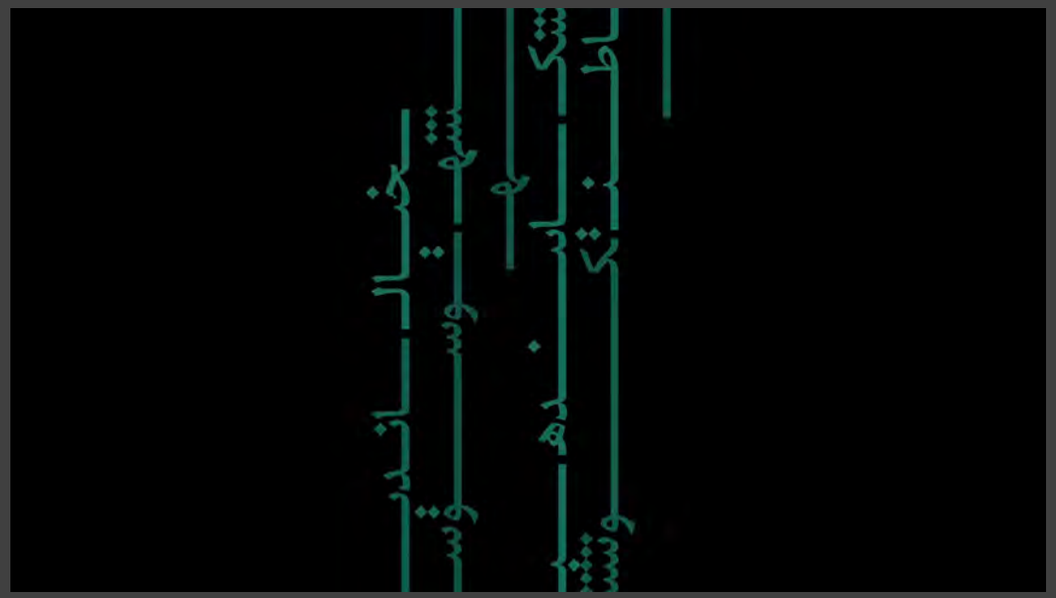
To generate subject matter for their posters, students discussed their summer break, using this content to create designs which typographically and abstractly conveyed an aspect of their experiences. They were allowed to conceive a theoretical event as the focus of the communication, or create a typographic expression along the lines of concrete poetry, where visuals are crafted using solely text. Posters were required to be engaging and communicative with typography as the driving force and tool.

From the outset, students were aware they would be translating one of their designs for motion, and as such, they were considering this transition in their conceptualization of the print pieces. In animating their posters, students created storyboards on paper, where they explored how the movement or meaning they constructed in static form, could be reinterpreted through motion. This process required them to consider the impact of different approaches to movement and composition in terms of time rather than layout, and to be selective in their approaches to the final animated piece.

Case Studies

Figure 4: Student Work, “What If”, Derek Lawrence

The poster series, “Contemplate” (figure 3), by student Hamidreza Sohrabi, is a personal reflection about the uncertainty of his future. The words: contemplate, moment, notion, ambiguity, future, prospective, innermost, thought, conjecture, concept, endeavor, aim and temptation, are represented in English and Persian as they overlap and entwine with one another. While the printed poster provides a compelling juxtaposition of the two languages, the animated version excels at imparting the viewer with a glimpse into the designers conscious thoughts as the words appear, disappear and reappear. The speed shifts from slow to fast while the frame zooms in and out until the entire poster is revealed. These carefully chosen transitions allude to the overall struggle the designer faces allowing the viewer to experience his emotions.



Media from the paper The Animated Poster: *The Animated Poster: Extending the Typographic Gesture through Motion*
Source(s): Student work, “Contemplate,” Hamidreza Sohrabi

In adapting the piece “What If” (figure 4) to screen, student Derek Lawrence creates a functional tool that harnesses the power of animation to work on the mind. The typography begins to rotate and scale when animated, bringing the poster to life. A mesmerizing set of instructions draws you into a peaceful and meditative state. The progression from large immersive type to a birds-eye view of the circular arrangement conveys and elucidates the gradual clarifying and focusing effect of meditation.

The poster “Isolated” (figure 5), was based on the traffic and noise of Chicago. The student, Lesley Teater, drew inspiration from feeling overwhelmed and isolated. The colors convey the frenetic energy of the city. The printed poster displays a moment captured mid-stream. In the animated version, this moment is extrapolated, allowing the viewer to experience the building emotions of isolation and panic through the behaviors of typographic elements, which function as pace-setters for the larger elements, providing a visual commentary on the isolation.

Figure 5: Student Work, “Isolated”, Lesley Teater

In the poster series “Tempo” (figure 6), student Emily Thomas focuses on rhythm and pace as the subject matter. Having developed a conference identity for runners, the poster and animation serve to promote the event. In the print, movement is implied and a rhythm created through the repeating forms which, when broken apart, abstractly spell out the word ‘run’. The rhythm oscillates from upright to slanted to convey stature and pace. These movements are amplified in the animation, where the lines of pattern bounce as though keeping time in a running rhythm, and the use of scale change both pulls us into the movement as well as creating a sense of perspective, as though the finish line is getting nearer, and we are approaching the event. In this way, the animation extends the typographic gesture.

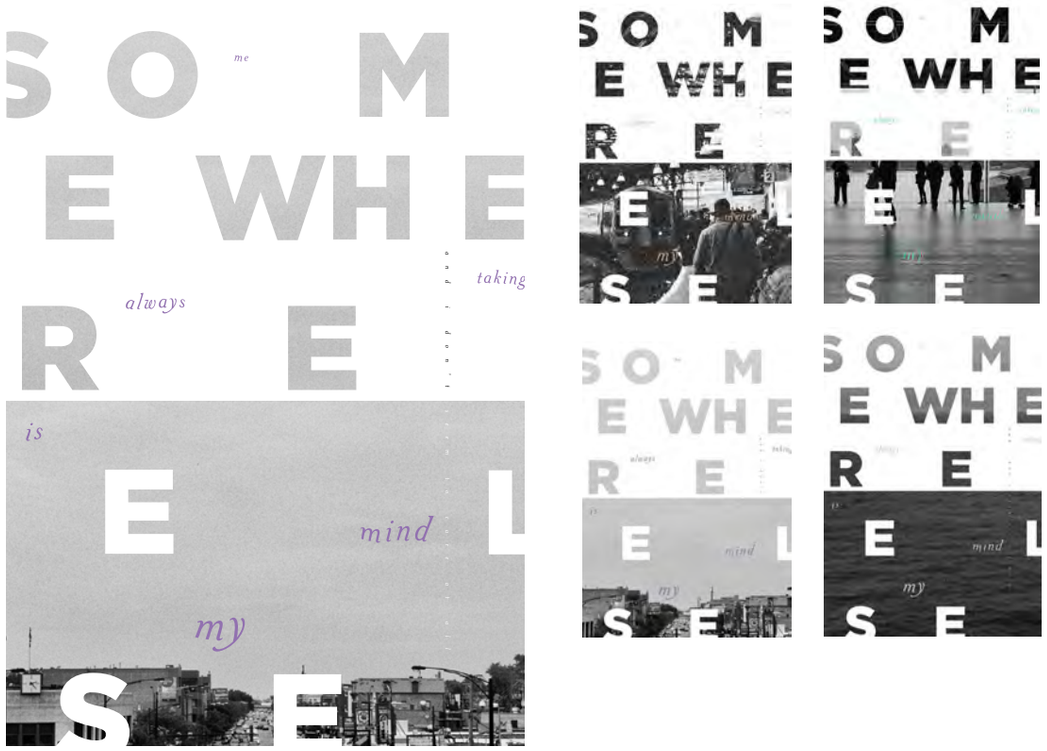
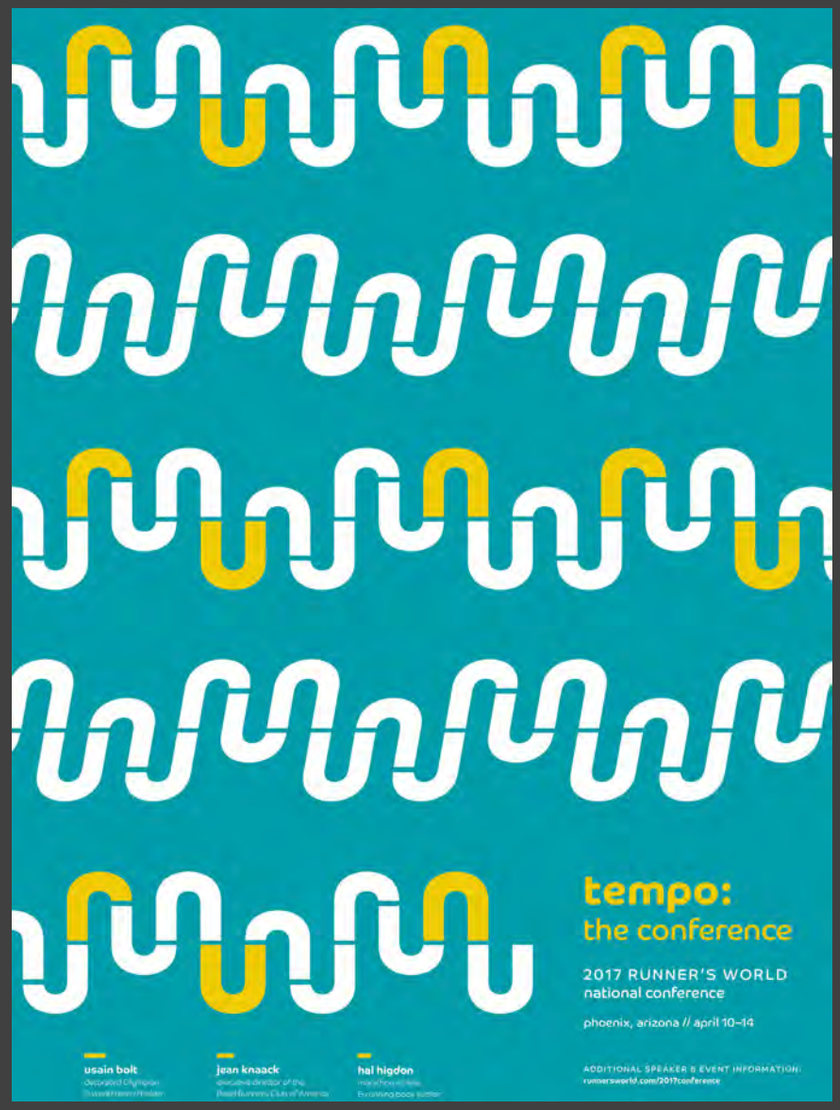
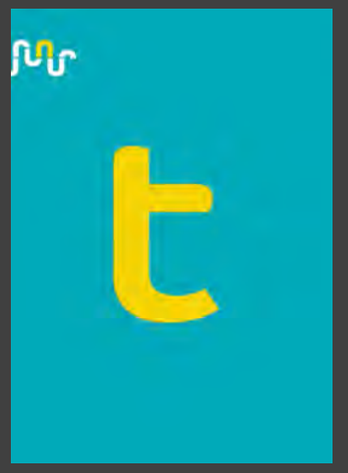
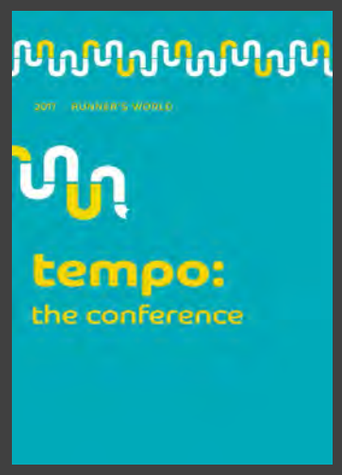


Figure 7: Student Work, “About Work”, Nico Ciani







Media from the paper The Animated Poster: *The Animated Poster: Extending the Typographic Gesture through Motion*
Source(s): Student work, "Tempo," Emily Thomas

In the poster series “About Work” (figure 7), student Nico Ciani amplifies the upward movement of the reading direction found in the printed piece by creating a simple animated GIF. The backgrounds switch out, to create a glitching quality, as though the signal is faulty, and we are transported to four other ‘somewhere’s. The change in the background image underscores the static nature of the larger type elements, making the frame appear a rigid entity from which the mind escapes. This concept is central to the content that generated the posters themselves, which were born out of a stifling office environment.

Figure 8: Student Work, “I Wish My Country Spoke In One Voice”, Grace Harms

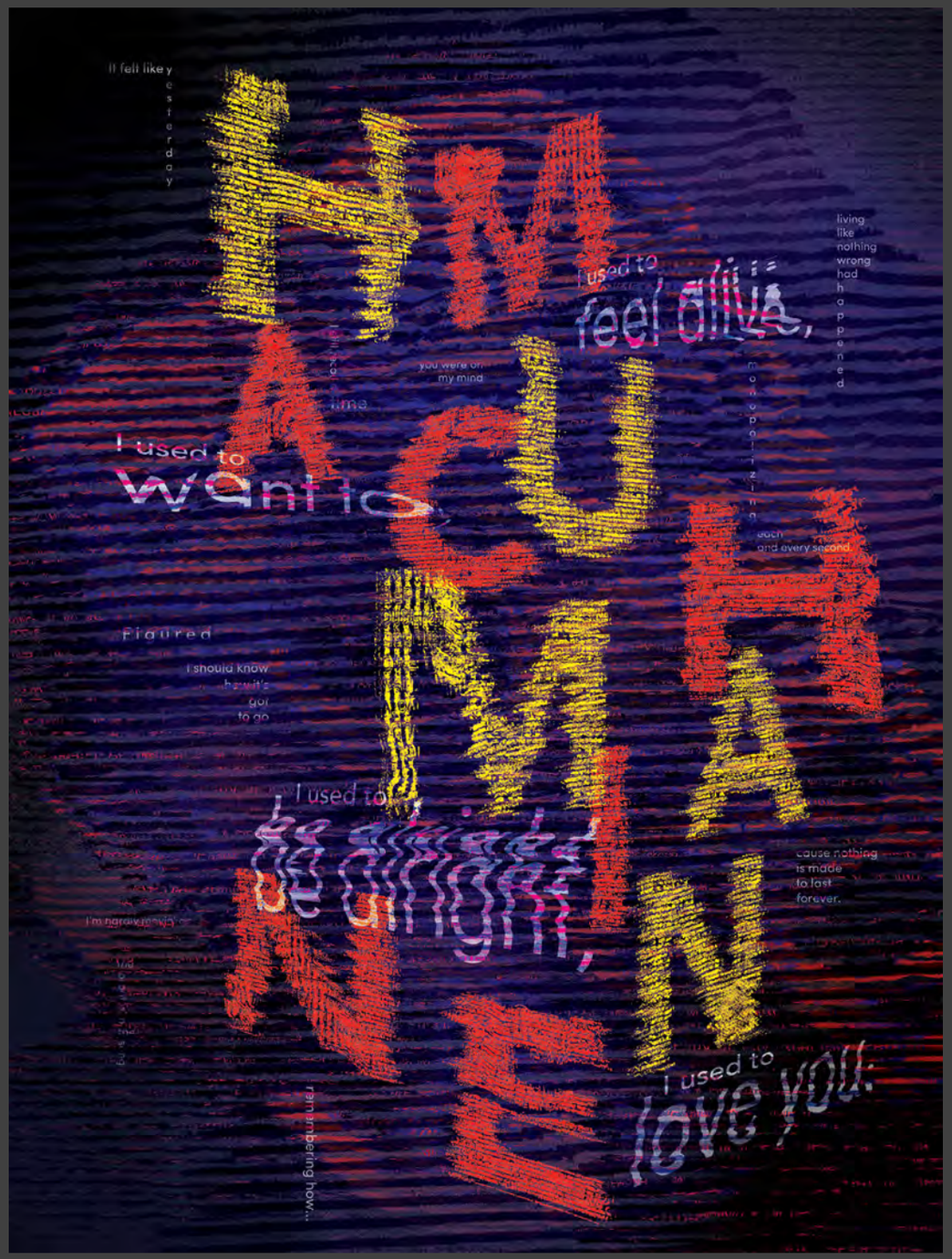
After visiting Quebec in the wake of a recent referendum on language, student Grace Harms focused her poster on the dual-lingual nature of the area with the poster series “I Wish My Country Spoke in One Voice” (figure 8). The poster sets French and English on equal footing, and can be turned upside down and read in either direction, thus creating a visual tension between the two tongues. This is further evoked through the subtle use of the red and blue as dualities in the background. In the animated piece, this duality is pushed further, and the notion of a conversation is evoked with the languages receding and advancing in response to each other. This powerful action brings life to the typography, and allows it to fully convey the immediacy of the spoken word in a way that the print version can only suggest or imply.

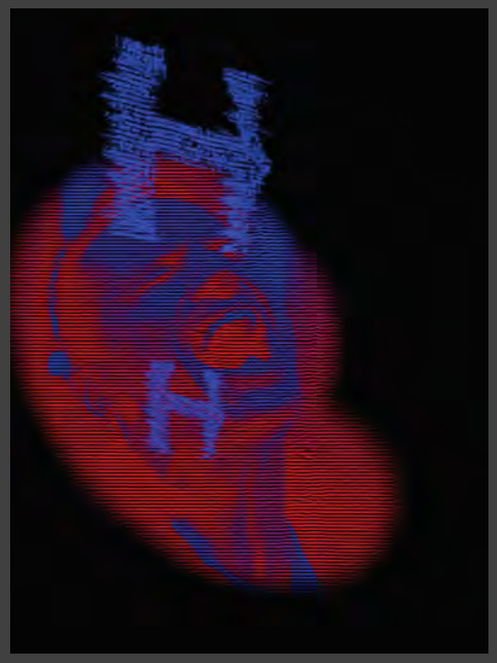
With the poster series “Human Machine” (figure 9), student Brenan Stetzer drew on his experience of traveling to a concert. The music genre is ‘Math Rock’, which combines heavy distortion and algorithmic sounding beats. The piece conveys the sense of being immersed in the music, and the related emotions felt while experiencing the live performance. The glitch-like quality of the texture is created by manually editing the typographic image in a text-editor, a process which creates a breakdown of the forms in the image, as well as unpredictable artifacts and distortions. The dichotomy between the organic and the mechanical explored in the print poster is further expressed in the animation, where the image of a face is slowly glitched and morphed into the typographic treatment we recognize from the poster. The two words float as unconnected letterforms with the ambient colors shifting and moving around the canvas, much in the way that a strobe light would in a dark club. The animation in this sense extends the central concepts of both the music and elucidates the visceral experience of the show in graphic form.

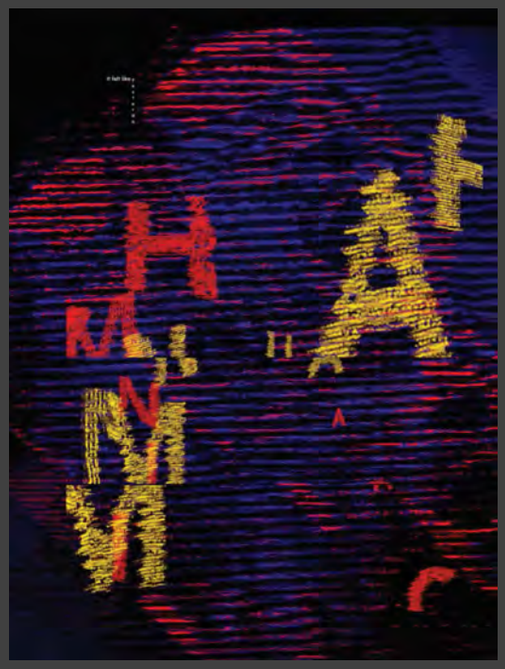
Observations

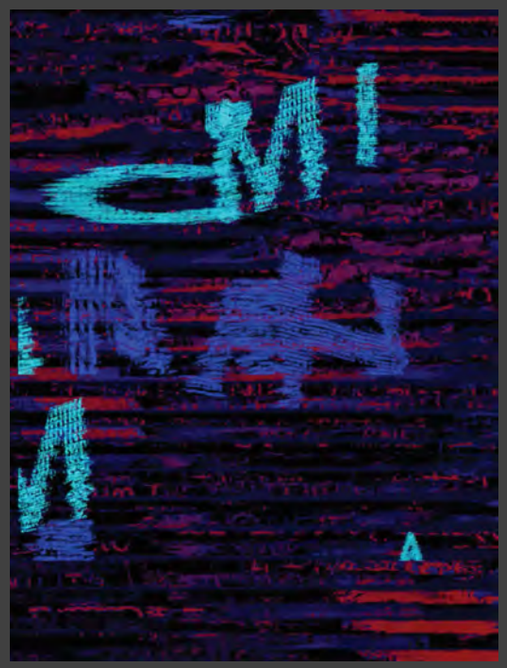
Peer learning

One positive outcome, although unintended, was the development of peer learning based on the students’ struggles with software. As students completed their animated posters, the diversity of software knowledge among peers was evident. This realization ended up being beneficial as it led to an unplanned, but wholly organic growth of peer learning. During class critiques and workdays, students were eager to share their knowledge with each other, assisting students who were not as comfortable with the tools (figure 10).









Media from the paper The Animated Poster: *The Animated Poster: Extending the Typographic Gesture through Motion*
Source(s): Student work, "Human Machine," Brenan Stetzer

Figure 10: Students share software knowledge during a class critique.
Source: Author photo

In working with technology, peer learning can be highly effective in the adaptation of software. Rather than working alone, students learn how to use hardware and software more quickly and effectively when they work in peer groups (Dwyer 1994; Dyer 1993). As they alternate between the role of teacher and learner in disseminating information with peers, students' communication skills are developed and strengthened. They become active participants in the learning process, gaining valuable skills in cooperation, listening and communication (Topping 2005). As a result of peer teaching, students display a heightened sense of self-confidence and self-esteem.

Exhibition

The printed and animated posters were exhibited simultaneously, providing a multi-sensory experience to viewers. The addition of sound to some of the posters afforded the viewers with an auditory experience in addition to the visual, heightening the overall environment. In displaying the work together, one is able to note how the designer used motion to alter or enhance the posters original message. The animations were projected onto two large gallery walls and, as expected, viewers stood to the side taking in the work. An interesting moment occurred when a toddler engaged with the animations, physically touching the typography as letterforms danced across the walls.

Conclusion

The relevance of skills in motion design, with particular regard to typography, is evident in the increasing prevalence of typographic identity designs which utilize motion, allowing a generative and adaptable identity to reform and evolve. In our networked, immediate and fast-paced media, the ability to consider how movement functions as an added venue for meaning is as important as skills in composition or typographic detailing. Approaching the traditional poster, an assignment prevalent in design education, through the lens of motion provided students with the opportunity to reconsider this additional context.

In a final comparison of the printed and animated poster designs, the animated posters afforded our students with a means of integrating another level of conceptual thinking and expressiveness in their work. Regarding the future of poster design, technology and designers will dictate the direction this method of communication will take. "Technology is now evolving at a very fast rate and as the posters begin to respond to their given environment, designers will be expected to create new ideas that will integrate information gathered from different sources, such as cameras and audio devices" (Colombi).
For now, utilizing motion in poster design expands the possibilities of the traditional two-dimensional poster. Refering back to designer Müller-Brockmann who states, the evolution of posters are reflective of the techniques and methods designers incorporate into their practice. As we look to define what a 'poster' is, it will be up to designers to adapt and challenge the paradigm.

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Jillian Coorey is an Associate Professor in the School of Visual Communication Design at Kent State University. She earned her MFA in Graphic Design from the University of Illinois at Chicago. Her research encompasses design pedagogy, k-12 design education, process and creativity and typography. She has presented her research at TypeCon, Design Research Society and AIGA Design Educators conferences, among others. Her professional work has been exhibited nationally and internationally and has been recognized and published in Graphis.

Aoife Mooney is an Assistant Professor at the School of Visual Communication Design at Kent State University where she teaches classes in typography, typeface design, and graphic design. She holds and MA in Typeface Design from the University of Reading (UK) and a BA in Visual Communications from Dublin Institute of Technology (Ireland). Her research focuses on the relationship between typography, language and personal expression, and this informs her practice as a typeface designer. She presents on her research regularly and internationally—most recently at TypeCon Seattle and ATypI Warsaw. She has written for Design Observer and Typographica and in the last year her BioRhyme typeface family was released with Google WebFonts, and she worked on the development of the Mallory typeface for Frere-Jones Type (NYC). Before returning to academia, she worked for 3 years in New York City as a typeface designer with the Hoefler & Frere-Jone Type Foundry, on the Idlewild, Tungsten and Surveyor families among others.

PAPER CATEGORY: THEORIZING

Lines in Motion: Situating Both [Lines of] Code and Graphical Time[line]-based Tools in Approaches to Digital Motion Design

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Abstract: As is the case with many areas of design practice, motion design has long been characterized by a constant tension between conventional processes and those that leverage digital technologies. While specialized digital tools, such as the graphical timeline interface element ubiquitous to motion design software applications, do offer numerous advantages in terms of efficiency and ease of use, it is difficult to argue against the fact that they also involve relinquishing some of the designer's control over the design process. In effect, part of the designer's process ends up being replaced with one pre-constructed by the developer of the particular software in question. How, then, might it be possible to appropriately leverage the advantages of digital motion design tools while simultaneously asserting—and even increasing the level of—the designer's control over the digital motion design process?

This paper will respond to this inquiry by discussing the concept of meta-design as a contemporary practice with potential applications to digital motion design. Meta-design refers to the designing of design processes—that is, instead of designers engaging in activities that directly produce some form of visual output, those practicing meta-design focus on the construction of systems that facilitate the types of activities that directly produce some form of visual output. In the realm of digital design involving software-based tools, meta-design situates the designer alongside the developer allowing for the assertion of greater control over the design process—particularly in relation to the designer's ability to comprehend and write computer code. For this reason, this paper will also discuss the ways in which code-based motion design—beyond the existing / typical use cases for ExtendScript in Adobe After Effects, for example—is not intended as a complete substitute for either analog or graphical timeline-based motion design tools, but rather holds great potential to act as both a technological and a conceptual bridge between other forms of practice.

Keywords: digital motion design, meta-design, tools, code, graphical user interfaces, software, After Effects, Google Web Designer

Introduction

As is the case with many areas of design practice, motion design has long been characterized by a constant tension between conventional processes and those that leverage digital technologies. For example, in "Graphic Design: The New Basics," Ellen Lupton notes that some designers prefer the conventional motion design process of drawing frames individually to the automated capabilities of many specialized software tools "because it provides [...] greater control of subtle elements" (Lupton 222). While specialized digital tools do offer numerous advantages in terms of efficiency and ease of use, particularly in regard to their implementation of graphical user interfaces (GUIs), it is difficult to argue against the fact that they also involve relinquishing some of the designer's control over the design process. In effect, part of the designer's process ends up being replaced with one pre-constructed by the developer of the particular software in question.

This paper presents the concept of meta-design, or the facilitation of others' design / creative processes, as an approach that positions the designer alongside the software application developer, allowing for the assertion of greater control over the design process. Meta-design often relies on the designer's proficiency in writing computer code in order to realize the creation of new design tools; however, the realities of practice mean that a balanced approach that supplements the use of graphical timeline-based motion design

tools with code-based approaches, rather than one that focuses exclusively on code, may hold the greatest potential for ensuring the designer's control over and flexibility within the design process.

GUIs for motion design

Context

The first example of a computer system featuring many common elements of what has become known as a graphical user interface was developed by the Augmented Human Intellect Research Center at the Stanford Research Institute in 1968, with the intent to examine how researchers could use "interactive computer aids [to] augment their intellectual capabilit[ies]" (Engelbart and English 395). In particular, it was noted that elements of this interface paradigm made interaction with the computer system "much easier and more powerful" and that "a user's ability to get about very quickly within his data, and to have special 'views' of it generated to suit his need, [were] significantly aided" (399). This work at Stanford was built upon at the Xerox Palo Alto Research Center (PARC) in the early 1970s, which, in turn, closely inspired early consumer computers like the Apple Lisa and Macintosh in the 1980s (Myers 47).

GUIs make engaging with a computer system more approachable through the implementation of two separate, but related, concepts—abstraction and metaphor. Here, abstraction refers to the selective revelation (and transformation) of the functionality of an underlying system; in the context of a GUI, this means that the interface (ideally) presents only what is absolutely necessary in order to achieve a particular objective. Jay David Bolter and Diane Gromala note a related sentiment in suggesting that "every digital artifact oscillates between being transparent and reflective" (6). When using a GUI-based computer, the user only needs to be familiar with the interface itself and not the detailed internal workings of the computer. This can be compared to the user interface of a car—in order to drive, the user manipulates (at a base level) the steering wheel, accelerator, and brake pedal, and, for example, does not need to know the specifics of how the engine works.

Metaphors are leveraged by GUIs to orient users to the functionality of the interface through a (typically visual or physical) comparison to some other entity with which they may likely have had prior experience (Marcus 129). For example, at a structural level, many contemporary operating system GUIs use a folder metaphor to represent the computer's hierarchical file system and facilitate the user's traversal of it. Taken to an extreme degree, the term skeuomorphism refers to the use of metaphors that maintain purely decorative / ornamental aspects of the original comparison; e.g., the use of a rough paper texture in the GUI of a note-taking application ("Skeuomorph").

A motion design GUI element—the timeline

The timeline is one of the most ubiquitous GUI elements used by contemporary software applications for creating and manipulating time-based media. This is for good reason, as the timeline represents a natural implementation of both abstraction and metaphor. The timeline abstracts the way in which the computer stores and accesses time-based media through the use of a metaphor that leverages the physicality of analog media like film or video / audio tape. This does not necessarily mean that the timeline element looks like actual film—this would be an example of skeuomorphism—but it uses the fact that such physical media equates the passage of time to a dimensional quantity (i.e., the length of the film, or the width of the timeline element, is tied to the duration of the time-based media).

Beyond simply making the creation and / or manipulation of time-based media easier, the advent of non-linear editing necessitated the development of the timeline GUI element—particularly the notion of a multi-layered timeline (see Figure 1). This is due to the fact that non-linear editing of time-based media retains content that has been trimmed (cropped) from a given media source. This trimmed content remains available to the user for future manipulation, and thus, the GUI needs to present a way to access it. With many time-based projects incorporating multiple media sources, the multi-layered timeline is a logical implementation of an approach to simultaneously representing the constituent media components of the project.

Figure 1: This screenshot of After Effects CC 2015 highlights the timeline interface element (bottom), where layers 2 and 3 are media sources with content that has been trimmed (the dark yellow regions to the right of the relatively brighter yellow), but is still accessible if needed (Adobe).

While this conceptualization of the timeline should be familiar to any user of contemporary versions of most software applications for digital motion design, including Adobe's (arguably industry-leading) After Effects, this has not always been the case. Notably, version 1.0 of After Effects (see Figure 2), originally developed by the Company of Science and Art in 1993, "was incredibly simple: no timeline window, one effect per layer, no transfer modes, no motion blur, and only one mask per layer" (Forde and Simons 44). For those individuals whom have had experience only with contemporary versions of After Effects, it can be difficult to imagine working within the limitations inherent to such an early iteration of the application. However, this example emphasizes the notion that, when designers rely exclusively on existing software tools, their processes can become constrained to the capabilities of the software alone.

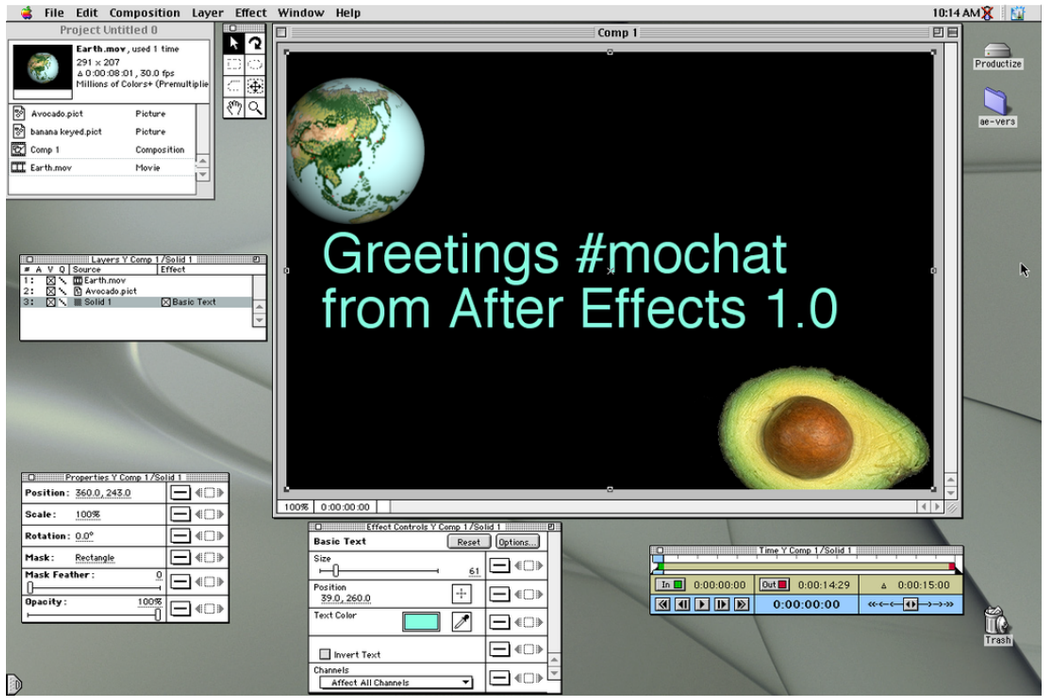

Figure 2: After Effects 1.0 (Wilk).

Issues with the timeline, and exclusively GUI-based tools in general

In many straightforward use cases, the timeline represents a tool for effectively navigating time-based media sources. However, one example of when the functionality of this particular GUI element begins to break down is when the designer desires for time to progress at a different, non-linear (not to be confused with the previous reference to non-linear editing) rate. This might occur when skipping a segment of time in the middle of a source, or when a segment of media is repeated / looped. One option for looping content in After Effects—besides manually copying and pasting a layer multiple times, or directly manipulating source footage in a way that would alter other instances of the content in the project—requires the use of time remapping and expressions, After Effects' implementation of Adobe's ExtendScript scripting language (which is related to JavaScript). Here, the GUI element is no longer sufficient for achieving a particular objective, and so the developer has sought to extend the functionality of the tool through a code-based approach.

One of the strengths of a GUI lies in its ability to provide an overview of all possible courses of action a user can take at a given point in time. This strength, however, is also a weakness, as it is indicative of the prescriptive nature of GUIs and the lack of flexibility (and, ultimately, control) given to the user. This lack of flexibility is compounded even further when, in scenarios like the looping example described previously, an appropriate extension of the graphic metaphor either does not exist or is more complex than the underlying concept itself. In the case of After Effects (as of this writing), this extended metaphor (that is, some representative visual indicator appropriately integrated into the timeline) does not currently exist and is, instead, facilitated by the addition of code. However, as the inflexibility of the GUI element remains—and the user still needs to interact with it—this is less than an ideal solution.

Code-based motion design

Meta-design

The realities of contemporary design, particularly those regarding the increasing democratization of design-relevant technologies, require designers to evaluate both their roles in practice and the way in which they assert those roles. The concept of control is critical to this consideration, as designers must be able to ensure that they are ultimately responsible for the way in which they work. Meta-design represents one response to this issue, "shifting the designer's role from that of executing processes in which the objective is producing finalized creative output to engaging directly with the development of tools facilitating [creative processes]" and, in effect, positions the designer as "one who designs (the process[es] of) design" (Tober 4).

Donald Knuth, creator of the METAFONT description language and author of "The METAFONT Book," first coined the term meta-design in 1986, noting that "[m]eta-design is much more difficult than design; it's easier to draw something than to explain how to draw it" (1). This challenge alludes to the skills that meta-designers need to have proficiency in—perhaps most importantly the ability to write code. This is due to the fact that computers are well-situated for use in the development of tools and frameworks—i.e., software—for facilitating creative processes. However, when developing such tools and frameworks, computers explicitly need to be told every single task or command that a user wants the computer to execute. This points to the fact that computer code can be a powerful instrument of control.

Code and motion design

The exclusive use of code-based tools can also be a valuable approach to motion design. One of the most prominent such tools is Processing (see Figure 3), described by project founders Casey Reas and Ben Fry as "a free, open source programming language and environment used by students, artists, designers, architects, researchers, and hobbyists for learning, prototyping, and production" (xxi) that "relates software concepts to principles of visual form, motion, and interaction" (1). Reas and Fry go so far as to claim that "[d]efining motion through code displays the power and flexibility of the medium" (279).

Figure 3: This simple Processing sketch draws a circle that moves from the left to the right of the display window before it continues, unseen, beyond the window bounds.

A code-based environment, like Processing, is suited for defining motion—indicating changes in various properties (size, location, color, etc.) over time—in two separate, but related, ways. Despite the fact that the Processing interface is essentially a text editor, one way in which time is delineated within it is through the sequencing of code in a given sketch, or program. One might similarly consider the distinction between both the script and storyboards of a movie. By default, lines of code that are written earlier in a sketch are executed before those lines written later. This is, of course, a convention that follows from written human language. Certain types of control structures (such as loops, conditionals, and function calls) can alter this normal execution flow. One type of loop—the draw function—is particularly relevant to motion design and is inherent to the way many Processing sketches are structured. Using the draw function enables a Processing sketch to continually render and display a sequence of image frames that, when one or more properties are modified from frame to frame, creates an illusion of motion. Given that designers must (even if indirectly) consider each individual frame rendered by the code they write, writing code from the ground up (and not relying on an abstraction or metaphor to manipulate those frames) presents the opportunity for the assertion of a high degree of control in the motion design process.

Issues with purely code-based approaches to motion design

An exclusively code-based approach to motion design is not perfect, however, and it suffers from shortcomings in much the same way that an exclusively GUI-based tool approach does. One issue relates to the learning curve inherent to code—while not insurmountable (and, in fact, Processing has been designed specifically for first-time programmers), there is indeed the perception that learning code is significantly more challenging than learning a new GUI-based software application; this case is perhaps most often made in the context of web design and development (Gugliuzza). Another issue presents itself in contrast to how GUIs provide an overview of all possible courses of action a user can take at a given point in time—unless working with an extremely specialized IDE (integrated development environment; a program for writing code), there is no such overview provided when writing code. Rather, a user needs to separately consult an API (application programming interface) reference for information as to the appropriate options for code to write in a given scenario. Additionally, if specific desired functionality is not already built into a given programming language, it is often necessary to re-write commonly used code structures over and over again. While this is a side effect of the inherent flexibility of code—more advanced users can use others' libraries of pre-built code, or even write their own—it is, at first, a less efficient use of time.

A balanced approach

A (supplemental) interface to code

While both the exclusively GUI-based and code-based approaches discussed thus far are seemingly situated on completely opposite ends of a spectrum, they each have advantages that are worthy of recognition. A balanced approach to digital motion design might combine GUI-based and code-based elements, capitalizing on their respective strengths—in particular, the ease and efficiency of a GUI for appropriate use cases, and the power and flexibility of a code-based foundation.

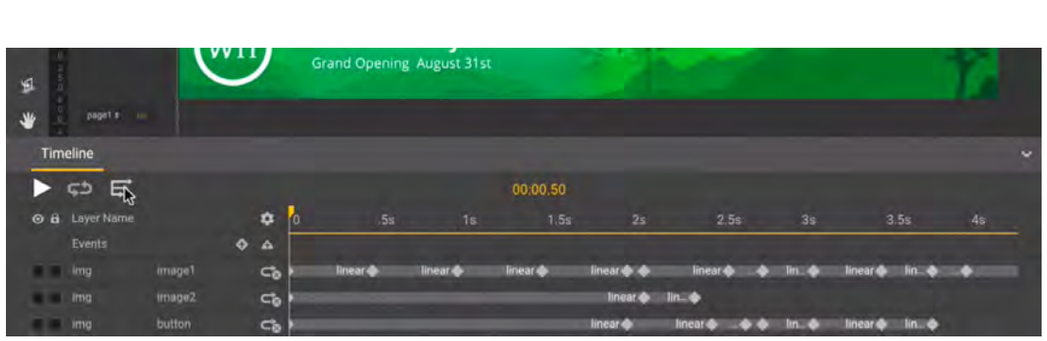

Figure 4: Google Web Designer's timeline interface element ("Google Web Designer").

Indeed, there are software tools that implement these qualities, one of which is Google Web Designer (see Figure 4), a perhaps generically-named application that enables users to "[c]reate engaging, interactive HTML5-based designs and motion graphics that can run on any device" ("Google Web Designer"). Originally developed to aid in the creation of dynamic online advertisements, Google Web Designer presents a GUI interface, including a timeline very similar to that of After Effects, to generating motion graphics (particularly those integrating interactivity) built using HTML, CSS, and JavaScript. The interface is not exhaustive; that is, it requires knowledge of code to

perform certain tasks in much the same way that expressions extend the functionality of the GUI in After Effects. This means that the GUI of Google Web Designer is not intended to be a complete substitute for its code-based dimension—it exists merely to make certain functionality (that which is arguably more easily executed through a GUI) accessible, while still placing code (and, thus, control) first. Furthermore, anything that can be accomplished through the GUI can also be executed directly through code—often in a more customized manner, as might be needed. In this sense, the GUI serves in a role that defers to the role of code in Google Web Designer's model of motion design (this relationship is opposite that in After Effects), allowing the user to leverage either dimension as is most appropriate.

Potential implications

The way in which the approach to digital motion design embodied by Google Web Designer balances the integration of a GUI with a code-based foundation clearly signals opportunities for practicing designers to assert greater control over their design processes. However, this approach also has potential implications for design pedagogy, as the degree to which design students should develop a mix of skills in code, software, and conceptual development remains a significant topic of discussion. In teaching motion design, there arguably is a somewhat unique need to specifically focus on facilitating students' production abilities. The balanced approach described herein may potentially enable educators to pursue flexible code-based instruction while simultaneously addressing the practical and appropriate use of existing software applications; previously, this situation was typically characterized by having to make a choice between the two directions.

Conclusion

This paper has presented a brief overview of the respective roles of GUI-based and code-based tools and approaches in contemporary digital motion design. By using time (and its representation), a defining quality of motion design, as a point of comparison throughout this overview, the relative strengths and weaknesses of each approach were discussed, culminating in the identification of a relatively unrealized, if not completely new, balanced approach. Proficiency in writing computer code positions designers to more strongly assert control over their design processes, but, for some use cases, manipulating a supplemental GUI makes sense for purposes of efficiency alone. Software tools like Google Web Designer manifest this realization and represent a truly flexible model that simultaneously incorporates the advantages of both code and the GUI.

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Brad Tober (btober@bu.edu) is a designer, educator, and researcher whose work investigates the potential relationships of emerging code-based and interactive visual communication technologies to both design practice and pedagogy. His practice-led research is characterized by a speculative approach to design that recognizes that forms of and methodologies for contemporary practice that spans design and technology are best developed through flexible and exploratory processes. Prior to his current position as an Assistant Professor of Design and Visual Analytics at Boston University, Brad spent five years as an Assistant Professor of Graphic Design at the University of Illinois at Urbana-Champaign. Brad holds an MDes from York University (Canada), a BFA in graphic design from the Savannah College of Art and Design, and a BA in mathematics from the University at Buffalo.

PAPER CATEGORY: TEACHING

The Moving Parts of a Design Curriculum

Kacey Morrow

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Abstract: Designers have always embraced the principles of motion in their work, whether it be simply directing the viewer's eye across a static page, creating a dynamic layout suggesting movement and change, the repetition of elements to create rhythm, or sequentially laying out the flow of a book or website. While these basic principles in traditional design are nothing new, the continually growing advancements in technology are revolutionary. New software capabilities have made it easier to design with motion and new platforms have provided more spaces for motion design to thrive. Whether it is found on a person's mobile phone, web browser, television, VR headset, wearable, or at an exhibit, movie, or live concert; motion design is omnipresent.

This paper will describe the importance of integrating motion at all levels within an undergraduate graphic design program. Examples of various motion-based projects at each level and in different avenues of design will be provided. Special attention will be given to Western Washington University's uniquely dedicated 4D course at the foundation level, the second-year interaction design course, and the BFA advanced motion design course focused on the importance of client-based work, complex problems, and addressing new technologies. Educators will benefit from seeing a program model that has demonstrated success through high quality student work and job placement. They will learn how a program can remain adaptable and relevant in the face of a constantly shifting design industry.

Keywords: Motion Design Education, Foundations, BA, BFA, Design Pedagogy, 4D, Language of Motion, Design Principles, Narrative

Introduction

During the foundational year and through the final year of graduation, Western Washington University's undergraduate graphic design program makes students aware of the ever-changing landscape of technology and visual communication. The Department of Design consists of around 120 students total and seven full-time faculty members, offering both a BA and BFA degree in Design.

It is critical for students to understand the principles of design alongside the principles of motion. Motion is yet another tool in their toolbox and should be considered when developing their concepts at all levels within the curriculum. The introduction to motion at the foundation level can range from stop motion, to visualizing music, spoken word, and kinetic typography. Advancing to the second year, students then apply their understanding of motion to more practical applications such as animating web pages, interactive mobile apps, publications, and user experiences. Ultimately in their last year, they are challenged by visualizing complex data for social good, and working with real world clients by creating promotional videos and projection mapping for live public events. By the time a student graduates, motion is second nature, prevalent in their work, and a part of their overall design vocabulary.

Core Foundation: 200 Level Courses

Motion is introduced in the beginning of our curriculum as one of four core foundational courses. Learning to design with time and motion is viewed just as important as learning to sketch a solution, create a 2D layout, and fold paper. We offer the following courses at the foundation level, which can be taken in any order:

Visual Communication Design I:

Translation of ideas into sketches and drawings representing solutions to visual communication problems.

Visual Communication Design II:

Introduction to visual literacy elements and principles and how they apply to graphic design and typography.

Visual Communication Design III:

Introduction to basic principles, processes, and materials of three-dimensional form.

Visual Communication Design IV:

Introduction and exploration of the basic principles of time-based media and methods of storytelling.

Through a different lens, each of these courses includes an introduction to the formal design elements and principles, in addition to an exploration of design thinking and methodology. This is the main objective of each course and is reinforced throughout the year. Therefore, students can see how the foundation courses are interconnected in order to provide them with a grounded visual vocabulary, critical thinking skills, and a basic knowledge of the necessary tools to succeed throughout the rest of the program.

Visual Communication Design IV

Introduction

By giving the time-based course context and meaning within the larger foundation, students are less intimidated and obsessed with just learning the software. I try to start the course by making motion design relevant and relatable to them. We go through numerous examples of where motion is found in our day-to-day lives including everything from websites, signage, apps, commercials, and movies. I even show them how people naturally want things to move and have a narrative. I provide a handout of mobile app launch screens and have them sketch over them illustrating how the graphics might transition onto the screen. They describe how they would bring these screens and logos to life.

Following this introduction, I also provide examples of implied motion as seen within print, a medium of which they are more familiar. Referencing the "Time and Motion" chapter of Ellen Lupton and Jennifer Cole Phillips' book, *Graphic Design: The New Basics* (214). I go over techniques of implied motion including diagonal and cropped elements, directional cues, mark-making, sequence, overlays, repetition, and showing process. They are able to relate to these examples and realize that these are techniques they have probably already implemented in previous printed projects.

After bridging the gap and making them feel more comfortable with the idea of motion, the first thing we go over is narrative structure. Every motion has a point A to point B, therefore every movement also has to some degree a beginning, middle, and end. Design students need to understand the principles of narrative structure to be able to, in a wider sense, communicate a message to an audience. The students engage in a collectively assembled exercise where they develop stories together by contributing settings, characters, conflict, twists and turns, and resolution.

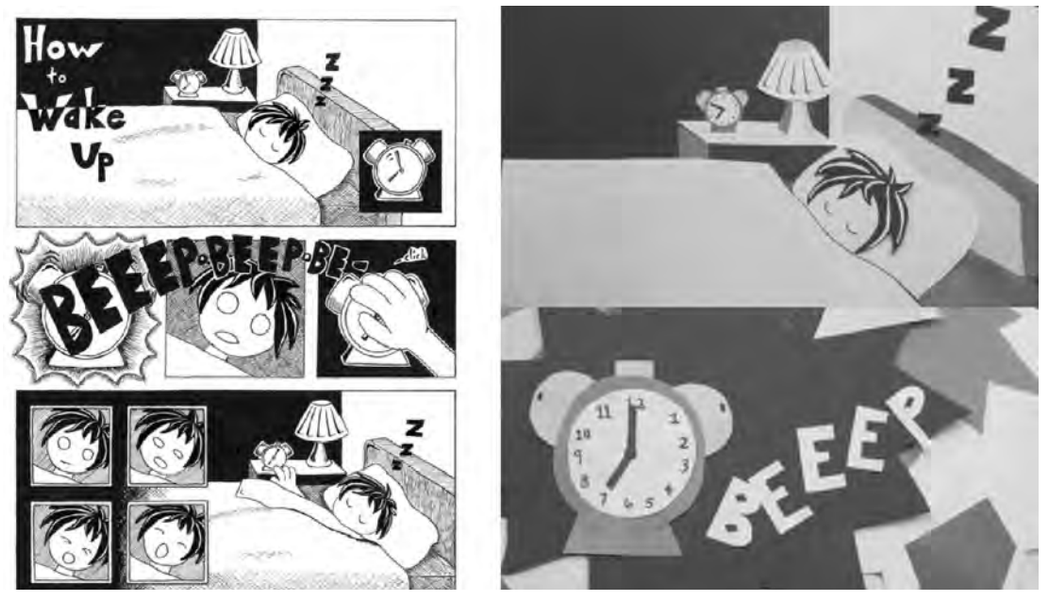

Figure 1: "How to Wake Up" Comic and Stop-Motion. Sources: Student Designers: Ena Mizuno, Paige Ormiston, Calyn McLeod, 2014; Instructor: Kacey Morrow

InstructoArt Comic

The first project assigned is a single comic page to better understand narrative and the depiction of time within a static medium. Students demonstrate an everyday action or event in a step-by-step sequence through comic art (see fig. 1). I assign them readings in Scott McCloud's *Understanding Comics: The Invisible Art*. We go over the concept of closure and awareness of the reader's involvement.

They learn various panel-to-panel transitions and find the appropriate subtractive or additive qualities within a sequence. They also gain an understanding of the relationship between time, motion, and space as depicted and perceived on the printed page. While exploring the visual and reading experience through the shape and order of the frames, they also concentrate on developing an original story that clearly communicates its message. They have to create the story in ten panels, then reduce that story to four panels, and finally two panels, while still trying to uphold the integrity of the original story. This gives them an appreciation for narrative structure, including necessary components, and the overall editing process.

Stop-Motion

Students form groups around one team member's comic and translate it into the medium of stop-motion (see fig. 1). The comic provides them direction and serves as a storyboard. Other requirements to enhance the animation are the inclusion of sound and analog letterform. During this project, students gain an appreciation for a hands-on approach to motion and frame-by-frame animation. This project helps them understand frame rate, shooting ratio, and time code. They explore motion and space, while considering duration and pacing. During this project, we also cover composition, camera, and lighting. Students are given the opportunity to further demonstrate their knowledge of the basics of storytelling. They discover how to use the stop-motion medium to its advantage by exploring techniques that can't be achieved in traditional video. This collaborative project is great to start with during the quarter because it helps develop student camaraderie early on.

Music Interpretation

After students have learned the hands-on approach to frame-by-frame animation, they are then introduced to principles of time and motion, including keyframing, in-betweens, and easing in After Effects. Referencing the book, *Motion Design: Moving Graphics for Television, Music, Video, Cinema and Digital Interfaces* by Matt Woolman, we discuss his morphology for the language of motion graphic design (9). Gaining an understanding of the main components of space, form, and time provides them with a new vocabulary and a way for them to break down the various aspects of this new medium. In this Music Interpretation project they are able to focus on the attributes of space, basic form, motion, and sequence.

Figure 2: Music Interpretation. Source: Student Designer: Andy Lai, 2016; Instructor: Kacey Morrow

Alongside these motion graphics components, they are also focusing on formal design characteristics of color, transparency, scale, and shape. To provided music, students create a series of explorations that use only these formal characteristics to create rhythm, which is both a design principle and a critical component of motion graphics (see fig. 2). In order to enter this project in baby steps and focus on these design characteristics, they are only allowed to use one formal characteristic at a time to create rhythm. In other words, if it is the scale study, they can only change the scale of their objects to generate rhythm. They cannot move the position of the objects or change the color, transparency, or shape. Students find this very challenging, but rewarding in the end, forcing them to focus on one thing at a time and still develop an innovative solution using what they can. In the various studies, they are also exploring depth, figure-ground relationships, balance, pattern, and consistency with variety. Additionally, this is a study in audio-visual relationships and an interpretation of music. The formal choices should reflect the music. The music serves

as a guide for pacing and natural rhythm. While developing parallel structural rhythm between form and music, they are also practicing sequential order, transitioning, pacing, timing, and easing.

In order to maintain the student relationships and encourage them to work together, this project is both individual and collaborative. Students are broken into teams of three and given the choice between two songs, which are already divided into thirds for them. They choose the provided song and work on their four studies for their third of the song and bring the segments back together at the end to create something larger than they could do on their own.

Spoken Word

This next assignment, students create a sequence demonstrating a public domain spoken word audio recording of their choosing, while focusing on form, layering, texture, and juxtaposition as design factors (see fig. 3). They explore how differences in form and sequence structure can convey meaning. They also learn the technical aspects of utilizing layering, blending modes, and creating texture in After Effects in addition to video and sound editing in Premiere. In order to encourage students to focus on different types of form, they must have at least three different mediums integrated into their sequence. This could be anything from video, photography, illustration, scanned-in textures, basic shapes, and so on. The key is trying to make them integrate naturally and find cohesion among the elements. The other main parameter applied to this project is to employ different types of juxtaposition within the narrative. Projects must include moments of juxtaposition and sequence structure that are layered, sequential, and simultaneous. This pushes students out of their comfort zone and they can identify which type of juxtaposition best communicates the message. Overall, they are building on what they have learned in previous projects, while adding more complexity and focusing on different design and time-based factors. Sound is still a big driver in this project. The spoken word audio guides the students' concepts and overall rhythm and pacing.

Figure 3: "Blindness" Spoken Word. Source: Student Designer: Maddy Ruppel, 2016; Instructor: Kacey Morrow

Word As Image

"Word as Image" is a project originated by designer, Ji Lee, who published a book of over 100 examples and has an ongoing Facebook page dedicated to these experiments. For the students, it is a challenging and innovative introduction to moving type. Students are challenged to visualize the meaning of words, using only the letterforms of those words with no additional elements. They are to create a series of five short studies, including a noun, adjective, verb, a set of opposites, and one word of their choice (see fig. 4). They are to choose between six different sans-serif typefaces, use only grayscale with one accent color allowed, and are required to add sound effects to bring the words to life. Students are encouraged to see the letters as shapes and play with them. They should explore both upper and lowercase, varying weights, rotation, extension, reflection, scale, and cropping to help see their letters as objects. During this project, students get to focus on letterform, formal characteristics, design principles, and overall composition. They also gain an introduction to animating type, while reviewing natural motion, narrative structure, spatial considerations, rhythm, pacing, transitioning, and sound editing.

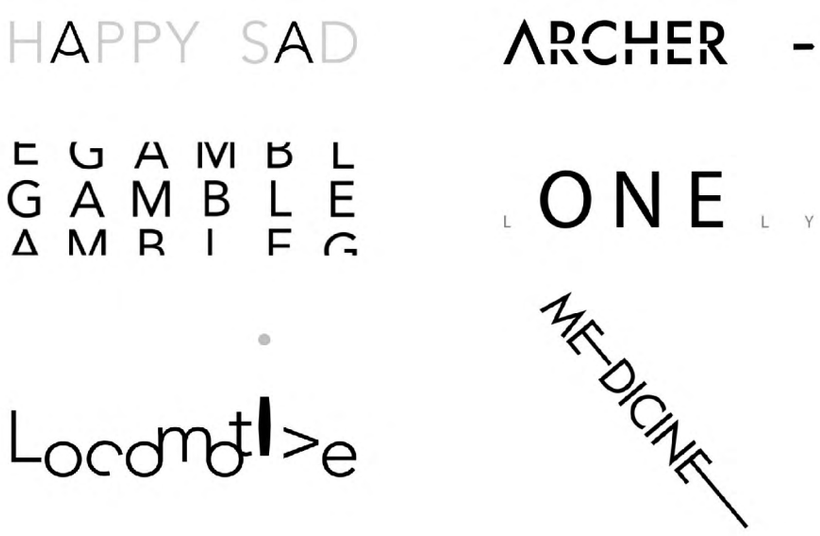

Figure 4: Word As Image. Sources: Student Designers: Shayne Smith, Ben Young, Jeanee Vilja, Mark Hyder, Matthew Allred, 2013; Instructor: Kacey Morrow

Type Specimen

In this final project for Vis Comm IV, students create a type specimen animation promoting a specific typeface that they choose from a provided list (see fig. 5). They are responsible for showing the range of the typeface, providing historical reference, contextual usage, and any defining characteristics about its anatomy or classification. The final animation should be both promotional and informational. In preparation for the assignment, we go over the basics of typography in class together and in groups they conduct a verbal reverse storyboard of at least 15 seconds of a professional animated type specimen example. Writing down every transition they witness helps them see what usually flies by in the blink of an eye. They discover patterns, consistencies, and rhythm, which assist in developing their own storyboards, while concentrating on transitioning and the flow of the narrative. This final project is comprehensive, but is slightly longer in duration and focused on typography. It also forces them to write a complete narrative without the assistance of a provided music track or spoken word audio as before. They learn more complex ways of animating type, integrating type and image, and proper workflow in After Effects. Even at a foundation level, this project typically appears in their later BFA portfolio applications, due to its comprehensive nature and practical application of motion.

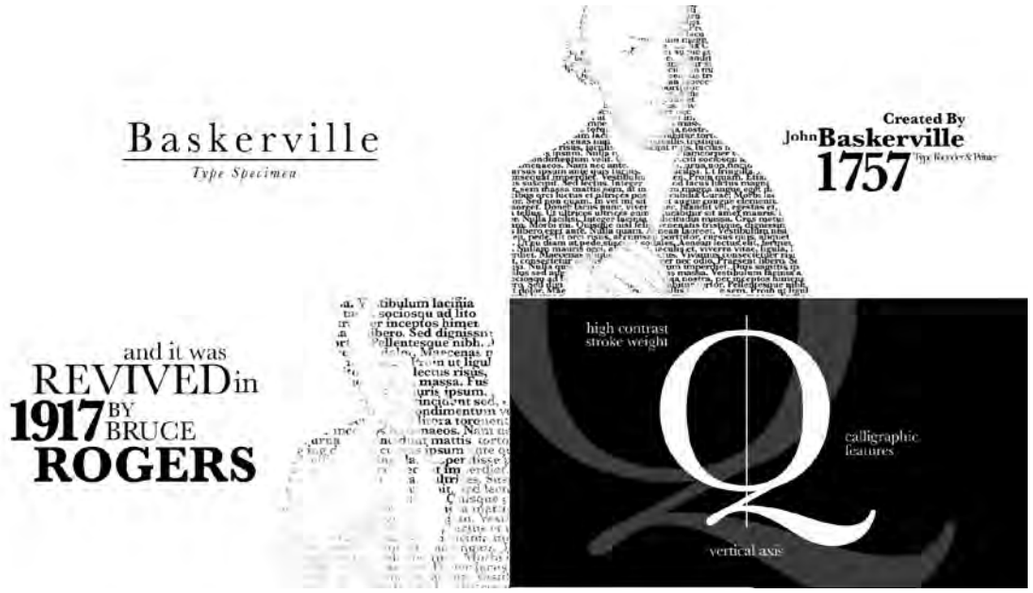

Figure 5: Baskerville Type Specimen. Source: Student Designer: Jake Anderson, 2016; Instructor: Kacey Morrow

300 Level Courses

Digital Media Design I

During this course, students learn methods and concepts of designing for an online experience, including a working knowledge of scripting languages, image optimization, file organization, information architecture, and usability. This class provides a wonderful opportunity for students to combine motion with interactivity. About halfway through the quarter they learn how to enhance their web design through CSS3 animations and transitions. They can make their websites much more dynamic and engaging by adding subtle motion to their events. They need to use them appropriately however, focusing on enriching the user experience.

Digital Media Design II

Students learn approaches and concepts in designing for various digital platforms, focusing on user-interface, interactivity, and user-experience in Digital Media Design II. There a few different ways students need to consider motion in this course. One of these considerations is the feedback during a user experience with a digital interface. Students need to understand the importance of providing and choosing the right type of feedback for varying tasks and events taking place during an interaction. These movements need to be appropriate for the type of gesture taking place. For example if someone is pinching something on a screen it may need to scale, if someone is flicking then the element may need to flip over, or if someone is scrolling or swiping the speed and ease of the position change will need to feel natural. Students also learn how to bring their interfaces to life by animating transitions, launch screens, or loading bars. This brings pleasure and more emotional connection to the overall user experience.

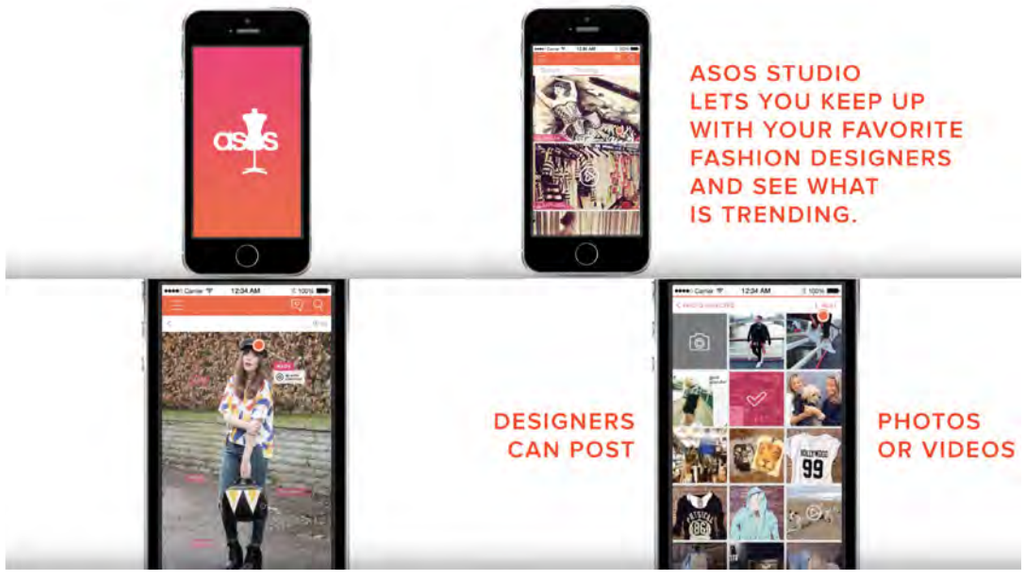

Figure 6: “Asos Studio” Mobile App. Adobe Design Achievement Award Semi-finalist. Source: Student Designer: Shayne Smith, 2014; Instructor: Kacey Morrow

Students are also using motion not as the final product, but to demonstrate how their concept works. Some students treat these videos as walkthroughs and demonstrate the inner-workings of an application. Other students might provide more narrative and context, showing a person using the application in a real-world scenario. And finally some create more of a promotional tool to highlight the selling points of their application (see fig. 6). One of the greatest challenges in this prototype video is finding the right balance of both showing and telling. Pacing is critical to showing the appearance, functionality, and interface transitions, while also providing text or voiceover explaining the application and its context. After learning this skillset, many students develop demo videos later for other projects. It is a great way to show off their work in their portfolios.

BFA Courses

Students submit a portfolio to become a Design major. If accepted, they take our core foundation of 100 and 200-level courses, and then continue on to take the 300-level series. If they maintain a minimum 2.5 cumulative GPA and complete a minor of 24 - 30 credits, they can graduate with a BA in Design. Admission to the BFA degree requires a second portfolio review. This review takes place near the end of the Winter quarter during the 300-level series. The BFA is limited to a maximum of 12 students. The BFA degree includes an additional year of advanced courses in design and a paid summer internship. All of the courses during the BFA year offer the opportunity to include motion design.

Typography II

The first course they take as a BFA student is Typography II. In this course students are given advanced problems of typographic layout. They focus on designing long textual content, such as books and publications. There is also an emphasis in the use of type as a conceptual tool for both communication and visual expression in a variety of visual/verbal genres. With the goal of keeping up with technology, students are now responsible for creating a publication in print and additionally as an animated e-pub. This demonstrates yet another way to bring their content to life through interactivity and motion. An alumnus was the 2015 Adobe Award Winner in Digital Publishing for his seamlessly animated interactive e-pub in this course (see fig. 7).

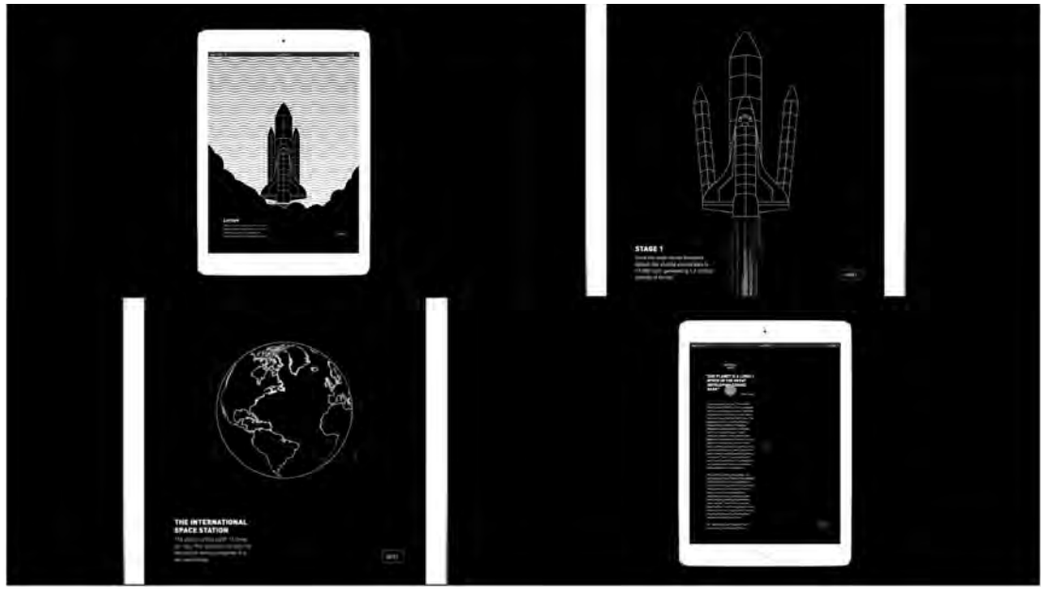

Figure 7: “Isolation” Digital Publishing. Adobe Design Achievement Award Finalist. Source: Student Designer: Zach Becker, 2015; Instructor: Cristina de Almeida

Digital Media Design III

Digital Media Design III offers a chance for students to solve advanced problems in time-based design. Projects are more complex and conceptual in nature. The focus is on the investigation of narrative and technical aspects of time-based media, including pre-production, production, and post-production phases. Currently this course addresses the importance of client-based work, complex problems, and new technologies. It is a very flexible course however and has been adapted over the years in order to take on new opportunities, reflect industry needs, and cater to the different skillsets and interests of each unique group of students.

TV Idents

Students animate three second, nine second, and fifteen second spots for a television network of their choice from a provided list (see fig. 8). They are to stay true to the concept and programming of the existing channel, but make it original. Idents are done to differentiate between channels, but are also seen as short pieces of entertainment in themselves, aimed to keep the viewer from turning the channel. One challenge for the students includes designing with motion and narrative under much shorter time constraints. They also need to create a consistent branding experience across the different spots, while infusing some variety.

Figure 8: “Animal Planet” TV Idents. Source: Student Designer: Tiffany Hsu, 2013; Instructor: Kacey Morrow

Title Sequence

This is a classic assignment that students really enjoy. It is an opportunity for them to create a mini-movie before the movie. They are prompted to create a title sequence for a book of their choice that hasn’t been made into a movie yet (see fig. 9). This is a very comprehensive project in that it involves type and image integrated seamlessly. It is longer in duration and allows them to explore narrative. They are challenged in discovering the right approach to communicate and set up the book/film. During class, we research, discuss, and compare examples of well-known title sequences and title designers. This provides them with ideas of different approaches and a historical context.

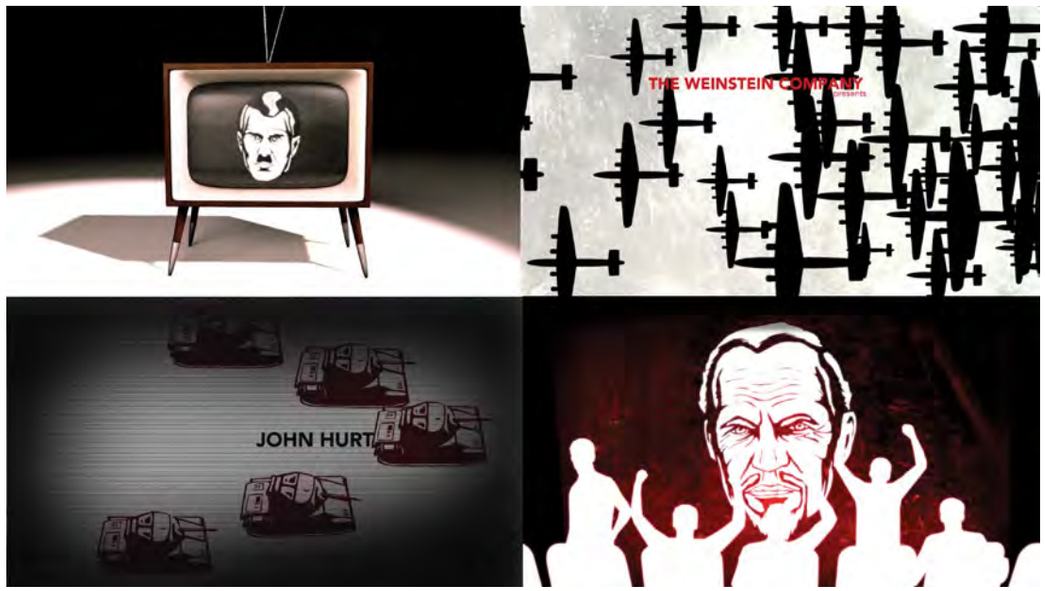

Figure 9: “1984” Title Sequence. Source: Student Designer: Peter Mallahan, 2012; Instructor: Kacey Morrow

Infographic

For this project, students demonstrate information through motion that would be difficult for people to digest on a printed page (see fig. 10). Motion can help visualize and explain information more clearly for an audience. It emotionally resonates with them. Students are instructed to choose information that is relevant, meaningful, impactful, accurate, and of interest to them. In preparing for this assignment, we also go over how to collect data, make relationships and organize data, and visualize data. We break down both strong and weak examples of infographics. We do a quick in-class exercise where I give them a set of data and a problem statement, and from there they need to try to sort, label, integrate, and prioritize the information to demonstrate a solution to the problem statement. We then discuss considerations for animating infographics with two alumni at Killer Infographics in Seattle, Washington. They are very helpful in providing the students guidance and techniques of how to take their infographics into a timeline. Students are challenged in this project to communicate the information clearly and accurately, while finding new relationships and meaning. The goal is to develop a compelling narrative sequence to leave lasting impact on the viewer.

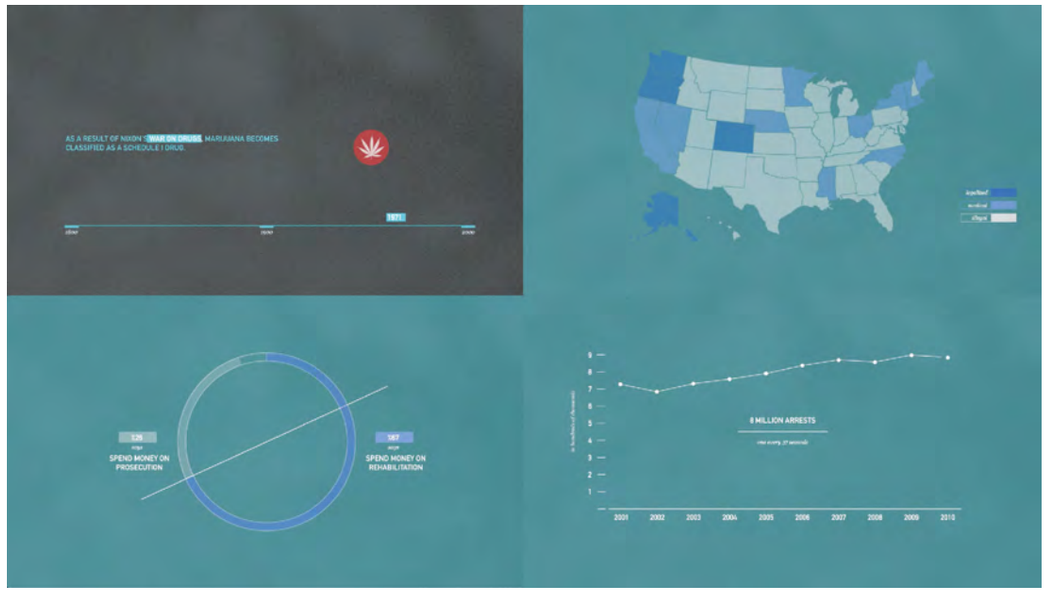

Figure 10: “Marijuana Landscape” Infographic. Source: Student Designer: Olin Nespor, 2016; Instructor: Kacey Morrow

Projection Map

Students create a music video for a local band intended for large-scale projection on the Flat Iron building in downtown Bellingham, WA (see fig. 11). This is a public outdoor event during the November Art Walk. The challenges are to design with the structure of the building in mind and to reflect the music of the band visually and conceptually. Focus is on concept, communication, innovation, audio-video synchronization, rhythm, and composition. This project gets students out of their comfort zone by having them design for something different than a mobile or computer screen. There is also this extra pressure and excitement surrounding designing for a live event and a real client. Another obstacle the students learn about after the event is the importance of high contrast when it comes specifically to outdoor projection. To keep us connected with professionals throughout the course, I solicit advice from music artists and alumni, Odesza. This band has become very popular among the students and I knew this would be a great way to connect with them. We are able to ask them about how they design for live large-scale projection during their musical performances.

Figure 11: “The Heart” Projection Map. Source: Student Designer: Olin Nespor, 2016; Instructor: Kacey Morrow

Small Business Promo

Motion graphics and video can be a powerful tool to promote businesses, products, and services. For this project, students create a commercial and a teaser as a team for a new local small business (see fig. 12). New local businesses can always use help getting off the ground. Students are given a choice of four small businesses to choose from and divided into teams of three. Each camera crew assists one another with the production aspect of the commercial. Teams help write, shoot, act, edit, and serve as extra hands. Each team member is shooting and editing a commercial and teaser together as a group. The video needs to reach a target audience, identify unique features about the business, differentiate the business from any competition, and suggest compelling reasons to go there and become a customer. Students concentrate on strong pre-production including research, concept development, and storyboarding. They are also instructed to shoot with editing in mind. During preparation for this project, we go over pre-production, composition, production, and editing. Students meet with the clients at their businesses to ask them questions, set up shooting schedules, and location scout. At the final critique, we invite all four businesses and two professional filmmakers in town to provide the students feedback on their work. These videos are ultimately used in social media to help promote these businesses.

Figure 12: “Something Found” Small Business Promo. Sources: Student Designers: Skylar Aieta, Jake Stoumbos, Austin Welch, 2016; Instructor: Kacey Morrow

Reel

The last project of this course is to edit a reel of their work. It is a great way for designers to showcase their capabilities, skills, and talent. It provides a taste of their work and represents who they are in a short dynamic way. Having a reel allows employers to see samples of their work without having to go through each project individually. It serves as a well-rounded introduction within their portfolios. They are allowed to include anything from any class they have taken and personal work as well. In preparation for this final project, we go over other examples of reels including watching motion designer, Nick Campbell, critique reels on *GreyScaleGorilla.com*. We also discuss tips and tricks for a successful reel including starting with your best work, being selective, music choice, transitions, arrangement of clips, and making sure people know your contact information. I know some of the students have already included their reel on their websites and social media and gained freelance work from it prior to graduation.

BFA Seminars

In addition to the Typography II course and the Digital Media III course, students also take three BFA Seminars during this final year. These seminars are flexible and can vary in topics. The Fall quarter in recent history has been primarily focused on environmental design. The Winter quarter has been an opportunity for students to explore and solve various complex design problems while making portfolio quality work. Spring quarter has been primarily a chance for them to evaluate their portfolios and see what is missing. They are preparing for graduation and making projects of interest.

During these BFA Seminars, motion is used in various ways (see fig. 13). It has been used to create demos of mobile apps or user experiences. It has been very useful for students to use when trying to show their environmental design. They will develop fly-throughs and animate the experience of being in the designed space. Students have also used motion for more than just demonstration purposes. We have had students design 3D VR and VJ explorations, and one student recently designed around 30 different loading bars as part of a daily personal project.

Figure 13: BFA Seminar projects. Source: Student Designers: "_able," Skylar Aieta, Dave Shin (top left) "resolve," Jake Stoumbos (top right) "VJ anim," Brandon Korvas (bottom left) "Pacific Station," Jake Stoumbos (bottom right), 2016; Instructors: Kacey Morrow, Brittany Schade

BFA Workshops

Students also attend two BFA Workshops during the year. The workshops are facilitated by a faculty member and taught by a professional in the industry on a specialized topic. Faculty members choose a subject they find is missing from the regular curriculum. These courses are very flexible and respond to current trends in the industry. Topics in recent past have been user experience, product design, video production, and type design. Students depend on motion in these workshops to demonstrate their ideas (see fig. 14). This Spring, students worked with a UX designer at Artefact in Seattle, WA to create VR prototypes using the application, Storyboard VR. The VR application tool allowed them to import assets they created from Photoshop, Illustrator, scanned drawings, 360° photography, or 3D. They then arranged those assets into a sequence in the VR app to tell their story. This workshop allowed them to experiment with narrative devices and rethink methodologies for the next evolution of design. One that may be more immersive and less tied to a screen.

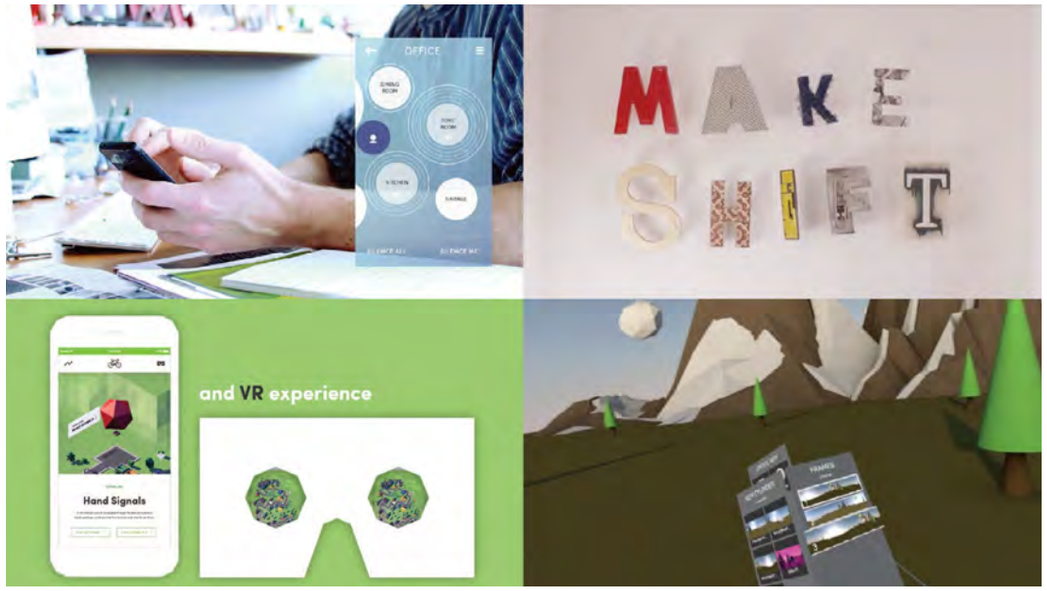

Figure 14: BFA Workshop projects. Source: Student Designers: "Quiethouse," Tor Jakubcin, Ruth Ganzhorn, Ellie Toomb, 2014 (top left) "Make.Shift," entire 2015 BFA class (top right) "Pedal," Zach Becker, Amelia Barlow, 2016 (bottom left) "Storyboard VR study," Brandon Korvas, Alicia Terry, 2017 (bottom right); Instructors: Cristina de Almeida, Brittany Schade, Kacey Morrow

Closing

The most instrumental change we made in our curriculum was to move sequential design into the core foundation and then continuing to build upon that knowledge in later courses. Students are able to understand the fundamentals of how motion integrates into their design work. At a foundation level, time-based media is introduced as yet another tool, just like folding paper, drawing in their sketchbook, or laying out a page in Illustrator. Students learn early on how motion enhances and utilizes the design principles and elements they are learning in their other foundation courses. With the intentions of demystifying this new medium, they are then comfortable in using it throughout the rest of their courses. They discover that motion can be used as a final product, as an instrument of dynamic media, or as a platform for communication. There are many avenues for motion design in today's industry and our students need to be able to speak the language of motion.

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Author Biography

Kacey Morrow is an Associate Professor at Western Washington University, teaching in the Department of Design with a focus on motion graphics, digital video, web and interaction design. Prior to WWU, she served as a Lecturer in the Graphic Design program at Ringling College of Art and Design. Speaking at conferences such as, University Film and Video Association, Design Principles and Practices and Massaging Media 2: Graphic Design Education in the Age of Dynamic Media, she stays involved in discussions about the intersection of design and technology and lectures about her work in experimental video. Her award-winning videos have appeared in several film festivals and exhibitions nation-wide including the highly acclaimed Seattle International Film Festival and Atlanta Film Festival. She also co-wrote the third edition of the textbook, 'Producing for TV and New Media' with Focal Press. Recently she founded the local film festival entitled Bellingham Music Film Festival celebrating the intersection of film and music. In addition to teaching and scholarly research, she is also a practicing freelance designer and filmmaker.

PAPER CATEGORY: THEORIZING

New Visual Motion Perception Findings and a Paradox: “What is going on?”

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Abstract: This study was undertaken to help clarify if visual perception of closely related subject matter is generally interpreted in a similar way by subjects in a format of on-screen 4D motion; also to help identify Foreground motion and to extend the concept of Figure-ground to motion. The subjects were given a series of six different, but closely-related, video situations and asked to describe what caught their attention. There were 12 subjects for the experiment. The results within each video interpretation showed that the reactions of the subjects had high correlations between each other. This correlation; however, was not seen to be true between different-closely-related videos. The results showed that the subjects generally interpreted each video situation type in a similar way, but that different video situations of very similar type had no correlation between them. Two “guidelines” or “rules” became evident. Paradoxically, these improved understandings bring into a question the degree to which practical applications of motion image such as TV advertising, marketing, and dynamic information visualization graphics for interaction have validity in predicting audience interpretation. Even minor variations may cause meaningful differences of interpretation. Additionally, similar questions might be extended to literature, music, some sciences, politics, and other data sets that require attention and interpretation.

Keywords: visual motion; attention; grouping; figure-ground; interaction

Introduction

Perception, in the most general terms, involves identification and interpretation of sensory stimuli in order to understand what is represented. In our everyday lives, it is common to witness a disconnect between “what is presented to” and “what is represented by” for the viewers. For example, see Figure 1: Viewers can see two geometric shapes as triangles whether there is a break within the contour or not. ‘What is presented’ in Figure 1 is continuous lines in two different ways; however, the viewers can see two triangles, ignoring or overlooking the blanks. Ironically, designers pro-actively employ this phenomenon in their design, considering the two triangles having the breaks rather than continuous lines to avoid sameness, to pursue originality as they represent triangles in a creative manner. On the other hand, if the break becomes twice as wide (Figure 2), viewers would see an arrow rather than a triangle for the contour.

Figure 1. Two triangles

Figure 2. An arrow

Gestalt[1] theory provides a set of rules for structuring visual stimuli in terms of grouping principles. The problem of the subject’s interpretations in 2D can be supported by Gestalt theory. For example, Figure 1 corresponds to the law of Closure[2] in Gestalt—they are ‘present as ab- sent’. The contour becomes ambiguous in Figure 2 in that the degree of clarity to be foreground or a figure declines, which corresponds to the problem of figure-ground[3].

Rubin (1915) discussed several aspects of the figure-ground distinction as follows: “1. When two fields have a common border, it is the figure which seems to have shape, while the ground does not; 2. The ground seems to extend behind the figure; 3. The figure appears to be object-like (even though it may be an abstract shape), while the ground does not; 4. The color of the figure seems more substantial and solid than that of the ground; 5. The ground tends to be perceived as farther away and the figure to be nearer

the observer, even though both are obviously at the same distance, and 6. The figure is more dominant and impressive and tends to be remembered more easily" (in Wallschlaeger, 1992, p. 356).

Metzger (1930) identified "the smallest amount of stimulation necessary in order for vision to occur termed the Ganzfield describing homogenous stimulation" (in Fineman, 1981, p. 14).

Bartram (1997) wrote about the practical application aspects of visual motion that motion attracts visual attention more than stable images.

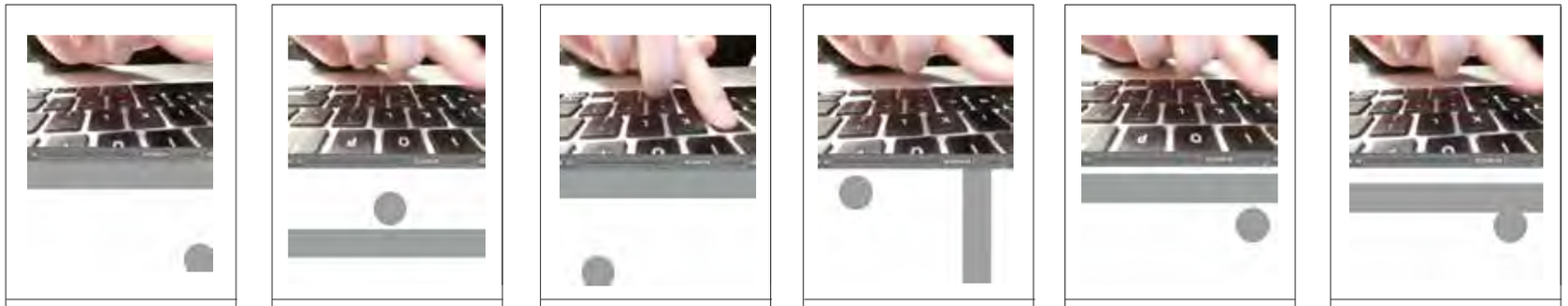
The dynamic nature of on-screen motion has effective visual communication potential for interaction. Motion benefits go beyond stable images, indicating cues, controlling space limitations, and structuring complex contexts.

Buchel et al. (1998) discussed the brain's functional aspect of visual motion that "motion is displacement over time and is a spatial-temporal attribute; there is no clear-cut distinction between featural attention for motion and spatial or even temporal attention. Attention to motion produces a modulation of the activity evoked by moving stimuli in extrastriate cortical regions of the brain, in which a wider network of the parietal and frontal cortex is engaged by attention to motion but not by motion per se—top-down modulatory influences on extrastriate cortex" (p. 1292). After Rubin, "the difference is not to be explained as a question of attention, but rather involves a specific perceptual process" (Pind, 2012, p. 91).

Kim (2007) discussed the viewer's interpretive aspect of visual motion, experimented with Motion Gestalt 4 to extend gestalts into motion. Gestalt is the embraced description of Rubin's figure-ground study (Pind, 2012). According to Motion Gestalt, the subject's interpretive aspect of visual motion, "Gestalt means the "act" of simplicity and interpretation and Motion Gestalt means the "act" of simplicity and interpretation of visual motion for emphasis, resulting in structural meaning. The act of grouping for simplicity in motion means "grouping frequent movements (Motion Proximity)," "grouping similar directional movements (Motion Similarity by Direction)," "grouping similar speed (Motion Similarity by Speed)," "grouping parallel

Thumbnail/ 2D, 3D attributes :
Finger (real-life)
Keyboard (real-life)
Gray Bar (graphic/ abstract)
Gray Circle (graphic/ abstract)

Video/ 4D attributes :
Displacement/ transposition
Regularity of motion frequency
Speed/ fps (frame per second)



	Irreg 4	Reg 11	Irreg 5	Irreg 6	Reg 1	Irreg 9
Events						
Finger :	Tapping a keyboard	Tapping a keyboard	Tapping a keyboard	Tapping a keyboard	Tapping a keyboard	Tapping a keyboard
Gray Bar :	Moving bottom to top	Moving bottom to top	Moving bottom to top	Moving left to right	Moving bottom to top	Blinking-displacement
Gray Circle :	Moving left to right	Moving top to bottom	Blinking-no displacement	Moving bottom to top	Moving left to right	Moving left to right
Regularity of motion frequency						
Finger :	Irregular	Regular	Irregular	Irregular	Regular	Irregular
Gray Bar :	Regular	Regular	Regular	Regular	Regular	Irregular
Gray Circle :	Irregular	Regular	Irregular	Irregular	Regular	Regular
Speed/ fps (frame per second) :	18 fps	18 fps	18 fps	18 fps	18 fps	18 fps

Figure 3. The snapshots of six movie clips with descriptions

movements in a repetitive manner (Motion Common-fate)," "grouping movements in causative logic (Motion Good-continuation)," and "grouping passages by a semantic summary (Motion Closure)".

The present research is concerned with whether visual perception of the situations with variations or subtle differences is generally interpreted in a similar way by subjects, or whether the apparently subtle differences evoke different perception in an on-screen 4D motion for- mat. This early study is of figure-ground-motion identifier concepts of figure from ground adding the influence of time.

Materials & Method

The research analyzed the viewer's responses for six movie situations based on the Grounded Theory 5 research method. Grounded theory looks systemically at the experiment through data derived from participant response. Codes, coding, categorization, and synthesis are accessed through a 'dynamic reading' of the data.

Total six short silent movie clips were designed. Each movie lasts seven to eight seconds. The movie is composed (vertically oriented) of the combination of real-life motion (top) and crafted abstract motion (bottom). For real-life motion, we tried to produce a simple situation that the viewer can describe easily. For crafted abstract motion, we used very basic geometric shapes that the viewer can name easily and focus on movement rather than other two-dimensional aspects. Each movie explores apparently-subtle-different characters. The six movies are named: Irreg 4, Reg 11, Irreg5, Irreg 6, Reg 1, and Irreg 9. The movie guide snapshots and descriptions follow (Figure 3). The movies in the sequence used for the experiment are shown at http://motiongestalt. com/draft1/motion-foreground-ex.html

An open-ended question about each movie was asked to capture intuitive response to motion. Subjects were asked to watch the movie clips (without sound) one by one, and after each movie was over, they were asked the question: "What is going on?" Responses about the scene were verbally captured. The responses were transcribed. Six movie clips were given to each participant. The same order of six movies was given to all participants. There were 12 participants for the experiment. The ethnicity was ten Americans, one African, and one Asian. All had normal English skills and vision. Gender distribution was seven females and six males. Participants' academic backgrounds included business, librarian and arts. The age was over 20.

The experiment was carried out on a Macintosh 17-inch MacBook Pro. An Adobe Flash CC was used to create the movies. The movies were uploaded to a website to play. The entire experiment lasted about 5-10 minutes for each participant.

Participants' responses of the movie analyses and attentions were categorized using open coding procedures. Specific patterns for each movie were formed within each participant response. These response patterns were identified and categorized from text transcriptions of the participant responses, labeled with "Link," "Finger," "Up & Lower," and "Lower". "Link" represents the viewer's pattern of correlating real-life motion (top) with abstract motion (bottom); "Finger" represents the viewer's pattern of attention to real-life motion (top); "Up & Lower" represents the viewer's pattern of attention to both real-life motion (top) and abstract motion (bottom) without a correlation between the events; and "Lower" represents the viewer's pattern of attention to abstract motion (bottom). See Table 1 and Table 2.

Link	real-life motion (top) & abstract motion (bottom) with a correlation
Finger	real-life motion (top)
Up & Lower	real-life motion (top) & abstract motion (bottom) without a correlation
Lower	abstract motion (bottom)

Table 1. Open coding criteria patterns

In Table 3, the participants' answers are categorized (axial coding) to find out the relation between each open coding criterion pattern and each movie event - which criterion pattern is most emphasized for each movie.

Link	“The clicking is making the circle blink”
Link	“Um … the bar was going up and then the circle was blinking fairly erratically and then the person hitting the key was also hitting was kind of erratically but wasn’t the same … erratic …”
Link	“Ah every time they click the button the circle … uh … kind of goes in and out of focus”
Finger	“They seem to be hitting the J button again as slowly and then the rate accelerates”
Link	“Similar concept someone’s pressing a button and kind of doing it repeatedly so that motion is kind of being reflected by the repeating pattern of the circle instead the circle moving this time flashing on the screen as the horizontal line kind of moves upward so kind of makes me think more repetition within the movement”
Link	“… … Um … very similar still still tapping on the key and the gray bar coming up and … the gray dot was on the left … um and its dot seem to be appearing as the key is being tapped”
Link	“Someone’s tapping a J on a keyboard and a vertical sold block line is moving up as a dot flashes in correlation with the J”
Link	“Um … as the finger’s tapping the J the ball circle bottom left was turning gray”
Link	“So … … as the finger taps, the circle stays in the same position? Blinking on and off but the gray bar I didn’t mention in the other movies, is moving up the screen”
Lower	“Ok this time I noticed there’s little bit of flashing from the dot that was appearing and it kind of going in a reverse fashion … I guess it was going opposite to when you pressing it”
Finger	“Uh … there clicking the keyboard? … … Right? Yeah! … Yeah”
Link	“Um … the person was tapping keyboard … and the bar was moving up so it seem like more pushing more pulled up to the top”

Table 2. Open coding examples (The movie Irreg 5)

Results

Table 3 shows the raw data in numbers (upper) and percent (lower). It is seen that the participants showed their interests for the criterion “Link” from the movie Irreg 5 (75%) while the participants showed their interests for the criterion “Lower” from the movie Reg 1 (66%). No en- tries were recorded in the tables for entries less than 0.8%. In the lower of Table 3, boxes were placed for entries of 50% or more.

	Finger	Link	Up & Lower	Lower
Irreg 4	6/11	5/11		
Reg 11		7/12	5/12	
Irreg 5	2/12	9/12		1/12
Irreg 6		7/11	1/11	3/11
Reg 1	1/12	2/12	1/12	8/12
Irreg 9	1/12	6/12	2/12	3/12

	Finger	Link	Up & Lower	Lower
Irreg 4	55 %	45%		
Reg 11		58%	42%	
Irreg 5	16 %	75%		0.8%
Irreg 6		64%	0.8%	27%
Reg 1	0.8%	17%	0.8%	66%
Irreg 9	0.8%	50%	17%	25%

Table 3. Raw data in numbers (upper) and percent (lower)

In Table 4, the participants’ answers are re-categorized (selective coding) to rank the order of each movie based on each criterion. For example, for the criterion Link, the movie Irreg 5 received the most attention from the participants at 75%.

Table 5 shows the order of criteria patterns used by the participants (selective coding). The order was Link, Lower, Finger, and Up & Lower.

Table 5 also shows the particular movie that was most seen by the participants for each criterion’s pattern.

	1	2	3	4	5	6
Link	Irreg 5 (75%)	Irreg 6 (64%)	Reg 11 (58%)	Irreg 9 (50%)	Irreg 4	Irreg 1
Finger	Irreg 4 (55%)	Irreg 5 (16%)	Reg 1 (0.8%)	Irreg 9 (0.8%)	Null	Null
Up & Lower	Reg 11 (42%)	Irreg 9 (17%)	Irreg 6 (0.8%)	Reg 1 (0.8%)	Null	Null
Lower	Reg 1 (66%)	Irreg 6 (27%)	Irreg 9 (25%)	Irreg 5 (0.8%)	Null	Null

Table 4. The rank order of each movie based on each criterion

1	Link	Irreg 5
2	Lower	Reg 1
3	Finger	Irreg 4
4	Up & Lower	Reg 11

Table 5. The order of criteria patterns most seen by the participants

Discussion

Table 3 shows the raw data in numbers (upper) and percent (lower). It is seen that the participants showed their interests for the criterion "Link" from the movie Irreg 5 (75%) while the participants showed their interests for the criterion "Lower" from the movie Reg 1 (66%). No en- tries were recorded in the tables for entries less than 0.8%. In the lower of Table 3, boxes were placed for entries of 50% or more.

The present study attempts to identify some practical contributing factors of motion-in-time that can affect the viewers attention in terms of motion-Foreground. In Figure 3, the 2D example from Hogeboom & van Leeuwen (1997): "the dark patterns in A are symmetrical and so the white part in the middle is less likely to be seen as the figure than in B. Perception is geared towards properties such as parallelism, convexity, and symmetry. In particular, these properties determine which surfaces are perceived to have figural qualities, as opposed to the ground. Figure-ground organization is clearly selective; backgrounds and holes, for instance, are less likely to have a specific shape". We designed 2D and 3D images with motion. They were combined into one split video screen: real-life motion and crafted abstract motion.

Figure 3. Hogeboom & van Leeuwen's Figure-ground

It became clearer during the data analysis that viewers tried to correlate different movie events emphatically when the events are presented with concurrent rhythm and placement (Table 4, the row of "Link". The most committed movie was Irreg 5). We tried to identify possible attributes to correlate the two motion situations, and found that "tapping" and "blinking" with concurrency and without displacement for both. Our null hypotheses included "Blinking/on & off movement associated with an important motion event can produce great attention." Actually, the blinking image was grouped with the motion behavior of tapping, or vice versa. The viewer's goal from "goal oriented activity (Leeuwen, 2011)" in this movie was to group similar repetitive, rhythmic, and positional status (no displacement in this movie) during motion.

On the other hand, the bar image in the lower screen had behaviors that were hardly mentioned by the viewers. It was perceived as "irrelevant ground". The tapping finger and moving dot's association can be considered as a "salient figure." The movie Irreg 6 had a similar rate (64%) to Irreg 5, noticing that the dot shows similar motion characteristics, moving only vertically within a shorter distance, and it shows a blinking dot with the least displacement. This finding supports con- textual/behavioral and positional sync correlates between different motion situations. Comparing Irreg 4 (55%) (Table 4) with Irreg 5, the viewer's answers were mainly categorized as having "Finger" (top) rather than attention to the "Link" (correlation). As a matter of fact, the main difference between the two movies Irreg 4 and Irreg 5 is the dot's displacement/shift, moving from

left to right (Irreg 4). It also supports the hypothesis of contextual/ behavioral & positional sync to correlate between different motion situations. In sum, motion behaviors in synchrony with its rhythm and placement can be a motion criterion for motion-Foreground.

Additionally, viewers stay with regularities in rhythm and speed with the causal logic of the motion in its progression (Table 4, the row of "Lower". The most committed movie was Reg 1). Causation in motion has been defined as such: "Stimuli in motion are grouped by causation as a syntax of motion in space and time as Motion Good-continuation. The causation rewards a viewer's expectation for dependable motion on screen in that multiple events over time will be connected and re- lated" (Kim, 2007, p.77). In the movie, the abstract lower screen motion shows regular progression; the causal logic repeats with regularity. Our null hypothesis included "Meaningful events dominate abstract events". One asks: "What is "meaningful" in motion?" We saw that the causal logic with a repetitive manner is "meaningfulness" in motion. The finger tapping was a series of simple repetitions, and was seemingly absorbed into the regular and causal overall event of motion (Lower). The dominant feature in the viewers' attention was the dot and bar's smooth, causal, and natural progression - every time the dot moves to the right the bar moves to top.

On the other hand, in the Reg 1 movie, the finger tapping can be considered as "irrelevant ground" while the abstract motion's smooth, causal, and natural progressions can be considered as a "salient figure". Comparing the movie Reg 1 with Reg 11, the only apparent difference between the two movies is the dot and bar's orientation. When there is an association between the movement of the dot and the bar in the movie Reg 11 (getting closer) then the causal logic is diminished, and the semantic is increased. In the movie Reg 11, the viewer's attention is drawn to semantic motion rather than causal motion. In sum, motion in causation with regular progressions, without disturbances from semantic possibilities, can be a motion criterion for Foreground-motion.

Considering the order of criteria patterns most seen by the participants, Link > Lower > Finger > Up & Lower in Table 5, we can conclude that the viewer showed the least interest in no correlation, or that the viewer showed greater interest in making a correlation or focusing on one feature than on the other. It is commonly asserted that what is presently focused is more likely to be what we see (Leeuwen, 2011, p. 53)and the phenomenon can be that viewers tend to be "fixated" (ibid.) or to "interpret" rather than treat what is seen as random or as having no relation.

The natural world features many overlays of still and moving images. It is logical that the subjects' perception mechanisms would continue in a smooth pattern from 2D/3D to 4D. This orderly perception hierarchy and analysis would allow for the integration of complex environmental stimuli into an understanding of "what is going on?" and the consequences. The faster and smoother the subject's interpretation is, the earlier the coping reaction and improved chances for a successful solution to "what is going on?" In terms of integrating these perceptions and solutions into practical human interactions, design does matter in both 2D/3D and 4D media circumstances.

With the analysis of our video studies, understanding of the perception and attention mechanisms became clearer in slow retrospective analysis. It was possible to see how the subjects reacted as they did. However, the movies were very restricted in their parameters. Thus, an analysis of the "simple" movies was possible. As the movies were relatively simple, it is felt that they showed the most basic reactions of the subjects in trying to comprehend the movies. The subjects responded repetitively in the two similar patterns. We found Attention status is achieved: Firstly, by motion behaviors containing synchrony with rhythm and placement; and secondly, by motion in causation with regular progression (without disturbances from semantic implication).

These two findings may be applied in future experiments as "guidelines" or "rules". They are significant because they can be applied to composing designs. Also, they can aid the motion designer to be less intuitive and more rational in creating constructs. Additionally, with applications of the guidelines, it may be possible to better predict responses to a given design.

However, real-life situations are multi-layered, complex, and ever-changing in time. For these reasons, the guidelines may only apply to parts of complex situations or designs. Subjects may react to complex designs with additional guidelines and rules beyond the two found in this study. This leads to thoughts about practical applications of

attention and perception rules. In every day life, mankind attempts to create constructs to communicate ideas. We see these constructs through our senses over time (i.e., 4D). The constructs can pertain to music, politics, literature, some sciences, and others. There are also variations in the presentations of each of these constructs internally by how they are "performed" and externally by how they are "perceived" in a certain historical context. The variation can be subtle or major magnitude. Paradoxically, despite our ever-increasing understanding of perception and Attention complexity, predictions as to the actual responses, beyond simple experimental constructs, appears as far away as ever.

Conclusions

In conclusion, we found consistent subject responses that suggest the highest Attention status for Foreground in motion is given in at least two circumstances: Firstly, by motion behaviors containing synchrony with rhythm and placement; and secondly, by motion in causation with regular progressions. Further ramifications of these findings are proposed in relation to "simple" and "complex" design constructs and situations.

Footnotes

1. Gestalt: we develop sensory stimuli into meaningful information holistically. Gestalt itself emphasizes the act of synthesizing the sum of its parts in terms of productive thinking (Wertheimer, 1945) corresponding to automatic reasoning (Gibson, 1979) explained by gestalt grouping principles.

2. Closure: we try to "identify" stimuli although there are missing parts.

3. Figure-ground: we group stimuli to distinguish objects as figures from their back- ground as ground.

4. Motion Gestalt (Kim, 2007): an extended notion of Gestalt to include the element of time regarding visual motion on screen; it defined gestalt grouping principles in time.

5. Grounded Theory (Glaser & Strauss, 1967; Strauss & Corbin, 1990): a theory through qualitative data from an experimental situation. The resulting outcome is regarded as a theory formed, in which the variables interact as a unit to produce the main causality discovered, with which the theory functions and predicts dynamic phenomena.

6. Goal-oriented activity: we distinguish between salient gure and irrelevant ground, and naturally incorporate them (Leeuwen, 2011).

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PAPER CATEGORY: TEACHING

Balancing Frameworks of Practice and Theory

John Colette and Austin Shaw

Savannah College of Art and Design

Abstract: The diversity of practice assembled under the term "Motion Design" reflects both the range of creative practices involved and also the diverse professional communities who employ these techniques for creative and commercial ends. As Art and Design programs respond to increasingly pragmatic analysis from student, institutional, and industry stakeholders, the capacity to balance both creative development and industry-focused graduate competencies places disparate demands on program design. The development of a progressive model of creative immersion, based on Alfred North Whitehead's principles of education in the Arts, forms a flexible framework for curriculum, ranging from a single course to a dedicated major of study. With the aim of effective generalization of practice, the range of course offerings, out of class experiences, and institutional support structures can be tailored by a University to offer the student both professional capacities and creative scope for artistic development within their program of study.

Keywords: Motion, Design, Education, Curriculum, Practice, Theory, Collaboration

"The antithesis between a technical and a liberal education is fallacious. There can be no adequate technical education which is not liberal, and no liberal education which is not technical: that is, no education which does not impart both technique and intellectual vision. In simpler language, education should turn out the pupil with something he knows well and something he can do well. This intimate union of practice and theory aids both."

—Alfred North Whitehead

As Motion Design continues to define itself as a distinct creative discipline, the question of "What constitutes a Motion Design program?" becomes increasingly relevant. Discussions surrounding higher education in general likewise call into focus the forces that might influence decision-making in the development of Motion Design curricula.

Studies in Art and Design are increasingly influenced by principles of Competency-Based Education. This in turn is aligned with the recognition that most students below the doctorate level see their study as a requisite credentialing process for employment. This shift in emphasis towards workplace readiness has informed the administrative landscape of higher education for well over a decade.

> Worries about the employability of recent college graduates have been around for decades, but the idea of a skills gap acquired special currency in the years following the Great Recession, as the job market was slowly mending. (Berrett 2017)

The focus on post-graduation outcomes has implicitly reframed the discussion of the role and efficacy of the traditional degree granting institution. Terms such as the "Competency-Based Workforce" (Pace & Worthen, 5) have become instrumental in the framing of this discussion, which rises to an air of instrumentalist alarm, highlighting the perceived threats of alternative "learning pathways" delivering these "services" to students (Vorhees 5).

Recasting traditional University curricula in terms of pure economic utility to the student "customer" may be, for the contrarian, part of a pervasive neoliberal worldview, in which the exploratory nature of learning and the wider domains of knowledge are jettisoned, and the role of learning is judged in simple terms of pure market efficacy.

> ...the cultural shift is plain: replacing measures of educational quality are metrics oriented entirely to return on investment (ROI) and centered on what kind of job placement and income enhancement student investors may expect from any given institution. The question is not immoral, but obviously shrinks the value of higher education to individual economic risk and gain. Removing quaint concerns with developing the person and citizen or perhaps reducing such development to the capacity for economic advantage. (Brown 23)

Competency is still, however, an important measure of program success, and is unlikely to diminish in emphasis for the foreseeable future. In addition to training towards workplace competency, a well-rounded education requires a variety of classical liberal arts. An academic Motion Design program ideally needs to balance frameworks of both practice and theory, and also the attributes of commercial design with the artistic capacity for expression. A diversity of praxis should be balanced with historical and theoretical perspectives, developing an inquisitive, reflective practitioner, who is supported by rather than defined by their program of study.

Unifying pedagogical strategies that traverse this range of creative outcomes, disciplines, institutional stakeholder interests, and varied student expectations in a university setting, places unusual demands on program design. This paper examines a gestalt approach to the development of a Motion Design curriculum, and an extended program of learning opportunities outside of that curriculum, which develop graduate attributes that focus on creative problem solving and a demonstrated capacity for industry engagement.

Curriculum design, the development of preparatory and core study units, the development of elective options, and the capacity for students to vary their program inputs will all be discussed, using examples of work from each area.

Graduate Attributes

Motion Design practice goes beyond the design of motion texts, immersion in media production processes, and development of finished works. Motion designers at the most fundamental level engage in creative problem-solving. A curriculum that integrates praxis will ask students to identify and analyze creative problems, interpret creative briefs, and construct solutions to fulfill creative needs. Students' ideation and articulation is visual, aural, and narrative. Creative concept development encompasses searches that are both internal [reflective] and external [contextually researched] (Fig. 1).

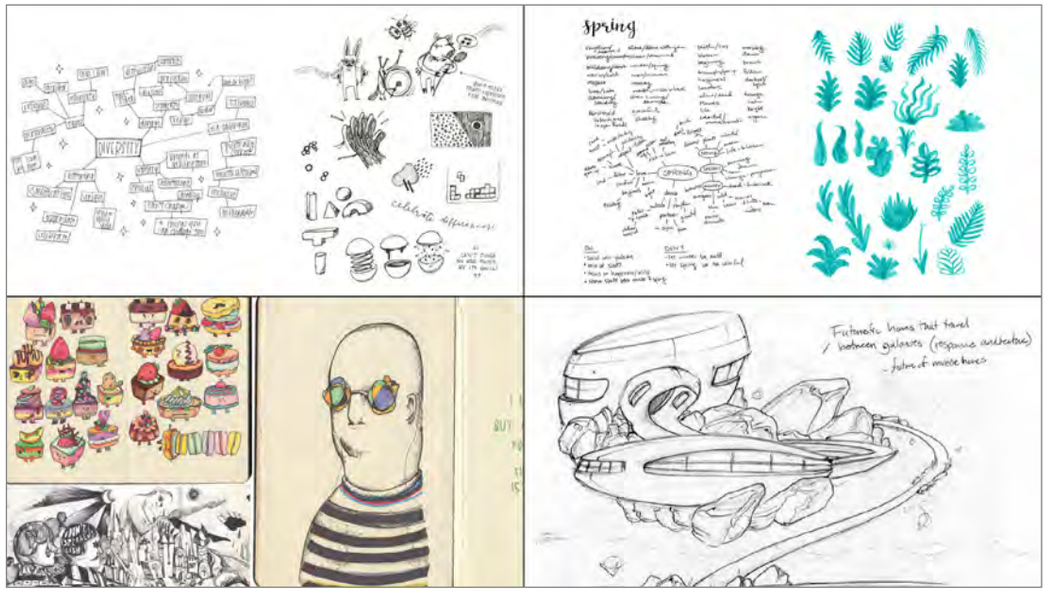

Figure 1: Examples of concept development and ideation by Elizabeth Stuart, Chrissy Eckman, Yeojin Shin, and Peter Clark, SCAD BFA students. Students are required to maintain a working sketchbook as a regular part of every course from intro to capstone.

Students further develop effective communication design practice, artistic works, and industry competencies in both solo and collaborative settings. While the difficulty of mapping graduate attributes in the broader arts curricula is problematic, it helps to clarify the competing interests in program design.

> Yet the recent focus on Graduate Attributes is distinctive in that the humanistic construction of a 'rounded and encultured individual' has been largely superseded by a utilitarian vision of employer requirements. (Forsyth, 1)

The motion designer, within the study and practice of art and design may be subject to a more commensurable focus. Without falling into the rhetorically proscribed field of “Motion Graphics,” a rounded motion designer can solve creative problems across a range of moving media, as part of an evolving and sustainable practice.

Recognizing the capacity for creative change and self-articulation in the graduate transcends a purely instrumental focus on simple competence by developing individual capacity for creative generalization within an ongoing, organic practice.

Scale and Process

Motion Design in the framework under discussion is understood as a specialist major of study; however, study of the discipline may involve as little as a single course at a given institution. By focusing on the goal of effective generalization, program design should include similar frameworks across either a curriculum or a single-course offering. Whitehead’s model of education in the arts describes this approach with great clarity by segmenting the process into three phases - Romance, Precision, and Generalization (Whitehead, pp17-19). It is important to note that Whitehead’s framework was conceived as a “cyclic process” (Fig. 2).

> Education should consist in a continual repetition of such cycles. Each lesson in its minor way should form an eddy cycle issuing in its own subordinate process. Longer periods should issue in definite attainments, which then form the starting grounds for fresh cycles. (Whitehead, 19)

Romance, Precision, and Generalization across a Motion Design Curriculum.

ROMANCE	PRECISION	GENERALIZATION
Freshman - Sophomore	Sophomore - Junior	Junior - Senior

R P G

Romance, Precision, and Generalization within a single course.

Figure 2: Whitehead’s romance, precision, and generalization as an information graphic in a single course.

Romance

In a single motion design course, the student is introduced to exploratory techniques, which afford the capacity to realize tangible outcomes over a very short period of time, usually within the first class. This structure creates both a sense of immanent creative potential and develops curiosity to extend these new capacities in the studio environment.

Within a larger curriculum, in an introductory motion techniques course, for example, the development of a series of quick and successively more complex moving graphics might outline basic concepts in movement, keyframing, serial form and the integration of different media types. The class program should conclude with a self-directed project applying the new learning, so that the practice of progressive [cyclical] generalization concludes each unit of curriculum.

Figure 3: Screenshots from Motion Techniques 1 course, SCAD 2017.

This phase of romance develops familiarity with the working environment, potential for creative ownership, and excitement at the new possibilities of such work, laying the ground for further exploration. Work here is designed to give a rapid sense of possibility without specific consequences. Abstraction, or the use of basic forms in short exercise format is most appropriate in a single class, and the broad exploration of multiple techniques with a short final project can structure a single course (Fig. 3).

Precision

In the next phase of a program, students will be introduced to specific techniques that give them a detailed framework for practice and the capacity to discriminate amongst options for creating specific effects in their work. Techniques in this stage are introduced in a highly structured form, by giving detailed explanation and investigation of processes, effects and variations that will recognize granular aspects of practice and their application. This stage most closely mirrors the broad focus on competency (Figures 4 and 5).

Figure 4: Example of a Design Style Frame that demonstrates competency through precision. In this frame, we see the balance of positive and negative space, variation in scale, and carefully considered use of color values and palette, all rendered with highly sophisticated illustrative technique. Depth is created through attention to detail, crafted layering, and suggested atmospheric perspective. The frame articulates a clear vision, while suggesting its liminal state within a broader moving work. Yeojin Shin, SCAD BFA.

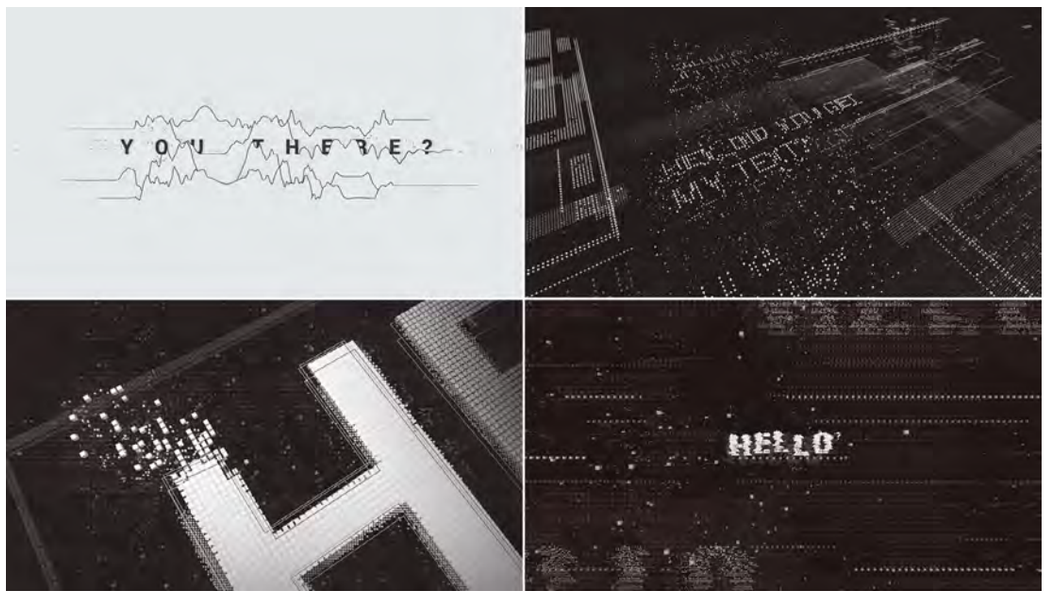

Figure 5: Example of a Design Storyboard that demonstrates competency through precision. This design board integrates visual and cinematic principles as well as an investigation of typographic form. Scale, perspective, value, and a variety of camera distances convey the vernacular of digital communications. The work was completed using standard design tools and code-based tools, principally Processing. Audrey Yeo, SCAD BFA.

Generalization

In the later part of a course, students will take their new competency into a personal investigation of practice, applying the techniques of the precision phase into a more speculative and self-directed work that incorporates individual creative and aesthetic concerns, with the capacity for studio practice in the creation of autonomous work as the designer / auteur. In this phase, the student operates in an integrated manner, ideally balancing practical competencies with individual theoretical concerns, and combining the discrimination and practical resolve of the designer with the speculative concerns of the artist in a hybrid praxis.

Considering this progression in terms of a full program, the same guiding principles apply, with specific caveats. Preparatory course-work in design principles, computer based imaging, spatial concepts along with inclusive liberal arts and art history courses might prepare the Freshman student for choice of a major of study.

As a Sophomore, (aligned with the romance period) the study of Motion Design would commence with fundamental techniques in studio courses and a historical survey specific to the discipline. Students build a sense of capacity within the discipline and understand the possibility of the medium. This extends in the Junior year with a focus on precision - specifically working on the refinement of design solutions, cinematic techniques and the development of professional practice and a working portfolio. At this stage extended study in Media theory will also serve to contextualize studio practice. Elective offerings in this stage might include Alternative Production Processes, 3D design, creation of Style Frames, Design for Motion, Projection Mapping and Physical or Interactive Computing (Fig. 6).

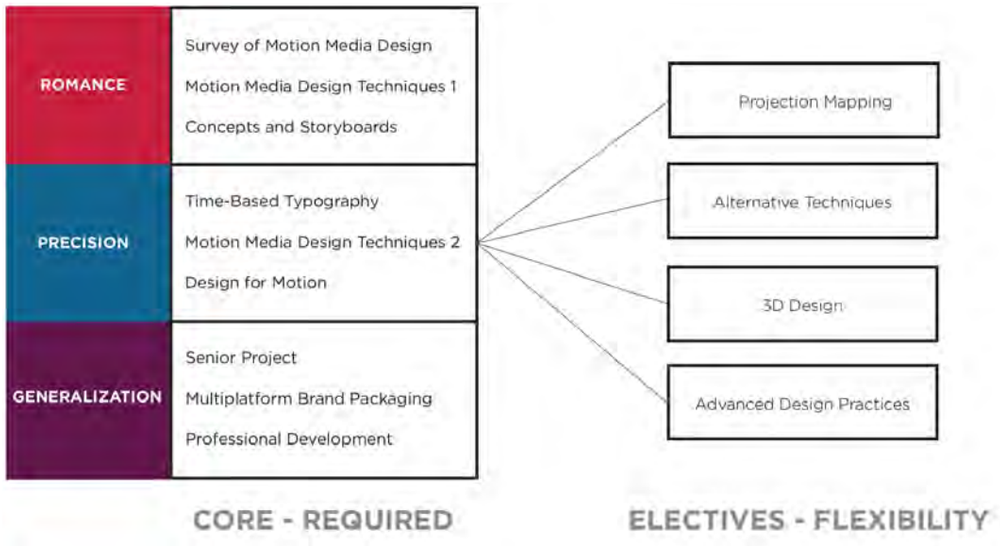

Figure 6: Whitehead's romance, precision, and generalization as an information graphic in a curriculum.

In the Senior year, a student will Generalize their practice through an extended, multi-term development of a project work that provides the opportunity for a significant capstone work that is suitable for external exhibition. Development of this work will ideally model professional processes of concept development and presentation, scheduling, resource allocation and integrative, personalized practice (Figures 7 & 8).

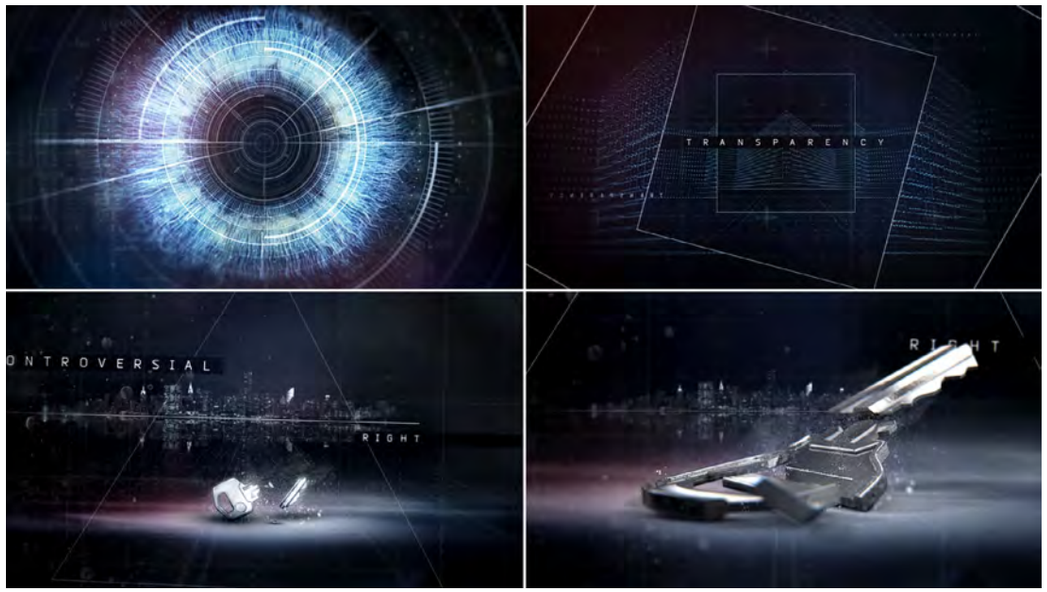

Figure 7: Design Board of Senior Project by Chris Finn, SCAD BFA 2015.

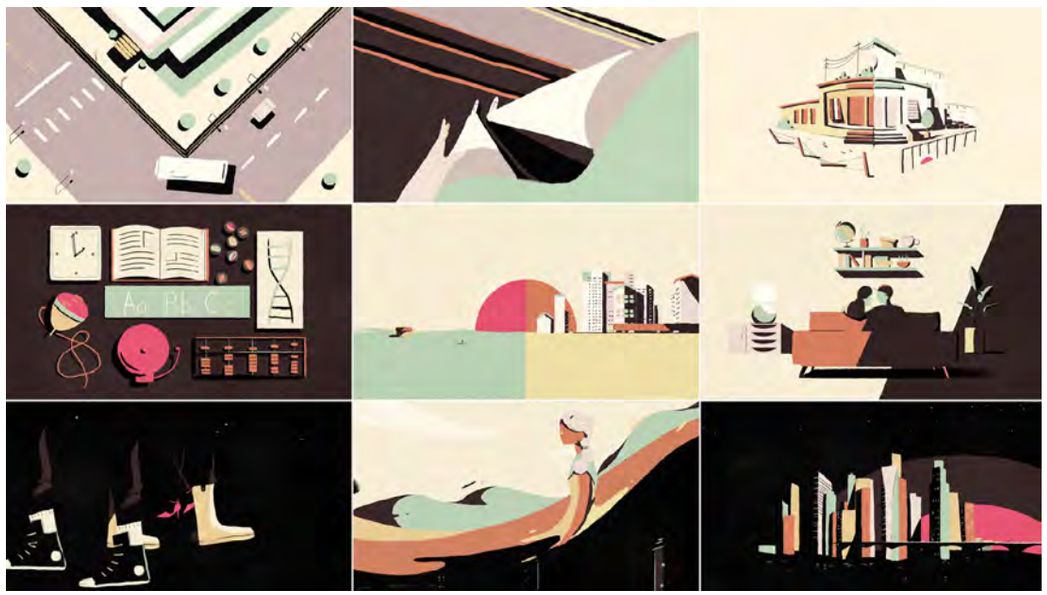

Figure 8: Design Board of Senior Project by Audrey Yeo, SCAD BFA 2016.

Graduate Studies will offer a more focused program, with preparatory course offerings for students who need to meet specific levels of practice before entering the degree program, and a late program sequence incorporating thesis development, writing and studio work for students undertaking MFA study. For all graduate students, coursework in Media Theory is a requisite and for MFA candidates, the thesis process is consolidated over three consecutive quarters. While an MFA project is supported by a written thesis, the development of a bibliography and clarification of the thesis question will take at least one quarter in a class work setting to provide a sufficient level of theoretical consideration of the thesis work.

MA students complete a final project under a more exacting rubric than undergraduate students. All graduate students are required to pass a review of candidacy before capstone work is undertaken.

Curriculum Design and Context

Developing curricular balance between theory and practice is both structural and pragmatic. Every class will incorporate pragmatic reference to the work of relevant artists and designers as a means of contextualizing immediate modes of practice. Screening of film segments, motion works, titles, exhibition documentation, or physical museum visits are incorporated into every class to provide a historical framework or thematic contemporary context. In some cases this may provide an immediate cue to exploring a specific technique (Fig. 9).

Structurally, the balance between theory and practice is embedded in the spread of courses and prerequisite requirements for contextual and theoretical studies prior to classes in advanced studio practice. Historical surveys explore the origins of motion design from pre-cinematic techniques, through early cinema and animation, 20th century commercial and experimental practices, and fine arts linkages to motion design. Undergraduates are required to take core units in Media Literacy and a Survey of Motion Media Design, as well as electives in Art History. Graduate students focus on more detailed surveys of Media Theory to build a foundation for their individual thesis work.

Figure 9: Work to reproduce classical paintings as cinematographic images. Professor Dominique Elliott, SCAD.

Extending Learning

The components of program design alone offer a framework that affords the possibility for graduate success. However, these components are amplified and cemented by cultural factors that surround the accredited program of study with extended learning and development opportunities. These cultural factors refer to the program's character beyond the course offerings and physical infrastructure. At SCAD, the department culture is prefaced by a lack of academic rank and the premise of equal and collegial relations amongst the faculty. The faculty are available to students outside of class and office hours for consultation and assistance. Students are encouraged to take an active custodianship of collective, course-related activities outside of class. These activities include a highly productive student

club, group exhibitions, and collaborative projects. Students are active in peer mentoring in both formal and informal settings, further establishing the collegial and supportive culture of the program.

These elements are not incidental. They correspond very closely to the broader definition of program level Graduate Attributes, combining both generalized capacities of practice with "soft skills," such as communication, organization of production assets, and collaboration. To illustrate this point, we will discuss examples from the Savannah College of Art and Design's Motion Design program as part of a larger Art and Design school, with over 70 major programs of study.

Collaboration

Students who collaborate *early*, and *often*, during their study usually thrive in media production environments. Collaboration is a salient feature of media production and applied design practice. Designers are called upon to operate within group settings, which match their specific expertise to broader professional requirements. The opportunity to collaborate takes a number of forms in the SCAD program.

In-class collaboration is recognized as a structured aspect of program design, and is most typical of approaches to project-based learning. At SCAD, this practice involves group projects, which may be smaller exploratory works-such as this dimensional head created in the second week of a projection class (Fig. 10).

Class collaborations may involve more elaborate and exploratory works, such as the multi-screen media architectural installation Flux / Fragment on Samitaur Tower in Culver City, California (Hochstatter. McCallum 2014) (Figs. 11 & 12). Collaboration here involves both student and faculty inputs. The development of these works extends the principles of core curricula into novel and technically bespoke applications. This work integrated depth mapping using spatial sensors, data translation into both compositing and 3D applications, and the rendering of work into a 10-screen edge blended HD projection controlled from a central media server. The entire workflow and realization involved participation from faculty and students for its production, and coordination with external stakeholders for its successful installation and display.

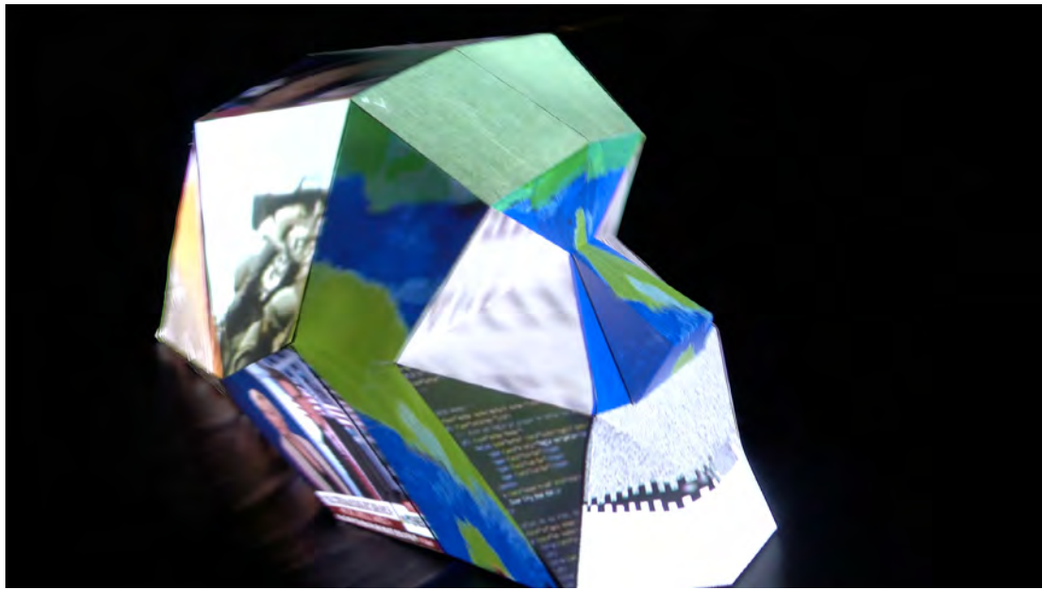

Figure 10: Projection Head: Beattie, Van Zee 2016.

Figure 11: Street Photos of Samiaur Tower (Hochstatter, McCallum. Murphy 2015) (Flux/Fragment Samitaur)

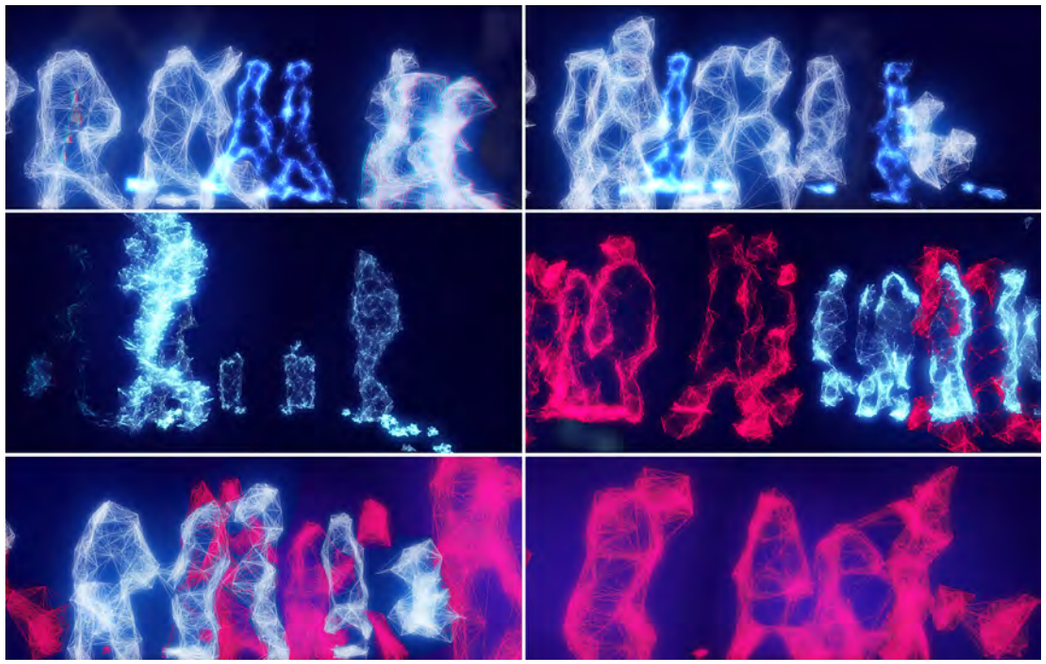

Figure 12: Layout of Screens from Flux/Fragment, Samitaur Tower, Culver City. McCallum and Hochstatter, 2015.

Figure 13: Papercraft Food Network, Compositing Project: Yeo, Shin, Joon, et al 2015.

Collaborations in both class and studio work will often mirror team-based productions within the industry. These works may follow a more traditional media development pathway. Design pitch and scope are followed by a scheduled production period and the division of production roles as appropriate. Students experience the cycles of production at different scales and with different team sizes (Fig. 13 & 14).

Figure 14: The Seed, Senior Project: Shin et al 2015.

Structured, cross-disciplinary research and collaboration is also offered to students through participation in the SCAD Collaborative Learning Center [CLC] projects, which assemble teams of students from different majors to solve a creative problem posed by an Industry partner. This model serves the dual purpose of giving the students pragmatic project-based work into which they generalize their core skills-sets in the context of an external challenge. Students may work on sustained project development for motion-based projects (Shaw, Fox Sports 2013, 2015. Gulfstream 2014).

Figure 15: Style Frame, Superbowl 48: Solomon et al 2014.

Figure 16: Classroom activity and process FOX Sports Superbowl 48, SCAD CLC 2014.

Collaboration may also involve integration with diverse majors of study in unfamiliar contexts: (Colette, Microsoft 2012. Adobe 2013. Fossil 2015. BMW 2014, 2015, 2017).

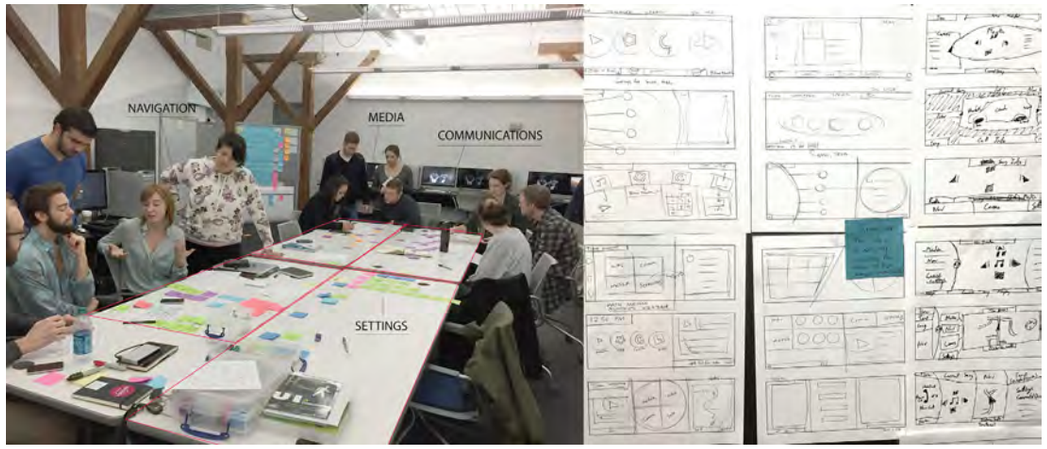

Figure 17: Classroom activity and process BMW Human Computer Interface, SCAD CLC 2015.

These collaborations are examples of how curricular extensions accommodate a guided gestalt approach to project-based collaborative learning, in a technically and creatively flexible framework. The structured and supported nature of the collaboration, along with the focus on an external partner's requirements, may resolve problems that have been proposed within project-based learning in post-secondary education, where this style of learning may not be integrated into the typical classroom.

> ...some practitioners and students are convinced that properly implemented project-based learning environments can promote the integration of subject material (and the ability to apply it as circumstances dictate). When project-based learning is used in this sense, it is usually at the end of a course or curriculum as a "capstone" experience. (Helle, Tynjaåa Laån and Olkinuora, 308).

The advantage of these curricular extensions is the modeling of effective project-based work, team dynamics, and deadlines in a research-focused environment. External expectations produce direct accountability for the results.

Formal, out-of-class collaboration likewise takes a number of forms. Students collaborate with both peers and experts in regular Inspire workshops. These events are open challenges, which are set by a visiting creative leader from industry. During the

workshop, both faculty and industry guests offer guidance, critiques of work-in-progress, and assist in facilitating resource requirements that arise during production (Figures 18 and 19).

Figure 18: Sarofsky Inspire Workshop, classroom activity, SCAD 2016.

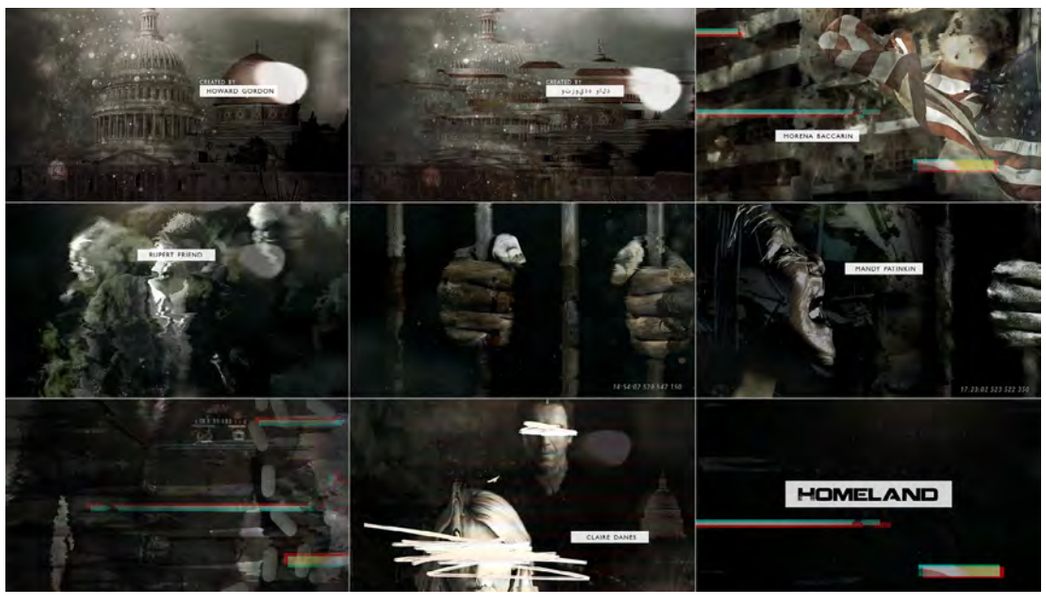

Figure 19: Style Frames for “Homeland”, created during Sarofksy Workshop, SCAD 2016.

These experiences, which fall squarely under the description of *extended learning opportunities,* provide discipline-specific, collaborative experiences. They offer a rich environment for interaction with Industry guests, while closely mirroring the production dynamics and time constraints of design-based production in a collaborative, studio environment.

Informal collaboration happens outside of class and across student populations. These projects take the form of student-initiated collaborations where principles from core class work may be explored in self-directed contexts (Figures 20 and 21).

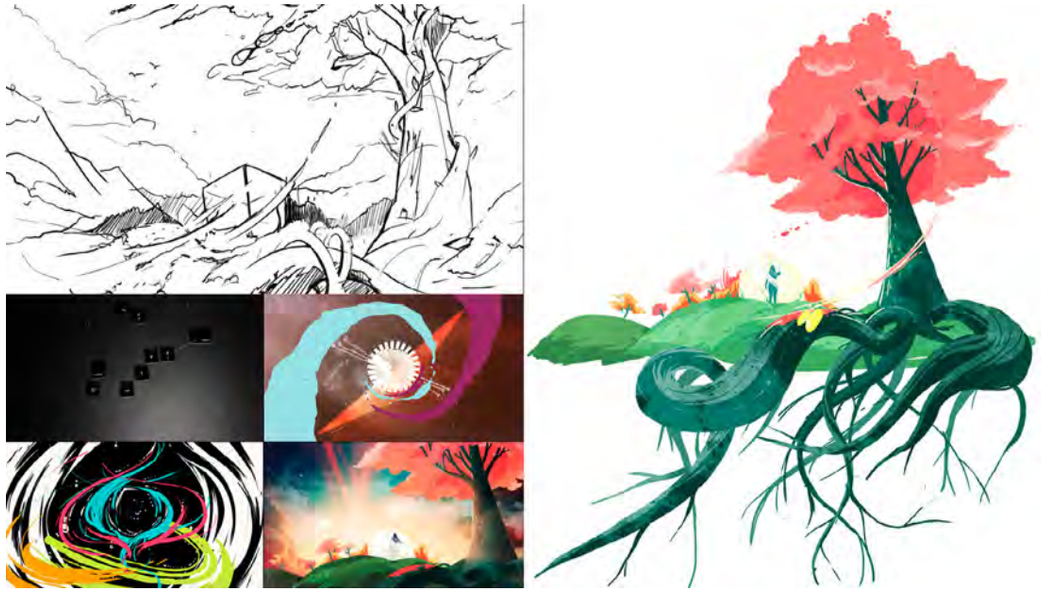

Figure 20: Memory Stream, Clark, Shin, Uribe 2014. Adobe Design Achievement Awards winner in Motion Graphics category, 2014. Art Director’s Club Silver Student Motion category, 2014. This work involved an extended period of studio collaboration and integrates a variety of techniques in illustration, 2D animation, stop motion, live-action, and compositing.

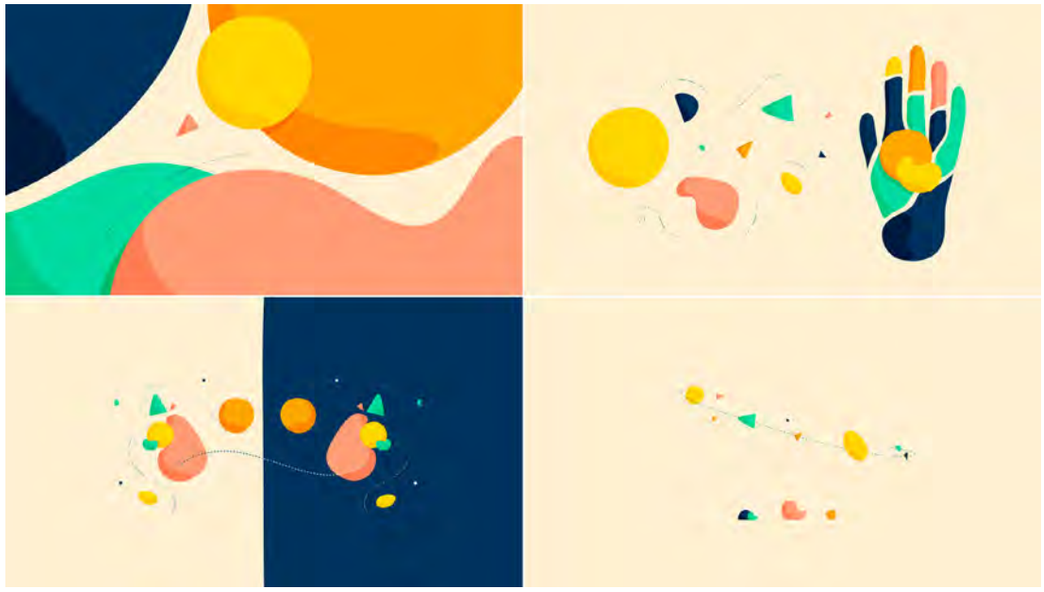

Figure 21: Untitled, Eduarte, Kerut 2017. MODE Summit Judges Choice Award, 2017. This design board represents a project supported by the paper's authors through independent study, assistance with sound recording, and sequential critique. In this example, the informal collaboration extends to faculty as well as across student populations.

A forum for experimental works is provided by group exhibitions initiated within the Motion Design major. *"Are We Content?"* was an exhibition arranged by students, in which they informally explored the boundaries of self-representation in digital contexts (Fig. 22).

Figure 22: Are We Content: Clark, Hochstatter, McCallum, Murphy et al Group Show, 2015.

Other informal collaborations are facilitated across the dozens of academic majors at SCAD, frequently involving Film & TV and Sound Design. These collaborations are clearly organic outlets for motion work, and might scale in scope according to program requirements in a range of academic settings (Fig. 23).

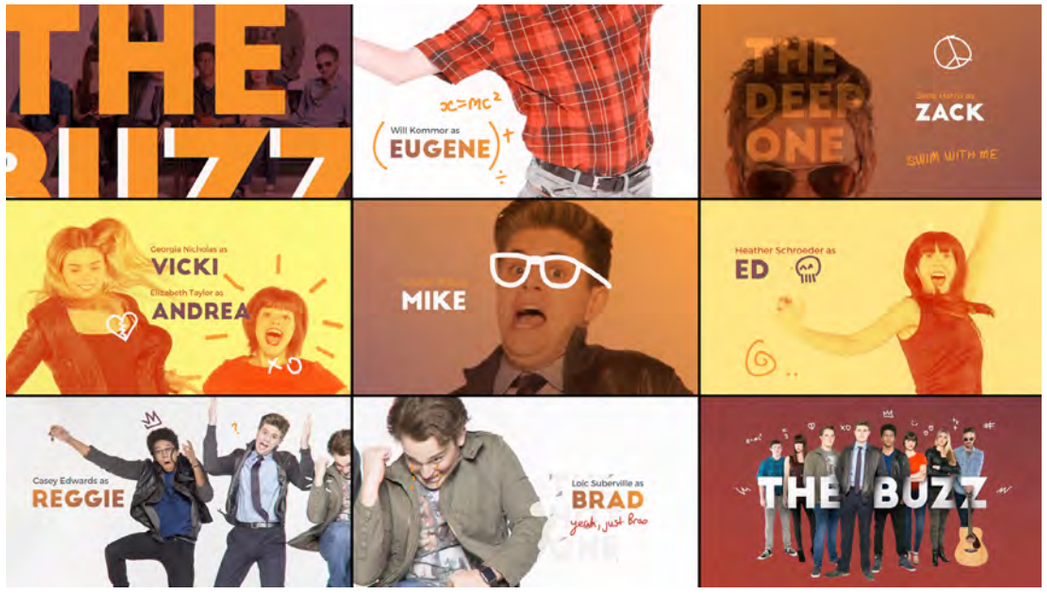

Figure 23: Buzz Titles, Berkely et al, SCAD 2017.

Students organize the annual *CoMotion* conference, including a significant collaborative exercise in the development of conference titling and graphics packages, none of which involve direct faculty oversight. SCAD's Motion Media Design student club, *MOME Love,* coordinates this process. This event also involves the invited attendants of 25 studios for two days of portfolio reviews, a conference program, keynote speeches, an awards showcase, and informal social receptions. The event builds on the broader collaborative principles of the program in a highly structured, professional development setting (Fig. 24).

These non-curricular experiences, which fall squarely under the description of extended learning opportunities, provide a range of collaborative opportunities. Many of these collaborations have specific outcomes and deadlines, closely mirroring the production

dynamics and time constraints of design based production in a collaborative, studio environment. Others allow speculative development of works within a studio context, outside of formal study.

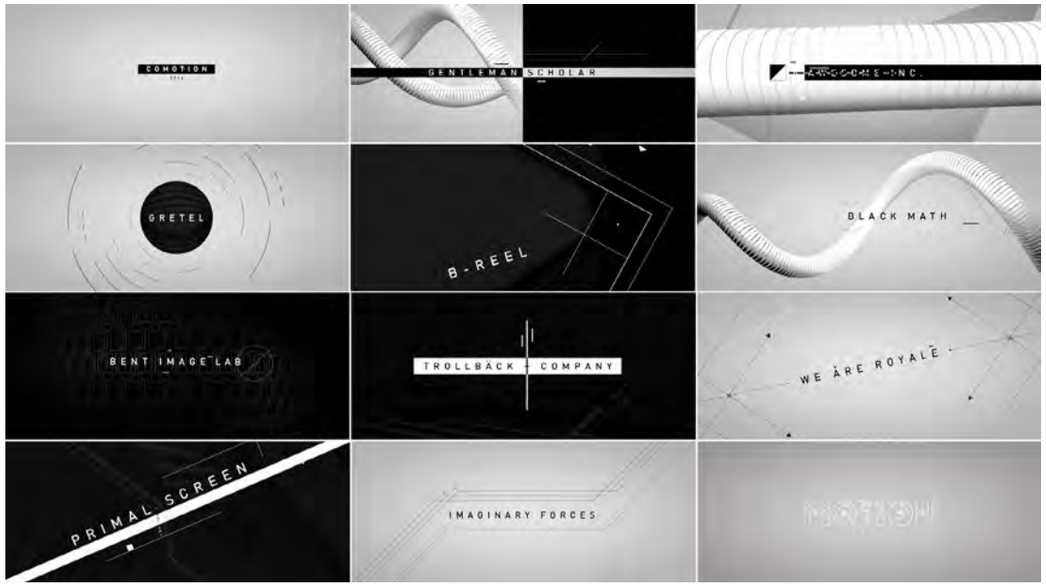

Figure 24: CoMotion titles, Lingard et al 2016.

While SCAD offers a specialized Motion Design program, these examples of curricular extension are applicable to programs that locate Motion Design as a sub-set of broader Media Arts, Film Production, or Design practice.

Conclusion

The challenge of offering a flexible curriculum that meets the needs of all stakeholders is an ongoing process. As an integrated and highly flexible media practice, Motion Design can provide either a targeted extension of an existing curriculum, or may provide the basis for a comprehensive major of study, as it does at SCAD. Higher education is increasingly examined in terms of its results, particularly in securing graduate employment by a range of observers—students, institutions themselves, government and the wider community. In this context, Motion Design is instrumental in developing adaptive graduates with both conceptual and practical capacities, which apply to a wide variety of professional settings.

Balancing a robust approach to professional preparation with the nuanced values of a traditional arts education requires more than just a focus on curriculum design. Curriculum is vital to managing the baselines in instruction, and allowing the student to develop generalized capacities in both creative practice and reflection. Additional soft skills in collaboration, process management and self-directed activity may be developed well beyond the classroom and the mandates of curriculum, allowing a program to fully develop the capacities of the individual student and prepare them for a lifetime of practice.

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Author Biographies

Austin Shaw is a full-time Professor of Motion Media Design at the Savannah College of Art and Design. He has also taught at the School of Visual Arts in New York City. For the past 14 years, Austin has worked as a motion designer for clients including Target, Ferrari, Fedex, McGraw Hill, Ralph Lauren, and VH1, and as a Creative Director, Designer, and Animator for companies such as Superfad, Digital Kitchen, Brand New School, and Curious Pictures.

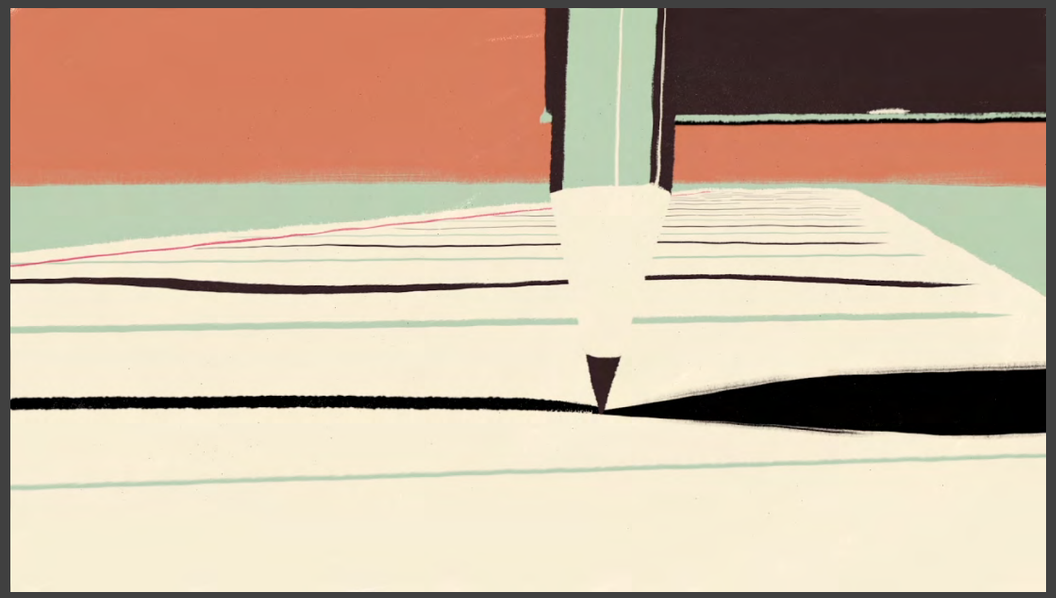
Austin is also the Author of Design for Motion: Fundamentals and Techniques of Motion Design. Below is a review of the textbook: "Austin is one of the first to identify and put down on paper a tangible, in-depth account of a new field that has quickly emerged within the design genre. For years, even professionals in the industry have had trouble giving it a title. Not only does Austin give it a name, but he also captures the essence of the field in a way that both young designers and professionals can appreciate. With words and pictures, he shares the process and explains in detail the knowledge base required for the field. He even questions industry leaders to qualify his process, making it a perfect balance of the academic and professional worlds." —Erin Sarofsky, Executive Creative Director, Sarofsky

John Colette is a Professor of Motion Media Design at the Savannah College of Art and Design, where he has served as Department Chair for five years. He teaches Media Theory, Professional Practice for Graduate Students, Projection for Motion Media and supervises small group research teams for clients including Microsoft, Adobe Systems, BMW Design Group USA and Fossil Watches.

John is a production specialist with a background in industry, academia and the management of creative and technical teams. Prior to working at SCAD, John worked as a Creative Director in Sydney Australia, developing programming for clients in Fashion, Property Development, Financial Services and Media. In the mid 1990s, he established the digital media department at the Australian National film school, the AFTRS, where he oversaw the development of extensive in-house production capabilities in visual effects, compositing, 3D animation and interactive media. During this period he also developed the school's industry short course program in digital media, taking a key role in teaching the program. John was also a Fulbright Scholar during this period.

After leaving AFTRS John worked as senior producer for CDP Media, delivering large scale digitally mediated visitor and public space projects. During this time he worked on the media precinct at Federation Square in Melbourne, produced the interactive MAP gallery for the National Museum if Australia and the South Gallery exhibit for ScreenSound Australia.

In 2001, John took a role as Senior Lecturer in the new Digital Media Program at UNSW College of Art and Design, where he oversaw curriculum and teaching for all moving image areas of the program. During this time he established a production consultancy, Pixelmill Films, working with a number of corporate clients. In 2006, Pixelmill was acquired by Macquarie Radio Networks, and John took on the role of Creative Director in the business full time.



Media from the paper *Pathways to Transition: How Narrative Structure Enables the Integration of Visual Explanations into Broadcast News*
Source(s): John Colette and Austin Shaw

PAPER CATEGORY: THEORIZING

Pathways to Transition: How Narrative Structure Enables the Integration of Visual Explanations into Broadcast News

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Abstract: A visual explanation renders an account of a phenomenon and provides a description of its characteristics in order to produce an understanding of a topic. Everyday people encounter visual explanations of subject matter as a result of frequent exposure to media such as motion graphics. *Specifically, broadcast news coverage offers a context where motion graphics are employed to present viewers with visual explanations of events and phenomena that are: 1) too perilous to physically cover and document, or 2) deserving of further explication so that laypersons can achieve an adequate comprehension of them. In both cases motion graphics offer an efficient solution for informing an audience. This paper examined how the narrative structure of broadcast news packages (packages) and the narrative structure of motion graphics containing visual explanations pertaining to those packages coincide, and how the motion graphics could be integrated into the packages for a seamless viewing experience that resonated with an audience. The theory of visual narrative grammar was used as a basis for articulating the infrastructure of the motion graphics and informing their cinematography such that each motion graphic contained an establishing shot that provided a setting for the visual explanation, an initial shot that depicted the commencement of the primary action of the visual explanation, a peak shot or climax, and a release shot (i.e., conclusion). Each corresponding broadcast news package was anchored and the footage was recorded within a real news studio, and each package was partitioned into an establishing section where the anchor verbally introduced the context of the visual explanation, an initial section where the anchor verbally described how the primary action of the visual explanation began, a peak section where the climax of the visual explanation was verbally described by the anchor, and a conclusion (i.e., release) in which the anchor brought closure to the visual explanation. The anchored news package footage was then cut along with their associated motion graphics in a variety of combinations in order to form complete packages. The results indicated that the placement (i.e., temporal location) of a motion graphic within a package was crucial for determining the efficacy of a broadcast news story and how viewers arrived at an understanding of its content. The findings of this paper have implications for the design of motion graphics and the presentation of broadcast news stories that require the use of visual explanations, and the findings offer the opportunity for further research.*

Keywords: broadcast news package; cognitive load theory; motion graphics; visual narrative grammar

Introduction

Televised newscasts (or news programs) supply people with information about current affairs and events occurring within their local and national communities as well as in foreign areas. During any given news program one may view stories about travel, health, politics, weather, and natural disasters, and the coverage of those topics may be provided by anchor persons (i.e., hosts of the news program) within the television studio or reporters that are "on location" (i.e., outside the studio and off site). A news program is generally structured in a series of blocks which are "segment[s] of news content sandwiched between commercial blocks" (Carr 186) and each block contains several items. The first block usually begins with the news program's opener or primary title sequence and then proceeds to the presentation of stories, and prior to the first commercial break the block may end with a teaser that previews the news program's remaining stories (Boyd et al. 252). The subsequent blocks associated with the newscast progress in a similar fashion until the program goes off air at its terminal break or completion.

One of the most comprehensive items included a block is the *package* which is a recorded story that provides in-depth reporting about a topic (Tuggle 150). The utility of packages can be demonstrated by an anecdotal observation of any national evening newscast because the majority of the news program will consist of packages that range in duration from one minute and 30 seconds to three minutes. A package consists of video footage, audio in the form of soundbites, a reporter's introduction to its story (i.e., stand-up), and other assets that are edited together in different ways in order to succinctly convey the package's story to an audience. There are multiple ways to structure a package and the approaches differ based upon the immediacy, relevance, and nature (or complexity) of the story. For example, the "altered chronology" method emphasizes the immediacy of a story by arranging a package's assets in an order that begins with information about the current aspects of story then transitions into the story's context and background, and ends with information about the future of the story's topic (Hewitt 113). The "particular-to-general" method uses personalization to focus on a story's relevance to viewers by first employing assets that display how an individual(s) that is similar to the audience is impacted by a topic (or issue) and then follows with assets that depict the broader scope of the topic. In order to address a very complicated story a package must do two things, it must incorporate assets that are capable of enhancing its story's comprehensibility and the package must adhere to a structure that is conducive for explaining complexity.

One way to provide viewers with more insight about a story is to integrate static graphics into the package because they are "vital in giving the viewer easier information about facts and figures and in making news reports more interesting and watchable" (Herbert 223). While static graphics enable viewers to make sense of concepts and allow data to be visualized, they are limited in displaying movement or showing change related to the content. Sometimes static graphics do not sufficiently describe and clarify certain aspects of a package's story and video footage pertaining to the story is nonexistent, too dangerous, or too costly to acquire. Under these circumstances a reporter may have a *visual explanation* created for the package. A visual explanation is produced in the form of a motion graphic that uses computer generated imagery (CGI) and animation to reenact events, simulate biological and technical processes, and depict physically inaccessible environments (Hernandez and Rue 12). To date, the application of visual explanations and the design of package structure have received very little attention from researchers and this paper has the goals of exploring how visual explanations can be efficiently incorporated into packages and what impact package structure makes on people's understandings of stories. The next sections of the paper provide further detail on visual explanations, another approach to structuring packages, and how people process information acquired from visual explanations.

Literature Review

Visual Explanations and Motion Graphics

A visual explanation renders an account of a phenomenon by depicting how it functions and by displaying any sequence(s) of events associated with the phenomenon or topic (Barnes 3). Visual explanations are presented to an audience in the form of motion graphics which are animated compositions that consist of continuous sequences of CGI that have been composited together and output to a digitally native or broadcast friendly file format (Crook and Beare 10; Skjulstad 364). The composition of a motion graphic typically includes a digital matte painting that serves as the environment or setting for the visual explanation, the phenomenon itself as a 3D CGI element, and typography and graphic elements (e.g., lines and arrows) as sets of 2D CGI elements. The presentation of a visual explanation is primarily facilitated through the animation of the aforementioned items as well as the animation of a virtual camera used to traverse the composition and produce dynamic shots.

Animation is the mechanism by which motion is realized because it depicts spatial and temporal change related to an object (Lowe and Schnotz 515), and it does this by "generat[ing] illusory movement by producing and displaying an artificial arrangement of graphic positions without reproducing the positions of real-time movement" (Martinez 42). As a result of animation, motion graphics are able to set the phenomenon of interest in motion, portray the phenomenon's development and progression, and make any other action pertaining to a visual explanation observable from multiple angles and different distances. The following example demonstrates how motion graphics leverage animation to present a visual explanation.

Consider a visual explanation about the behavior of blue Atlantic marlin and that the motion graphic housing the visual explanation contains the following items: a matte painting of an ocean that displays the area above (i.e., sky) and beneath the water's displacement layer (i.e., underwater light fog and caustics); a 3D textured and rigged marlin; and 2D arrows and typographic annotations (figure 1). Animation will allow the 3D marlin to swim and maneuver like the real fish, the ocean's surface to churn, and the motion graphic's virtual camera to descend from the sky through the water in order to focus on the marlin as it engages in action. The 2D arrows and typographic annotations can be animated to trail the marlin and fade in and out as necessary. It is obvious that a viewer should gain a better understanding of blue Atlantic marlin from this motion graphic than from other sources of visual material because animation enables the visual explanation to be tailored toward succinct communication.

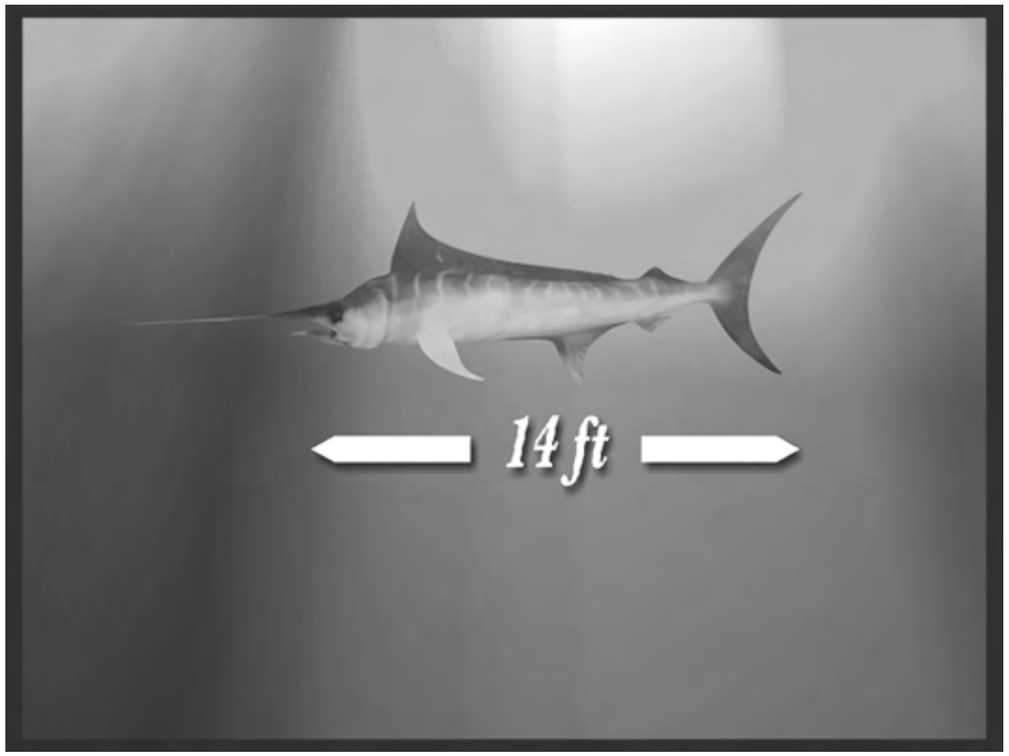


Figure 1. Frame from a visual explanation about blue Atlantic marlin.

Narrative structure

Once all of the content for a story has been acquired, a reporter begins to construct a package by engaging in the editing process. Editing involves selecting, assembling, sequencing, and refining content such as video footage and motion graphics in order to "present them in a narrative structure that will tell the story" (Hudson and Rowlands 303). The editing process is centralized around maximizing the impact and engagement that can be achieved by the story and these qualities determine the structure of the package, that is, where the reporter decides to introduce each asset in the package and how much time is allotted to each asset. While the "altered chronology" and "particular-to-specific" methods are applicable to packages the approaches heavily rely on the subject matter of a story to dictate the narrative structure of a package. Other approaches to narratives may make editing more intuitive and packages more understandable.

The theory of visual narrative grammar suggests that stories can be intuitively understood when they contain four interdependent components: an establisher, an initial, a peak, and a release (Cohn 421). According to the theory establishers (E) introduce the context or background of a narrative and initials (I) display the beginning of the narrative's causal action or event(s). Peaks (P) display the climax, objective, and completion of the narrative's action or event(s) and releases (R) provide closure by bringing resolution to the narrative and displaying its implications. When organized together these components form the EIPR narrative structure which has been shown to produce coherent stories (Cohn et al. 19). If the EIPR narrative structure were applied to the design of a package each component could provide descriptions of different aspects of a story. The E portion of the package could describe the story's context or setting, the I component could describe the nature of the critical features of the story, and the P component could describe how those attributes function and what contributions they make to the story. Lastly, R could describe the outcomes and implications of the story. EIPR narrative could inform the positioning of media assets within a package so that the assets may fully resonate with viewers. In the case of a full package about the behavior of blue Atlantic marlin video footage of a reporter on a sailboat introducing the story may serve as E, at I there would be video footage (with narration) of marlin swimming and jumping out of the water, a motion graphic

presenting a visual explanation about how marlin swim against ocean currents and propel themselves at P, and at R there may be video footage of the reporter discussing ecological contributions made by marlin.

Understanding Visual Explanations

Comprehending a package that adheres to EIPR requires the use of one's cognitive architecture. Human cognitive architecture is comprised of sensory memory, working memory, and long-term memory, and the most important part of the system is working memory. Working memory is essential because it is where conscious cognition occurs and it is where all information is processed whether the information has been recently acquired from external stimuli or the information is knowledge retrieved from long-term memory (Sternberg 192). However, working memory is resource-based and has a limited capacity to hold information which if exceeded causes a person to exert mental effort towards processing information (Miller 81; Baddeley 5). One experiences cognitive load (CL) as a result of exhausting working memory and exerting mental effort, and CL is demonstrated by the difficulty that a person has learning new information and by the difficulty that the person has completing tasks requiring the use of that information (Sweller 30). There are three types of CL that exist: intrinsic CL, extraneous CL, and germane CL (Schnotz and Kürschner 474). Intrinsic CL is associated with the inherent complexity of a topic and it is caused by the amount of novel information that has to be held in working memory during comprehension. Extraneous CL occurs when the design of an item (e.g., a package) does not contribute to the comprehension of its content. Germane CL, which can be experienced when working memory is not diminished by intrinsic CL or extraneous CL, is associated with effective comprehension because it occurs when mental effort is directed towards assimilating new information with prior knowledge acquired from long-term memory (Kalyuga 51). Each kind of CL is indicative of the nature of an external stimulus and they are based upon whether the stimulus inhibits or facilitates comprehension and the reasons why.

The most concise and unobtrusive way to measure CL is through the use of Paas' 9-point CL scale (Paas 431). The instrument is symmetrical with the response of "neither low nor high mental effort" lying at its center and the responses of "very, very low mental effort" and "very, very high mental effort" lying its poles. People are asked to label a choice on the 9-point CL scale that reflects the amount of mental effort that they have exerted during learning or task performance (see Van Gog and Paas for a review of studies using the scale). Another benefit of the 9-point CL scale is that it can be administered while someone is engaged in a task or immediately after they have completed the task. Van Gog et al. (834) cautioned researchers to iteratively take CL measurements throughout task performance and to subsequently average the measurements to ensure that the CL data would be unbiased and avoid inflation.

Alone the 9-point CL scale only documents the overall amount of CL experienced by a person but if the scale's data were to be examined alongside other comprehension data it may be possible to identify the different types of CL imposed by a stimulus or a task. Paas and Van Merriënboer (738) developed a statistical measure for determining the nature of the CL produced during learning and task performance by corroborating CL data with recall data. The measure is called efficiency and it reflects "the magnitude of the difference and the direction between performance and [cognitive] effort when scores are ordered on a comparable scale" (Hoffman & Schraw 7). Mathematically, efficiency is calculated by first standardizing both the CL scores and recall scores produced by an individual, and then subtracting the standardized CL scores from the standardized recall scores and dividing this quantity by an estimate of pooled variance. Table 1 displays all of the efficiency formulae discussed in this paper. Huang, Eades, and Hong (140) adapted the formula for E to include response time as a variable and they suggested that it be standardized as well. Learning efficiency (LE) and performance efficiency (PE) are produced when the original efficiency formula is further refined to examine CL scores produced during learning (or exposure to a stimulus) and task performance along with recall scores and response times (Van Gog and Paas 21). The resulting formulae, formula 2 and formula 3, are displayed in table 1.

Table 1
Efficiency formulae.[a]

	Formula	Notes
1	$E = (zPerformance - zCL) / \sqrt{2}$	Original Efficiency Formula
2	$LE = (zRecall - zViewing\ CL - zViewing\ Time) / \sqrt{3}$	Learning Efficiency Formula
3	$PE = (zRecall - zRecall\ CL - zRecall\ Time) / \sqrt{3}$	Performance Efficiency Formula

[a] All variables are standardized.

LE corresponds to the extraneous CL resulting from the structure of a stimulus presenting information to a person. If the design of an item promotes information processing then an individual should expend a small amount of mental effort during learning, achieve high recall scores during task performance, and take a small amount of time doing so. A positive LE is desirable and it indicates that the design of a stimulus is conducive for learning whereas a negative LE indicates the opposite. PE corresponds to germane CL because a person that has successfully comprehended information should only expend a small amount of mental effort when engaged in task performance, achieve high recall scores, and expend little time doing so. A positive PE indicates that germane CL did occur during when a person was exposed to a stimulus and that comprehension was successful whereas a negative PE indicates the opposite. A well-designed package that appropriately uses EIPR narrative structure for the placement of assets is likely to exhibit a positive LE and a positive PE.

Research Questions

The following research questions advance this paper's inquiry into the structure of packages and how storytelling is affected by the placement of a visual explanation within a package:

RQ1: How does narrative structure affect one's comprehension of a package?

RQ2: Where does a visual explanation make the greatest contribution to a package's storytelling?

Methods

Participants

Eight-six students participated in this study and their average age was 20.24 years (SD = 1.04). The sample was 64.4% female and 35.6% male, and on a demographic questionnaire the participants indicated that they watched television news for approximately 23.28 minutes per day and viewed online news for approximately 68.4 minutes per day. Also, 70.9% of the participants indicated that they watched standalone motion graphics as well as motion graphics that were integrated into other media with some degree of frequency whereas 29.1% of the participants indicated that they either infrequently watched motion graphics or did not view them at all.

Materials

The stimuli were two types of packages that were formatted as 1280 X 720 pixel video files that were displayed on 27-inch Apple iMac desktop computers. All of the packages had an individual duration of 45 seconds and they differed by topic and narrative structure. One package was about the presence of dust devils (i.e., whirlwinds) in the southeastern United States and the other package was about the prevalence of waste oil fires in industrial parks (figure 2). Both packages contained a reporter's stand-up or introduction to the story, the reporter stand-up bringing a conclusion to the story, and a visual explanation of the package's topic in the form of a narrated motion graphic. Three variations of each package were produced using EIPR narrative structure. There was an EIP version of each package where the visual explanation was presented from E through P and the reporter's concluding stand-up was shown at R, and there was an IPR version of each package where the reporter's introductory stand-up was shown at E and the visual explanation was presented from I to R. Also, there was an IP version of each package where the reporter's introductory stand-up was shown at E, the visual explanation was shown from I through P, and the reporter's concluding stand-up was shown at R. Finally, there was a control (or EIPR) version of each package and they contained a visual explanation that was shown through all EIPR components. The CGI elements for the visual explanations were made using Autodesk Maya and Adobe After Effects served as the compositing software for the motion graphics. All of package assets were assembled, edited together, and output to video files using Adobe Premiere Pro.

The instrumentation for the study consisted of a demographic survey, the 9-point CL scale, and comprehension questions. The demographic questionnaire documented information about the participants' ages, gender, and news consumption and motion graphic viewing habits. The 9-point CL scale recorded the amounts of cognitive load (in the form of mental effort) that the participants experienced at different times during the study (-4 = very, very low mental effort, 4 = very, very high

mental effort). A set of comprehension questions was associated with each package version and the questions were multiple choice with four possible response options (i.e., one correct answer and three foils).

Figure 2. Frames from the visual explanations integrated into each package.

Design and Procedure

The study employed a between-subjects design with the independent variable of package version. Package version which the EIP packages, IP packages, IPR packages, and the control or EIPR packages, and only one version of a package was presented to each participant. For example, if an individual viewed the IP package then they would not view any other version of the packages. The topics of the package were alternated between participants so that not all of the participants saw the same subject matter. Some participants were watched a version of the dust devil package whereas some participants watched a version of the waste oil package.

The dependent variables were viewing time, viewing CL, recall score, recall time, recall CL, learning efficiency, and performance efficiency. Viewing time was the amount of time that the participants spent viewing their assigned package. Viewing CL was the amount of CL that the participants experienced while watching a package. Recall score was the amount of accuracy achieved by answering a package's comprehension questions and it was calculated as a percentage of correct responses achieved on the questions. Recall time was the amount of time taken to answer all of a package's comprehension questions. Recall CL was calculated as the average amount of CL that the participants experienced while answering a package's comprehension questions. Learning efficiency was calculated according to formula 2 in Table 1 using standardized versions of recall score, viewing CL, and viewing time as inputs. Performance efficiency was calculated according to formula 3 in Table 1 using standardized versions of recall score, recall CL, and recall time as inputs.

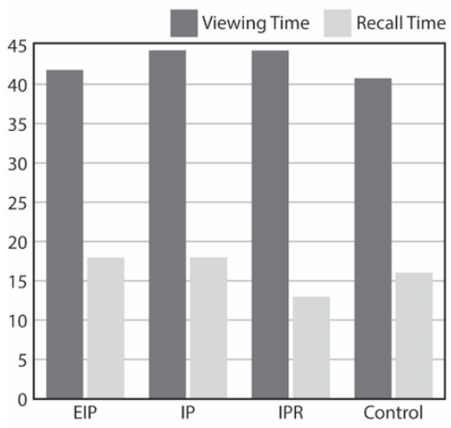
Each participant was randomly assigned to view one of four package versions: EIP (n = 22), IP (n = 16), IPR (n = 28), or control (n = 20). After providing informed consent for their participation in the study, each participant was seated in front of a 27-inch Apple iMac desktop computer equipped with headphones and given 30 minutes to complete the study at their own pace. First, they completed the demographic questionnaire, then they viewed their assigned version of a package. Next, the participant indicated how much CL they experienced while viewing the package using the 9-point CL scale. Finally, they answered each of the three comprehension questions associated with the package and

after responding to each question the participant documented the amount of CL imposed by the question. On average, it took the participants 467.24 seconds (SD = 112.26) or 7.78 minutes to complete the study.

Results

Viewing and Comprehending the Packages

Not all of the participants viewed the assigned packages in their entirety as displayed by the viewing times and, as expected, all of the participants took a much smaller amount of time (i.e., recall time) to answer their package's comprehension questions (figure 3). Also, the participants experienced low amounts of viewing CL while watching the packages and the IP and control packages incurred the least amount of viewing CL of all of the packages which indicated that those packages did not cause the participants to exert much mental effort during the viewing experience (figure 4). The recall CL associated with each package was high and markedly greater than each package's viewing CL which suggested that the participants exerted more mental effort while responding to their package's comprehension questions than while watching the package's content. The biggest differences between recall CL and viewing CL existed within the IP and IPR packages, respectively. Overall, the participants achieved approximately 77.52% accuracy on the comprehension questions with higher recall scores being acquired after watching the control and IPR packages (figure 5).



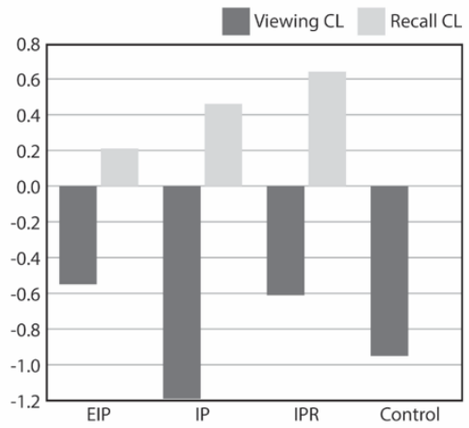
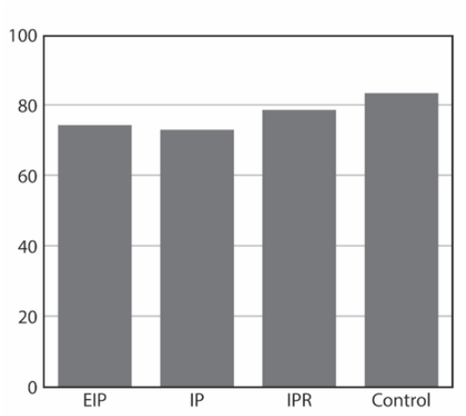


Figure 3 (left). Participants' viewing times and recall times
Figure 4 (right). Participants' viewing CL and recall CL.

Efficiency of the Packages

The LEs and PEs of all of the packages and the optimal efficiencies are greater than zero (figure 6). The LEs of control and EIP packages were positive which indicated that both packages' stories were effectively presented to the participants. However, the LEs of the IP and IPR packages were negative and this suggested that those packages' stories were not conveyed to the participants very well as a result of the packages' structures. The PEs of the control and IPR packages were both positive which meant that the participants were able to understand those packages' stories whereas the PEs of the EIP and IP packages were negative which meant that the participants had a difficult time interpreting those packages' stories. Other findings of interest are that only the control package demonstrated both a positive LE and PE, the IP package demonstrated a negative LE while maintaining a positive PE, and the EIP package had a positive LE and negative PE. These relationships between the efficiencies reveal how the presentation of a story connects with how well the story is subsequently understood by viewers.



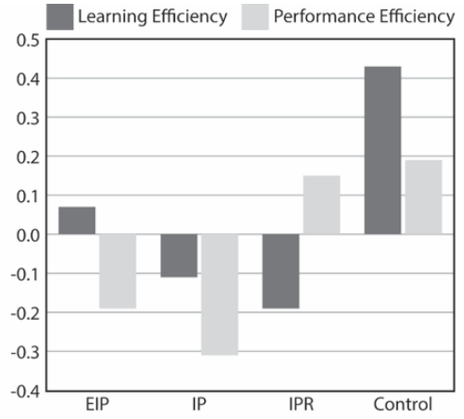


Figure 5 (left). Participants' recall scores.
Figure 6 (right). Participants' learning efficiencies and performance efficiencies.

Discussion And Conclusion

The study presented in this paper sought to explore how EIPR narrative structure could be imposed on packages that contained visual explanations and whether the efficacy of those packages' storytelling could be maximized by the position of the visual explanations. Visual

explanations utilize CGI and animation to convey how a phenomenon behaves or a process functions, and they are fundamental to the presentation of complex stories (Orlebar 109). RQ1 focused on how well packages that adhered to variations of EIPR narrative structure were understood by viewers. All of the packages were viewed for relatively similar amounts of time and they all incurred low amounts of viewing CL but that does not necessarily mean that the participants fully comprehended their assigned packages' stories. The participants provided the most accurate responses to the control package's comprehension questions and experienced the least of amount of recall CL and took the least amount recall time while doing so. The recall scores, recall CL, and recall time associated with the IPR package followed the same trend. The control package presented a full visual explanation throughout each narrative component whereas only 75% of the IPR package consisted of a visual explanation. This finding would seem to indicate that a visual explanation should utilize the majority of space within a package or at a minimum it should immediately follow the reporter's introductory stand-up in order for a package to be understood. According to visual narrative grammar theory E is a redundant narrative component because it provides contextual information that is also contained in the remaining parts of a narrative and it is the least action-packed component (Barnes 15; Cohn, 424). Therefore, it may be more appropriate to place the reporter's stand-up at E and allow the context of the story to be verbally communicated to the viewer. However, a true conclusion cannot be drawn until the variables of viewing CL, viewing time, recall CL, recall time, and recall score are concurrently taken into account in the forms of LE and PE.

RQ2 concerned the efficiencies of the packages where LE describes how well a package presented its story and PE describes the extent to which the story was comprehended. Only the control package demonstrated a positive LE and a positive PE. The IPR package demonstrated a negative LE and positive PE while the EIP package demonstrated a positive LE and a negative PE. The control package was the considered to be more efficient than any of the other packages simply because it provided the participants with the most exposure to a visual explanation without much superfluous information and this enabled the participants to more effectively interpret and apply the information that they had acquired from the visual explanation. Technically, the control package enabled the participants to experience germane CL and subsequently direct their cognitive processing efforts towards understanding the visual explanation and learning the package's story. Although it was a little more challenging for the participants to learn from the IPR package, the participants were able to arrive at a sufficient understanding of the package's story. The participants had to adapt to the design of the package but after doing so they were able to effectively process the package's information. The EIP package began by presenting its visual explanation and it ended with a concluding stand-up, and the structure of the package seemed not to impede learning but the package's negative PE suggested that the participants had a difficult time interpreting and applying the information from the package. These findings confirm that visual explanations should be presented after the contextualization of a story or an introductory stand-up, that at least 75% of a package should be composed of a visual explanation, and that visual explanations should be positioned in the most active areas of a package's narrative structure which are I and P.

While visual explanations are encountered on a daily basis via the packages incorporated into broadcast news programming there have not been many studies that examined their utility and application. This paper made an inquiry into the impact of visual explanations on the storytelling capacity of packages. It is very clear that the selection and placement of assets within a package affords the comprehensibility of its story. Visual explanations possess tremendous explanatory power and when integrated into the appropriate package structure they can succinctly advance a story in order to inform an audience in ways that standalone video and audio cannot. Further research should explore how visual explanations can be applied to documentaries and other television programming.

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PAPER CATEGORY: TEACHING

Choose Wisely: The Importance of Tool Selection in Motion Graphics

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Abstract: Interfaces are no longer static. Animations like swipes, pulls and expands permeate apps and operating systems. Interaction designers must become comfortable with this new design language and learn how to use these animations to convey additional information to their users. In this paper, we describe a course offered to UX graduate students on the subject of motion graphics. We will examine pedagogical methods, provide reflections from students, and make an argument for animated wireframes as an improved form of design communication. Moreover, we will explore the nature of animation programs selected for the course, and how they affected the range of possibilities produced by the students.

Introduction

The art form of animation has been practiced and studied for more than a century. (Cavalier) But the principles that animators follow have been largely unchanged since they were developed at Disney in the 1930s. These principles have been effective no matter what type of animation they are applied to (2D hand drawn animation, stop motion animation), with very few adjustments. They also hold true over technology advancements like computer animation.

Because of this consistency, we can assume that these principles should work with any kind of animation until proven otherwise. Therefore, when teaching animation, the challenging part is not explaining to students how to make their animations feel alive, it is in helping them execute these principles in their chosen medium.

For interaction designers learning animation, the requisite medium is computer interfaces. There are dozens of programs that can effectively create animated interfaces. Interaction designers can use these programs to demonstrate their interface ideas to developers, business people, and managers, among others. It is essential that they use a tool that can give them the freedom to implement their ideas, but also allow them to work simply and quickly enough that they do not put in more effort than is warranted for an idea that might not proceed past the wireframe stage.

In this paper, we describe a course taught to graduate interaction design students that focused on teaching these animation principles to designers and using them to create animated wireframes for communicative purposes. Students selected among three different programs, After Effects, Hype and Framer Studio. As students completed assignments, we discovered that each of the programs had different strengths and weaknesses.

We will explore how each program affected the creativity of the students, their satisfaction in their learning experience, and how their choice limited their ability to complete the assignments. We will also explore the value of animations for communication between designers and other professions involved in the development process.

Animation for Interaction Designers

In the early days of computing, screen animations were limited to a blinking cursor. With the advent of the graphical user interface (GUI), animations became more common and complex: buttons highlighted when clicked, mouse cursors animated as spinning wheels or hourglasses to show the passage of time. The web browser used mouse cursor animations to indicate when the user was hovering over a link, and technology like Flash allowed developers to create web pages with complex, and sometimes unnecessary animations. Smartphones have given us an entirely new set of animations that provide affordances and information to the user about her(or his) interactions.

The goal of all interface animation is to add another layer of information that the user can employ to understand and use the interface. The blinking cursor gave feedback that the system was ready to accept user input. Buttons highlighted when clicked as a visual cue that the

system had registered their input. Because smartphones use touch input rather than a mouse cursor based system, designers and developers are able to create a new visual language involving animations that directly respond to user touch input like swipes and pull to refresh.

As technology has improved, animations have become easier to display, and are now an integral part of interface design. As such, it is important that designers learn how to speak this language so that they can How should we go about teaching designers animation?

Teaching Animation to Interaction Designers

When considering how to teach animation to designers, we believe there is no need to reinvent the wheel. The art form of animation has been practiced for more than a century, and been a common form of storytelling and entertainment for much of that time, popularized by Disney, and embraced by many other studios. Because of this, many frameworks and instructional materials for animation already exist. Gonzalez found that basing "their animation on realistic graphical representations rather than on abstract images" increased decision making ability and satisfaction with the interface. (Gonzalez) This points us towards teaching traditional animation principles, rather than attempting to come up with new animations that only apply to a specific app.

The most respected animation framework comes from Ollie Johnston and Frank Thomas in their book The Illusion of Life (Thomas and Johnston). This book explores the early days of the Disney Animation Studios, as they learned their craft. In the book they lay out the 12 Principles of Animation. These principles describe how Disney animators gave life to their drawings. Even though these principles were designed for hand drawn cel-based animation, they can apply to any form of animation, including stop motion and 3D animation (Lasseter). These principles have proved incredibly robust, and they have now been applied to interface animation (Thomas and Calder). With this in mind, we felt confident using these principles directly to teach interaction designers animation.

Class Structure

Motion Graphics for Interaction Design was taught in the Spring of 2016 to eight graduate interaction design students. The class was designed in collaboration with one of these students as an independent study, which was opened up to other students. These students developed an interest in motion graphics during their job search when it became clear that this skill would make them more valuable to employers. The pedagogical goals were for students to understand the principles of animation, appreciate and understand how animation is used in interface design, and to learn how to create animated wireframes to better communicate their ideas.

We selected texts from animation and interface design. In addition to a chapter from The Illusion of Life, already mentioned, students were required to read Computers as Theatre (Laurel) and chapters from Timing for Animation (Whitaker, Halas, and Sito). Computers as Theatre was selected to give students a different view of the interface, one focused on performance, and emotion. Timing for Animation was selected as a more detailed exploration of the technical details of producing animation. Lectures included topics from all of these texts, along with guest lectures from industry professionals, and a lecture on the future of animated interfaces, which focused on virtual and augmented reality.

In order to produce their animations, students were offered a choice from three applications: After Effects, Hype, and Framer Studio. After Effects is a flexible animation tool, that allows the user to create simple animations based on position, scale, and rotation, and can even create fully animated characters. Hype is a prototyping tool designed for interface animation, while Framer Studio is an interface animation tool that requires the use of code in the form of Coffee script. Of the eight students, four selected After Effects, two selected Hype, and two selected Framer Studio. Students were offered the opportunity to select any tool after consulting with the instructor, but none chose to do so.

There were 5 projects assigned during the semester. Each assignment was designed to build skills on the previous assignment. First, students were asked to sketch out all of the animations in an existing app(Figure 1), so that they could gain an appreciation for the state of animations in interfaces, and how subtle these animations could be.

The second assignment asked them to examine an animated character from a short film in order to understand how much animators can convey through a movement. Students were required to watch with the sound off, to avoid being influenced by music cues and voice acting.

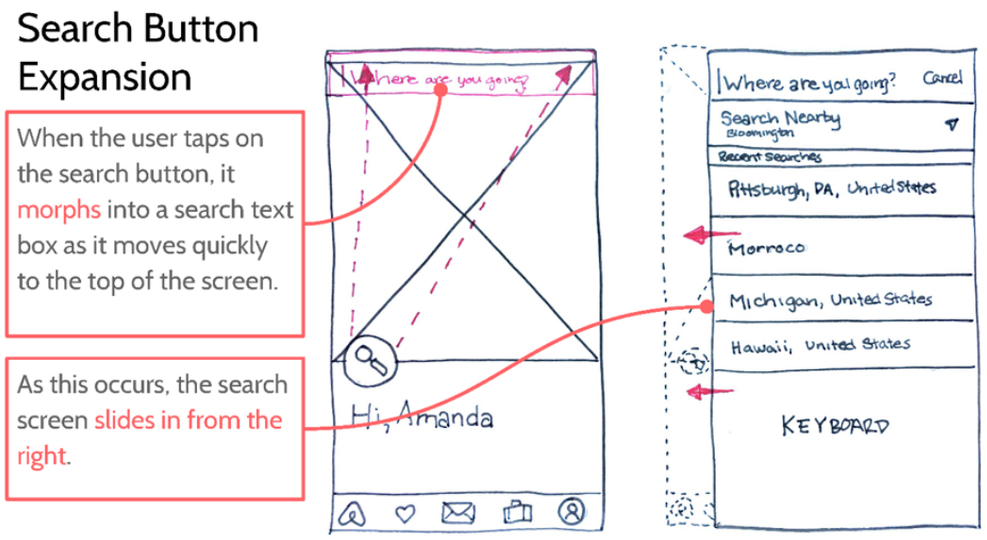

Figure 1. A student sketches out animations to better understand their structure

In the third assignment, students began working in their chosen app. They chose a simple shape, and animated it to give it a personality. In addition, an in-class exercise was performed early in the semester that was inspired by The Illusion of Life, in which Johnston and Thomas describe an animation test given to all new Disney animators wherein they would have to animate a bouncing ball. Each student completed this exercise in the app that had chosen for the semester. The fourth assignment had students creating common UI animations in their chosen app. These animations were saved in a public location for everyone to study as a learning aid.

The final assignment had students design an original app, and build an animated wireframe including an onboarding sequence, which is a way for app designers to quickly give their user an introduction and tutorial. This project allowed students to bring together all of the design skills they had learned in other classes with the new animation skills they had learned, providing them with a portfolio piece that they could show potential employers.

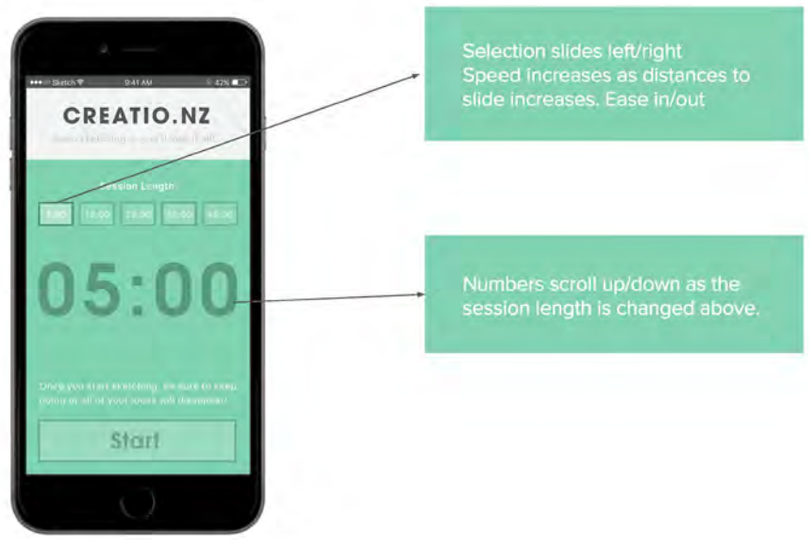

Figure 2. An example of a student's plan for their final project.

Results

All eight of the students in the class now work as interaction designers in various roles across the country. Six of the eight students were interviewed about their experience in the class and how the class has helped them in their careers. In this section, we will discuss the results of these interviews, covering their experiences and how the limitations of the programs chosen affected what they were able to accomplish.

Because of the number of tools available for animations, we felt it was important to give students a choice. However, we didn't want students to spend too much time researching and weighing options. We curated a set of three apps mentioned earlier: After Effects, Hype, and Framer. Other apps were considered, including Principle and Keynote.

When selecting an app to use, students had various reasons. Some already had experience in one of the apps, and wished to learn something different. Some had always wanted to learn a particular app, and used the class as an opportunity to work on it. Since Framer requires coding, those who chose it had a particular interest in learning how to code. For one student "I thought that maybe having that coding experience might even be able to help me talk to front end developers about it a little bit more."

Students in the class were in their final semester of graduate school, meaning that they already had extensive training in interaction design, and all had internship experience in the field. This gave us the freedom to explore animation principles directly, trusting these graduate students to draw connections between animation and interface design largely on their own.

When asked about the focus on animation principles rather than UX principles, one student said "I honestly didn't hear anybody while we were taking the course saying like 'why are we learning animation stuff? Why not UI specific stuff?' Because I think everyone had an understanding [that] UI animation is a specific thing, but it's based in some very fundamental principles of animations, and I think that's where everyone saw where you were going with that."

One of the more challenging aspects for students was learning the applications they had chosen while they were attempting to complete assignments. This was an issue with every program.

One student made this comment on After Effects: "The biggest challenge was just the standard Adobe like oh my god there's a billion options [laughs] and where do I even start."

Students found issues with both Framer and Hype in the lack of complete documentation and small user communities—a result of the short time they have been available. One student said of Framer "There's not a lot of resources online, so you can't just Google it... There's a community there, so you can ask questions. If you ask questions there will be people to answer [them], but there's not a lot of resources like After Effects you can just google it and get results right away."

The biggest issue with the programs however was how they affected the creativity of the students. In After Effects, students had full control over the timing and motion of their animations. Framer, they also had a large degree of control, assuming they could discover the methods of control. Hype, however, seemed to give students much less control over their animations. "I wanted to do an example of somebody drawing and then showing it sort of being erased, and I couldn't figure out how to do any of that...unless I used some kind of SVG animation, and then at that point you're really just coding, you're not really using the application."

Because Hype was built expressly for the purpose of animating interfaces, it seemed like creators of the tool designed functions that would make it easier for users to create standard animations. By doing this, they constrained their interaction design users into a narrow set of choices that are aligned with existing practices. In After Effects, however, users are given total freedom to work creatively because the designers of the program had no preconceived notions of what kinds of animations users will create. Framer is slightly more limited than After Effects, but because of the focus on a programming language, users are able to make combinations and connections that the original designers might not have intended, increasing their ability to be creative, but still limited by more traditional interface animations.

Students were able to create simple animations in Hype without much effort, only running into problems when they attempted to push the boundaries of standard interface animations. "The thing I was trying to do...where it was kind of like a liquid effect,...there was just no sense of realism at all to that kind of stuff. So I felt like that was kind of a mess. Just complex stuff in general, it seemed like it couldn't really handle."

Hype is designed mainly for UX designers to create simple animations quickly, which follows the design ethos of working quickly without making strong decisions until ideas have been validated. (Buxton) But pushing into new kinds of interface animation became much more difficult. "I think it's really solid for simple interface animations (and) typical UI animations that you see like you know drawers sliding out, and easing and things like that, rotating elements enlarging and shrinking. The typical things you think of, bouncing even, but when it starts getting complex and you really want to push the limitations of UI animations and say like well how can I be creative here and how can I do something that's a little bit more unique but still adds to the experience and still makes sense for user interface, I think that's where it really starts showing its limitations."

Conclusion

There are many programs that can produce simple animations. The tool selected by a professional is largely up to what results they need to produce, and how quickly they need to produce them. But in order to make effective animations, students must understand

the underlying principles with as few constraints as possible. By doing this, students can feel confident in their careers to experiment with tools and animations, and explain their choices to colleagues and managers. This allows students to not only create this animations, but advocate for better animations, and provide leadership on these issues in their professional careers.

Because of this, we believe that the most appropriate program to use when learning is the most open tool available, and allows the most creativity. In our case, After Effects is clearly the best tool for teaching interaction designers how to create animations. Framer is useful for giving students an understanding of programming as it relates to animation, which could be useful for students who need more experience with programming concepts, but a tool like Hype, which professionals might choose for quick prototyping, might be too limiting for a student who is trying to learn broader animation principles.

In our interviews, we found that many of the students had not used motion graphics in their careers, but it was frequently discussed, suggesting that companies are interested in exploring. "I feel like there are a bunch of little opportunities where it comes up even though we're not really exploring it, or putting it in practice yet, it's definitely talked about, which I think is really interesting."

For those who did use animation in their careers, the most common use was communication to non-designers like programmers and managers. As one student explained, "If you're just trying to explain it in words, people are like 'Where's this gonna go, where's that gonna go, how is this gonna move that down, and where will it fit?' But if you just take a couple hours to mock it up in After Effects then you can show it to them, then it makes perfect sense because they can see it right there in front of them in black and white, so, it's very useful for stuff like that."

In closing, one student's statement perfectly summarized the importance of selecting the right motion tool for the situation. She feels that After Effects is not a good tool for interaction designers in practice, but was very valuable in learning how to animate. "In terms of the principles, using a challenging tool like After Effects...helped me think about the complexities of motion in animation. Right now I'm...building a product from the ground up, so...basically all of the decisions are mine, as I'm advocating for the user and even when it comes to animations, there's some things that I'm looking at and I'm saying when that pulls out, can we do this...can we have a little bounce to it. Or can we do this instead of that, and so that's been great because thinking about it now, I wouldn't have even thought about these very important interaction details, and I don't think I would necessarily have the articulation for what I wanted the experience to be if it wasn't for the class."

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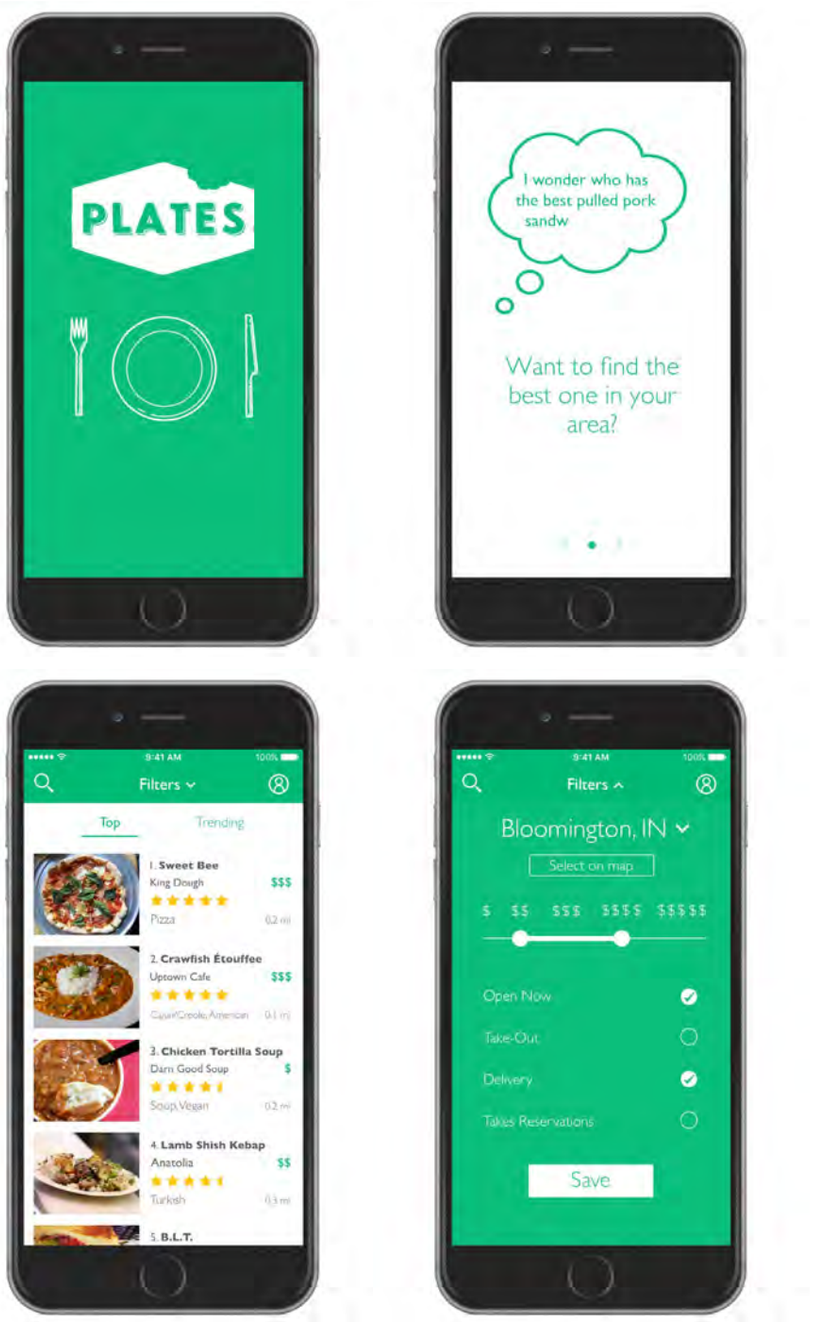

Media from the paper Choose Wisely: ***The Importance of Tool Selection in Motion Graphics.*** Source(s): J. Hunsucker and M. Siegel

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Martin Siegel is a Professor of Informatics, Education, and Cognitive Science at Indiana University, Bloomington. Within the School of Informatics and Computing, he is the Director of Graduate Studies. Prior to serving in this position, he served as the founding Director of the Human-Computer Interaction Design Program, the Executive Associate Dean of the School, and the Chair of the Informatics Department. From 1991-1999 he was the Director of Research and Development at the Center for Excellence in Education. Marty is among a group of pioneers in online learning, beginning with his work in the 1970's on the PLATO system. At the University of Illinois, he was the Assistant Director of the Computer-based Education Research Laboratory (CERL) and Head of the Curriculum and Applications Group. In 1988, he was Microsoft's first Faculty Fellow. His current research focuses on design pedagogy and slow change interaction design. He is writing a book called The Design Habit: Transforming from Non-Designer to Designer.

PAPER CATEGORY: THEORIZING

Weaving Meaning: An Approach to Motion Design for Marginalized Groups as they Persuade Mainstream Groups

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Abstract: Motion design offers remarkable opportunities for audiences, not only to actually see and hear new worlds that expand visual and aural experience, but also to simultaneously imagine images and texts. Through motion design's weave of sight, sound, and imagination, audience becomes an interested and invested collaborator with the designer as both explore the unexpected and seek out new avenues of novel experience. Unfortunately, imaginative exploration can face barriers when arguments attempt to change how an audience defines or values others who seem "foreign." Challenges to existing assumptions can leave an audience unable or unwilling to effectively imagine a new perspective as they encounter ideas that oppose their existing points of view. This conflict between an existing perspective, which defines how a group is currently imagined, and an often kinder, more accurate way of seeing, which an audience might find harder to accept, points to a unique opportunity for motion design that is not available in textual approaches to argument. While text must always rely on a potentially unreliable audience to imagine people, scenes, and transitions, kinetic argument can shift freely between imagined and actual image, text, motion, and sound in order to help audiences move toward new perspectives without being asked to imagine what they cannot or will not see or hear.

One group that has become harder to imagine through a kinder lens is Muslim women in hijab, the head scarf that can be interpreted as putting on modesty. Westerners who imagine that hijab means having no power over one's own life, see Muslim women in hijab as objects of pity or individuals to be feared. Sadly, that viewpoint can have more weight and influence than competing definitions, because established perspectives are difficult to change. To increase the possibility of altering an established view, motion designers interested in creating arguments for social change need approaches focused on a specific type of sequencing. I leave it for others to consider important aspects of transition and rhythm. My concern with sequence centers on when the audience will be invited to imagine a current perspective and what aspects of the new perspective they will actually see, hear and read. As the audience is invited to change contexts or open existing contexts to new ideas, the uncomfortable feeling that occurs when new information must replace an existing world view might be diminished. This is the critical piece. The audience is not asked to abandon an existing idea. Instead they are invited to make room for new sights and sounds that seem reasonable in that context. Based on my earlier and ongoing work, this paper offers an exploratory approach for situations where marginalized groups hope to speak more effectively to mainstream groups. Specifically, I analyze two examples that sequence imagined and actual image, text, motion, and sound in order to help mainstream groups empathize with Muslim women. The key objective concerns when to invite audience imagination and when to introduce actual images, text, motion, and sound so that the controlled sequence invites new ideas into a broadened perspective. Ideally, new perspectives should be able to co-exist with current views until the new idea eventually gains more credibility.

Keywords: Visual/Verbal Communication, Motion Design, Kinetic Argument, Visual Rhetoric, Communication Design

Introduction

I teach in Qatar at one of six American universities in Education City. While this is a Muslim country, and that religion dominates, our student body is more diverse. Still, the main reason I find myself here hinges on a question posed by one female Muslim student. I was only a visitor when she asked it. At the time my main concern was whether or not I could be happy so far away from the States. I did not know this student, and we would never meet. But she had a greater impact on my life than she will ever realize. She wore a niqab, an item of clothing favored by some of our female students, which covers all parts of the face except the eyes. As I sat there, I was fairly certain of my stronger attachment to home—until she said, "how do we get them to quit hating us?" On an academic level, she'd posed a provocative question about audience, and that's how I usually frame its impact on me. But what I really thought at the time was how hard it must be for her to live everyday with that question. It seemed to me then, as it seems to me now, that if communication design, as a form of argument, could help create an answer to her question, maybe I should go to Qatar to be with so many other students who likely feel as she did.

In exploring possible answers to her question, this paper seeks to identify qualities specific to motion design that can begin to address misunderstandings—if not outright hated—that marginalized groups can experience. I want to carefully hedge on this claim, as these observations must be tested, retested, and refined. However, they do build from a foundation in my earlier work on print which suggests that image and typeface offer meaning that text cannot (Hagan 51). For that reason, I argue that images and typeface are not a kind of language. Instead, each element contributes aspects of meaning that other forms cannot offer, which imbues motion design with value that text cannot imitate. Text offers statements questions and demands that images do not have the syntax to contribute (Olson, 191). Images contribute spatial relationships that text cannot offer with the same exacting ease (Hagan 61). Typeface, rather than pulling its meaning from the text, tends to push its meaning onto words (Doyle and Bottomley 396).

But what about the imagined images that text invites and the imagined text that images can encourage—aren't they somewhat interchangeable with the elements we actually see and read? The difference is that imagined images are personal and cannot be shared as common understanding. For example, how an individual imagines Paris might be colored with negativity that does not reflect other people's views. Further, research suggests that *imagined* images are different from actual images because what we imagine is not modality specific (Loomis, Klatzky, and Giudice 131). What we see in our mind's eye is not the same as the objects we actually see.

In applying these differences to kinetic typography, other researchers have made important contributions concerning the emotional appeals that type offers. This has led to an engine for expressive text (Lee, Forlizzi, and Hudson 81-90), which holds value that becomes more apparent as we better understand the ways that audience emotionally engages with type in motion (Stone, Alenquer, and Borisch 212-219). Emotional attributes contribute importantly to argument along with the facts of the case and the credibility of the speaker (Aristotle). These three features provide much of the meaning—the mutual understanding that we hold in common. Unfortunately, meaning has traditionally been conceptualized through the lens of language (Davis 4; Halliday and Matthiessen 1), a way of approaching common understanding that has proven difficult to re-conceptualize.

Meaning's links to language might be the reason why the textual metaphor is often used to explain the contribution that images make to argument. That metaphor has emerged in the concept of a grammar that is unique to images but offers "similar semantic relationships" to text (Kress and van Leeuwen 44). The metaphor suggests a way of reading that arises from a set of learned conventions (Kostelnick and Hassett 5), which can be reinforced through iconic images that need no caption (Hariman and Lucaites 5-7). Further, in motion design a useful morphology has been framed as a system to describe "the study of the language of motion-graphics design" (Woolman 7). Grammar, reading, and semantic relationships, rather than colors, textures, and spatial relationships problematically complicate our understanding of images.

The textual metaphor can make sense, but in a limited way. For example, we see  and say apple. But a focus on these language/image ties can also lead to this *fundamentally problematic* conclusion: "Words evoke images, and our perception and understanding

of visual representations are connected to and dependent on our verbal concepts, without which pictures would be incomprehensible" (Kjeldsen 124). If the textual metaphor leads to the belief that images can only be understood because of "our verbal concepts," it would stand to reason that images could only offer novelty. Experience, as well as the theory of dual coding (Paivio) suggests that is not the case. Dual coding means that while our minds can work with images and words in an interconnected fashion, the two also offer separate ways of understanding. For example, using language to remember a shopping list, does not preclude simultaneously understanding visual information as one navigates a grocery store. We need not include the running commentary, "counter, person, cart, floor, cash register." New objects can be understood in terms of non-verbal volume, angles, colors and textures. Unfortunately, a focus on the textual metaphor can make unique spatial contributions seem less important.

Not everyone agrees that the textual metaphor should inform other ways of making meaning (Gries; Hagan; Kinross; Sless). But moving away from that metaphor will mean taking the opportunity to *see and value difference* over similarity. Importantly, those differences are complementary (Hagan 51-52). While text lacks the ability to efficiently and effectively communicate spatial relationships (Jackendoff and Landau, 99-124), images uniquely and effectively provide that meaning (Hagan, 61).

In the move away from the metaphor, it also is important that audience imagination has its own valued differences. Designers have the opportunity to tap into the individual variation that imagination brings, and then to encourage change in an audience through actual sights and sounds (Hagan 75). Reflection takes time and so would the hoped-for change in audience thinking. However, as the examples will suggest, inviting the audience to engage with their assumptions, and then adding new ideas that were not part of that mental space before, might lessen the effects of cognitive dissonance.

Cognitive Dissonance

Cognitive dissonance has become a more common term for good reason. As we move into a world where preferences are studied and targeted (Peha), the added weight given to those preferences could mean added resistance to ideas that stand in opposition (Brehm; Gawronski; Harmon-Jones). Preferred ideas negatively impact individuals and societies when mainstream groups decide without compelling evidence that individuals who are different are also dangerous.

Researchers in cognitive dissonance, note that imagining a new perspective makes the whole process that much harder (McGregor, Newby-Clark, and Zanna 325-353). When individuals were asked to reflect on two opposing views, they tended to harden their attitudes toward what they already believe. It stands to reason that asking an audience to imagine a new idea that is not a preferred perspective could actually undermine the new idea. But motion designers can avoid this problem, and might have the greatest chance to encourage change, because of all the different approaches to meaning that are available in this medium.

Established ideas are held in our imaginations, in the words and images that populate our thinking. Importantly, while these related ideas cluster, changes in context allow new ideas to be considered (Aitchison 100-101). From this starting point, the speculative question becomes, how do we change the context in order to join new ideas to an existing perspective, so that the new idea can gain some traction as part of that cluster—that nest?

As designers consider what elements should be imagined as part of this change in context, versus what elements should actually be seen and read, there is the additional opportunity to consider the sequence in which we open an existing nest to a new idea. In this way, we might set up situations where eventually, new ideas can gain added weight. While problems with the approach will surely come to light, my hope is that further research will lead to a process where designers can effectively lessen the effects of cognitive dissonance, not by telling an audience that they are wrong and must acknowledge that fact, but instead by showing them changes in context that invite reflection on new ideas. I believe that these explorations will need to reach outside of social media's sometimes targeted influence, and into public kiosks and PSAs on VHF stations.

In this paper, the goal is using motion design to help mainstream groups change their perspectives on marginalized groups. There are three examples. But the first is a problematic video that shows why it's a bad idea to shift from one contextual nest to another in the pursuit of a single goal. The second and third are more successful and allow for comparison between two approaches. The second shows the value of an explicit opportunity to imagine, while the third considers the value of an implicit opportunity to imagine. That last example is also a video, that contains elements that I argue can be applied to motion design.

Nest Shifting

Before looking at the two compositions that focus on the plight of Muslims, consider another marginalized group and why the move from implicit imagining to actually seeing was not as effective as it might have been. In this PSA created by the Ad Council for Feeding America, Matt Damon represents a member of the working poor. His portrayal challenges the assumption that people who need food banks simply do not work hard enough—do not pick themselves up by the bootstraps. Damon adds the weight of his considerable ethos to link our sympathies to a man named Steve, a member of that working poor.

As the audience watches Damon emerge from a modest clapboard home, they are invited to imagine the marginalized and struggling people who actually live there. But they imagine through a kinder lens in the form of Matt Damon. While the audience must first imagine Steve through Damon, they are later introduced to the real Steve who enters the frame toward the middle of the ad. He is dressed in the same clothes that Damon wears, as he walks in off the street and toward Damon. The real Steve is the new idea that enters into the changed context.

At that moment, as they look at each other, the audience sees Steve's face and Damon's back. They also see imagined and concrete elements working together to put the poor and the powerful into the same nest, which is focused on hunger. Unfortunately, just when the call to value this man Steve and act on his behalf could be most effective, their dialogue moves us out of one mental nest and into another. Damon asks Steve, "how did I do?" At that pivotal moment, when Steve and Matt Damon occupy a nest where the audience is being encouraged to add more empathy to their perspectives on poverty, they shift to a new space that is all about Damon. Steve offers an acting critique. Damon's "performance" was a little "stiff." The words move us from a focus on one man's reality to another man's "performance." Damon reminds Steve that he has an Oscar (forgetting to add that it was not for acting).

As these two engage with the joke, the text states, "hunger is a real story." In terms of lessening cognitive dissonance by changing the context, a failure occurs because the dissonant idea has been muted. Instead of inviting further reflection on the real story, the audience is invited to engage with a humorous critique, allowing them to imagine something much easier—Steve's assessment of Matt. Humor is not the problem. The unconnected context is. The scene fades while the words "hunger is a real story" remain, but that message is not reinforced through sound. As they walk down the street, Steve reminds Damon that the actor has never played Steve. While their walking and talking together could relieve the tension of a serious subject, or even be an attempt to give Steve agency as Damon's equal, their movement and sound do not reinforce the more important idea that Damon represents. He has become the actor instead of Steve's surrogate and voice. An announcer adds the parenthetical ending, "it's hunger action month, so click 'share' below to pass along this video and play your role in ending hunger." Not only does the ad focus too much attention on acting, but the final text suggests that "your role" ends with a click.

In short, the actual situation that Steve experienced is first imagined though the lens of someone we know and like. It changes the context from negative to positive. Into this changing context, the new idea is introduced. An actual member of the working poor and his actual voice put a person that the audience might not find credible next to someone that they do. Unfortunately, instead of cementing concern for hunger with a person we now care more about, we are left to imagine Damon's acting chops, changing the nest from poverty to acting, and lessening the importance of the dissonant idea.

Nest Shaping

These next examples are not exemplars, but they do show the potential to effectively sequence imagined and concrete elements (Hagan 75-79) within the same the mental nest. Both *What Gives Power and When You Don't Exist* use surprise as a key feature. And in both of these cases, the surprise happens in order to recast the nest within a new context.

What Gives Power was created by a former student, when the Islamic Center of Pittsburgh volunteered to be a client on a class project. That collaboration not only marked the first time that I worked with the Muslim community, it also led to an early look at how imagination and concrete elements might work together (Hagan 75-79). I continue to refer to this piece because it fundamentally changed the way I think about approaches to visual/verbal argument. While I once focused on the ways that concrete images and statements function, allowing imagination to remain unexamined, this designer's work made me account for the imagined elements that cause audiences to become our necessary collaborators. I found that in print and motion design audience imagination offers opportunities that move beyond what text alone can consider.

What Gives Power begins with text alone as a series of questions that explicitly call on the audience to imagine. The first question is, "what gives a woman power?" Each question fades, allowing time for the audience to consider their answers. The questions revolve around the external and internal attributes that might, or might not give a woman power.

After a big picture question "what gives a woman power" fades out completely, the next fade-in is the first of a series of comparative questions that ask the audience to make a judgment on two alternatives. Does power emerge from a quality of character, or is it embedded in the physical. The fade-in begins with, "is it her compassion," and to that the text adds, "or her calf muscles." Interestingly, just as we cannot actually see compassion, the words about compassion blur so that we can no longer read them, while the words calf muscles fade slightly to gray but stay visible. Next the audience is asked to consider; "Is it her strength... or her silken hair?" Strength then blurs, while silken hair grays out but stays in focus.

The questions continue in this vein, "is it her understanding...or her unblemished skin?" Is it her patience...or her perfect figure?" The questions explicitly invite the audience to imagine internal characteristics as well as external features. Internal characteristics are always on the left and the external are always on the right. That positioning becomes important later in the piece. The audience is free to imagine a woman's power within the scope of questions that stand in a kind of opposition. What they imagine is not the subject of ridicule. No change in typeface suggests a moral divide. One is just harder to see than the other as it would be in life. But with every question, the nest is clearly being shaped toward an individual focus, until, a question mark appears with the last internal characteristic, "is it her determination?" As the characteristic blurs and fades, the question mark moves to the top right of the page in order to pose the final alliterative question, "or her designer suit?"

Language can be slippery as the words "designer suit" will soon reveal. At that moment, the words "designer suit" melt down and over the physical qualities of power to reveal an actual woman in hijab, who has those qualities but prefers to keep them within the designer suit. While the explicit invitation to imagine has built the nest, now the audience actually sees a new woman, not usually associated with power, who appears in that same nest. She changes the context. Importantly, the silence that has accompanied this piece now changes as the strong voice of this woman reminds the audience of the value of internal characteristics, which she claims as her own. We hear, "I get my power from my compassion, my strength, my understanding, my patience, and my determination. Do not pity me. I find power in my piety."

I argue that it is in this connection between a view of power that has been imagined by the individual and then joined to the concrete view now included in the nest, offers an important opportunity for further exploration. That exploration lives with the audience, but also lies in all the ways designers might use explicit invitations to imagine.

The final argument, *When You Don't Exist,* is a video that begins with an implicit invitation to imagine as a newscaster from the UK states, "The refugee crisis has prompted an emergency Parliamentary session this afternoon." The implicit invitation is to imagine that Syrian refugees are again creating complications for other countries. Images, sound, and typeface all play a role here to create a familiar news scene. The audience sees the news ticker as it explains how stock markets have reacted. The over-the-shoulder insert on the left states that the unrest continues. The situation is serious. But the actual people who are suffering are not fully revealed. What matters most in this example is that the audience thinks they already know who is at the heart of the problem.

The scene in the newsroom zooms into a video clip that shows the refugees, covered hijab-like in blankets, with their backs to us, walking away. The audience doesn't need to see them because they can imagine who they are.

The implicit invitation references the refugees we are used to seeing. As the audience watches them walk away, the first suggestion that a new idea is about to be added to the nest comes in the form of the voice of a refugee, who is obviously not a native Syrian. This boy states, "It was bad at home. We had to leave. Dad couldn't come. I don't know where he is now." The voice is new but sounds familiar. This familiar child might be reading what other children have said, because what the audience sees encourages them to continue to imagine the refugees that they are used to seeing.

As these refugees continue walking, the boy with his English accent continues with, "Mom says we're going somewhere safe. She's trying to be brave. Someone told me these boats sink all the time." Here again is the voice of a child who is not foreign to the intended Western audience. The surprise is the realization that imagining a foreign group is not a correct assumption. As scene transitions from the group wearing blankets to uncovered individuals, the audience sees people who look much more like they do. But the full realization does not occur until the refugees take the blankets off their heads.

At that moment, the tables turn as the context changes. A voiceover states, "Most of the European refugees are trying to make their way south. They believe that Africa provides a chance for a better life." Sadly, as the scene transitions to a broader view, the life we see these new refuges living is not one that suggests things will get better any time soon. The PSA ends with "This is fiction. Any resemblance to how European countries are currently treating migrants, asylum-seekers and refugees is entirely coincidental." While the PSA ends with irony, the implicit invitation to imagine a default view of the refugee, more importantly places the Western audience into that nest, so that they might begin to consider and connect to the plight of refugees—even those who do not look so familiar. If that happens, the possibility exists that the new idea, one in which we all want and need the same things for our children, could begin to occupy the refugee nest.

In both the time/motion and video examples, sequence invites imagination through selective views of typeface, text, image, and sound, which builds a changing context as unexpected images and sounds enter the picture. The development of audience imagination is a critical part of the designed sequence. My claim is not that seeing this, or any other PSA, will lead to an immediate change of heart upon first viewing. What I am saying is that this approach begins to open a nest that adds weight to the new idea and might lessen the hold of the established idea over time (Harmon-Jones 94). Therefore, we should study how to work with these elements more effectively.

Summary

In exploring the sequence of imagined and actual image, text, typeface, and sound, I see a potential goal in kinetic argument to use sequence to diminish problematic existing views in favor of better new ideas. To accomplish this goal, I argue that ways exist to put the established and new ideas into the same nest, so that terms that once were not associated, such as Muslim woman and power, or European and refuge, gain a stronger bond. In order to find ways to give more weight to the new idea as it joins the established nest, we might consider four options. First, in the design process, there exist ways to link imagined established ideas to new dissonant ideas in order to strengthen rather than weaken the connection. Second, within that process it seems that while tangents can be entertaining, they likely interfere with the process of giving weight to the new idea. Tangents that utilize surprise by introducing a new nest, simply dilute the opportunity to change minds. Third, I want to consider the opportunity to study whether or not sequences of actual and imagined elements might be more effective when an audience is first allowed to imagine the established idea before being confronted with the new. Finally, exploration linked to imagined and actual elements might encourage an evolving and improving process. Kinetic arguments might be made better when the design process clearly accounts for images as meaning through spatial relationships (Hagan, 61) and text as meaning through statements, questions, and demands (Olson, 191). In this way, kinetic arguments can be tested to find the best ways for image, text, and typeface to play their roles in the sequence of the imagined and the actual.

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Author Biography

Susan M. Hagan, Ph.D. MDes, received her master's degree in Design and PhD in Rhetoric from Carnegie Mellon University. She is now an Associate Teaching Professor at Carnegie Mellon University in Qatar. She focuses her research interests on the interaction of words, images, and typeface, both static and in motion, in terms of their value for argument, description, and narrative. She envisioned and co-edited a special issue of Artifact: The Interaction of Practice and Theory in 2007. Her article, Visual/Verbal Collaboration in Print Complementary Differences, Necessary Ties, and an Untapped Rhetorical Opportunity (Hagan 2007) received the 2008 NCTE Best Article on Philosophy or Theory for Technical or Scientific Communication. Collaborating with a colleague in computer science led to, Typesetting for Improved Readability using Lexical and Syntactic Information, published in the ACL (Association for Computational Linguistics) for ACL 2013, the premier conference in the field of computational linguistics. She is currently engaged in two projects: an invited chapter focused on illustrators as collaborative problem solvers in the environments of argument, narrative, and description, and a book project with the working title, Interplay: How Image Text and Typography Create Complementary Meaning, which emerges from her interdisciplinary background in design and rhetoric, and grows out of the 2007 article.

PAPER CATEGORY: TEACHING

Introduction of Memento Mori in a Motion Graphics Course

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Abstract: This paper details the way in which I introduced the theme of memento mori art, or death in art, and wove it into a motion graphics course taught at a college in New Zealand. In this paper I will show how an investigation into the historical use of memento mori or death in art accomplished two things for my course: firstly, introducing this theme and in particular looking at key examples of this art throughout history helped structure my entire motion graphics course; secondly, introducing this theme to my students helped them grow as artists and ultimately developed their own artistic skills. In regards to the first point, I will show how using this theme of death in art acted as an engaging and fruitful guiding thread which helped organize my entire motion graphics course. For, a class in motion graphics involves striking a right balance between theory, software demos, classroom activities, and assignments, and I will detail how this range of classroom activities were placed under an umbrella of one overarching theme: memento mori. Regarding the second point, I will show how this investigation into memento mori ultimately helped my students create their own original artwork. The course design encouraged students to seek inspiration beyond popular culture like YouTube and Vimeo, advance their understanding in symbolism, and develop an appreciation of diverse artifacts. This approach resulted in conceptually stronger and original motion graphics animations from the students.

Keywords: memento mori, motion graphics, design, animation, interdisciplinary.

Introduction

Can historical art references be taught, and in particular, woven into a contemporary motion graphics course? Further, how would students benefit from studying these historical art references? These were the questions I was grappling with when I was designing my motion graphics course at a college in New Zealand. Then, while casually leafing through the book *Memento Mori* [Georg, Kammel, Donien, and Zeiller] I had a series of eureka moments concerning how the theme of death in art throughout history might be implemented into my motion graphics classroom for an entire course. I thought that I'd use this historical art reference - the theme of death in art, or *memento mori* art - to answer my above two questions. That is, I planned on using this theme as a historical art reference which would weave throughout the entire course helping to organize the material, and in turn, develop ways in which my students could use this historical theme to help them grow as creative artists themselves.

This paper explains the results of my course. I will explain the way in which I used this theme as it developed throughout the history of art as a guiding thread that weaved throughout the course. I will show how the course was structured such that we examined the historical use of death in art from the 15th century up to the present day, and how this examination was tied in with my lesson plans involving theory, software demos, classroom activities and assignments on motion graphics design. I will also show how this course, structured by way of the theme of *memento mori*, engaged my students and ultimately gave them insights and knowledge which helped them grow as artists, culminating in their final art project for the course.

This paper will begin by giving a short description of the college which I taught this course at, as well as the general course objectives and curriculum of the class. I will then flesh out in more detail what this historical concept of *memento mori* is, and how I implemented it into the course. I will then go through a week by week explanation of how this course was structured, detailing the time period from the history of art we were drawing from, how the particular weekly assignments were arranged, and what motion

graphics concepts we worked on. I will then conclude by looking at two student final projects in order to show in what way the students used this historical theme to develop their own art.

The College and Curriculum

The course was taught in 2013 at Media Design School in Auckland, New Zealand. This college excels in intensive programs preparing students for careers in the media arts for example: animation, game development, graphic design, and visual effects. This was a bachelor's degree in visual effects and the students were taking this mandatory course towards their degree. However, I would like to mention that this institute did not follow the semester or quarter system that we are familiar with in the US, as it was an acceleration bachelor's degree program where the students received degrees in three years.

The overall course objectives concerned enhancing the students' knowledge of both the history of art as well as the use of motion graphics software. In general, the aim of this course was to provide students with: the skills, knowledge, and creative techniques required to solve motion design problems; enhanced evaluation, diagnosis and problem solving skills; and enhanced observation and evaluation skills.

Concerning the curriculum, the college offers a bachelor's degree with an accelerated three-year program. This course was an intensive seven-week course with five day weeks and four contact hours daily. Students had a theory class on one of the days and on the rest of the week studio sessions were held. The course was a blend of software skills and fundamentals of motion graphics, with an assignment due at the end of each week. The software lessons were based on Adobe After Effects while the motion graphic fundamentals focused on an understanding of image composition, design, and animation principles. The seven-week course was broken up into individual projects each week, with a final project over the last three weeks. The course was kicked off by presenting the students with the theme of *memento mori* or death in art, along with an outline for the entire course including a weekly breakup. The course culminated in a final three-week motion graphics animation project for which the goal was to create either a title sequence or a music video that reflected the theme of death.

The Historical Theme

Death is a recurring theme in cultures including Egyptian, Mexican, Tibetan, Haitian and others. "*Memento mori*" is a Latin expression meaning 'remember that you have to die', and originates from a practice common in Ancient Rome. When a general came back victorious from a battle a parade was held in which he would receive compliments and honors from the crowd of citizens. However, here he ran the risk of falling victim to haughtiness and delusions of grandeur, and so to avoid these, a slave stationed behind him would repeat "Respice post te. Hominem te memento", which translates as 'look after you and remember you're only a man', or in other words, 'remember that you have to die'(Wikipedia contributors 2017).

I began the course by focusing on the 15th century, where we looked at the significant events and influencing factors on art in that period. The preceding century had seen the worst of the black death and the population across Europe and the rest of the world had shrunk significantly (Benedictow 36). As a resultant familiarity with death the art beginning in the 15th century exhibits the recurring motif of death. In the face of this demise thinkers of this period began to contemplate their lives here on earth, rather than in an afterlife. This new thinking was then reflected in the artwork of this period and as a result *memento mori* became a prevalent theme during this time (Koudounaris 78). This course examined this theme of death in art from the 15th century all the way up to the present date.

It was through this historical study of death in art that my students furthered their skill as motion graphics artists. Students deepened their knowledge of After Effects and other programs using historical artwork as a visual material. Students were expected to conduct research as well as identify and develop motifs and icons in order to form visual motion pieces from each time period using standard and non-standard techniques. The goal was for the students to output visually rich and conceptually strong work that displayed robust motivation and reflected good research and investigation techniques.

Weekly Overview

I will now give a week by week description of the course, detailing the way in which this theme of *memento mori* or death in art was implemented into each week, helping structure the entire course. As I will show, while we examined this theme from the 15th century up to the present day, we used the art from each period to hone various motion graphics techniques each week.

I also note here that the students were given assignments to work on that are referred to in this paper as 'formatives' and 'summatives'. The former assignments were designed for practicing the tools while the latter contributed to the overall grade for the course. Also, I should note that the students had an initial introductory session with After Effects before the beginning of this course, and so they came in with a basic understanding of the software.

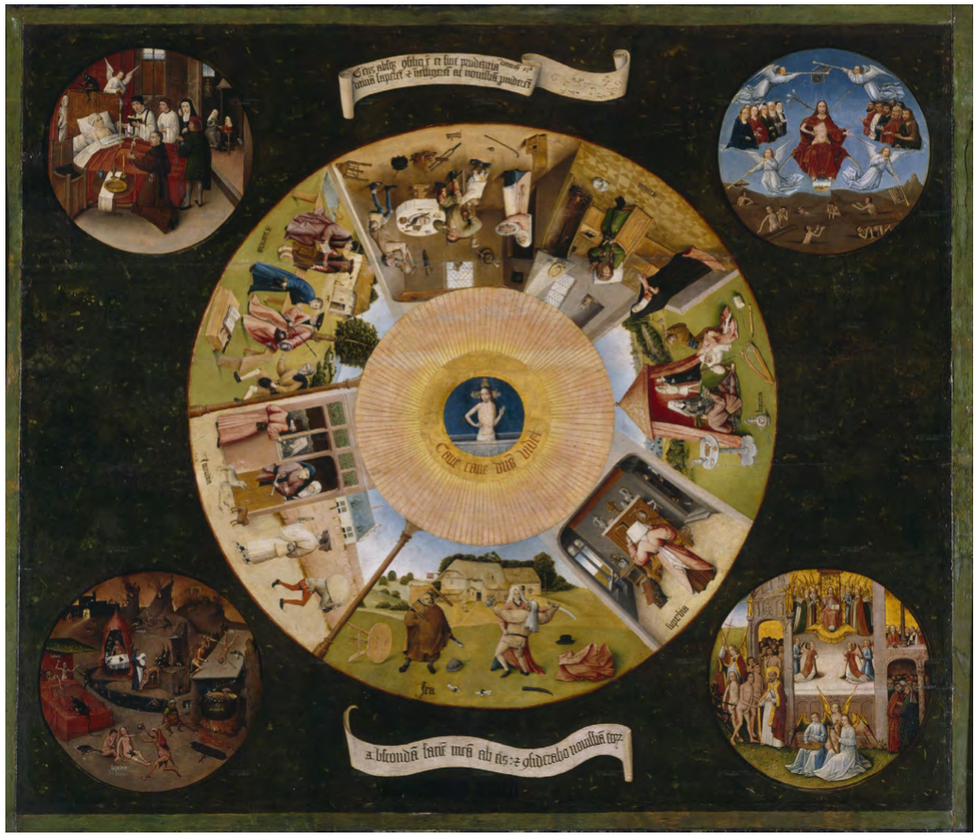

Figure 1: The seven deadly sins and four last things by Hieronymus Bosch painted around 1500

Week 1: 15th century to 18th century

In this week we looked at paintings by Hans Memling, Hieronymus Bosch, and the famous *Danse Macabre* or 'Dance of Death' by Michael Wolgemut. We looked at Vanitas paintings and had discussions around the symbolism present in them. We also discussed the context of the paintings, factors such as the black plague and the conflicts in Europe, and how they influenced the artwork of the period.

Figure 2: The Last Judgement by Hans Memling painted between 1467 and 1471

Since this week marked the beginning of the motion graphics course, we began to deepen our knowledge of the After Effects software, familiarizing ourselves with its basic operations and deepening our understanding of animation principles. As we worked with the software during this week, the paintings of this period were utilized as material for the students to practice motion graphics skills such as masking, keyframing, and parenting.

In the formative exercise the students were asked to select a Vanitas painting and bring it in to the Photoshop application in order to edit the picture. They separated the layers and imported it in to After Effects

in order to animate the layers. In order to practice animation principles with an emphasis on achieving smooth animation the students animated a recognizable object from the painting. They also spoke about the paintings that they chose and explained the symbolism involved in the objects in the scene, the use of color, and the mood of the painting.

Week 2: 19th century

In this week, we looked at the industrial revolution and how it influenced art. We also investigated the invention of photography and its use in photographing the dead as a way to remember lost loved ones. Since this period saw the printing press come to the fore bringing with it the development of more fonts, the theory lessons were focused on color, composition, and the evolution of typography. Drawing from the developments within the 19th century, the motion graphics skills practiced concerned color correction in After Affects as well as gaining competence with Track Mattes and Puppet Tools.

Figure 3: Example of a Daguerreotype photo

Figure 4: Oliver Goater, student kinetic type animation based on the track 'I don't Know' by Wax Taylor.

In the formative assignment, the students worked on a kinetic typography exercise, where they were given a choice of fonts and sound bites to choose from. They were given one week to work on these assignments, where the focus was on deriving a type design based on the sound bite and symbolism of the period.

Week 3: early 20th century

Here the class looked at artwork from 20th century artists and in particular Pablo Picasso's use of color in his transition from the blue period to the rose period. We also looked at Edvard Munch and the Dada movement, as well as Norman Mclaren and his contribution to the beginnings of time based media.

For the formative assignment of the week the brief was to demonstrate the transition from 15th century art to the current year in a cascading style with the use of artwork from each period. The students could focus on any particular topic, which in this case was- weapons of warfare throughout the ages. The animation needed to reflect the theme of death and the students would animate accordingly using skills that were learnt in After Effects thus far - such as the use of 3D and tracking and creating transition elements to proceed from one sequence to the next.

MEDIA DESIGN SCHOOL

3D2V01: MOTION DESIGN FORMATIVE 3

BACHELOR OF ART AND DESIGN

TIME- 1400 TO 2013

BRIEF

Create a 30 second motion design animation that encapsulates this time period. We will use elements in paintings and custom design elements to create a 3D cascading movement throughout the piece.

Use 3D feature in After Effects to bring your animation to life and pay attention to transitions and pre-comps as that would help you from making the animation too unwieldy and complex.

You would choose the paintings first and then start making designs that are derivative of those paintings and figure out transition elements that would help carry the piece through with the aid of music.

CONSIDERATIONS

1. Give consideration to the emotion of the animation- it can be humour, irony, fear, lethargy, energy, empathy.
2. Choose visual elements and colours that would help you get the desired emotional outcome.
3. The style and pacing of animation also adds to the outcome so please give it due consideration using the graph editor.
4. Use sound effects to enhance the animation.
5. When looking for resource images, as per the composition choose high rez or regular rez images which would be determined by how close they get to the camera.
6. Give due credit to the original artwork that you use.

AESTHETIC CRITERIA

A *Utilize a minimum of 3 paintings. There needs to a* **derivative design component** *to the piece as well.*

B *There needs to be consideration to colours and elements that you choose for the derivative design.*

TECHNICAL CRITERIA

- *The final piece needs to have audio 16bit, 48.000kHz.*
- *The storyboard needs to have 6 frames minimum.*
- *The finished project must be 30 seconds long.*
- *Is the finished production a Quicktime Movie, Photo - Jpeg compressed with the quality setting set to 80%, 1050 x 576, 25 fps.*
- *Is production rendered frames not fields.*
- *Has the production been submitted on or before the deadline stated on the brief?*
- *Is finished production saved in the WEBDROPZONE. named: STUDENT NAME _ Time*

MILESTONES

TREATMENT- due **24/05/13**

What you are trying to express through the piece, it needs to be half a page with a colour palette and you will need to present it by end of day.

STORYBOARD(STYLE FRAMES)- due **28/05/13**

There needs to be a minimum of 6 frames, but could be more. Frames would be in colour and close to the finished look.

PREFINAL CRITIQUE- due **30/05/13**

The animation needs to be in a good shape with just the final tweaks remaining.

FINAL CRITIQUE & SUBMISSION- due **31/05/13** - *1:00pm*

The finished piece needs to be dropped in the dropzone by the start of class and then we shall have a critique session where everyone

Figure 5 : The formative design brief for week 03

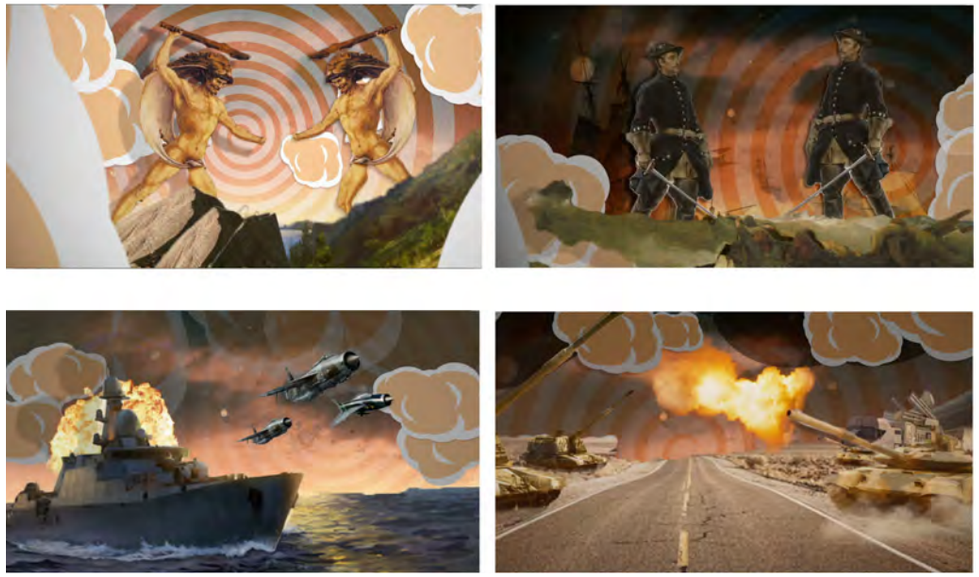

Figure 6 : Jesse Meha, student design solution for the brief above.

Week 4: 1950s to the current date

Works of art relating to death that were looked at and discussed in this week included Andy Warhol and his 'Death and disaster series', Damien Hirst and his series of animals suspended in formaldehyde, as well as Jean Michel Basquiat and Francis Bacon's work.

This was the last week of instruction with regards to developing the basic understanding of the software. Drawing from this contemporary art, the students were given projects to develop their software skills. In particular, gaining competence in Shape Tools and integrating the workflow between Photoshop, Illustrator, and rotoscoping in Mocha were the main focus. At the end of this week the students were also introduced to the summative brief that they would be working on during the subsequent final weeks.

Weeks 5 - 7

During these final weeks, the students worked on their final summative project, choosing from either a title sequence, titles for a festival, or infographic animation. The aim of this assignment was to enhance the students' design and investigation skills, as well as develop their ability to express messages in a clear, coherent manner through a motion piece. This assignment required the students to use their

analytical skills to dissect the varying layers of complexity of an issue and apply story telling techniques to unravel it to the viewers in a coherent manner. The motion graphics movies they created were to be visually interesting, have multi-layered imagery that complemented the topic and demonstrated an application of the design fundamentals, and very importantly, it was to reflect the theme of death.

This final project was an individual student project, although they did brainstorm and work in groups for the initial phase. The students had three weeks to work on this project and the project was broken down into these steps:

1. Mood boards and Treatment

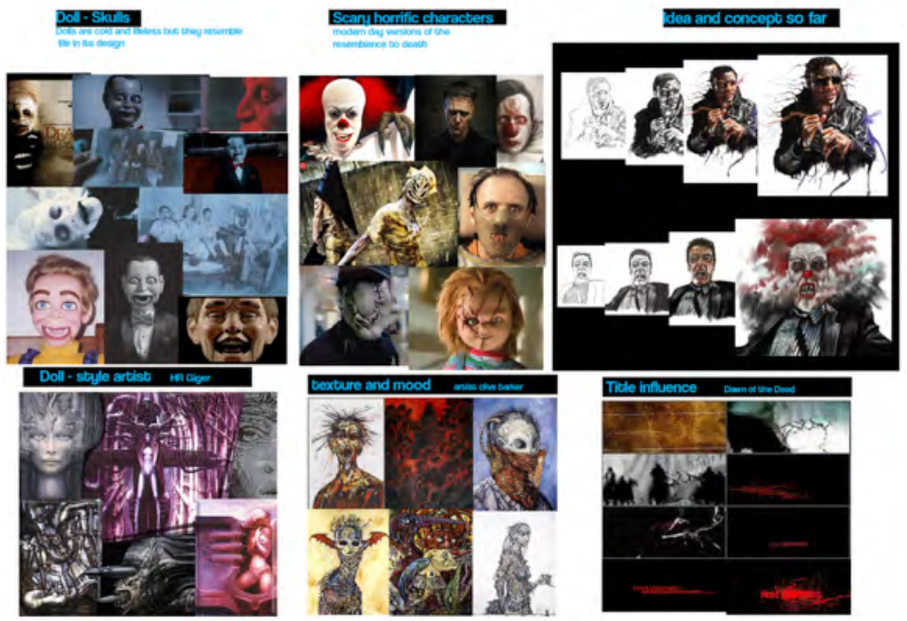

Figure 7 : Ashleigh Foochong, Treatment and moodboard

This was the initial ideation step where the students went through keyword mind mapping exercises and also developed treatments and mood boards to map the course of the animation. The students designed initial style frames which they pitched to the class and, in turn, revised their work based on the feedback that they received from their classmates and instructor.

2. Final Storyboards

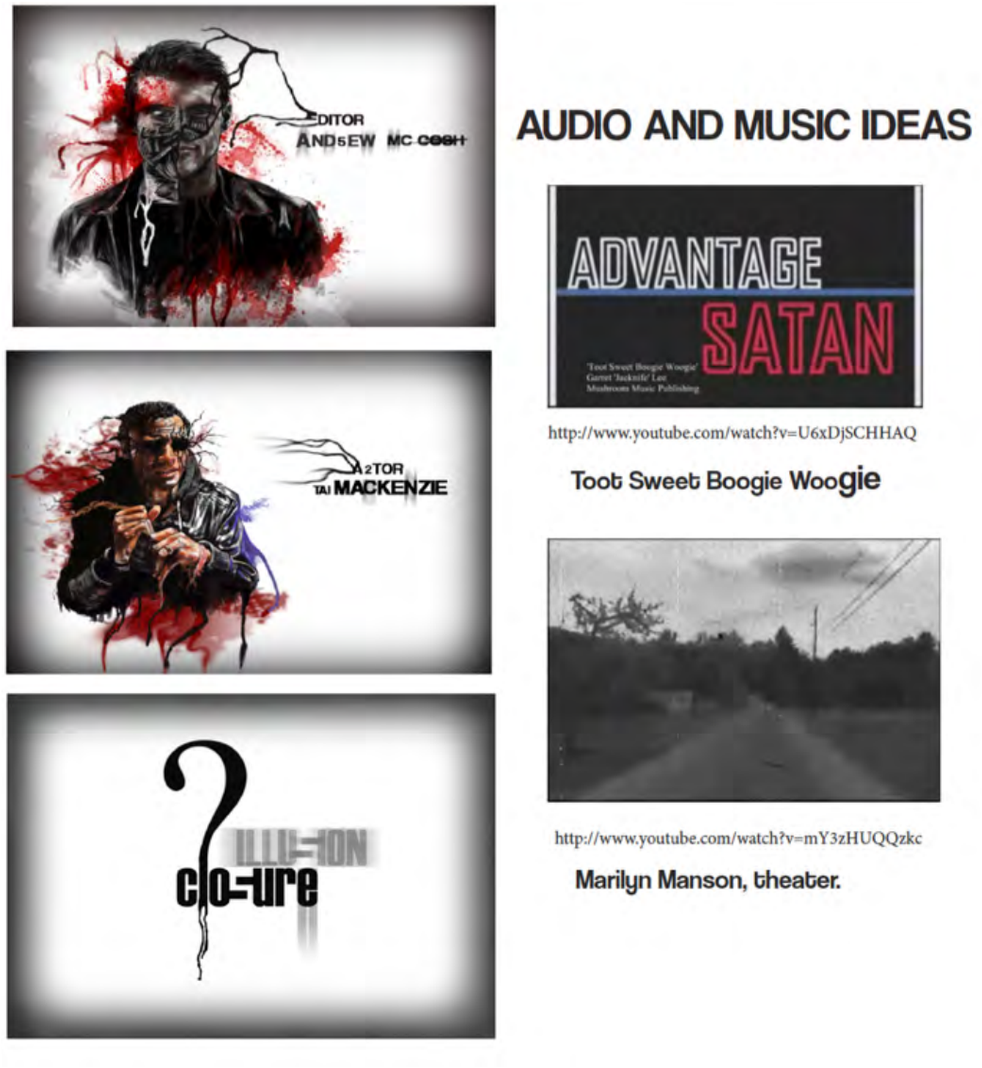

Figure 8 : Ashleigh Foochong, style frames.

Drawing from the initial designs of the first step the students proceeded to develop full style frames and storyboards. They used the color palettes that were developed in the ideation phase and also made sure to check that the theme of death was indeed reflected in the concept of their piece.

3. Production

Figure 9 : Ashleigh Foochong, style guide

In this phase the students organized the project folders and created an animatic of the storyboards in order to get a feel of the animation. Based on this they then proceeded to start the animation process, which was itself a work-in-progress milestone.

4. Pre-final Presentation

After about a week and a half it was expected that the animation was as close to being finished as possible, and here the students showed the animation to the class. This stage mimics the common industry scenario where the designers give a presentation to their clients and get feedback which they then incorporate into the final animation.

5. Final Animation

The students presented their finalized animation, which by now had incorporated the feedback from the previous stage.

Sample Student Final Projects

Ashleigh Foochong

The topic of Ashleigh's final project concerned creating a title sequence which incorporated the theme of death for a film created by her friends for a student film festival. The title sequence was in a hand drawn style and had illustrations of her friends who were characters in the film. She had illustrated their faces as part of the title sequence visuals. Ashleigh managed to incorporate the historical theme of death into her own art in a way that enhanced her creative expression. The images for the various stages and the final motion graphic animation are provided here.

The topic of Jesse's final project concerned creating titles for a music festival. Jesse had an interest in Tibetan Buddhist culture and *Bardo Thodol* or *The Tibetan Book of the Dead* [Coleman, Jinpa]. He studied the artwork and the stories associated with the book and then designed icons for a music festival derived from those in the contemporary landscape. He shot the footage himself, and the music he used is an original track recorded by a friend of the student. His original artwork demonstrates a present-day appropriation of the historical theme of death in art.

Jesse Meha

Conclusion

Utilizing the historical theme of *memento mori* or death in art in this course served two main fruitful functions. Firstly, it served as the overarching theme which helped structure the weekly lesson plans which in turn provided the material for the students to deepen their understanding of motion graphics animation. The topic generated many opportunities for discussions and provided windows into history, and the students got more out of the course because of this. Furthermore, the use of death in art was useful in which students were able to create personalized storylines, but on a more general level, this technique of using historical artwork to help shape present understanding demonstrates the significance of understanding the history of any artifact will shed light on one's present condition, by drawing parallels between the socio-political circumstances at the time and in the current moment. Secondly, the theme of death in art also helped my students create their own original works of art. This theme invoked a great deal of curiosity and self-reflection from the students and they were able to interpret the theme, as it stretches through the history of art, and include it in their artwork in their own unique way. The theme gave the students a distinct brief problem - how does one use death in order to create? - which ultimately advanced their story telling abilities in such a way that they were able to create successful and original motion graphics videos by looking at historical references. The initial premise of using a historical reference as a single thread through the motion graphics course and to enable the students to create original artwork was successful.

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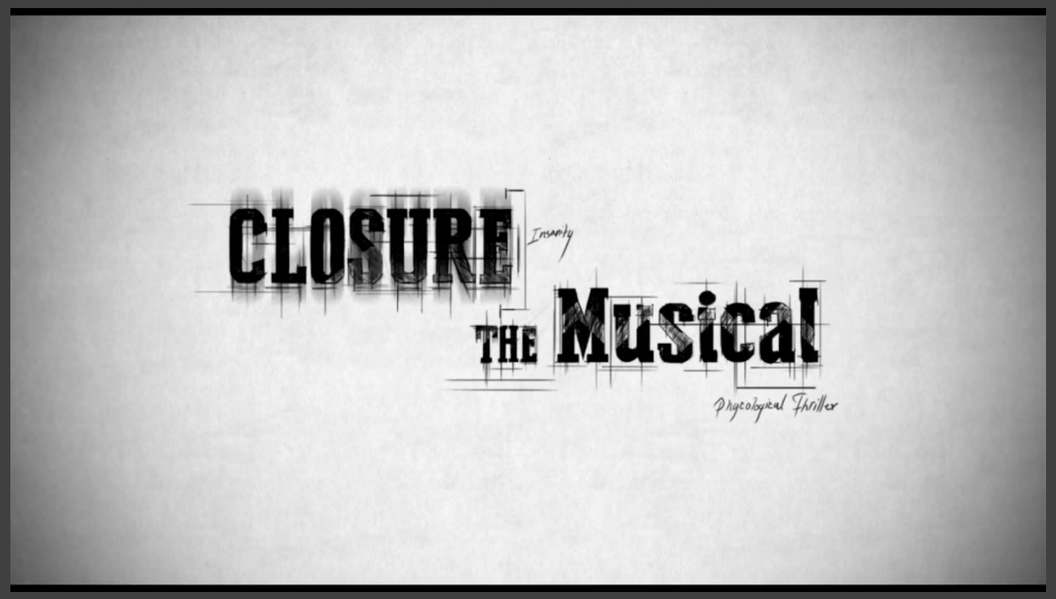

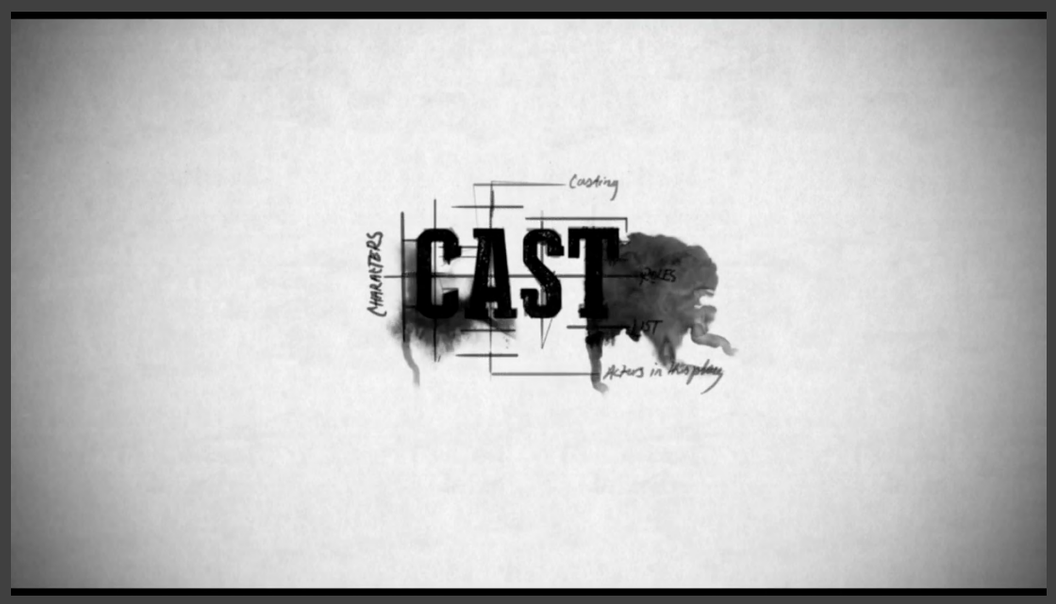

Media from the paper *ReDEsigning Motion: Motion Design and Science Fiction Film*
Source(s): Nikhil Ghodke

Author Biography

Nikhil Ghodke teaches in the Department of Communication and Media at Manhattanville College in Purchase, New York. His area of expertise is Motion Graphics. He has worked for 10-12 years in the industry; in roles ranging from Motion Graphics Designer to Senior Art Director in the United States, New Zealand and India. He has also taught motion graphics in Media Design School, New Zealand and the Art Institute of Tampa, USA. Some of the projects that he has worked on professionally are- rebranding of ABP news, a national news network in India, a promo for the movie Hobbit (for Sky tv in New Zealand) and pitches for rebranding of Hallmark Network in USA and of TV Pasiones in South America. He worked for the HSN network as a Senior Art Director and during his tenure saw the network undergo a major revamp in its branding and transition to high definition content.

He has interests in photography and videography along with motion graphics and has traveled to 19 countries; photographing the art and culture of each region. He has exhibited his work in India and also in the US, one of his photos was displayed in a juried exhibition by Dark Room Gallery in Vermont. He started the first motion graphics course at Manhattanville College and is looking to integrate and expand on the program by incorporating cross-disciplinary projects and making it industry relevant.

PAPER CATEGORY: PROJECTING

Texting Culture: A Moving Target

Emmy Rice

Assistant Professor Kansas City Art Institute

Abstract: Tap and hold with two fingers, then drag down to send a heartbreak in motion. The recent release of Apple's ios10 Digital Touch offers a multitude of ways to communicate in motion. Users can send fireballs, lasers, and commercial memes, such as Judge Judy, through the updated keyboard in the text message. Text a confetti screen takeover to a friend on their birthday, or design the delivery of a text as a playful bubble.

Text messages play an everyday role in semiotics and culture. Informing our spelling and syntax, altering how many characters we give to a word or encouraging the use of abbreviations. Emoji's began as carefully arranged punctuation patterns that formed an image, demonstrating our need to communicate visually. Now there are a wealth of pre-designed options which standardize and expedite this same intention. Interactive design has evolved from keeping up with our pictogram needs to suggesting its adoption. ios10 suggests an emoji as one of three autocorrect options, ultimately changing human behavior and our communication style.

Digital innovation thrives when it looks to human behavior/culture. These tools and devices do nothing without us using them, inputting moving lasers and fireballs. Why do we need our texts to move? Is this somehow a reflection of our offline communication? Users consistently demand that their online conversations mirror their "IRL", face-to-face experiences. Connotative, emotive qualities are key to humanizing plain text sterile environments. Motion reigns, providing a full range of frame-by-frame possibility. This presentation will take a cross discipline approach to the visualization of text messaging, supported by semiotics & digital culture.

Introduction

Abbreviating is a natural tool in digital messaging. We often type on the go, and if we can physically use less characters without compromising meaning, then abbreviating becomes a powerful tool to do more with less. Our messaging transforms from laugh out loud to "LOL", or in real life to "IRL". We're saving time, while concurrently constructing a language system that's native to digital environments. Each community has their own acronyms, easily understood within closed circles. The esoteric abbreviations demonstrate the powerful use of language's ability to create boundaries and community. Much like giving dap, tailorable messaging doesn't try to inform outsiders of it's meaning. There is no "how-to" guide. Outsiders learn from immersion, transitioning to insiders with experience.

Psychologist Michael Argyle recognizes the importance of nonverbal gestures, "the prosodic signals of timing, pitch, and emphasis" (4). The problems inherent in plain text messaging stem from the inability to express tone. The tonal nuances provided in face-to-face conversation simply don't exist in digital type. Misinterpreting emails and mobile texts happens often. Tone and range is predominantly found in non-verbal communication such as body language, facial responses, and visual imagery. Bodily communication expresses emotion and establishes interpersonal relationships (Argyle 6). Motion is king in these moments. Motion allows us to use image, speed, transition, and sound. These modes provide more sensory inputs, adding definition and subtlety to our message.

Today we find motion applied to a range of digital stickers, keyboard emoji, and narrative sequences. Emoji's began as carefully arranged punctuation patterns that formed an image, demonstrating our need to communicate visually. Keyboard inputs of colons, forward slashes, dashes, underscores, and periods result in a wide range of tailorable possibilities. We have a natural inclination to communicate with images and symbols, innately applying anthropomorphic properties to plain text on a screen. Users have found ways to construct symbols and imagery within the limitations of our keyboard, carefully organizing the punctuation keys into a wide range of facial responses. We craft smiling, winking, frowning, and crying faces. These symbols allow us to punctuate our text, adding tone and nuance.

Now there are a wealth of pre-designed options, which standardize and expedite keyboard emoji. Interactive design has evolved from keeping up with our pictogram needs to suggesting its adoption. ios10 suggests an emoji as one of three autocorrect options, ultimately changing human behavior and our communication style . Snapchat celebrates motion, suggesting moving filters and narrative stories that allow us to communicate sequentially.

Digital natives have readily embraced the visual possibilities afforded by Snapchat, or "Snap" as it is known to the initiated. Initially Snapchat appears to position itself as an enabler of selfie culture. The captivating moving selfie lenses augment our self-portraits and suggest collaborations with friends. In essence, it's fun, and that might be design's greatest tool: giving us an opportunity to laugh, have fun, and a needed break from our daily stress. Snapchat is responsible for the innovative stories feature. Users effortlessly build "stories": sequences built from their snaps. The feature scales up to include a complex arrangement, or down to sequence between just a few images. "Snap" celebrates motion and users will find it in the captivating lenses, geofilters, and stories.

Emojis, digital stickers, and narrative stories represent modern communication today. These fireballs, heartbreaks, and lasers add a subjective, qualitative level to the conversation. Often personal and subjective to the people in the conversation, they establish a one-to-one conversation, misunderstood to outsiders unfamiliar without the unique language system. They make our interactions more human, full of assigned meaning.

Digital innovation thrives when it looks to human behavior/culture. These tools and devices do nothing without us using them, inputting moving lasers and fireballs. ios10 suggests an emoji as one of three autocorrect options. Snapchat suggests moving filters and narrative stories that allow us to communicate sequentially. These suggestive behaviors ultimately will lead to adoption, changing human behavior and our communication style.

We have communicated face-to-face for centuries, and only in the last decades are we using digital messaging. Technology will continue to advance, and our need for nuance and subtlety will run parallel. Still emoji, moving emoji, celebratory confetti screen takeovers, and social media stories prove that nuance and subtlety is needed in digital messaging. Users consistently demand that their online conversations mirror their "IRL", face-to-face experiences. Connotative, emotive qualities are key to humanizing plain text sterile environments. Motion reigns, providing a full range of frame-by-frame possibility.

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Author Biography

Emily Rice is Assistant Professor of Graphic Design, in her third year at the Kansas City Art Institute. Rice focuses her research and professional practice on interactive design—studying digital ethnography, information architecture and user experience. She presented "Pedagogy of Play, Fostering Flow States as a Tool for Design Thinking" at the 2015 international Design Educators Conference, Spaces of Learning, in Toronto, Canada, and is speaking at Cumulus, Open Design for E-very-thing, in Hong Kong, China this fall. She received her MFA in Graphic Design from Kansas State University, and has a BFA in Fiber. Her analog background in textile design, and skills hand writing HTML and CSS code, culminate in a love of process and provide fresh approaches to design thinking.

She believes in the value of service to the industry, and is Vice President of Education for the Kansas City chapter of AIGA, the professional organization for design. Rice leads the annual design programming for the regional student membership base, providing opportunities to connect students and professionals, as well as strengthen ties with nine regional higher education institutions. She has been a member of AIGA since 2006.

PAPER CATEGORY: PROJECTING

ReDEsigning Motion: Motion Design and Science Fiction Film

Zlatan Filipovic and Leila Kucukalic

American University of Sharjah, Khalifa University

In this project, we explore new spaces and approaches in motion design by relating experiments with time, space, and body conducted in science fiction films and the comparable possibilities in motion design. In a series of intentional departures from the basic principles of time-space-object relationships in motion design, the resulting video experiments allow the viewer to 'see the invisible.'

The resulting design, applied to the MODE conference logo, illustrates moments from selected science fiction films serving as prime examples of cognitive estrangement applied to construction of form and motion. Following the 8x8 format of this presentation, we have chosen eight instances in the films that challenge the time and space concept, ultimately allowing the audience to see the invisible. The students are presented with the concept of estrangement, first introduced by Russian formalist Victor Shklovsky in his *Theory of Prose* (1925) and describing a process where art serves as a "means" of experiencing things beyond the immediate recognition. "By 'estranging' objects and complicating the form, the device of art makes perception long and 'laborious'" (6). This notion was later applied by Darko Suvin in his *Metamorphoses of Science Fiction* (1979), to indicate the cognitive estrangement elicited by the new worlds and thresholds introduced in science fiction. Students are asked to create motion design solutions, sased on these theoretical concepts, the examples from science fiction films that illustrate them and the ensuing visual experiments, such as Tim Sessler and Brandon Bray's short video "Balance."

As Cento Lodigiani (currently @ Dress Code, NYC) explains in his animated version of basic motion principles applied to simple shapes: "The 12 basic principles of animation were developed by the 'old men' of Walt Disney Studios, amongst them Frank Thomas and Ollie Johnston, during the 1930s. Of course they weren't old men at the time, but young men who were at the forefront of exciting discoveries that were contributing to the development of a new art form. These principles came as a result of reflection about their practice and through Disney's desire to use animation to express character and personality."

Amongst all these principles that place emphasis on the implementation and respect of laws of physics, exaggeration seems to be the only good entry point for the creation of the innovative visuals and POVs towards designing experiences of estrangement. Be it by using the qualities of matching or intentionally breaking the form/quality of movement, exploring the glithching, warping, bending the space/form or pushing the limits of making the grid/pixel apparent. It is a starting point of seeing and experiencing something new, something different.

The selection of moments from science fiction films was determined by the history of the genre. Although Shklovsky applied his insight to the form experiments in the avant-garde art movements at the turn of the 20th century, it was not until the 1960s and 1970s that significant experiments with form occurred in science fiction realm. These decades mark the so-called New Wave period in science fiction when the writers and artists started to test the genre form and means of expression, and when they focused on 'inner trips' of all kinds. This, rebellious investigative time of New Wave also resonated with the civil right movements in the West. Today, the process of estrangement in motion remains an important tool of showing that something is amiss - witness the viral GIFs of both presidential candidates and the loop of their distended facial expressions - and it continues to represent a crucial tool in artistic analysis and in seeking to express new meanings and define new spaces.

The first moment comes from *2001: Space Odyssey* (1968) and the famous transposition of the flying bone, thrown by the agitated Australopithecus, into a near-future spaceship (clip 01). The next design was inspired by Tarkovsky's *Solaris* (1972) - an ode to the limits of human understanding and perhaps the need to break them - where Gaia/Harry, a woman recreated by Solaris, is coming back to life

before incredulous Kris Kalvin's eyes. (clip 02) Followed by *Westworld* (1973) and the first use of the pixelized POV of the malfunctioning gunslinger's vision (visual effect developed by John Whitney / Gary Demos) (clip 03). These essential moments of estrangement in the context of their innovative use give way to science-fiction blockbuster and the effect that nevertheless changed perceptions of time-space through visual manipulation: we are talking about the warp drive from *Star Trek: The Next Generation* (1987-1994) (clip 04).

The films and visualizations presented here serve as the gateway into the new cognitive space and our next two examples belong to the period in science fiction following the New Wave, known as Cyberpunk. As these two moments and films illustrate, the alterations of the bodies and identities in the Digital Age of machines, became the focus of fictions from the 80s and the 90s. *The Ghost in the Shell* (1995), *Matrix* (1999) (clip 05 & 06).

For the oughts and the present, the two examples/designs represent two key estranged experiences: one that seriously questions the nature of reality—*Scanner Darkly* (2006) (clip 07)—and the other that serves as an exploration of human augmentation and possible future as we slowly evolve, hopefully forward—*X-Men: Apocalypse* (2016) (clip 08).

In deconstructing these instances, the principles of motion design related to estrangement start to emerge. What ties them all together? The question is what we are really seeing and how does it relate to time-space and cognitive estrangements qualities? The effects presented here show us not so much the connotation of the meaning, but truly opens spaces beyond the surface representation, thanks to the seeming estrangement of the body, time, space and principles of motion design.

Starting with the exercise of reverse engineering, students take the above mentioned segments of the films and deconstruct their formal properties. Sound plays a crucial role in enhancement of the quality of estrangement, therefore in conjunction to the visual formal analysis, the analysis of the aural elements feeds to the formula of new representation. The new construct of motion design stems from the properties students extracted and is applied to the simple geometric shapes, developing further in to integration of typographic elements. Limited selection of the elements from the presets and effects library is then considered with a rigorous iterative process of building understanding of the fundamental properties that drive the transformation.

Footnotes

1. https://vimeo.com/93206523

2. Assignment developed by Professor Brian Lucid at the Massachusetts College of Art and Design, presented as student works at MODE13 by Heather Shaw, adapted and expended in the curriculum of Motion Graphics course at the College of Architecture, Art and Design at the American Universtiy of Sharjah, UAE by Zlatan Filipovic

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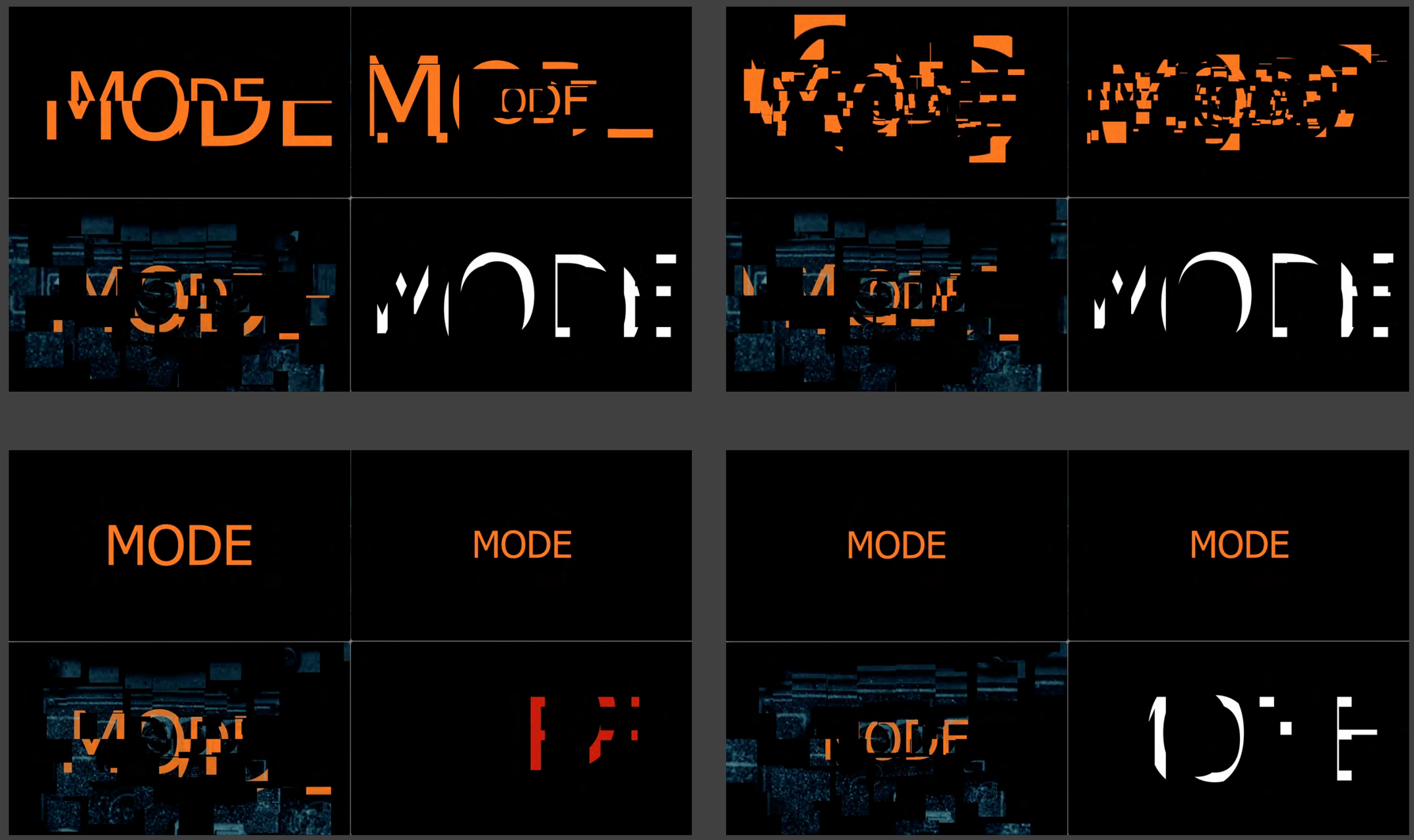
Author Biography

Zlatan Filipović (zlatanfilipovic.com) is Associate Professor of Art and Design at the American University of Sharjah, where he teaches multimedia design and animation. His areas of research and teaching interest include film, video and animation in linear and interactive environments as well as art/design pedagogy. Filipović holds an MFA in Electronic Integrated Arts from NYSCC at Alfred University and a BA in Painting from the Academy of Fine Arts in Sarajevo, Bosnia and Herzegovina. He has exhibited widely in solo and group exhibitions, namely Manifesta 4 in Frankfurt; Gallery Almine Rech in Paris; European Media Art Festival, Osnabruck; Siemens art Lab in Vienna; Art Museum of UNM, Albuquerque; National Gallery of Bosnia and Herzegovina, Sarajevo; Maraya Art Center, Sharjah UAE; Biennale of Contemporary Arts in Thessaloniki, Greece; Sharjah Art Museum, Sharjah, and presented at various international film festivals.



Media from the paper *ReDEsigning Motion: Motion Design and Science Fiction Film*
Source(s): Zlatan Filipovic and Leila Kucukalic

PAPER CATEGORY: PROJECTING

Animation Principles in UI

Brittany Layton

Abstract: More and more frequently, designers are acknowledging the importance and effectiveness of motion design in the context of user experience. Motion is no longer merely a way to delight the people using our products, but a functional tool that makes experiences easy and fun. Most of us have heard the time-old—and still true—saying that good design is about telling a story. This paper explores how User Interface designers can leverage motion to communicate more effectively, successfully communicate their product's intentions, and express brand personality throughout the user experience.

Keywords: User Interface Design, Animation Principles, User Experience

Introduction

More and more frequently, designers are acknowledging the importance and effectiveness of motion design in the context of user experience. Motion is no longer merely a way to delight the people using our products, but a functional tool that makes experiences easy and fun. Most of us have heard the time-old—and still true—saying that good design is about telling a story. In user interfaces, stories are the flows and emotions that people experience when using a product. Motion can help us tell these stories in less time and with more clarity. Motion within UI enables us to:

- Direct focus
- Establish hierarchy and spatial relationships between objects
- Build brand character

Animation in the context of user interfaces is still a very new field. There are little to no resources to teach best practices for page transitions or show common patterns for loading screens. What we can do is develop a usable motion library by studying traditional animation principles and learning how to apply them to abstract shapes and patterns like digital interfaces.

One of the most commonly referenced resource for animation techniques is Disney's 12 Principles of Animation, introduced by Frank Thomas and Ollie Johnston in the 1980's (Disney, Oh My). These principles are meant as a guide to creating the illusion of natural movement in character animation. Using these principles, we can more effectively communicate with our users.

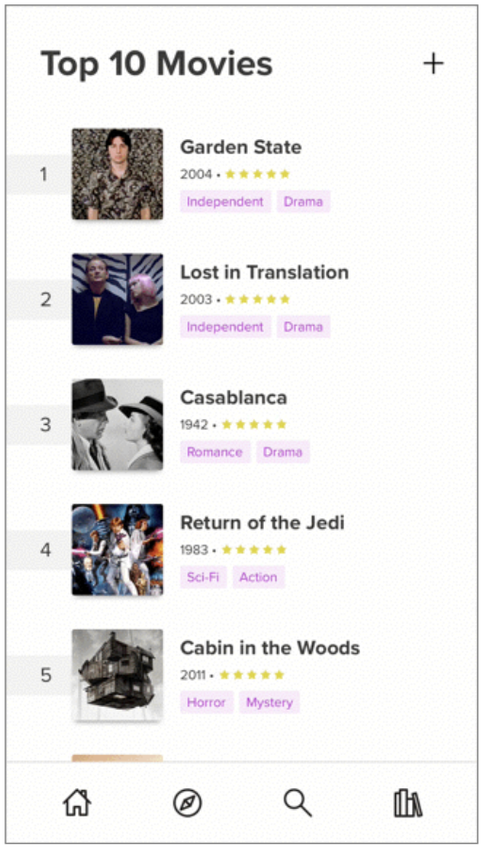
The following examples explore a few of these principles, and how they can be applied to UI design to create a better experience for our users. All visuals were created to inform this study and exemplify best practices.

Solid Drawing

This principle is more or less the basis of the material design language developed by Google ("Material Design"). Solid drawing refers to treating shapes as if they are solid objects, and are therefore subject to the natural laws of physics. Using the concept of solid drawing is crucial to developing spatial relationships between panels or information. All objects maintain a set weight and volume and are subject to forces like gravity, friction, and inertia, so any result of movement should reflect this. When objects abide by natural law, where they belong and where they are going is more intuitive to users, and just plain feels better (see fig. 1).

Arcs

The direction in which an object moves is telling of the type of object it is. Typically only mechanical objects move in perfectly straight lines, while objects with more organic qualities move in arcs. Whether you want your product to be received as technical, goofy, or graceful, altering the arced motion can make it feel true to the brand's character (see fig. 2).



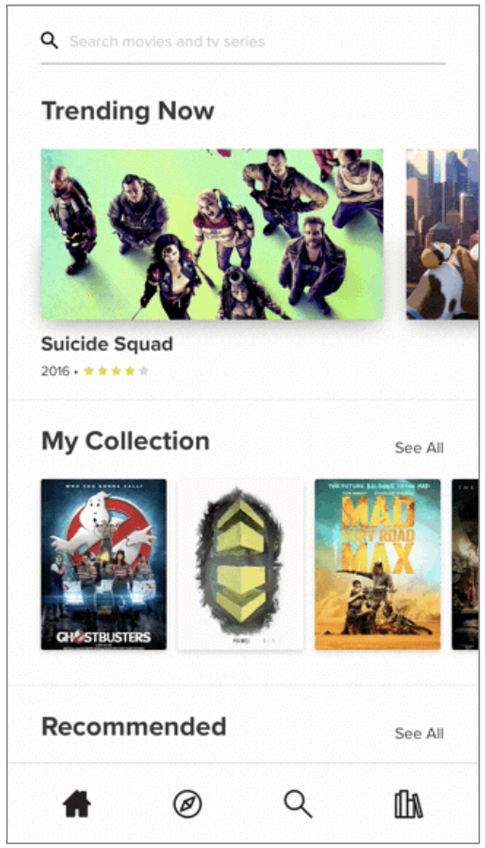
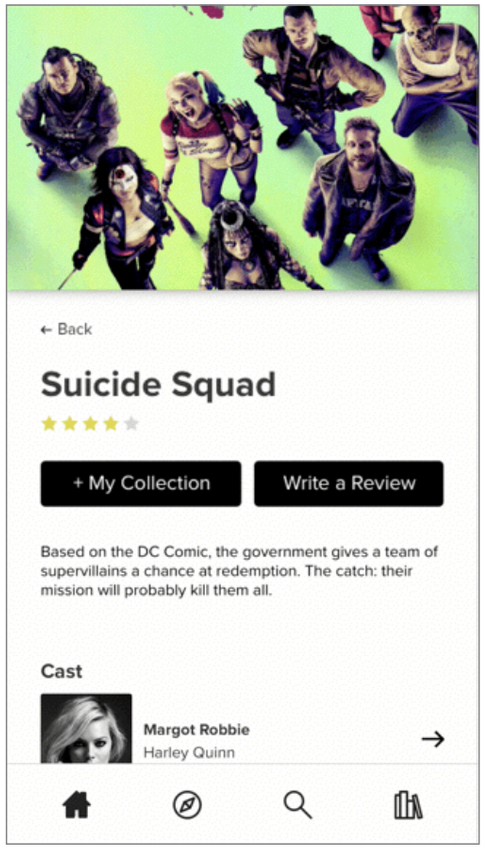


Fig.1 (left). As panels are interacted with, the shadows, layers, and speed change according to the laws of physics.

Fig. 2 (right). Straight lines of motion keep this app clean and professional, while addition of the soft easing make the movement feel more natural.

Staging

Staging is all about setting the scene for what's about to happen. In the case of interfaces, good motion design leads the eye to the important content. As they transition through screens, staging animations bring focus to what should be addressed next, or call attention to potential interactions that could be initiated. This establishes hierarchy and clarifies the action flow for the user (see fig. 3).



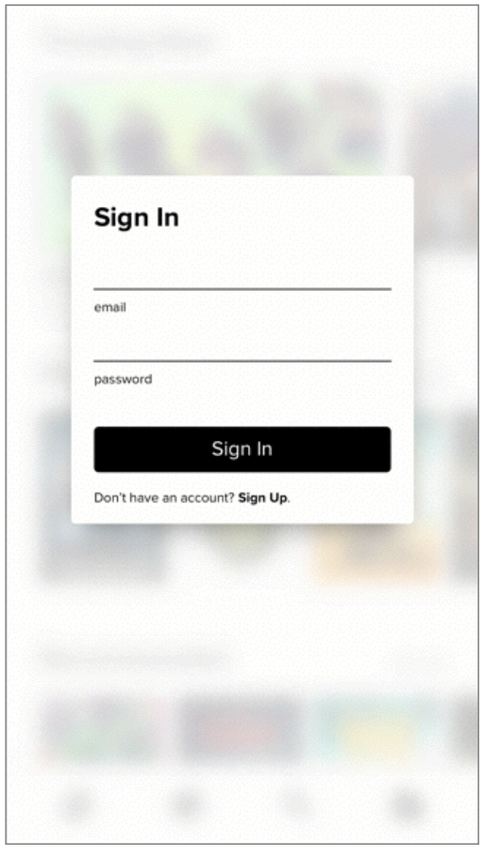


Fig. 3 (left). The submit button only appearing after the user has started typing the review sets the stage for what action they should take next.

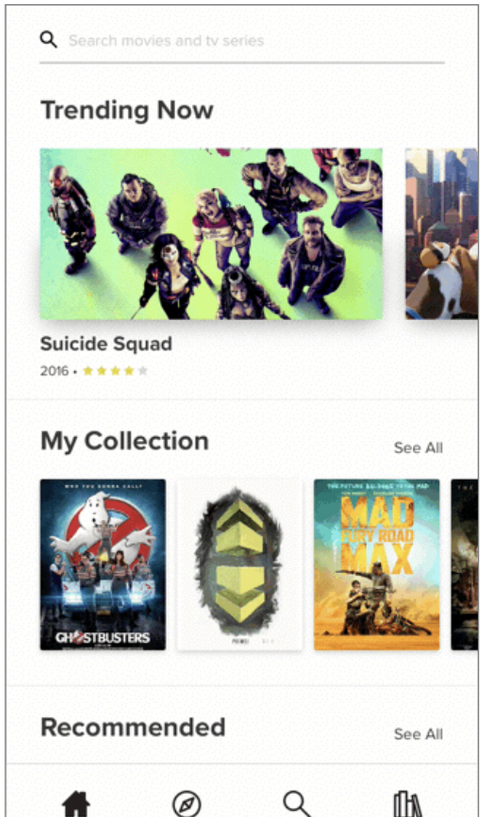
Fig. 4 (right). Exaggeration can emphasize both confirmation and error states.

Exaggeration

Exaggeration is exactly what it sounds like: making something more dramatic in order to call attention to something or to make a point. This can manifest in a shaking notification bell, or in response to an interaction error. Exaggeration directs focus and makes it clear that the user should pay attention (see fig. 4).

Secondary Animation

Secondary animation instills confidence in people that actions have been taken or completed. It reiterates the main action so the user can be sure of what's happening. It's a subtle and often subconscious affirmation (see fig. 5).



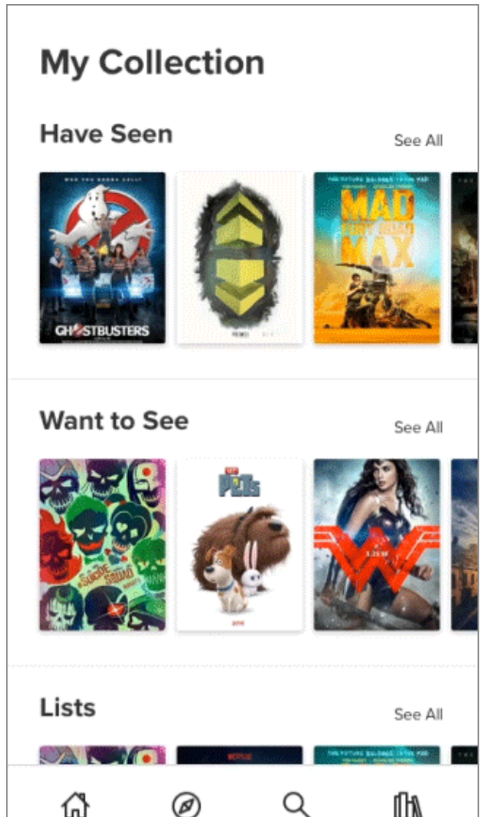


Fig. 5 (left). The primary movement of the My Collection category being selected and moved to the top is reinforces by the rest of the screen's upward movement.

Fig. 6 (right). Appeal makes a standard interaction more fun.

Appeal

Appeal is centered on what is known to many designers in the industry as delight. If your animation makes a user widen their eyes, turn up the corners of their lips, or give a light chuckle, you've made an appealing interaction. This gives interactions a more memorable experience and builds character for your brand. Appeal takes your product to the next level by adding deliberate brand consistency and personality—it not only solves a problem, but it surprises and has emotional pull, which is what keeps people coming back to use your product and not a different one that can help them achieve the same goals (see fig. 6).

Knowing these principles will only get you so far. Learning these principles will get you a solid foot in the door of UI animation, but sometimes even when you've followed all of the rules, your animation still seems off. One of the most important lessons to learn as a motion designer is the importance of developing taste—that muscle in your brain that tells you when something just feels right. Paying close attention to how things move in the real world can significantly improve your eye for motion. How does your best friend walk? What does it look like when the tide rolls in? How do the objects around you react to your own movement? Start to take in the movements of everyday life and it will translate into your digital work in a surprising way.

When used correctly, traditional animation principles can greatly impact the effectiveness and usefulness of your product design. When animating for products, always keep in mind the motion's functionality—every movement should be intentional and benefit the user experience in some way. Use the natural law of physics as a guide to how objects should move and interact with one another. Lastly, keep it fun! Purposeful design shouldn't have to be boring; design a delightful experience, and your users will keep coming back for more.

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Author Biography

Brittany is a UI/UX designer based out of Santa Cruz, California and is currently working at Octopus, a digital design studio that works with tech giants and startups alike. She graduated from Ohio State University's Visual Communication Design program in 2015 and has since had the pleasure of collaborating with the likes of Dropbox, HP, and more. Brittany has always been fascinated with stories, which has driven her interest in the role that motion has to play in communicating purpose and intent within product design.

PAPER CATEGORY: PROJECTING

The Animated GIF's Contributions to Design and Illustration Education

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Kent State University

Abstract: This paper will focus on the history, simplicity, and longevity of the animated GIF (Graphics Interchange Format). Utilizing the animated GIF within design and illustration education will be discussed and moving GIFs will be presented as an option in helping students understand rudimentary animation. Sample projects wherein design and illustration students incorporated short animated GIFs from two separate illustration courses, Graphic Narrative *and* Advertising Illustration, *at Kent State University will be presented.*

Keywords: GIF, illustration, design, education, animation, motion design, motion

In 1987 the U.S. software writer, Steve Wilhite, created the GIF, an acronym for Graphics Interchange Format, while employed at CompuServe (O'Leary). CompuServe was the first major online computer service provider in the United States, founded in Columbus, OH in 1969 (Compuserve). The GIF format supports animation by including multiple frames or images that can be played in sequence, or endlessly looped, in a web browser using a compressed file size and a limited color space (O'Leary). Today, thirty years after its creation, the animated GIF is still widely utilized and maintains its popularity, despite newer competitive formats with smaller file sizes. Animating GIFs can be both a simplistic and effective tool in introducing design or illustration students to motion design and simple animation.

Even before modern technology, humans recorded movement through sequential imagery. Ancient cave paintings, such as the Cave of Swimmers found in the Sahara Desert, make use of multiple repeated images, depicting and recording the motion of swimming (Avramidis). The Cave of Swimmers essentially houses an ancient storyboard, or animatic, of successive movements. Because of his interest in the evolving image, Whilhite, pioneer of this new motion technology for the internet in 1987, could easily be likened to these Neolithic painters or even later pioneers of motion graphics and the kinetic image, such as Marcel Duchamp and Man Ray-collaborators in the experimental 1926 film, Anémic Cinéma (Martin 53). Technology constantly changes the way in which we interact with or experience motion, but the innate human interest in motion-be it derived from nature or technology, remains unwavering.

Currently, animated GIFs are almost anywhere technology exists. As previously mentioned, GIFs are typically small in both file and visual size, making them sharable and instantly accessible across a myriad of platforms, specifically the internet. They are relatively easy to understand, create, and animate. In animated form, they commonly accompany online editorial pieces for magazines and newspapers. Animated GIFs appear in advertising and marketing campaigns, and in promoting products, films, and performances. Designers and Illustrators are regularly using animated GIFs to promote both themselves and their work on blogs, websites, and through social media.

Overall the GIF's quality and file size is worse than the MP4 video format, and other ways to make short animations exist. The GIF is merely one option, or a preference, for working in motion. With that said, short and small sized GIFs can be a quick way to animate when students are working in Adobe Illustrator or Photoshop. Assignments incorporating GIFs, help in introducing motion to design or illustration students who have not yet taken motion or animation courses. With students who have already taken motion design classes, creating animated GIFs based on illustration allows students to comprehend rudimentary or beginning animation easily.

With design and illustration rapidly leaning towards kinetic imagery, I incorporated animating GIFs into two different illustration courses at Kent State University this past year. The first course in

which I used a GIF-based project, was called Graphic Narrative-a course that fuses written and illustrated content. The class examines different genres of illustrated storytelling: comics, the graphic novel, and children's books. Different genres of writing are explored: The short story, poetry, play-writing etc. For a one-week exercise, I asked the students to write poems and create an animated GIF based off the content of their poem. Students submitted a variety of poems; limericks: prose poems, sonnets, among other genres.

Fig. 1: Vector-based still frame of animated GIF for Graphic Narrative, Kent State University, Samels, 2016.

As the approach to the types of poems students chose varied, so too did their illustrated styles. There was a blend of traditional and non-traditional artwork: charcoal, vector-graphics, collage, among others. Many of the students had already taken motion design at Kent State, so the exercise was very fluid as there was an existing working knowledge of motion to build on.

Fig. 2: Still frame of animated GIF based off poem for Graphic Narrative, Kent State University, Mahone, 2016.

In another class, Advertising Illustration, I had students create illustrated mailers (6" by 8") promoting a concert series. I also asked that the advertisement link to a web banner and that students incorporate layers of the original illustration to animate as a GIF. The idea was for students to understand, apply, and reformat the same artwork, for multiple contexts, within a single advertising campaign.

Fig. 3: Concert series illustration used for animated web banner, Advertising Illustration, Kent State University. Blanchard, 2017.

After both of the animated GIF projects, I asked the class of seventeen undergraduates and one graduate student for their feedback on animating GIFs in relation to motion design and animation. Most of the students said they had already taken a motion design course at Kent State University and all but one student said that they could see themselves incorporating motion or animation into a job within five years. Nearly all of students felt that using GIFs alongside illustration helped in better understanding of animation. Some students indicated that they found using GIFs confusing. A few students mentioned that they would rather not use GIFs, but would prefer using programs such as After Effects.

The animated GIF is a tool, that while simple, still has relevant applications within design, illustration, and animation. There will always be new and evolving areas of motion to be explored, however the animated GIF persists as an accessible, foundational, and classic starting point.

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Author Biography

Christopher Darling received an MFA in Illustration as Visual Essay and a Paula Rhodes Award for Exceptional Achievement in Visual Essay from the School of Visual Arts in New York City. He served as a contributing writer for the Visual Arts Journal and co-founded Carrier Pigeon Magazine in New York City. Some of his freelance illustration clients include, The New York Museum of Natural History, Sony Music Entertainment, Frieze Magazine, and the United Nations Refugee Agency. His work has been exhibited both nationally and internationally and has been recognized by American Illustration, The Society of Illustrators, 3x3, Creative Quarterly, Communication Arts, and the Association of Illustrators. Darling lives in Cleveland, Ohio and is currently Assistant Professor of Visual Communication Design at Kent State University. In 2016 he was awarded the Studio Prize by Architect Magazine for his collaboration with Kent State University's graduate College of Architecture and Environmental Design for his contributions to the Graphic Novel/Novel Architecture studio course which examined the intersections of comics and architecture.

PAPER CATEGORY: THEORIZING

The Effects of Motion Graphics and Strategic Graphics Placement in Health-related Digital News Packages

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University of North Carolina at Chapel Hill

Abstract: Results from numerous media effects studies in the area of health communication message design support the effectiveness of visuals to improve communication with audiences, increasing message attention, comprehension, and recall (Houts, Doak, Doak, & Loscalzo, 2006). However, support for the presence, versus the absence, of visuals in health messages does not tell message designers which type of visual to use or how to strategically place visuals to make messages most effective. Therefore, our study aims to answer two questions: 1) Is there a significant difference in message reactions and outcomes when using static versus motion graphics? 2) Does the strategic placement of either type of graphic, and thus its visual frame, make a difference in message comprehension and other outcomes? To answer these questions, we will conduct an experimental study testing messages using static or motion graphics and also testing the best placement of these visuals throughout the message. For example, are graphics more effective at the climax of the message or at the resolution? Testing visual placement will involve assessing visual frames that appropriately and visually explain a particular portion of the message. In our experiment, we will measure how viewers respond to message by assessing their message comprehension, recall, likability, perceptions, health-related intentions, cognitive elaboration, among other reactions. We expect to find that messages using motion graphics will produce significantly greater, or more positive, outcomes than those incorporating static graphics. We also expect to find that visuals placed at the peak portion of the message will produce greater outcomes. Lastly, we expect to find that the most effective messages will be those that use motion graphics at the peak portion of the message. Results will be directly applicable to designers of health-related messages by informing them of how to strategically design and implement motion graphics visually framed to explain specific parts of a health message. The applicability of our findings to contexts other than heath communication is likely, but further testing would be necessary. Results will demonstrate that, regardless of message context, visual framing of motion graphics and their placement is a process that should be selective and purposeful in the field of media.

Introduction

Everyday people are exposed to media about various health-related experiences ranging from public service announcements to advertisements. For example, commercials about health products and activities are routinely broadcast during blocks of television programming. Diet commercials discuss how one can attain a better quality of life after participating in some type of diet and exercise regimen whereas pharmaceutical commercials advertise new medicines and how they can serve as a panacea for a specific illness or ailment. Usually, public service announcements for preventative care bear warnings and directives regarding medical advising, screenings, and vaccinations. In most cases media or messages about health-related experiences attempt to convey information using narratives.

Outside of television, investigative journalists use digital news packages to present in-depth reporting about how health behaviors affect individuals or groups of people. Digital news packages are standalone interactive feature stories that are contained within webpages, and they "tend to consist of multiple pieces of media in order to express multifaceted stories through an organized layout, such as video paired with text, or interactive graphics" (Hernandez and Rue 24). Health coverage provided by digital news packages can be comprehensive because it may include multiple perspectives from the different parties engaged in a health-related experience. These individuals include patients, medical care personnel, other stakeholders, and policy makers who all have their knowledge and opinions

documented and woven into a robust and coherent story. Media assets such as photographic slideshows, standalone audio and video, and interactive data visualizations help supplement the written discourse of a digital news package by furnishing detailed descriptions of the concepts and events presented by the text (Jacobson 532). Photographs are beneficial for displaying strong emotions and capturing moments in time whereas video is good for contextualizing a story. Interactive data visualizations allow people to explore the empirical trends and relationships surrounding a topic. Other media assets like static graphics are good for diagramming processes. A digital news package's narrative is produced when written discourse about an issue or subject matter is combined with relevant media assets.

Digital news packages that contain narratives about health-related experiences are difficult to design due to certain challenges. Primarily, this type of digital news package serves the purpose of succinctly conveying a health narrative and has the goals of engaging viewers and informing their awareness of an issue (Hinyard and Kreuter 788). The media assets incorporated into these digital news packages should help the narrative persuade people to alter their health behaviors, and Houts et al. (187) suggested that static graphics can improve people's understanding of and adherence to health information. That is, the use of visuals should enable people to more easily comprehend health-related information and the visuals should guide people to make a determination to act based upon that information. However, there has been little research about the impact made by animated graphics on the narratives of health-related digital news packages. This paper seeks to fill that gap in knowledge by presenting a study that evaluates whether animated graphics enable health narratives to be effectively communicated. Cancer serves as the health-related experience that is being examined in the study because of its prevalence in the US and its effect on patients and caregivers. Lung cancer and melanoma are the specific cancers that are addressed. We propose that health-related digital news packages and their narratives can be systematically structured, and that animated graphics can be strategically positioned and utilized within a digital news package in order to maximize the impact of the narrative in terms of people's willingness to act on its information. Graphic medicine, animation, and narrative structure are discussed as approaches to this endeavor.

Literature Review

Graphic Medicine and Animation

Graphic medicine is a relatively new discipline that uses visual storytelling to explain different aspects of a health-related experience in order to help people to understand and rationalize the experience from the perspectives of a patient, the patient's family members, and healthcare providers (Green and Myers 575). This field is charged with presenting health-related experiences in ways that help people understand how an illness functions, how it can be dealt with (e.g., treatment and coping strategies), and what outcomes are associated with the experience. Graphic medicine has multiple benefits: 1) it enables healthcare professionals to effectively engage in diagnostic reasoning where they derive insights about a patient's condition, 2) it informs patients' expectancies about their condition(s), and 3) it advances public health agendas by increasing people's awareness about health concerns. Static serial graphics (or comics) are graphic medicine's principle means of visual storytelling because, as Czerwiec et al. (1) remark, graphic medicine is "the intersection of the medium of comics and the discourse of healthcare". In the context of graphic medicine, comics are able to resonate with people because they "capture the emotional intensity of medical narratives and…critically comment on the delivery and impact of health care" (Green and Czerwiec 2580). Willis et al. (2) experimented with different illustration styles and developed a motion comic for HIV/AIDS prevention. While they determined that people found motion comics as an acceptable way to present health narratives, motion comics are capable of offering limited animation so it was not possible to determine how motion truly influences the efficacy of a health narrative.

Animation allows a person to observe motion as well as how objects change over time and space, which is something rarely done with comics (Lowe and Schnotz 515; Martinez 42). Not only can motion be applied to an object, it can be applied to the camera that provides the viewpoint for the animation which subsequently permits a person to view objects from different angles and distances. For example, an animated graphic is capable of depicting the progression of a disease and how organ tissue is damaged by the illness whereas a comic would leave a great deal of that information to the interpretation of the viewer. The utility and value of an animated graphic

should coincide with its position in a health narrative meaning that the animated graphic may elicit a stronger response from a viewer if it is shown later in a health narrative and if it depicts more of an illness' prognosis. The next section discusses how narrative structure can be imposed on a health-related digital news package.

Narrative Structure

The theory of visual narrative grammar can be used as a basis for structuring the presentation of stories in digital news packages because it facilitates the standardization of stories (Cohn 421). According to the theory, all narratives consist of an establisher (E), an initial (I), a peak (P), and a release (R). An establisher contextualizes a story, introduces a setting, and provides any referential information necessary for advancing the narrative. An initial conveys the commencement of the story's causal action, and a peak displays the climax and objective of the events began in the initial. A release shows the aftermath and implications of all of the preceding parts of the narrative. Together these narrative segments form the EIPR narrative structure which has been shown to intuitively produce coherent stories (Cohn et al. 19). For a health-related digital news package the establisher segment could introduce causes or antecedent events leading to the occurrence of an illness, the initial segment could define the disease and display how it begins, the peak segment could show the disease's progression and the manifestation of symptoms, and the release segment could present the intermediate and long-term prognosis of the illness. EIPR narrative structure also offers a way of partitioning a digital news package's infrastructure for the strategic placement of static and animated graphics in a health-related digital news package because those items could accompany a specific narrative segment and reinforce its subject matter.

Research Questions

The following research questions advance our inquiry into this paper's topic:

RQ1: Which narrative segment (E, I, P, or R) and which type of graphic (static or animated) most effectively communicate health-related experiences in digital news packages?

RQ2: How well can partitioning the structure of a digital news package enhance one's understanding of a health-related experience?

RQ3: How do the visuals that are included in this study help the participants make sense of cancer-related experiences?

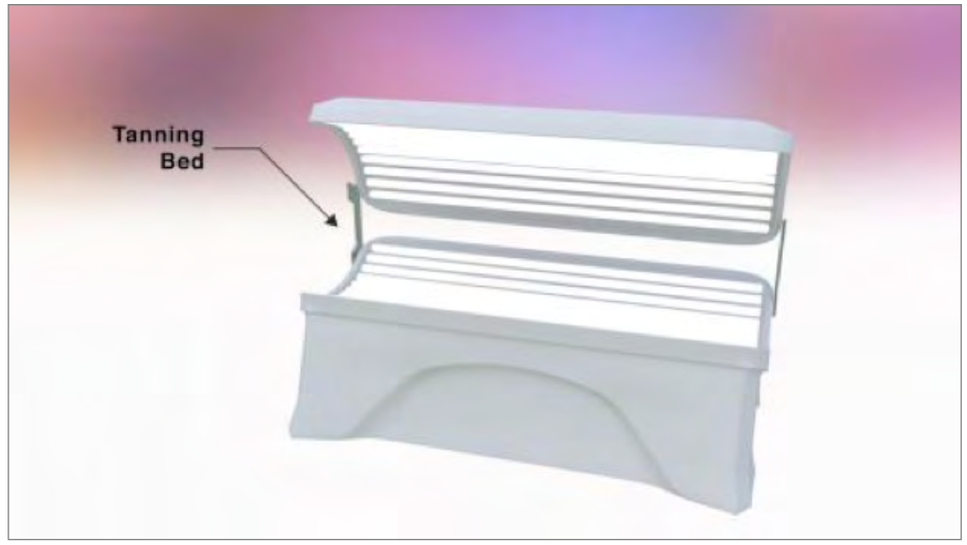
Methods

Participants consisted of 190 undergraduate students from a large Southeastern university. Participants ranged in age from 18 to 30 and the majority (81.5%) were Whites, followed by African Americans (7.7%), Asians (5.7%), mixed race (3.6%) and Hispanics (1.5%).

Messages

Each message, one about lung cancer and one about melanoma, was four paragraphs long, including an establisher, initial, peak, and release paragraph; each paragraph was approximately four statements long. Some messages contained a static graphic, while others contained an animated graphic, and message conditions varied by narrative placement of either graphic (in the establisher, initial, or peak paragraph). Graphics were not introduced in the release paragraph because we felt it was unnecessary to depict the fatal outcomes of each cancer, and this narrative segment only plays a peripheral role in communication (Cohn 1340).

Six animated graphics (1280 px x 720 px), lasting seven seconds each, were created using Autodesk Maya and composited in Adobe After Effects. Graphics depicted the key concept of the narrative segment in which it was placed. For example, an animated graphic placed in the peak narrative segment for the lung cancer message depicted the spread of cancer from the lungs to other areas of the body (Click here for animated graphic at initial narrative segment for melanoma; Click here for animated graphic at peak narrative segment for lung cancer.) To maintain consistency between graphics and eliminate possible experimental confounds, six static graphics (1280 px x 720 px) were created using still frames from the animated graphics that best depicted the key concept of the corresponding narrative segment (See Figure 1 and links above).



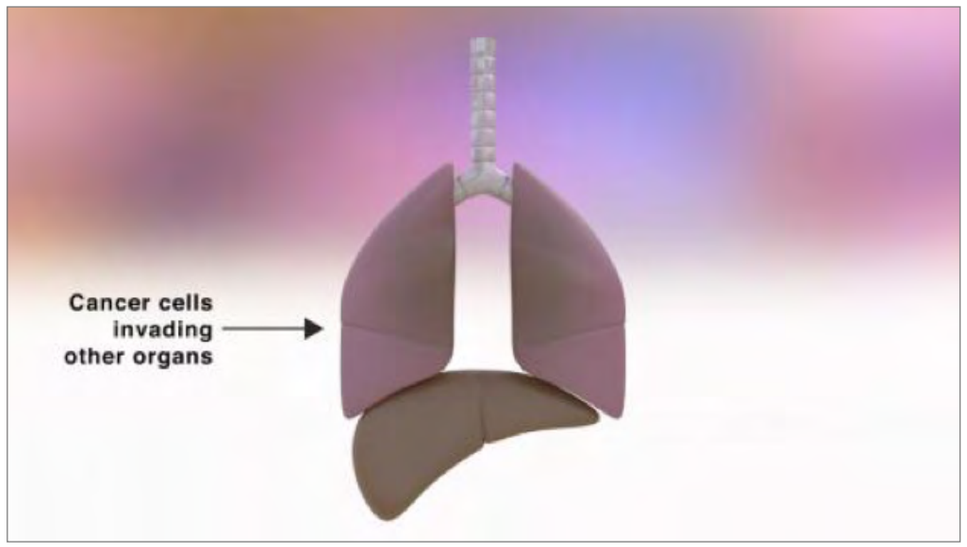


Figure 1. Static graphic samples: Static graphic at establisher narrative segment for melanoma, Static graphic at peak narrative segment for lung cancer.

Procedures

An experiment was used to test to effects of static and animated graphics placed in various narrative segments. Study sessions were 30 minutes, with 20 participants per session. Participants were provided desktop computers with access to an online survey containing one message and follow-up questions about message believability, attitudes, and behavioral intentions, as message reactions pertaining to these measures are indicative of effective communication. Participants viewed a message with either a static or animated graphic placed at either the establisher, peak, or initial narrative segment, and messages were programed into the experimental survey so that they were evenly and randomly dispersed among participants.

Participants answered two questions, using a 5-point scale, to indicate the level of message believability and truthfulness, from 1=Not at all believable/truthful to 5=Extremely believable/truthful (Noar et al. 3). These ratings were averaged together with higher scores indicating greater believability. Participants' attitudes about the message they viewed were measured using the following scales and prompts: The *message was* (-3) *unpleasant/pleasant* (3), (-3) *bad/good* (3); I (-3) *did not enjoy/enjoyed* (3) *the message;* I (-3) *disliked/liked* (3) *the message* (Lazard et al. 5). Responses were averaged; higher ratings indicating positive attitudes toward the message. Using a 7-point scale, from 1=Strongly disagree to 7=Strongly agree, participants responded to the following statements to indicate their behavioral intentions as they relate to cancer prevention: 1) *I intend to do what I can to reduce exposure to smoke [or UV rays] and reduce my chance of developing lung cancer [or melanoma], 2) I plan to talk about ways to reduce lung cancer [or melanoma] risks with those who might not know; and 3) I want to tell those at risk (i.e. smokers [or tanners]) about how lung cancer [or melanoma] works* (Noar et al. 3). Ratings were averaged; higher scores indicate stronger intentions.

Results

We found that message believability depended on when a graphic was introduced and which message it appeared in (lung cancer or melanoma). For the message about melanoma, when a static graphic was placed in the establisher or peak narrative segment, or when an animated graphic was placed at the peak narrative segment, messages were significantly more believable than the other message combinations ($p<.05$). Regardless of cancer type (lung cancer or melanoma), messages with animated graphics were rated as more believable than messages with static graphics. In addition, when either type of graphic (static or animated) appeared in the peak narrative segments, messages were more believable than when they appeared in the establisher or initial narrative segments.

Participants who viewed a melanoma message indicated having significantly greater positive attitudes ($p<.01$) than those who viewed a lung cancer message. Messages with either type of graphic (static or animated) elicited similar ratings of attitude toward the message, which were low; however, this is not surprising due to the somber nature of these messages. Differences in attitude also depended on when a graphic appeared. Messages with graphics placed at the establisher narrative segment elicited lower positive attitudes than messages with graphics that appeared at the initial or peak narrative segments. Low positive attitudes, not surprisingly, toward messages focused on risky cancer-related behaviors and fatal outcomes, can result in positive health behavior change if they elicit negative emotions (Sims et al. 5).

Lastly, participants' behavioral intentions depended on which graphics were used and where they appeared in the message. Messages with a graphic that appeared at the peak narrative segment resulted in greater cancer prevention behavioral intentions among participants. In addition, messages with animated graphics, versus those with static graphics, elicited greater intentions.

Discussion

Based on the results concerning message believability, attitudes toward the message, and behavioral intentions, overall, messages that incorporated an animated graphic and messages that incorporated graphics at the peak narrative segment showed greatest potential for effective communication of health-related experiences. This was especially the case for messages that influenced behavioral intentions, which is the strongest predictor of behavior. The practical implication of these findings is that designers of digital news packages who wish to inform audiences about health-related issues in a way that influences positive health behavior should use animated graphics more often than static graphics and that placement of graphics illustrating key components of the peak narrative segment is recommended over the introduction of graphics in other narrative segments.

Partitioning out the structure of a health-related narrative can enhance one's understanding of a health-related experience because it breaks down the information into more manageable segments, which can allow viewers to cognitively process key components of health processes without having to make assumptions about how they originate, develop, and ultimately affect one's overall health.

Because the visuals in this study illustrated the key components of the cancer processes, participants were informed of the causes of each type of cancer, how the cancer develops and spreads beyond the initial cancer site, and how a negative outcome of each cancer can be fatal. The visual used in each message condition made these aspects of these types of health-related experiences salient to participants so that they were able to see how their behavioral choices can go beyond simply smoking a cigarette or utilizing a tanning bed and lead to harmful outcomes that can affect their entire body and life. The visuals also depicted these cancer processes in a way that tangibly showed participants health-related processes that are not visually accessible and, therefore, impossible to witness otherwise.

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Jennah Sontag received her MA in Journalism, with an emphasis in photojournalism, at the Missouri School of Journalism. Currently, she is pursuing a PhD at the University of North Carolina at Chapel Hill and conducting research that combines visual communication and health communication theory.

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PAPER CATEGORY: TEACHING

Deep—And Disruptive—Investigations in Familiar Media Experiences

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Abstract: In the current environment of digital media, motion and interactivity play key roles in establishing hierarchy and guiding audiences through dense and complex content. As an Interaction Design Professor, I am interested in teaching students how to create immersive, responsive, and time-based experiences which evolve from user conditions. This requires an alternative process for creation than traditional 2-dimensional design practice. Interaction designers can not craft a singular and repetitive animation from start to finish. Rather they must develop frameworks or structures which generate a multitude of results based on user input, context, and medium. In the context of design education—particularly undergraduate education, where students are always looking to make work that will get them a job and fear undertakings when the outcome is not known—teaching students to accept this process and embrace the potential of giving away aesthetic control can be a tricky task. Yet if done correctly, the generative and experiential potential of process-based design practice can be limitless.

In most design programs we follow a 'design first, code later' trajectory where students are introduced to the practice of design through the Adobe Creative Suite only later to be thrown into a 'code-based' model with introductions to HTML, CSS, and Javascript. This disruptive and late introduction to rule-based procedures for creation hinders the transition from static to dynamic media. Many students in my courses view the coding process as a disruptive middle step in the attempt to translate their static work into a dynamic medium opposed to an opportunity for unexpected results. This subconscious mindset results in stale, flat, un-engaging experiences in the browser—students simply design posters they paste in the browser.

As design educators, how might we encourage students to dive deep and experiment with rule/code-based procedures which develop fluid, interactive, and unexpected multi-sensory experiences with digital media over the more concrete and controlled methodology of authorship-based design practices? How can we eliminate the fear of the unknown and encourage procedural-based experimentation with digital and interactive media?

This paper and presentation will expand on the above mentioned dilemmas and present a series of project and curricular tactics I have been exploring to teach alternative interactive browser experiences to students. Opposed to the rapid skill-acquisition model of traditional tutorial-based technology courses, these tactics create spaces for exploration in digital media by reducing the burden and anxiety of mastering code and encouraging a cut-paste and/or hacking-style approach to developing projects. This model also explores project dynamics which are free of the traditional 'client-based/problem solving' model and proposes action/effect-based projects. The paper will outline a series of classroom tactics, curricular adjustments, and project examples currently being implemented in courses and workshops at Washington University in St. Louis.

Introduction

Graphic Design—particularly Interactive Design—has always had a deep-seated identity crisis. From its birth the role, title, output, and ownership for designers has been in constant flux—largely due to its relationship with technology. As technology evolves so too must designs relationship to it. Yet the current academic structure of design first, code later leaves many graduating students—as well as seasoned practicing designers—in a constant state of inadequacy and inferiority.

Over four years of coursework, students are hit with a myriad of skills, pedagogies, and precedence of which they are expected to shape their own creative voice. With so many foundations to establish it is often all faculty can do to squeeze in the traditional foundations of 2dimensional design before students don their caps and gowns. Students must learn about scale, hierarchy, color,

word/image relationships, pacing, image manipulation, etc. This list doesn't even account for the skills they are expected to obtain including learning at a minimum Photoshop, Illustrator, and InDesign along with printing techniques, book binding procedures, etc.

This leaves very little room for technology-based investigations which increasingly define the role of designers in a contemporary landscape. Learning to design dynamic systems opposed to static outputs and creating frameworks which adapt to their environment and audience define these new spaces. Yet at many institutions, courses which introduce web design, motion design, programing, etc. are relegated to optional electives in the later years of students education and not established as foundational practices. Even when courses are required—at Washington University in St. Louis we require all design students take an Interactive Foundations course which introduces HTML and CSS—they are rapid fire and tutorial based. This offers little opportunity for students to digest or reflect on what it is they are actually doing as they attempt to grapple with all the new procedures and languages that are put in front of them. The mentality is to simply complete the task and move on to the next exercise.

Thanks to Moore's Law (Berman and Dorrier), which essentially quantifies the state of technological advancement to double on a yearly basis, the technological resources and spaces of today's first year art/design school student will inevitably be drastically different by their graduation. As design educators, it is our role to prepare students to leave school ready to participate, criticize, and advance the field. We must also encourage them to feel empowered and productive in what they make. Yet if we are constantly playing catchup or treating technology-based and responsive systems as an afterthought, how do we encourage students to see beyond the task at hand and the technological expectations of today? Is this current model of rapid skill acquisition truly appropriate for today's students?

Over the course of this paper I will outline my own observations and speculations on the evolution of design for dynamic mediums and how these conclusions have translated into my classrooms and syllabi.

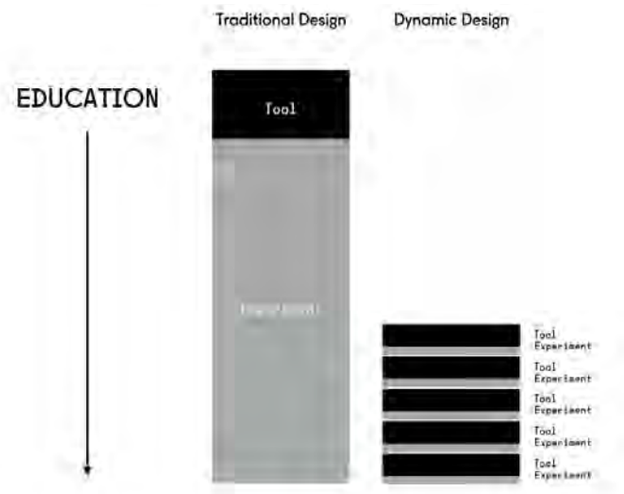

Fig. 1. Diagram of pedagogy model for Traditional vs. Dynamic Design practices over the course of an undergraduate education.

Marginalization

As stated above, with so many topics and skills to obtain over an undergraduate education, the basics of 2dimensional design often preface the curriculum. In its most basic form, the classic curriculum revolves around introducing the Adobe Creative Suite and procedures in the foundational years which students then experiment with over the later years through increasingly self-generated projects and leading to a final capstone project of a student's invention. This model provides foundational understanding and technical development in the early years of the curriculum subsequently creating spaces to experiment in the latter. Yet this model is still based around designing for fixed mediums like posters and books. In this sense, students are ingrained with the task of designing a final object.

Once students learn how to "design" they are then introduced to algorithmic or procedural operations of code and markup. Yet when faculty wait to introduce procedural or code-based design practices until later in their education we must essentially reset a student's education. Students are hit abruptly with a new method of making, which can set them back just as they were beginning to master their skills in static and 2D representation.

This abbreviated timeline also has a detrimental effect on the ability for students to digest and reflect on what they are actually doing. For one, the timeline for learning is rapidly increased and corresponds to a very quick drop out rate. Rather than having several courses over multiple years to learn the foundations it is often funneled into a single crash course—at Washington University in St. Louis we call this 'Interaction Foundations.' If students do not quickly latch onto this new pedagogy of procedural design practices and writing code they are quickly left behind and since many of the more advanced code-based courses rely on an additive practice of knowledge students often feel if they are not good at coding they can not work in digital mediums.

Secondly, it creates very little space for experimentation and encourages more of a tutorial-based classroom. Courses tend to be skill-based, encouraging students to learn more and more advanced languages and processes but spending little time to reflect on what those processes are and do. In this model, students struggle through learning step by step. They attack a problem, solve it, and move on to the next problem with little time for reflection of what they actually did. Readings are about tutorials not theory. Discussions are about following best practices not criticizing or challenging them. The titles of these advanced electives help set the table for this divergence. At Washington University in St. Louis we pride ourselves in our major elective curriculum for upper level students. In traditional mediums we offer classes like "Voice," "Visual Journalism," and "Book as Lens." Yet our most advanced interactive offering is "Interaction Design: Layout Systems." In title alone we can easily recognize that the lens of education in these interaction courses drift towards the technical and not the expressive.

Not Design First, Code Later but Design and Code Together

I believe this is a flawed model. Teaching technical skills is important but we are training designers and not developers. Designers must learn the foundations but also challenge and criticize their execution. The appropriate curricular model would introduce these procedures right alongside color, scale, hierarchy, typography, etc. It would also introduce programing in the same space as the Adobe Creative Suite as these foundational tools are just as important and do not rely on traditional training to be undertaken.

So what does this mean for the practice and how we teach students to participate? What should students be making in the classroom and what skills do they need? How might we teach students in a way that encourages exploration, breaking of rules, and creating products that they can own—products with experiential agency?

Experimentation > Skill Acquisition

Over the past two years at Washington University I have undertaken several curricular adjustments to address these concerns. It is based on a two part model: First, we will not treat interactive medium as an optional detour from traditional practice but to teach its foundational logic as essential skills for any design practice. Secondly, alongside technical courses we will have spaces where students can experiment with foundational digital interactions. Here, we will encourage deep dives into creative practice similarly to how traditional design studios focus. This has lead to reevaluating our core foundation courses by instigating procedural design projects into courses like Typography 1 and Word and Image as well as evolving our major elective offerings away skill based courses and towards a focus of experimentation. It is my hope that by reevaluating where and how we structure our curriculum we may create a more responsive and enlightened student body who learn to develop open systems with adaptive content.

Tactic One: All Design is Interaction Design

Interaction design is developing processes for generating adaptive experiences but this does not mean only digital experiences. Designers are increasingly discussing physical media in the same interactive dialogs as digital. As teacher we must continue to encourage that type of thinking in students. Andrew Blauvelt describes this shift in his essay *Towards Relational Design,* "the nature of design itself has broadened from giving form to discrete objects to the creation of systems and more open-ended frameworks for engagement: designs for making designs" (Blauvelt par. 10).

One of the main goals of an adjusted curriculum was to begin to introduce procedural practices earlier in the curriculum. As these practices do not require digital screens, only a reevaluation of the role of the designer as a curator of experiences and not a dictator of a single message. In this case, rather than designing the final outcome they are encouraged to design the framework for that outcome. One such example is a project called 'Rules and Results' which is now taught to in our Word and Image II course at Washington University in St. Louis. This course generally revolves around explorations in type and image relationships in multiple mediums. Students design books and posters in which they gather their own images, do their own research, and explore new ways to visually represent their content. For Rules and Results we hoped to introduce the foundations of procedural design strategies devoid of the technical requirement that writing code presents. In this case, rather than designing the final poster, students were required to design a set of rules (in English) for making a poster. They subsequently give these rules to a classmate who in turn executes the rules to create the poster. This process is the foundation of designing for interactive media and by exploring it in a more traditional course students explore the potential of designing frameworks that allow for variable and customized outputs. Rather than designing a singular poster, students learn to design rules for an infinite amount of outputs and ones that can adapt based on location, preference, time, scale, etc.

What is most exciting about this project is seeing the translation from designing outcomes to designing frameworks 'click' in the student's head. When they are trying to learn this alongside learning code it can be difficult to see the bigger picture of how code can be a great asset opposed to an obstacle. In the old model of design first then code later, students lean towards thinking that designing for dynamic mediums is simply about translating their print work onto a digital surface, posters on the Internet. Yet the true value in framework-based design practices is opening up opportunities and designing for unexpected inputs.

At the beginning of this project, students were writing long and elaborately descriptive rules to be followed. They wanted to make sure that their partners poster looked exactly as they intended. Yet as the project went on we discussed how what they are doing now is not designing a single poster, but an infinite number of them, each potentially being slightly different. In order to do this, they began experimenting with variables. Many focused on characteristics of their 'machines' a.k.a. their partners, who would be executing their poster production. If you are a boy do this. A girl, do that. If you have long hair follow this list of instructions. If you have short hair follow an alternative list. They would also ask their 'machines' to perform tasks outside of just moving things around in InDesign. Some asked their partners to go out and take photographs or hand letter in paint. In this case, the designer has no control over what the actual photograph or writing looks like, only that they know what the content was intended to be. There is no stopping the 'machine' from selecting a different subject for the image. In this case, would the poster still work or do the rules need to be redefined to assure appropriate content?

Fig. 2. Alchek, Olivia. Rules and Results. 2016. Poster Series. Private Collection.

These questions, not the outcomes, are what truly makes these projects great. Learning to navigate, plan for, and manipulate the unexpected adds rich opportunities for both the makers and those experiencing the works. We also discussed how the interactive nature of being a 'machine' changed the way viewers interpreted the final results. Again, by divorcing the process from a new medium and a new language, students are able to dive deep into a procedural operation that they will subsequently undertake later when learning to code. It is the hope that this experience will help them reflect when new mediums are introduced.

Fig. 3. Pavlova, Irina. Rules and Results. 2016. Poster Series. Private Collection.

Fig. 4. Erlich, Katie. Rules and Results. 2016. Poster Series. Private Collection.

Tactic Two: Middleman Products

Rather than being purely formal (artist) or purely product (developer) based, these follow the model of tools which add functionality to larger, more robust, and existing platforms and daily experiences. Examples of this are tools like Browser Extensions, Bookmarklets, and Twitter Bots (thought these are certainly not the extent of their potential). These products are small and compact elements which sit on the shoulders of the technology systems we engage with everyday as both users and designers. They affect, change, and distort experiences rather than making new ones from scratch. This process

reflects what Ralph Ammer refers to as “Natural Design” (par. 9). In this model, we “make ourselves smarter rather than the things around us” (par. 13). These tools inject themselves into our daily existence of technology and create opportunities for advanced customization but also create moments of meta-reflection. They can encourage their users to pause momentarily and reflect on their patterns, their activities, what they are doing and where they are spending their time. Again, this goal is for these products to both serve a specific purpose but also reflect on a larger dialogue at hand. While in this case I am not echoing the biological-based aspect of Ammer’s concept, I am in support of the dialogue that designer’s output should support and enhance existing life, not propose new forms of life.

Fig. 5. Western, Audrey. Rules and Results. 2016. Poster Series. Private Collection.

In the classroom, the constraints of these output paradigms allow students to focus on refining experiences and not building full systems. Rather than the concern of building an entire website from scratch, these tools are simple—usually only a few lines of code. They then spend their time tweaking and evaluating a simple operation and how it affects an overall experience, not building the entirety of the platform. This provides not only ample time for formal experimentation but also time to reflect on the realities and the idiosyncrasies of digital experiences and explore numerous actions and results.

Tactic Three: Experimentation with Simple Tools

This leads to the third tactic which is about adjusting the classroom to be a space for experimenting with simple foundational interactions versus learning newer ones. I have been advancing this agenda through a current senior level studio taught at Washington University in Saint Louis titled Form and Interaction.

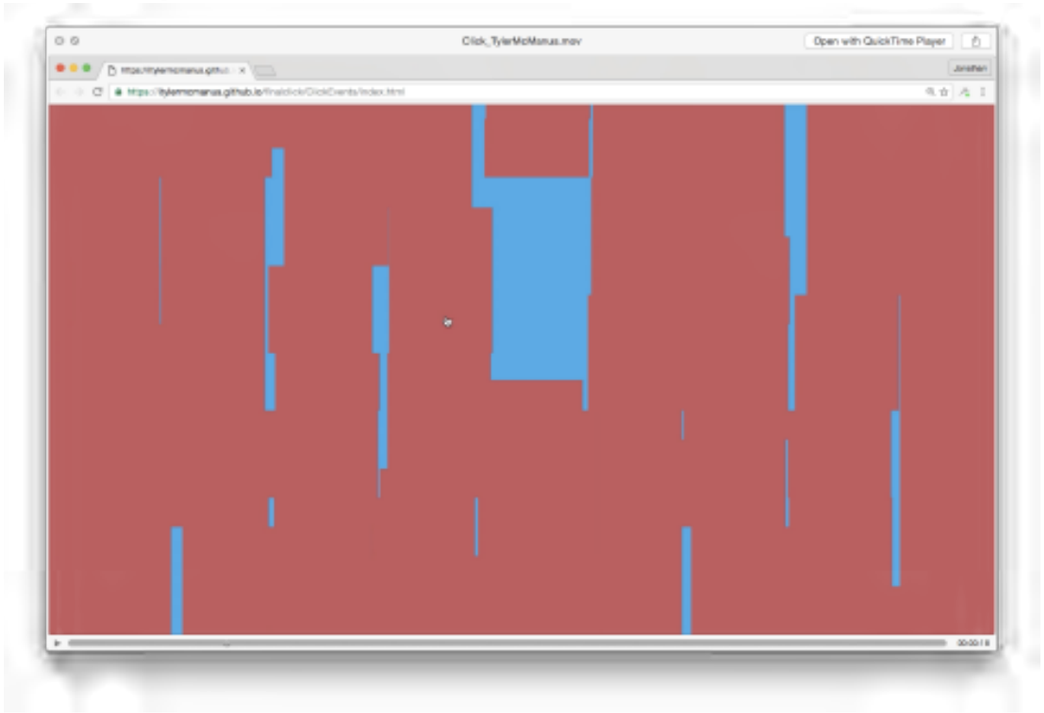

Fig. 6. McManus, Tyler. Windchime. 2016. Website. Private Collection.

The premise of this course is based on four rules. First, the projects are all action-based. The assignment provides the class with a micro-interaction (Saffer), for example a click, a scroll, a drag, etc. Students

must develop their entire projects around this singular experience. To exacerbate this restriction, projects are not allowed to have any real world variables or expectations. There is no clients, no content, no budget. Students are to develop multi-sensory experiences which are dictated and controlled by the action. In this model, the action is not in support of a narrative, it is the narrative. The goal of this is to free the students of the burden that they must "solve a problem." Rather, they are simply encouraged to make an immersive experience.

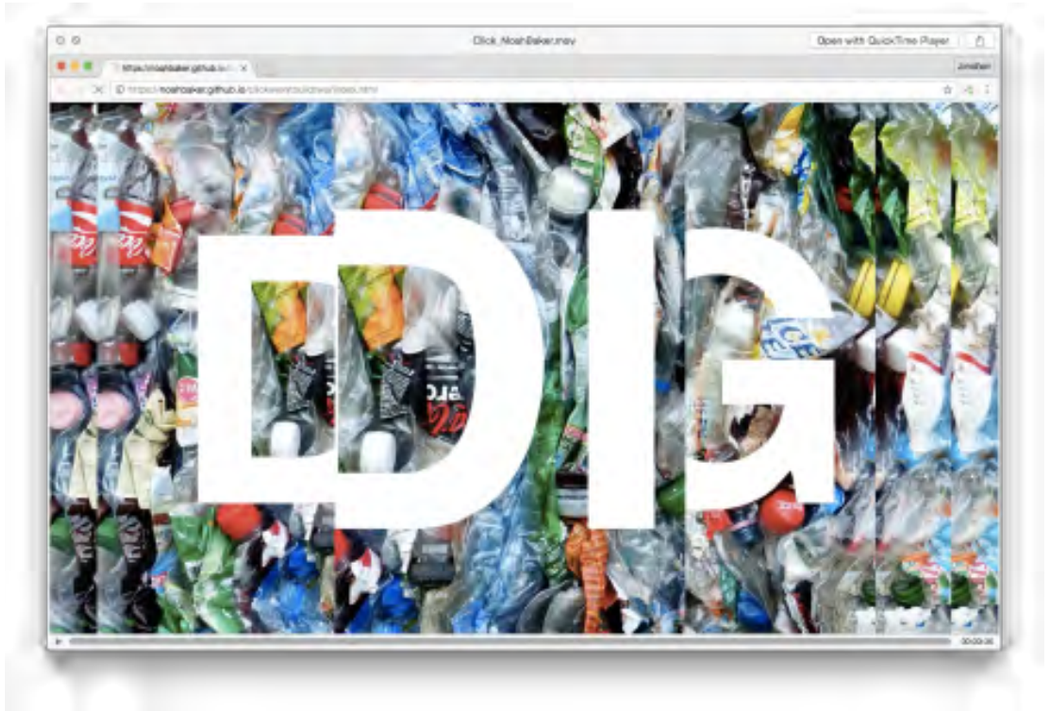

Fig. 7. Baker, Noah. Dig. 2016. Website. Private Collection.

When we elevate these simple and common actions to a space of great value it can be hard to get student to defy the traditional experience or expectations these actions indicate. As mentioned previously, interaction design relies heavily on expectations of functionality to produce efficient and clear experiences. Following these expectations is a must for the developer, but the new middleman designer has the opportunity to defy these expectation. In this case, challenging expectations may create unexpected yet deeper immersion in an experience. To encourage students to break through and challenge these expectations I start each project with a one week charrette. In this charrette, students must develop one hundred individual results using the given action/interaction. This framework, though excessive, is extremely efficient in getting students to break down the established expectations of what a particular action means and develop alternative tangential experiences. It is easy to develop the first twenty yet the last eighty can prove deeply challenging. The charette encourages students to stop thinking logically and start connecting disparate effects. This is where exciting things begin to unfold. Students begin asking dumb, naive questions of their projects, they start doing silly things simply to get to the charrette's requirement and along the way often find profound results which become the foundation of their full-fledged projects. Many times this involves linking atypical sensory experiences, drastically shifting scales, defying spatial restrictions, and stretching activity times extreme highs or lows.

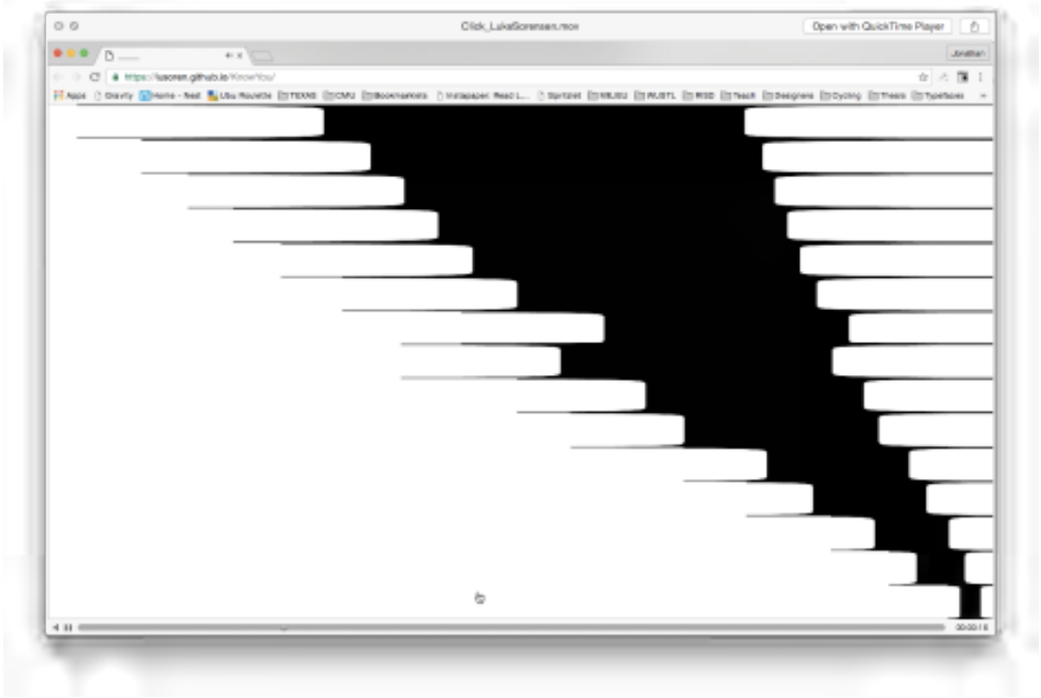

Fig. 8. Sorensen, Luke. I Would Like To Get To Know You. 2016. Website. Private Collection.

The last and maybe most important component of this structure is that students are only to use skills they learned in their Introduction to Web Design course meaning all that is expected is an understanding of HTML, CSS, and maybe some Javascript.

Students are welcome to add as many other components as they wish but no new skills will be taught or expected. The studio is about spending time reflecting on the foundational structure of their known skills and pushing them into unexpected territories.

Tactic Four: Loops

By focusing on deep dives into the basics, students not only learn the visual potential of code, they also have ample time to study the theory of particular code-based logics. Particularly in this course students explored the visual potential of loops, a sequence of statements which is specified once but which may be carried out several times in succession (Wikipedia sec 6 par 1).

This simple concept has far reaching potential both on and off the screen as it allows for complex and dynamic visual experiences through a simple rule-based approach. For example, Windchime (Fig. 8) is created by copying a single element multiple times across the page and changing one variable each time. The element oscillate back and forth upon being activated by the mouse. This element is copied many times to fill the screen and then each copy is given a random size variable. By varying the size of each element yet maintaining all other variables the motion of the screen is digested as a single element, not numerous individual pieces. This random variable is also used on each reload, as it is defined to change the color of the elements and the color of the background on each refresh.

Another example is Kaleidoscope (Fig. 9). Similar to Windchime, the student created two types of simple elements in a grid and then coded particular movements of those elements. The two elements were defined by differing opacities that when viewed in a static form looked like 2 simple colors, yet in motion they create unexpected and dynamic interactions. Each one of these movements (Left, Right, Up Down) was dictated by a single line of code applied to one or the other elements on the screen and by using opacity instead of color, the overlapping of elements creates dynamic results.

Across the examples shown here, each project uses a loop in some form. I Would Like To Get To Know You (Fig. 8) is a single animation repeated to fill the screen but only played upon each click. Dig (Fig. 7) is a repeated image stacked on top of itself which when clicked slides to one side or the other. The image is repeated each time which creates unexpected interactions with each other. This repetition is the key component to the loop, it builds an animation off of itself, its previous version, and the next to create an all encompassing whole that is more than the sum of its parts. Most importantly, it allows students to detail the single effect or experience and then apply it to multiple elements. Rather than attempting to customize each piece, students refine and create open ended variables which connect into rich and conversive visual experiences.

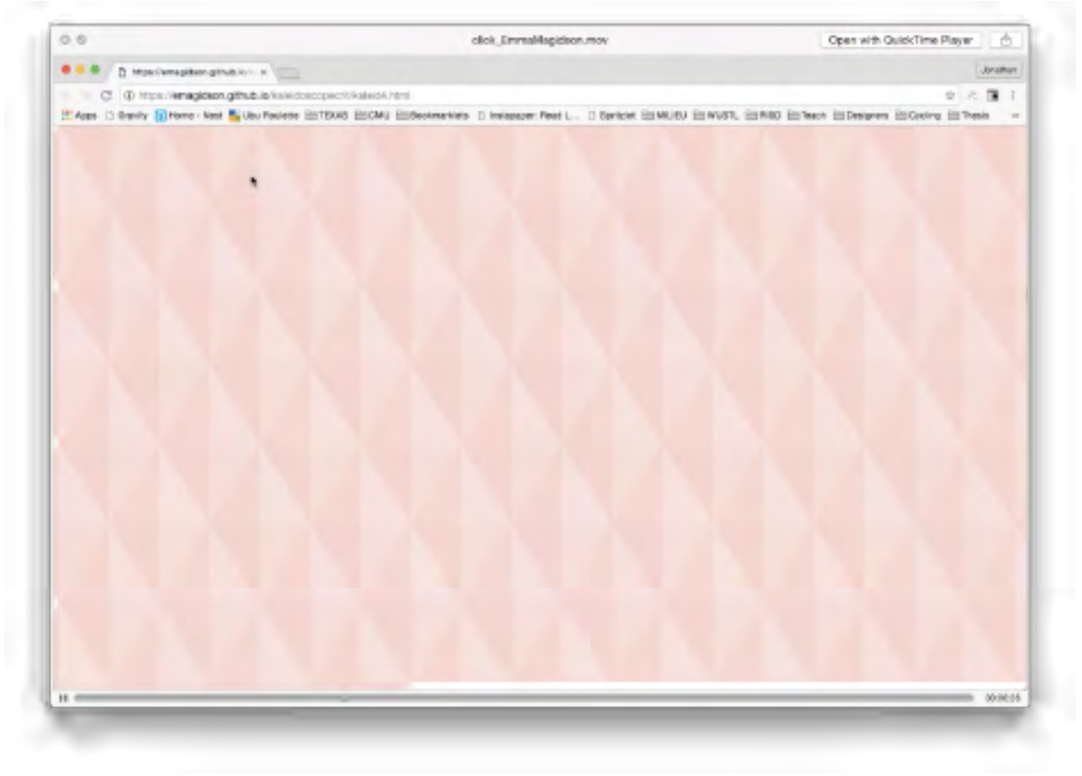

Fig. 9. Magidson, Emma. Kaleidoscope. 2016. Website. Private Collection.

In the end, the projects that have come from this class have been profoundly groundbreaking for both myself and the students. Students start to realize the deep and powerful opportunity of simple algorithmic procedures in creating immersive experience. They break down the barriers and expectation that interactive projects must be something complex, robust, and high-tech. In conclusion, students begin to take ownership over a space that is not simply formal and not purely productive but experimental, conversive, and dynamic. It is this middleman space that if executed correctly is deeply more interesting and powerful than either space the artist or developer resides in.

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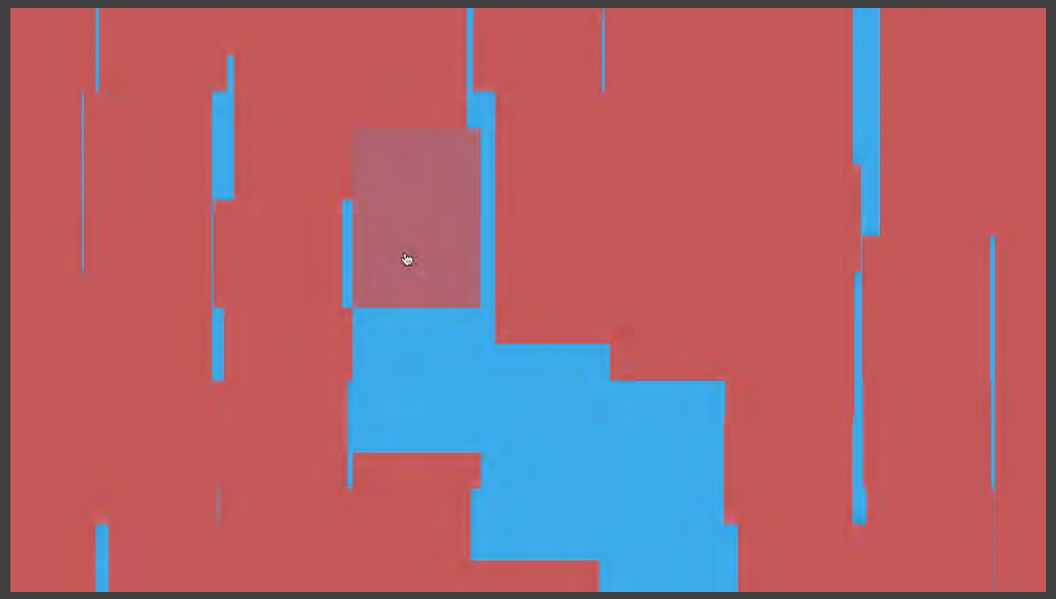
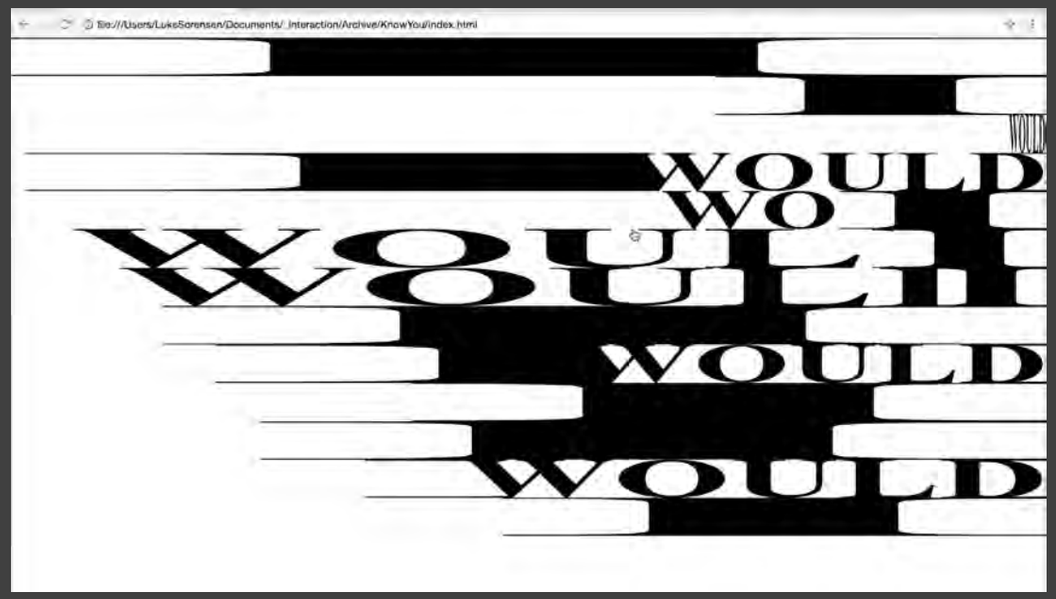
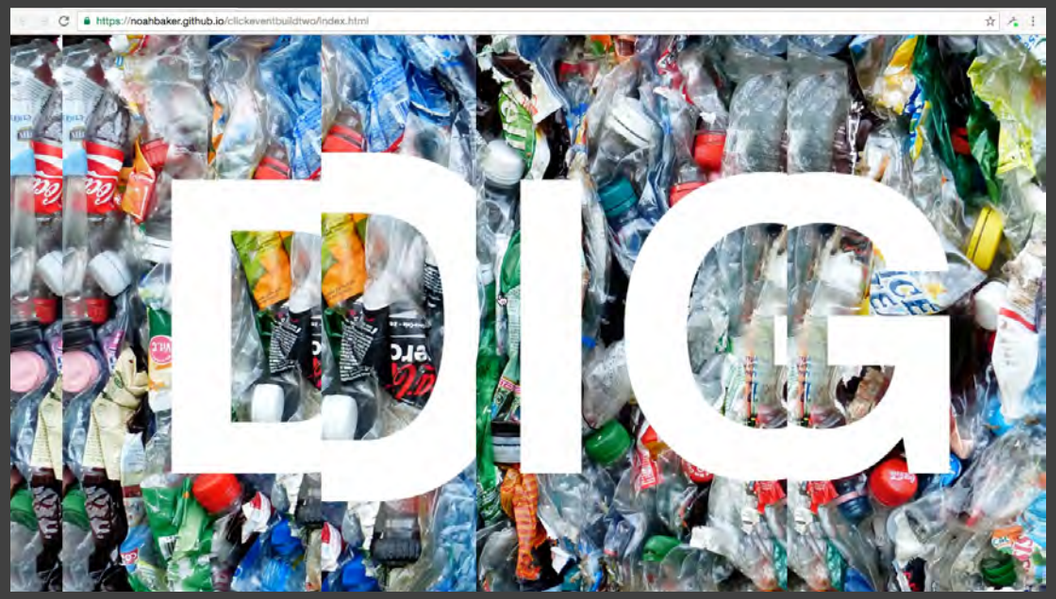
Author Biography

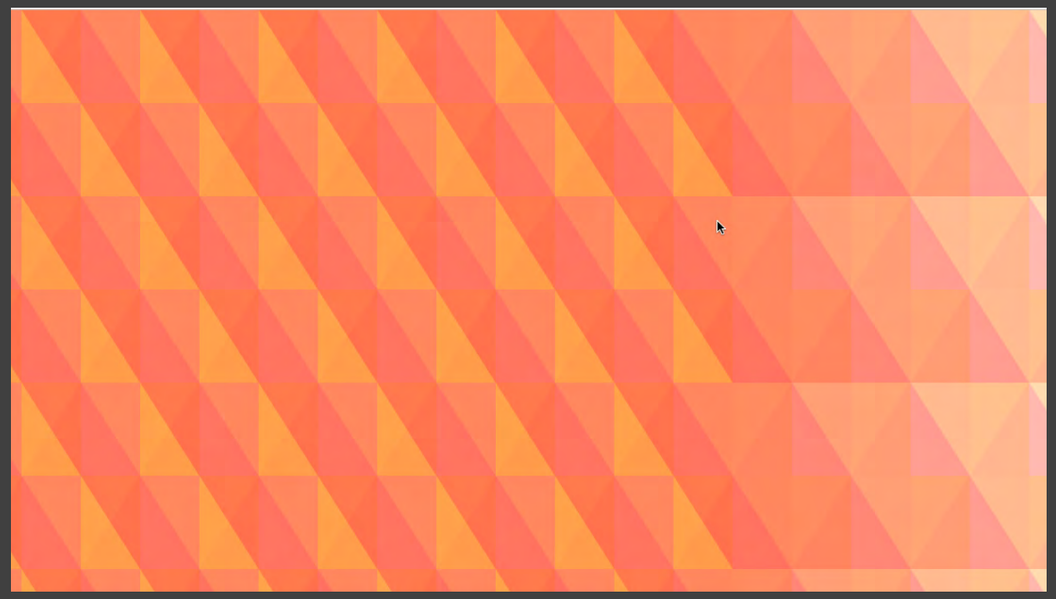
Jonathan Hanahan is an artist and designer whose practice explores the cultural and social ramifications of experiences which transcend physical and digital occupations and the role technology plays in shaping, mediating, and disrupting our everyday realities. He develops Thick Interfaces—tools, devices, software, artifacts, websites, videos, etc. which agitate the digital facade and reveal the physical reality and complexity which exist underneath the thin veneer of our digital devices.

Hanahan received his BARCH from Virginia Tech and his MFA from The Rhode Island School of Design. He is the co-founder and creative director of Milieu, an anti-disciplinary studio focusing on developing tangible, speculative, and networked experiences with the Internet. In addition to his studio practice, Hanahan is an Assistant Professor in the Sam Fox School of Design & Visual Arts at Washington University in St. Louis.









Media from the paper *Deep—And Disruptive—Investigations in Familiar Media Experiences*
Source(s): Jonathan Hanahan

PAPER CATEGORY: THEORIZING

“Fragile museum object, are you ready for your close up?” Robotic Arms and Cinematic Cameras for Immersive Moving Macro Films.

Jonathan Hamilton

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Abstract: This paper explores the relationship between motion graphics and user engagement for museums, collections, and fragile archives through filming with moving cinematic cameras. For museums and collections, one of the key questions is how to increase visitor engagement, both onsite, and online. Additionally, the aim is for these visitors to have a deep immersive experience with items in the collection.

Museums are using filming techniques to give users an experience of their collections online, yet these films record the object in only a basic way. The camera is often static or has only very basic movement, films are formal with only limited immersive qualities. This paper reports on a pilot study made by a small group of researchers into filming objects from fragile museum archives and collections in a more immersive way. Intending to give the film viewer a greater immersive awareness, simulating the experience as if holding and examining the museum object in their hand.

Taking advantage of the recent developments in accessibility to cinematic cameras including motion technologies could reveal new views and experiences of these fragile objects. Filming was made with a variety of methods, including using cameras that are hand held or with robotics support. Cameras have been attached to a new type of robotic arm, designed for repeatable movements to within 0.1mm accuracy. This has enabled filming with repeatable camera paths in extreme close up with a type of “Moving Macro” only made possible by the use of robotics.

Filming took place at a number of fragile archives including a historical lace archive and mechanical watches and clocks from a major UK collection. The pilot study has raised questions; How do you use robotics and cinematic cameras when documenting an object from a fragile archive? What are the limitations of this filming method? What roles could digital 3D scanning and representation play?

Keywords: Cinematic, Immersvity, DSLR, Camera, Robotic, Museum, User, Experience, Archive, Experiential

Introduction

Museums are continually seeking to engage new and established audiences with the aim of immersing visitors with their collections. However, many objects are difficult or too fragile to display, in the case of some smaller museums and collections access is further restricted by limited public opening. A solution could be filming these objects using immersive experiential video methods combined with interactivity. As online and offline videos these films could offer not only increased access, but also show radically new ways of viewing and experiencing an object, its construction, materials, historical and anthropological backstories.

The author of this paper leads a small group of researchers in an on-going practice based pilot study into how video and motion graphics can be used to reveal authentic new views and experiences of fragile archives. The group seek to create video with immersive qualities for the viewer, influenced by Stephen Bitgood’s 1990 research on the importance of authenticity in creating the immersive experience. The pilot projects seek to produce new views of fragile museum objects with the aim of giving the viewer an intimate personal experience with a fragile object. The videos intend to simulate the experience of holding a fragile object for the viewer, examining it and holding up to the light to experience its visual and material qualities. The viewers immersive experience will be further enhanced with pre-recorded audio commentary and subtitles, revealing the objects narrative backstories.

Taking advantage of recent developments, making cinematic cameras, macro lenses and robotics more accessible, the project creates camera movements and views that would not be possible any other way. Here we report on findings from our group's first research project working on a video field study of objects from two UK archives of national and international significance. The videos show these new views of the fragile objects and reveal material qualities that are not always possible inside a museum. The project aims to give the user a similar experience of holding a museum object examining and exploring it in different ways. Compared to viewing an object in its glass museum case, the videos seek to improve and enhance a user's immersive experience.

What are the significant issues for museums?

Nina Simon, Executive Director of the Santa Cruz Museum of Art & History states in her 2011 museum blog raises the questions;

> What are the most important problems in the cultural sector? The two hot problems seem to be; Finding new business models to sustain funding and support operation and making offerings relevant and appealing to shifting audiences

Simon also asks;

> How can we make cultural knowledge, content, context, and experience, as widely, freely, and equitably accessible as possible? How can our institutions and programs improve quality of life for individuals and communities?

It could be said that cinematic filming is now mainstream, being used in many TV programmes and across social media. Its daily exposure often, in new contexts where only standard filming had previously been present, to some extent cinematic is now expected by audiences. The project films intend for museum objects to be shown in a more relevant format for audiences by using cinematic methods.

Museums and collections have significant challenges in displaying and giving public access to their objects. Having large reserve collections museums often only displaying a small percentage of their collection to the public. Our research films could show items from the reserve collections, giving access and also attracting new and established audiences to museums and collections. There is also potential for engaging, social media friendly "Makings of Videos" showing how, in this project, new and old technology, robotics and mechanical watches were used within the production. Potentially attractive to a teenage audience capturing the imagination of this sometimes difficult to attract demographic. The video work could also act as a form of preservation for fragile and decaying items in a collection with the videos giving access without further damage.

Museum research, immersivity and authenticity

C.G.Screven (1969) describes the museum as;

> Potentially at least, the museum is an exciting alternative to conventional education…no coercive forces, no grades. The visitor is in an exploratory situation, moving about at his own pace and on his own terms…The museum should serve as an ideal learning environment for inviting inquiry, questioning and constructive practice in investigatory behaviours

S.Bitgood (1990) defines the 9 factors that may contribute to simulated immersion with the 4th factor being;

> Authenticity or object realism…When visitors are immersed in an exhibit that simulates a time and place, they are likely to report…The exhibit is realistic and natural

Later that year Bitgood et.al (1990) state in their investigations into the museum visitor immersion experience;

> Perceived naturalism or authenticity contributes to the immersion experience

Bitgood clearly explains the importance of naturalism and authenticit. Could we argue that using an optical device such as a high definition cinematic camera, taking its visual input direct from the source, be more immersive than a digital 3D computer graphics model? Whilst it could be argued that a digital 3D file created entirely inside a computer is highly accurate and precise, it's source does not come directly from the object it is portraying. Could it be argued that this form could, if created without sensitively, be counterproductive to immersion, lacking authenticity?

Research team previous films informing project methods

The research team had made some prior experiential immersive film work, in 2012, with a Lace Archive held at a UK University creating the film “Journeys into Lace” (figure 1) The Lace archive consists of highly fragile yarn machine made Lace, and their equally fragile Lace Design books. The Lace has substantial visual qualities with a variety of ways in which it can be filmed, but had restricted access due to fragility. A museum local to the research team was chosen; The British Horological Institute (BHI) had similar issues to the Lace archive, but with very different objects. The BHI has an extensive collection of watches and clocks including those of national and international significance. Yet access to the public was restricted to two days access each year. The films made of both collections used a range of camera filming methods; Hand Held, Monopod and Tripod. As we were in an exploratory phase, we needed to keep agile and responsive, the majority of filming was made hand held.

Figure 1: “Journeys into Lace” https: vimeo.com/61249310

On reflection the “Journeys into Lace” 3-minute-long film, appears to suggest to the viewer that they are in the presence of the real objects. This seems to be apparent from having the camera extremely close up to the object, in one case a series of very old lace sample books. The books are highly worn and decaying with richly coloured spines. The lighting at the side of the books further enhances the textural qualities, suggesting imagined histories for the viewer. The Short Depth of Field (SDOF) from the cinematic lenses adds considerable intimacy. Later on in the film the extreme close ups combined with the sophisticated back lighting combine to shows a piece of white lace, ghost or angel-like in appearance. The delicacy of this white lace, only partially in focus, appears spiritual from the out of focus areas. The in-focus areas inform the view with regard to the lace structure. Towards the end of the film the lighting and SDOF combine helping to describe the touch, feel and drape of the lace fabric.

Object Motion and Camera Motion “Journeys into Lace”

In the parts of the film that feature Lace samples, the manipulation of the fabric is the main motion, so in these cases the camera does not move significantly. Much of the time camera work was hand held, not tripod mounted, to keep agile, to react and respond quickly to the object in front of the camera. With the objects that have limited movement, for example the lace sample books, the camera moves more noticeably. As fabric tends to move in a variety of ways, hence the camera moves less during this film as the fabric itself moves. Objects that are more fixed than fabric, such as clocks, watches and timepieces may require more movement from the camera.

Immersive filming of the BHI collection

A series of films were made from a short list of watches and clocks in the extensive BHI collection. Initial films were made on site with the museums natural lighting, using hand held and tripod mounted cameras. “The Mudge Copy Chronometer” (figure 2) film shows a beautifully crafted marine chronometer clock, with highly polished and machined brass parts. The main spring is moving at an almost furious pace producing a noticeably frantic sound. The clocks movement and the sound enhance each other, behaving almost like a musical instrument. The spring moving, coiling and uncoiling in constant rhythm is like a beating heart.

When listening to the sound of this mechanism with headphones on it is extremely immersive, almost like being “inside” the clock. The face of the clock has beautiful purple anodised hands, the minute hand being reminiscent of the leg of an insect, set against an ivory clock

face. The graphic design of the lettering and numbers on this face is particularly sophisticated in its use of thin lines and ivory watch face. When pausing the film, it is possible to see that the numbers are hand painted with evidence of brush strokes, this only appears to be visible through the video compared to seeing the object in person.

Figure 2: “The Mudge Copy Chronometer”

The next watch inscribed “Mr Constantin Vacheron, Genève” had a different sound to the Mudge, still frantic but a gentler sound. It was also possible to see the mechanisms coloured jewels moving up and down and in and out. The Regulator Timepiece Clock from 1818 is different again, very precise in both its audio and movement, the camera reveals the enamel texture to the clock face. In extreme close up of the minute hands it is clear to see the hands move with gradual but high precision; the fractions of a minute are visible in extreme macro.

In the presence of the actual clock these features were not apparent, yet when reviewing the films, it appears more noticeable. In some cases, the films of the clocks appear to be creating a stronger experience than being in the presence of the actual object itself. The watches appear to have personalities it may be possible to tell the clock or watch by its sound alone - it could potentially be a game for school kids to listen and identify?

Limitations to hand held filmmaking

There is so much to observe within all the moving parts of the watches and clocks held at the BHI, the macro camera in its hand held mode struggles to show features accurately and precisely. To move the camera around the complex layers of moving mechanisms of the Mudge Clock is almost impossible to repeat with any great degree of accuracy. There was a need to find a way of filming with a macro camera that could give us control over its movement with a greater degree of accuracy and repeatability.

Looking for alternatives to hand held cameras

The film making industry uses custom robotic systems “Motion Control Rigs” that enable most types of camera movement. These were too cumbersome and expensive to hire at this stage of the project. Whilst these systems are still a potential method to use in the future, at this early stage of the project we were looking for a more agile, flexible and responsive system. Universal Robots (UR) make robotic arms capable of repeatable movements with 0.1mm accuracy and are simple to program. We had access to UR robotic arms held at one of the research teams’ university. It was straight forward to attach a cinematic Digital Single Lens Reflex (DLSR) camera. The aim was to move the camera, with a lens capable of great magnification, around a fragile object to reveal views that could not be achieved any other way.

The research team chose the methodology of Bricolage and Agile thinking (C. Levi-Strauss. 1962) to keep the creative and technical process flexible, and to keep open to new ways of working. Aware of the dangers of working with technically complex systems and the tendency to become trapped within a complex technical process, resulting in narrow thinking. UR promote their robots as having a user friendly graphical programming language, using waypoints. Easy to learn, requiring minimal training, ideal for our agile methods. Yet we were keen not to let the waypoints method dominate the camera movement. Instead for a more agile method was sought to lead the programming of the robotic arm.

Drawings were made on photocopies of clock and watch photographs, to determine potential camera movement pathways. Using instinctive, agile methods to inform the programming of the robotic arm movement. Reflective practice “on and in action” methods, (D. Schön. 1983) were used, these drawings were evaluated on and in action under a number of headings to identify the potential of each pathway drawing.

On the very first day of filming the robotic arm footage was unstable due to a weak attachment with resultant vibration in the footage. But we could see that the footage was very engaging, informative, with

high levels of cinematography, even though the footage suffered from vibrations. As the camera moved around the watch, with its lens aperture wide open, for extreme SDOF, caused the camera lens to continually seek focus. Less sophisticated cameras would have created very jerky footage, un-cinematic and counterproductive to immersivity. Our chosen DSLR with its 64 point focussing system appeared to intelligently look for active parts of the image on which to focus. This was very similar to how a cameraman would choose instinctively what to focus on. One of the technicians noticed that the footage at the start of a sequence was often out of focus. Other members of the team suggested that this was a positive and artistic quality that should be embraced. Appearing to simulate qualities of human vision when picking up a new object for the first time. Could this be similar to the human eye, with the mind trying to question and understand what the objects qualities, material construction and meaning could be?

Solving robotic problems

Vibration

The UR robotic arms possess very powerful motors in each of their joints, causing serious vibration in the cinematic camera footage. This disturbance was further exaggerated by the extreme close ups from the macro lenses we were using. Vibration effected footage was stabilised using Adobe After Effects (AE) which reduced the problem, but did not eliminate the issue. The AE stabilisation process also caused some cropping of the image. Composition within the camera frame had been carefully made, the team were reluctant to set this framing to chance by this digital cropping, so the main technical focus was to reduce vibrations from its source.

Robotic filmmaking

Prior to filming with one of the clocks from the BHI our aim was to establish a proof of concept filming method using a modern mechanical pocket watch mechanism as our test subject (figure 3). Once this vibration had been eliminated, to then approach the BHI for the opportunity to film one of their historic timepieces using the robotic macro camera combination. The SDOF filming with the robotic arm worked highly effectively in suggesting the view an individual may have if they were holding the object themselves.

Figure 3: Robotic arm macro footage; Sekonda modern pocket watch

The metal watch mechanisms caught the light showing machined textures helping to reveal the manufacturing processes that made the watch, but also offering new views of the object. The camera and robotic arm pathways were complex at times passing around and over the object sometimes several times. The DSLR cameras' 64 point autofocus system produced sophisticated foreground to background focus changes in a similar way to how a camera operator would possibly do in the same situation. But the footage was distinctly different and original. Could robotic filming be creating a new genre or approach to the moving camera in contrast to human controlled camera movement? (figure 4)

Comparative analysis of films made with robotic and tripod camera supports

After completing some of the robotic test films the research team was concerned that the footage may not be visually distinctive. Deciding to make a comparative analysis study, the pocket watch was

filmed with the camera attached to a fluid head tripod. On viewing this tripod footage, the watch mechanisms were extremely clearly represented, but the film appeared very formal and stiff, lacking in movement. To counteract this the mechanical watch needed to itself move, rotate, to create additional movement within the camera frame. When the tripod footage was compared to the footage from the robotic arm camera combination the team were relieved to see that the robotic arm footage appeared more immersive through its more varied pathway around the object. When comparing the tripod footage/watch rotation footage this looked far more artificial being noticeably controlled by an outside source.

Figure 4: Universal Robotics arm and Macro Camera filming

Restrictions of the robotic arm camera combinations

Whilst the robotic arm gave us a unique way of moving the camera with a macro lens, and the ability to film at high magnification, there were some disadvantages compared to hand held filming methods. The first most notable difference is that when the robotic arm is moving it is not possible to interact with the camera, to change any settings or functions, in particular the focus of the lens could not be changed. Ability to react to the object during filming is restricted. This was not a major problem because hand held videography in "Journeys into Lace" (2012) and "Never Quiet Never Still" (2011) kept the camera focus fixed and instead moved the camera, resulting in a more immersive experience for the film viewer. These current disadvantages of the robotic arm are far outweighed by its abilities to film in extreme close up with repeatable precision. In future projects we aim to use bigger more professional cameras that allow focus and other controls to be manipulated remotely during filming. We would expect this to produce better quality footage with higher levels of cinematography. However, at present we are keen to keep the equipment simple, straight forward, and agile.

Future BHI projects with the robotic arm

Now we have established this proof of concept we are ready to film one of the valuable historical clocks with the robotic arm/ macro camera combination. The Mudge Copy Chronometer, Marine Clock was difficult to film with both hand held and tripod methods, the robotic arm could film this clock in a unique way, communicating more about this complex clock.

Robotic Conclusions

Agility, Drawing, Waypoints and Macro filming

Robotics have some significant benefits for this creative project, but may not be suitable for every fragile archive/collection object, so it should be used with care. The current robotic system still lacks agility; it does not seem possible to easily make a manual camera/robot movement that accesses instinctive camera pathways. Waypoints and Graphical Interfaces are a significant step forward in ease of use, but still far from ideal for Art and Design users. If camera pathways were created in the same way as in digital applications, like After Effects, allowing users to adjusting a path visually, using Bezier curves would help with agility. As Macro filming with its high magnification requires precision and accuracy. There does not appear to be any other method that can be as effective and as accurate as a robotic arm for filming a tiny watch mechanism. Whilst the camera moves freely around, can start to replicate the experience of holding the fragile object.

Next steps

The BHI hand held films appear to reveal more about the watches and clocks than when being in the presence of the actual object. This may be due to the lenses and magnification, or it could be due to framing, making the eye focus and concentrate. This had been a surprise, as these were rough tests films, we were not expecting to make any revealing discoveries at this early stage. We have made some significant progress filming using the robotic arm and camera. From the very first shoot using the unstable plastic camera mount, the footage showed that this method was showing that it could reveal new viewpoints that could not be achieved any other way. We have made good progress with the robotic arm for "Moving Macro" filming, with the modern mechanical pocket watch as its subject. What could the robotic arm and camera reveal when filming one of the BHI's sophisticated highly designed and engineered historical watches? This will be the focus of our next tests.

The robotic filming with optical cameras is achieving good results and could play an important role in creating an immersive experience for the online and off line museum visitor. 3D scanning is one area we would like to try. New approaches to 3D scanning objects are being developed by researchers in the UK and worldwide. In particular, the work being done at Liverpool John Moores University, UK has recently demonstrated their ability to scan metal objects, which otherwise has not been possible. VR, 360° filming and Augmented Reality could also be highly effective for communicating in and immersive way. Scanning and filming directly from the source objects appears to be a focus for authentic immersive experiences.

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Author Biography

Hamilton is expert in digital cinematography, experienced in working with technology-based businesses; e.g. over a three-year period collaborating with technical providers Reflecmedia with an innovative 'green-screen' technology producing 'ScreenDress' a dance-performance garment containing motion graphics. Hamilton has published in the area of Immersive Interaction Design. Graphical dimensions of projects are to explore the notion of the 'experiential' as it relates to technology.

Mr Hamilton has worked in collaborative partnerships since 2006, creating innovative video and projection systems for live performance. He also collaborates with the Nottingham Lace Archive filming elements of the fragile collection used at Shanghai-Expo 2013.

Hamilton is regularly updating his knowledge of new camera equipment and software. Motion Control Robotic Camera Rigs, DSLR HD cameras, and responsive Web App for audience and user data analysis. He is working with fragile archives and collections including the British Horolgical Institute, Upton, and Nottingham Lace Archive.

He curates professional context Twitter and Instagram feeds @jonahmilton19 (www.twitter.com/jonhamilton19) ; new technology and creative practice with a focus on new camera technology and the opportunity for immersive and experiential communication. Twitter analytics show a 14% engagement rate, since March 2013 has seen a seven-fold follower increase. Recent tweets show 10,000 and 43,000 engagements.

PAPER CATEGORY: PRACTICING

Engaging Videography Sparks Effective Learning: A Comparative Study

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Abstract: This comparative video study examines whether the design of a video used for educational purposes can positively impact students' learning. The creation of the new video was part of a larger project; the initial project involved the development of an undergraduate course module in Critical Infrastructure Protection (CIP). This course module was embedded in undergraduate courses in technical and non-technical disciplines. The instructional module begins with a video overview, which is often students' first exposure to the topic of CIP. The original video piece, produced by the Department of Homeland Security (DHS), originally filled this role as the introduction to the CIP module. Due to students' lack of engagement with the DHS video, two faculty, teaching in Graphic Design and Computing Security, teamed up with two undergraduate students in Graphic Design and Live Action Film to create a more appealing replacement for the original video. Interested in formally assessing the new video, the faculty researchers at Rochester Institute of Technology (RIT) who supervised the new video project designed a preliminary study to measure its efficacy with students who are unfamiliar with the topic of CIP. Utilizing competitive testing, participants viewed and evaluated both the DHS and new RIT videos, and a survey captured quantitative and qualitative feedback indicating a strong preference for the new video.

What is Critical Infrastructure Protection?

In recognition of the nation's strong economy and military, the Clinton administration identified a "growing potential vulnerability" that indicated a need to safeguard various resources. These important resources—critical infrastructures— "are those physical and cyber-based systems essential to the minimum operations of the economy and government." Some examples include transportation, telecommunication, water systems, and emergency services [1]. We depend on critical systems such as these each day, and highly publicized events such as the September 11 attacks, the Virginia earthquake, and major hurricanes such as Katrina, Ike, and Irene have exposed serious vulnerabilities with our infrastructure, especially its ad hoc nature. Critical Infrastructure Protection (CIP) is a nationwide program in the United States, originally established in 1998 under President Bill Clinton [1]. It is therefore important that all students learn about the nation's critical infrastructure so that they can play a role in protecting it.

CIP education / development on modules

While the Department of Homeland Security [2] has prepared informational materials on the 16 critical infrastructure sectors and some instructional units are available for graduate students [3], high school/community college/undergraduate curricula do not address CIP in any meaningful way. Employees who understand the socio-technical issues and risks faced by society are in demand in both public and private sectors, especially since most of the nation's critical infrastructure is privately owned. Students who are exposed to CIP concepts throughout their school years will graduate with necessary skills and knowledge to address risk and resiliency issues in CIP systems.

Through a National Science Foundation-funded project, a multidisciplinary team from three academic institutions developed and used a module-based approach to educate high-school, community college, and university students in critical infrastructure protection. A course module is a distinct unit of course materials, such as a lab or a teaching component, which can be incorporated into existing courses in the curriculum without requiring any course or degree program changes and curricular approval. The project addresses the need for CIP instruction at the high school, community college, and four-year university levels by developing modular pedagogical materials. Through this approach, CIP material is embedded into courses across the high school and college curriculum, in both computing and non-computing disciplines.

Introductory module: the role of video

In the introductory module, students learn about critical infrastructure; its relationship to emergency management and planning; and why protecting the infrastructure is important for personal, community and national security. This module is appropriate for any course at the high school or undergraduate levels. The module begins with the students viewing an introductory CIP video, followed by in-class discussions.

The original video piece, produced by the Department of Homeland Security (DHS), initially filled this role as the introduction to the CIP module. RIT faculty who screened the DHS video in classes, as a preamble to more in-depth study on the topic of CIP, noticed that it seemed to produce a routine result, regardless of students' majors or areas of study: boredom.

Therefore, two faculty, teaching in Graphic Design and Computing Security, teamed up with two undergraduate students in Graphic Design and Live Action Film to create a replacement for the original video. The student team collaborated with faculty to research, plan, and produce a new video piece to stand in place of the original DHS video.

Figure 1. Comparing the length of the initial DHS video and new RIT video

Producing the new video

Leveraging their perspective as students and feedback from peers, the team created an informative—yet humorous and relatable—take on the subject of critical infrastructure protection. In addition to addressing the length of the original video (see Figure 1), the student team drew upon audience research as well as their own perspective as undergraduate students. Their goal was to create a more appealing initial exposure to the content for learners in the CIP course. They worked together to craft a video that utilizes multiple approaches (see Figures 2, 3 and 4).

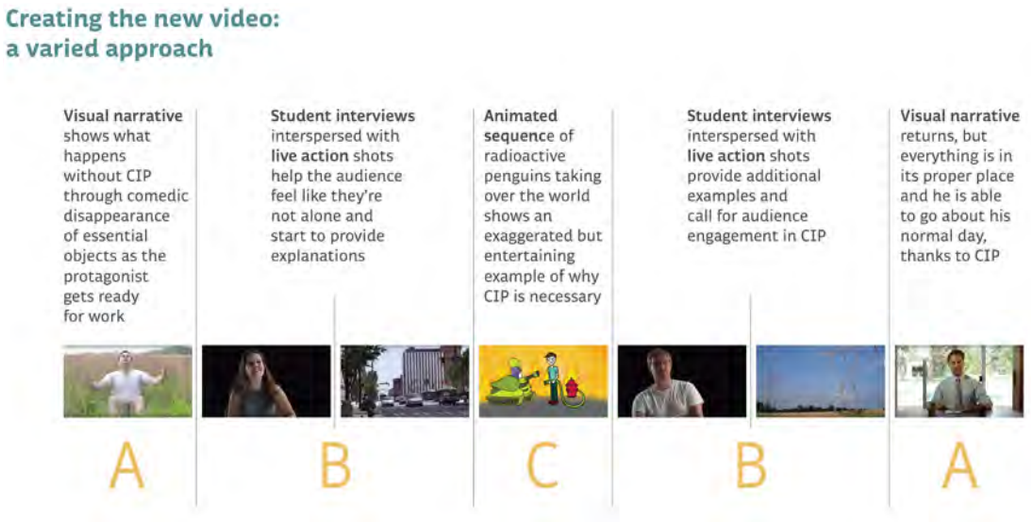

Figure 2. The varied structure of the new video includes a visual narrative, interviews, live action, and voiceovers, interwoven with a playful animated sequence.

Figure 3. The protagonist of the visual narrative humorously ends up sitting in a field in his underwear after losing his clothing, food, phone, car and home due to lack of Critical Infrastructure Protection.

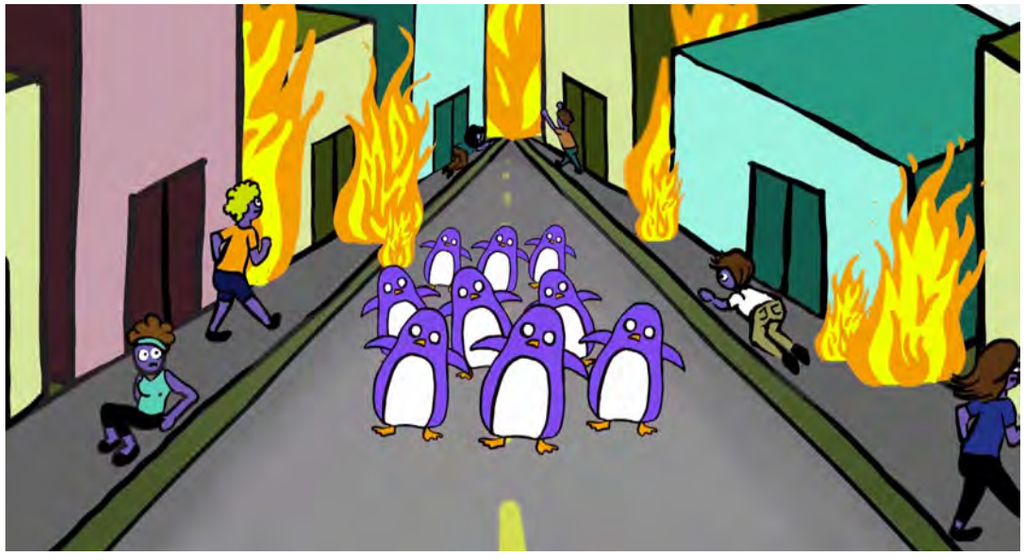

Figure 4. The narrator maintains an even, deadpan tone as he describes chaos produced by radioactive penguins who escape from the zoo and are unable to be contained due to critical infrastructure failures.

Methodology

Overview

While the RIT faculty involved in teaching the CIP module responded favorably to the new video, the researchers supervising the creation of the new video wanted to formally assess its teaching effectiveness as well as students' responses to the content and design. The researchers designed a study, which uses competitive testing: viewers see both videos, and a survey measures their responses to each. Adapted from business and marketing, competitive testing in the design and usability spheres involves engaging users in testing one's product alongside a competitor's [4]. In this case, the new "product" was the RIT-produced video, and the competitor was the original DHS video.

Study design and implementation

A purposive sample of 52 undergraduate students from 4 design courses of varying levels (1 freshman, 2 sophomore, 1 senior) voluntarily participated in competitive testing of the two videos. Design students provided an ideal audience because none were previously familiar with Critical Infrastructure Protection, and they had the ability to provide feedback on the effectiveness of the design of both videos.

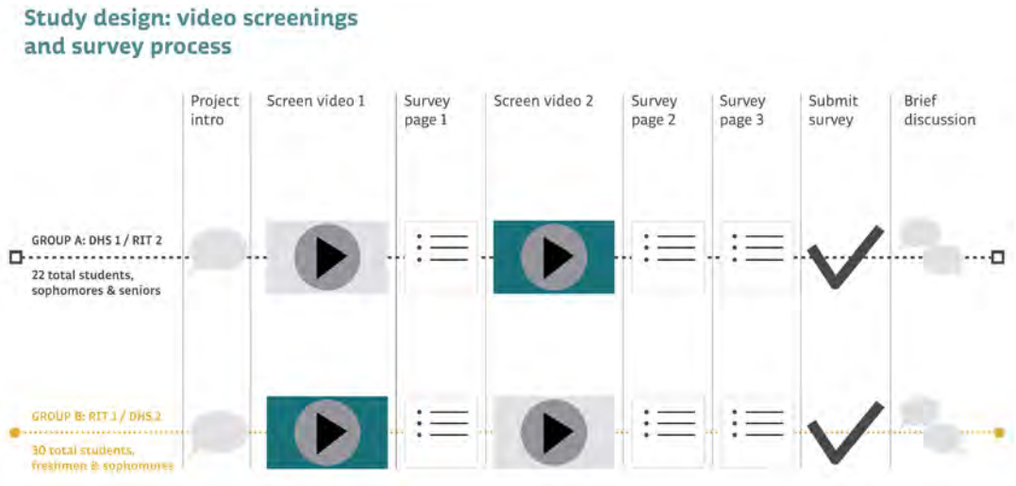

Figure 5. Study design

During the study, participants viewed the videos in a classroom setting; Group A watched the original DHS video first, while Group B saw the new RIT video first. Each group voluntarily responded to questions regarding the first video before viewing the second video (see Figure 5). The instrument contained both quantitative and qualitative questions to provide multiple types of feedback (discussed in section 3: Results).

Participants heard a brief introduction to the project, asking them to compare the two videos and evaluate them from the perspective of high school or college students enrolled in a course on this topic and learning about it for the first time. The researchers told them that one of the videos might serve as an introduction to the course. The researchers did not provide information on how, when, or why the two videos were produced, or any additional details on the specific videos prior to the screenings.

In all cases, the respondents completed each corresponding portion of the survey immediately after watching the respective video; the second video was only screened after respondents had completed their surveys of the first. Following completion and submission of the entire survey, researchers conversed briefly with

respondents to answer additional questions and gauge impressions that may not have been captured in the survey's qualitative questions. The survey questions used in this study are shown in Figure 6.

For each video, respondents received the following survey questions:

What did you learn from this video about critical infrastructure protection? Describe at least 3 things, if you can.

Rate the following *(likert scale: 1 = low/poor, 5 = high/excellent)*:
How engaged did you feel while watching this video?

How well did this video work as a teaching tool?

How effective was the design of this video?

How much did you personally like this video?

Following the survey questions for their second video:
Which video did you prefer overall *(video 1 / video 2)*
Please discuss what you liked and disliked about each video.

Figure 6. Survey questions

Results

The second video emerged victorious from the combined data analysis: 73% of the 52 respondents preferred the new video to the original Department of Homeland Security video for use as an introduction to the CIP education modules (see Figure 7). The new video also performed well along the four dimensions measured in the survey: audience engagement, teaching effectiveness, design, and personal preference (see Figures 8, 9, 11 and 12).

However, there are some interesting findings in comparing the two separate data sets: While 100% of the (22) students in Group A who viewed the DHS video prior to the new video preferred the new video, the preference for the new video was less pronounced in Group B, who watched it first. Groups A and B also had very different impressions of the teaching effectiveness of the DHS video.

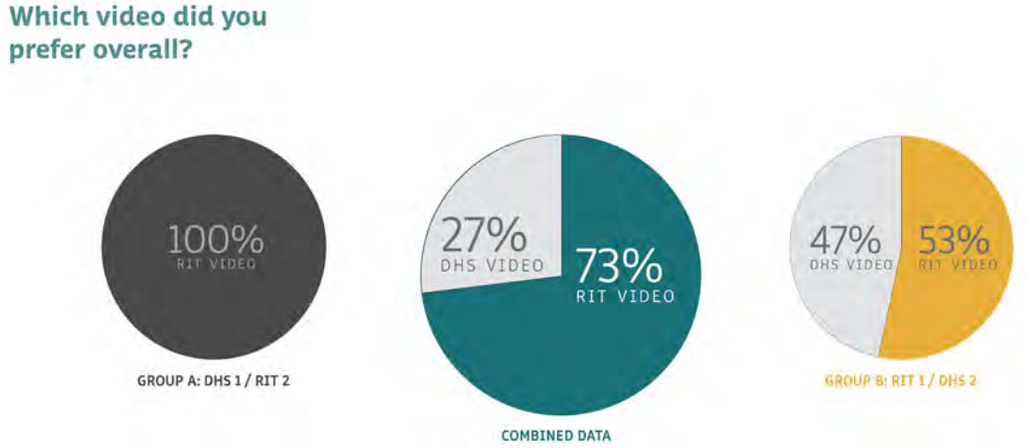

Figure 7. Overall, survey participants showed strong preference for the new video

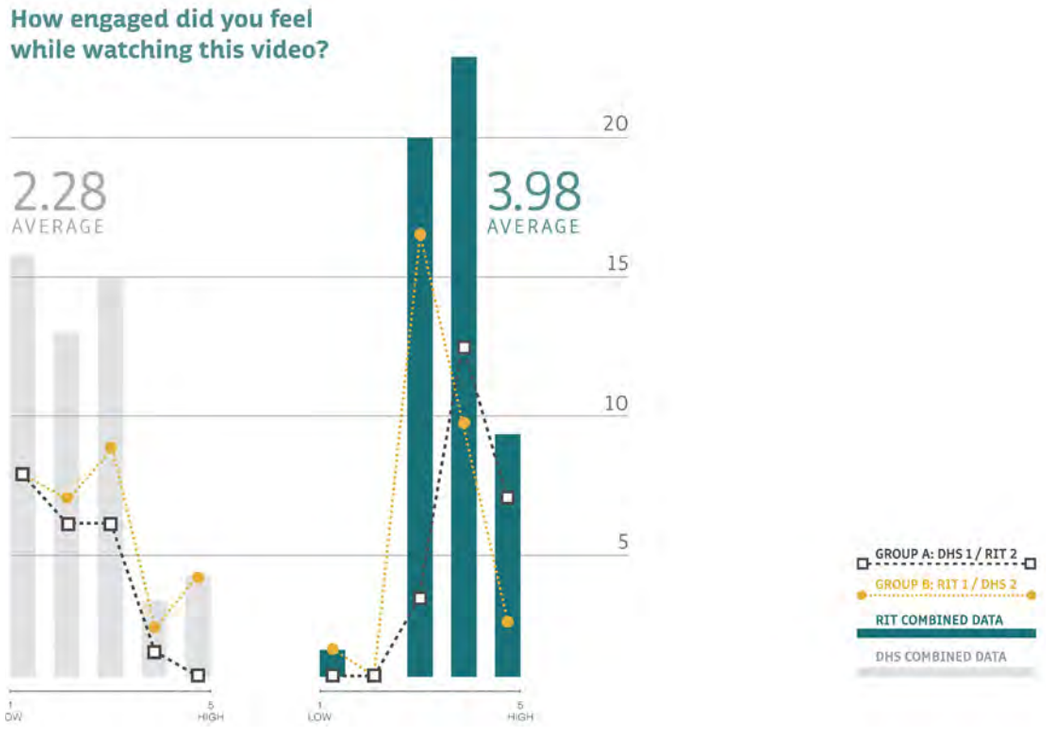

Figure 8. Audience engagement during the old (left) and new (right) videos; line graphs illustrate the results from the two separate testing groups while bar charts show the combined results.

During the post-survey discussion, a participant in Group B remarked that she thought watching the RIT video first made her more attuned to the content in the second (DHS) video. A few other respondents in the same class verbally agreed. Another responded that, while she thought the DHS video clearly provided more content, she felt she already had a basic understanding of CIP because she had watched the first (RIT) video already.

A few Group B respondents deemed the humor of the RIT video "unprofessional." These viewers' survey responses were generally more critical of the new video than the group who watched it after the DHS video. Several comments point to the fact that the new video contains "less information," while others preferred the organization of the DHS video:

"I personally preferred the second [DHS] video, it offered a lot more information and it was presented in a very organized manner, even though it was a bit longer."

"It [DHS video] was easier to understand even though the design was poor and gave more information."

"The first [RIT] video was very creative and was really fun, but the second video actually got the information that I was looking for across. It was very direct."

However, some members of that group appreciated the difference between the videos:

"The first video's effects were very out of date. While the second was pretty funny."

"The first [RIT] video was more engaging because it had humor to it and it gave information as well. the second [DHS] video was very boring and not engaging at all and it felt like i was being lectured instead of watching a video to learn."

More commonly, however, respondents from both groups gave negative feedback regarding the DHS video, honing in on details such as the overall duration, design approach, "Powerpoint-style" transitions, dated appearance, and narration style. Across both sets of surveys, 20 different respondents used the word "boring" to describe the DHS video. (Conversely, 12 different respondents used the words "fun" or "funny" to describe the new video.)

"The second [DHS] video was very boring and not engaging at all and it felt like i was being lectured instead of watching a video to learn."

"The second [DHS video] was so boring and long and dragged on and I just couldn't focus or engage at all in it."

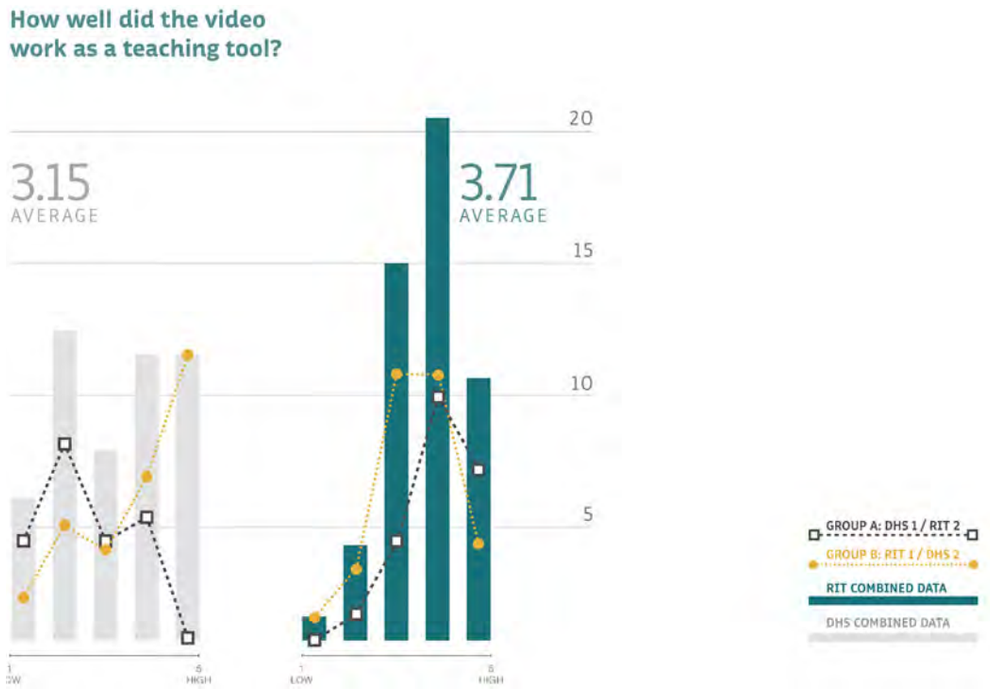

Figure 9. Audience assessment of the old (left) and new (right) videos as teaching tools; line graphs illustrate the results from the two separate testing groups while bar charts show the combined results.

One Group A participant from the senior class remarked aloud after the surveys were submitted that she thought the new (RIT) video would make her "feel more receptive to learning" for the rest of the CIP course. Others agreed and said that they appreciated that the students who were interviewed in the new video were also "clueless about CIP," because they felt like it took pressure off of them as well, as though it was acceptable not to know about CIP prior to taking a course on the subject (Figure 10).

Figure 10. A series of interviews with students on the topic of CIP, interspersed with explanatory live action shots, made the target audience of college students feel at ease in their own lack of knowledge on the subject.

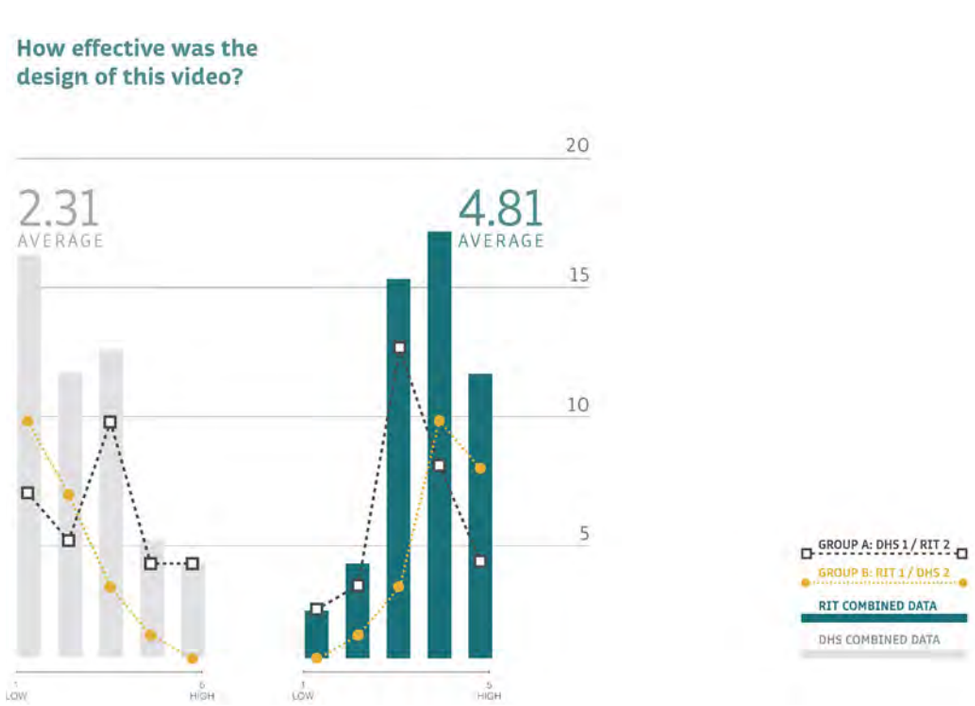

Figure 11. Audience assessment of the effectiveness of the design of old (left) and new (right) videos; line graphs illustrate the results from the two separate testing groups while bar charts show the combined results.

After watching the DHS video first, followed by the new RIT video, Group A participants appeared visibly relieved when watching the new video afterward. The responses to the qualitative questions also indicate that the majority of viewers appreciated the levity of the new video, although more students from Group A interpreted the humor of the new video as a positive attribute than their Group B counterparts.

"The second one [RIT video] is a lot more engaging and had a story; it was funny and captivating. It also used simple language that was easy to understand."

"Video 2 [RIT video] connected infrastructure to our daily lives through narrative. The animations were funny and engaging so it was easy to understand."

"It's much more relatable, there are a lot more activity and action going on in the video, which can make the audience feel a little bit more engaged than usual."

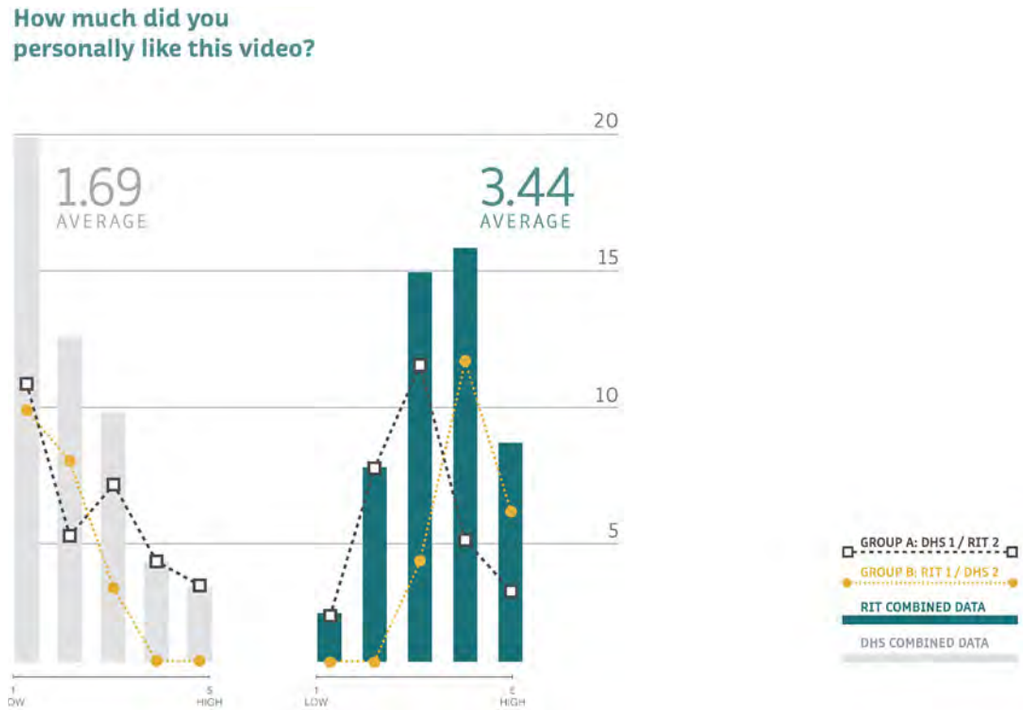

Figure 12. Audience reports how much they personally liked the old (left) and new (right) videos; line graphs illustrate the results from the two separate testing groups while bar charts show the combined results.

Conclusions

Overall, the data indicate that the approach of the new video is effective in engaging the target audiences in the CIP content and in maintaining their interest for the duration of the video. Both groups reported much higher levels of engagement while watching the RIT video. Additionally, in response to the survey question to share learnings from the videos, respondents from both groups indicated that the video effectively introduced the concept of CIP. In a word-count comparison of 'learnings' from both groups on both videos, respondents submitted a total of 566 words for the RIT video vs. 572 words for the DHS video (Figure 13). While students in the group who watched the RIT video first expressed concern that the video contained less actual content than the DHS video, the group who watched the RIT video second seemed to understand that the content that was trimmed from the new video would be taught elsewhere during the course.

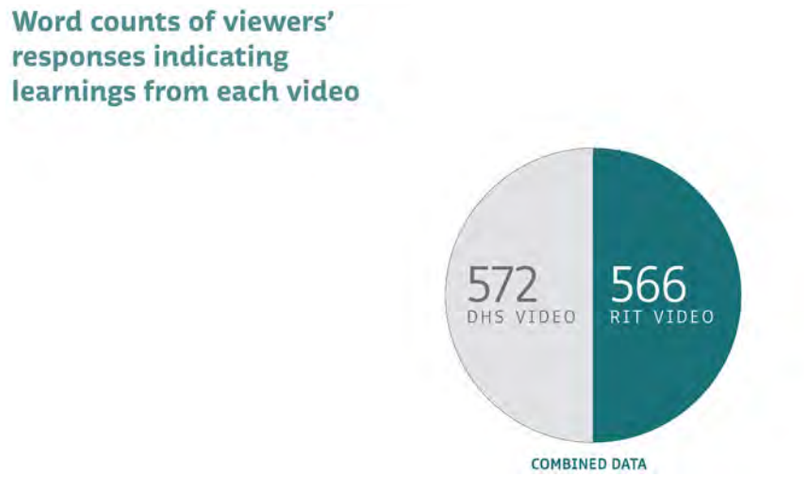

Figure 13. Comparative word counts of audience's self-reported learnings from both videos.

A few respondents provided constructive criticism for the new video, making suggestions for improved cohesion, more detailed explanations, and even adjusting the audio balance in places (Figure 14). While the team will take these suggestions into account, the next step for this project is implement the new video in classes completing the full CIP learning module. This will give the team an opportunity to test the effectiveness of the RIT video with actual CIP students and the ability to compare the findings with the results of this preliminary study.

Figure 14. Though many students offered additional suggestions for improving the new video, most responded well to the varied approach, including the animated purple radioactive penguins—who reappear during the closing credits.

Acknowledgments

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Author Biography

Kelly Murdoch-Kitt is an Assistant Professor in the Graphic Design program at Rochester Institute of Technology's College of Imaging Arts and Sciences. She teaches and works primarily in the areas of interaction and user experience design. Her recent pedagogic research collaborations explore methods, tools, and benefits of effective cross-cultural design education. She is also exploring the impacts of integrating sustainability challenges into project-based design courses. She recently presented research at Spaces of Learning: AIGA Design Educators Conference and the 2015 Association for the Advancement of Sustainability in Higher Education (AASHE) Conference and Expo, "Transforming Sustainability Education." Recent journal publications include "Design Nexus: integrating cross-cultural learning experiences into graphic design education" in Studies in Material Thinking 11: Re/materialising Design Education Futures (co-authored with Prof. Denielle Emans, 2014) and "Sustainability at the forefront: educating students through complex challenges in visual communication and design" in Interdisciplinary Environmental Review (co-authored with Kelly Norris Martin & Denielle Emans, 2015). Prior to her teaching position at RIT, Kelly worked as a UX designer and researcher in the San Francisco Bay Area and was an adjunct faculty member at California College of the Arts and the University of San Francisco. Kelly holds a Master's degree in Graphic Design from North Carolina State University's School of Design and a BA in Fine Art and Theatre from Wake Forest University.

PAPER CATEGORY: VISUALIZING

Motion Design for Data Visualization and Interactive Prototypes

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Rochester Institute of Technology

Abstract: As new interactive screen based form factors and digital products transform the requirements and expectations for new designers, motion design has emerged as a key creative skillset for tomorrows visual and UX designers. To prepare students for this challenge the New Media Design (NMD), BFA at Rochester Institute of Technology (RIT) has created a rigorous 4-year interdisciplinary degree program. While maintaining a strong core creative and visual design curriculum the New Media Design program incorporates 3D and motion design sequences that enable students to explore motion based solutions for broadcast, marketing, experimental, data visualization and UX solutions. Through project based student examples this presentation will explore how motion design can be used to showcase data visualizations, prototyping real-time data interactions, interactive informational graphics and procedural design solutions across multiple device.

With emerging technologies stretching the forms of communication and interactivity, the ability of the designer to effectively communicate user experiences, data interactions, UI transitions and complex screen behaviors is critical. Motion design has emerged as a fast, thorough and expressive format that allows the designer to simulate interactive solutions as linear stories without having to be limited by the technical requirements of building working prototypes. Industry has also recognized this format as a benefit during the creative and planning of UI projects as our alumni now hold positions such as Motion UI Designers at companies like Google.

The processes and projects presented will showcase how motion graphics can be utilized to transform matrices of raw data into effective communication and interactive solutions. To achieve successful results, it is important to create an educational path that distills the process into its core elements of animation principles, graphical forms, data formats, visual design principles and interaction models. With the core skills established students are now capable of understanding the advantages and disadvantages of specific graphical forms of communication and can create strong, effective solutions through a systematic design process.

Keywords: Animated Prototypes, User Experience Design, Information Design, Data Visualization, Design Process

Introduction

With emerging technologies stretching the forms of communication and interactivity, the ability of the designer to effectively communicate user experiences, data interactions, UI transitions and complex screen behaviors is critical. Motion design has emerged as a fast, thorough and expressive format that allows the designer to simulate interactive solutions as linear stories without having to be limited by the technical requirements of building working prototypes. The New Media Design (NMD), BFA at Rochester Institute of Technology (RIT) leverages traditional graphic and information design principles and practice to explore motion based design. Through project-based exercises spread over 4 years and multiple courses, students explore how traditional information design and user interfaces can be merged with motion design to showcase data visualizations, prototyping real-time data interactions, interactive informational graphics and procedural design solutions across multiple devices.

The included examples help showcase how motion graphics can be utilized to transform matrices of raw data into effective communication and interactive solutions. To achieve successful results, it is important to create an educational path that distills the process into its core elements of animation principles, graphical forms, data formats, visual design principles and interaction models. Our UX design projects deploy an iterative user experience process as illustrated in figure 1. With the core skills established students are

now capable of understanding the advantages and disadvantages of specific graphical forms of communication and can create strong, effective solutions through a systematic design process.

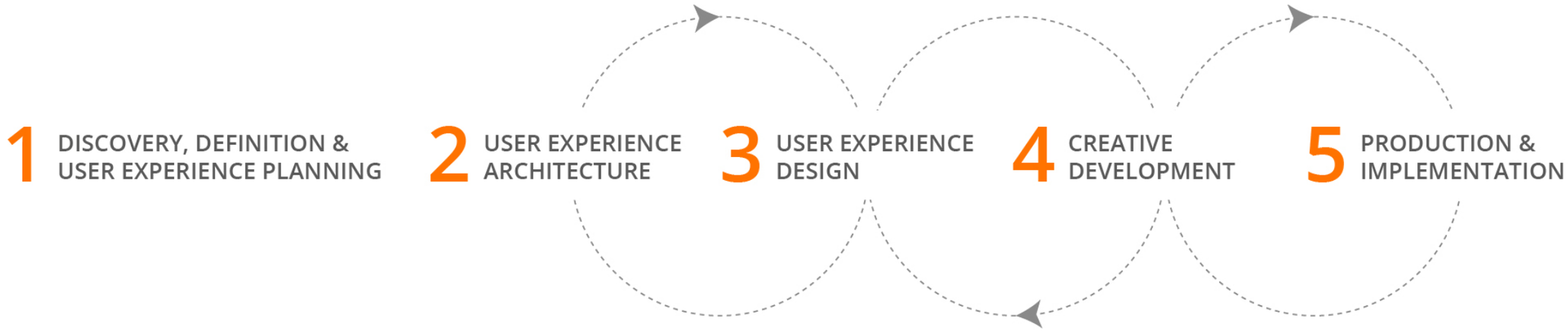


Figure 1: UX process diagram

The Process

Discovery, Definition & User Experience Planning

As with all design projects, investigation is at the center of defining any graphical translation of information in static, interactive or animated form. This process is used as the foundation because it begins with the critical steps of discovery and definitions of requirements and targeted audience. These steps require designers to examine the digital output and interaction models early in the process and assist in establishing a solution that promotes usability. In the following examples in figure 2 infographic project, in figure 3 and 4 interactive infographics project, and in figure 5 interactive real-time data visualization project, they represent the ease of understanding, value, and the impact or importance the information has for the user or viewer. Once a clear scope and target audience has been defined the process moves on to the UX architecture and design phases. While these may reflect a traditional motion workflow the process gives students a repeatable list of milestones and creative tools to deploy.

User Experience Architecture

The user experience architecture phase is used to identify critical informational data sets or informational based tasks that are necessary to focus on during the final motion pieces. Additional content analysis for creating classification and organizational relationships is explored for both data visualization solution and animated prototypes. Organizational tools such as LATCH created by Richard Saul Wurman, represent an easy to implement entry point into data organization through location, alphabet, time, category and hierarchy (O'Grady pp. 82-83). Now with a defined project scope, intended output, target audience and organized task flow and data classifications, the designer moves into the visual design stage.

Again, the designer is adapting this process to meet the specific requirements of the project but both information design and interaction design rely on the graphical design principles of gestalt, typography, color and form. As explored in The Practical Guide to Information Design, an adherence and exploration of design solutions based on consistency, proximity, chunking, alignment, hierarchy, structure, balance and clarity are critical during this phase (Ronnie

pp. 7-9). However, the motion designer can't stop at the evaluation of visual form but must continue to explore the key areas of informational structures, motion design, and application requirements.

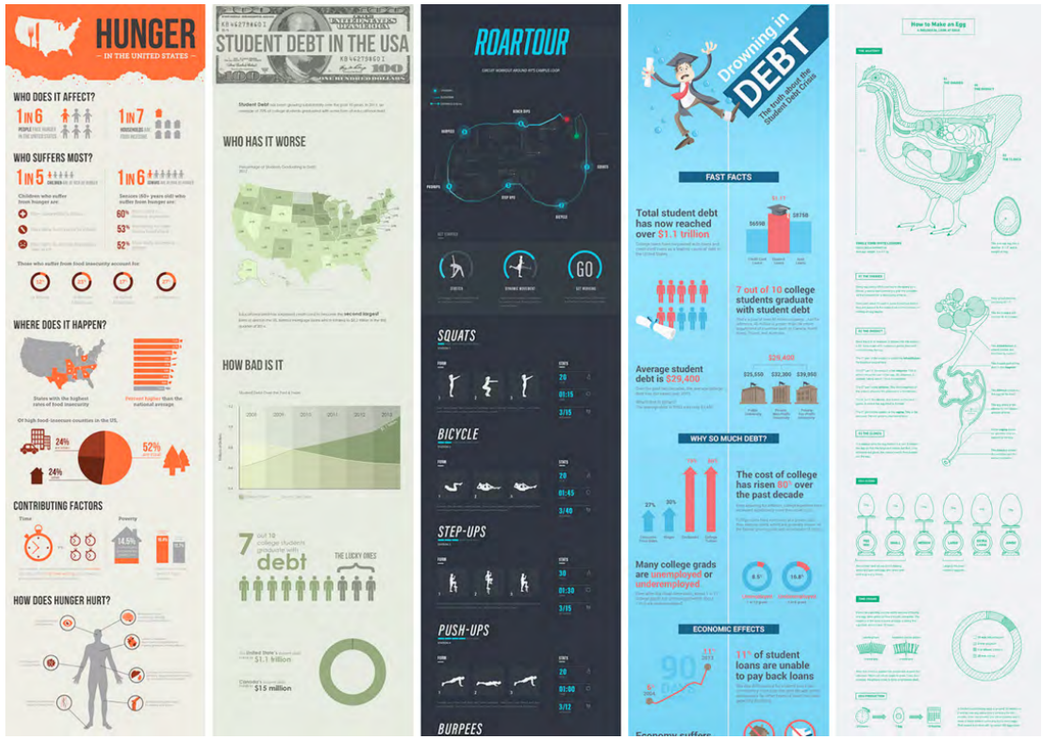


Figure 2. Infographic project: students research factual raw data which are related to social issues or procedural information. Using the raw data/information and its graphical form students develop their intended message in a way that engages the audience, provides information, and convinces the viewer to seriously consider their point of view. During this project students follow a guided design process; research data and topic, research design, ideation (concept, idea & story development, sketches, etc.), exploration, and iteration. Project by Lauren Carney, Noah Green, Riley Yankowich, Kelly Hurlburt and Luka Schulz

To explore the informational structures a deeper investigation into data structures is embedded into the architecture phase. This exploration utilizes concepts around traditional informational graphing mechanisms that include charts, graphs, diagram, plots and pictographs (Wilbur RIT). Based on the initial research of audience, usability, available interactions and intended value, the designer can identify the possible visual representations and form factors that fulfill the desired outcomes in figure 3. A strong foundation in graphic design information design assist the designer in creating the proper mental models that foster an intrinsic relationship between the controls, data structures and effects for the user (Lidwell 128). These structural representations are also dependent on the purpose of the data such as procedural, statistical, explanatory or informational. The figures 3 and 4 are results of the New Media Design project: Interactive Infographics.

Figure 3: Interactive Infographic project: this project is a standalone interactive infographic that could be incorporated into a large web, tablet or mobile experience. Students explore the potential of graph forms, graphical translations, imagery, typography, transitions and their advantages beyond listing raw data. The goal is to show complex data in an informative, explorative, entertaining and easy to understand manner. It also provides the users with some control over the data/visualization displayed. Prototype demonstration is a part of their final solution. Prototype: https://vimeo.com/149517260. Project by Olivia Grace.

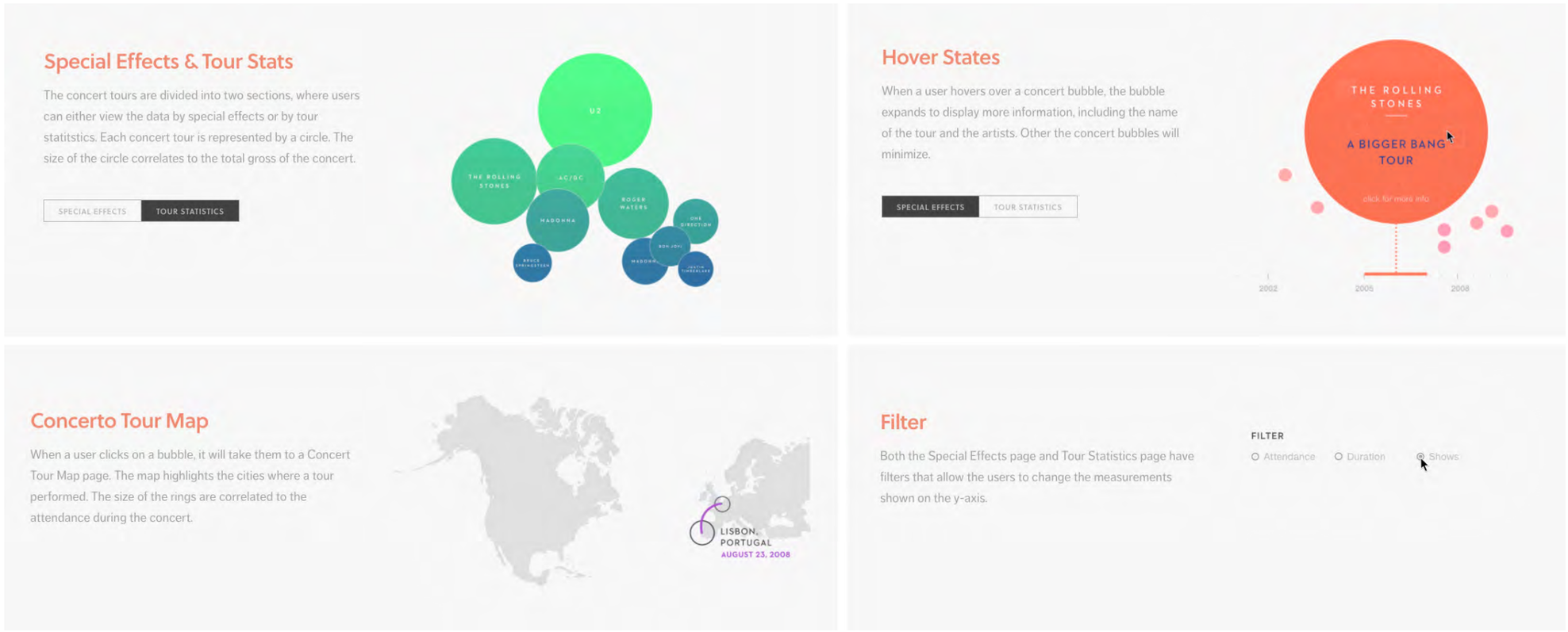
User Experience Design with Principles of Motion

With the data and user experience solution mapped using traditional graphing, visual design and interactive systems the designer can explore the principles of animation. This process begins with the exploring how the basic principles of animation for traditional 2D, 3D and UI design. In *Principles of Traditional Animation Applied to 3D Computer Animation,* John Lasseter illustrates the importance of adapting Ollie Johnston's and Frank Thomas's animation examples from the 1981 book *The Illusion of Life: Disney Animation* (Lasseter pp. 35-44). One of Lasseter's key findings is that while the fundamental principles hold true for any animation that the process and techniques must be adapted to achieve the desired results. This also holds true when applying

animation to informational graphics, user interface elements and animated prototypes. As with traditional animation and motion the 12 basic principles of squash and stretch, anticipation, staging, pose to pose, follow through, easing, arc, secondary action, timing, exaggeration, solid drawing and appeal principles add to the visual language, tone and character of the data and interface. However, the motion designer now must consider the form factor of the display, usability and related impacts. For instance, the timing of data and animated elements displayed on a smart phone or digital watch directly influence the timing, complexity and scale of the animation. While faster and more subtle motions create refined yet clear transitions, usability hints and relationships between views and elements (Google, Material

of proper staging, easing and exaggeration can assist in creating a focal point and maintain a continuous path for the viewer to follow. In addition, timing plays a secondary role in controlling anticipation between action and reaction when the motion is a result of an interaction, selection, transition or user gesture in figure 4. This feedback loop allows the user or viewer to easily recognize that an action has been executed and to await the response animation. Proper timing is critical to allow the viewer to move between the input and the resulting animated data or visual transitions without introducing exaggerated delays which will also result in a disconnect between the data, input and animation.

Figure 4: Interactive Infographic project. Prototype: https://vimeo.com/149517260 Project by Olivia Grace.



Motion); slower and exaggerated motion may serve a larger screen interactions and projections more effectively. Likewise, the nature of the data, communication objectives or interaction will require the use of a stronger focal point through reduced background animations. The use

Creative Development and Production & Implementation

Now that the designer has completed the investigation phase of the project through data analysis, user research, identified outcomes, selected appropriate data structures and motion controls, a series of

visual explorations are created to highlight the aesthetics and character of the motion design work. Inspirational boards and competitive research are used to formulate the basis of the creative development and production of the motion graphics design in figure 5. These investigation, inspiration phases lead to the creative iteration of the design for information graphics, visual composition, and applied motion techniques. Following accepted user experience workflows, user testing and evaluation is introduced to assist in the iterative design of the solution. The effective application of aesthetic principles such as color, typography, visual forms, and structure assist in achieving a solution that reflects the Principles of Least Effort which describes the searching and seeking behaviors of users and how simple, accessible, familiar and comfortable (O'Grady 86) are key attributes to creating highly effective solutions. This is not to say that challenging the user or viewer through interaction, motion or aesthetics cannot be as powerful or in fact more powerful, but to do so requires the designer to create a compelling solution without burdening the user with unwarranted complexity.

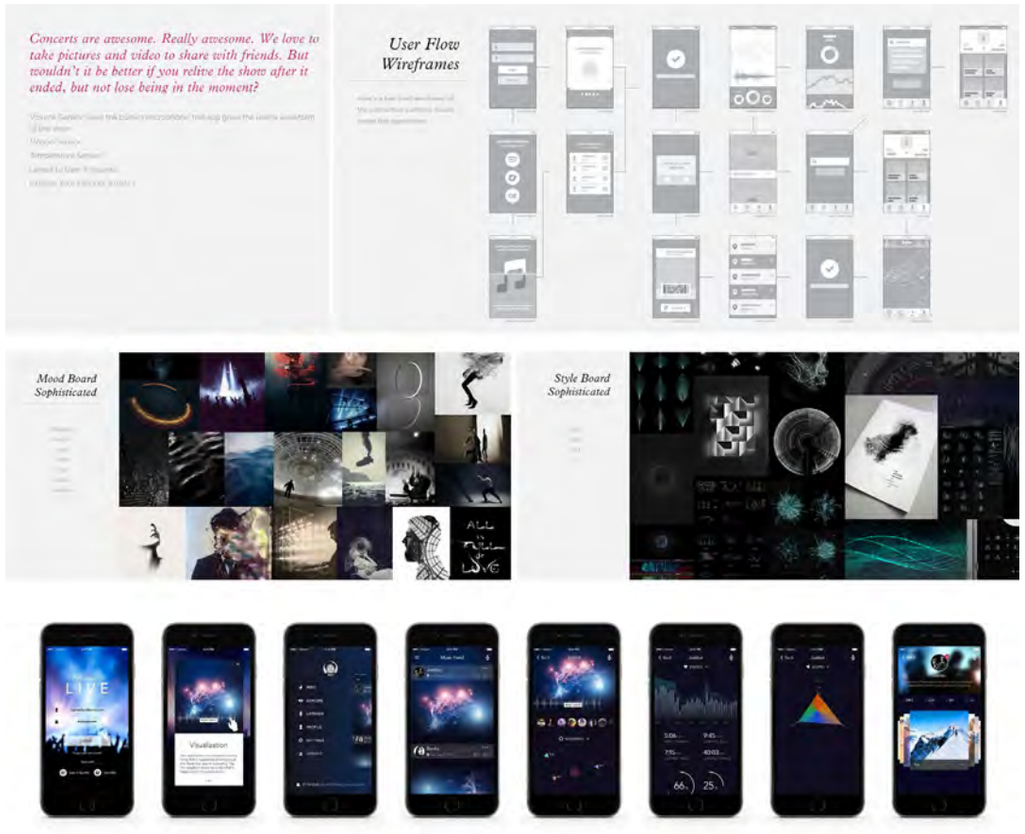


Figure 5: Interactive real-time data visualization project: the project is an exploration of the innovative potential of real time data forms and their advantages beyond matrices listing raw data. Students explore visual representation of data, examine principles for visualizing numerical information, and distill real time data in order to present them in a way that is easy to understand and engaging for the targeted users. Prototype demonstration is a part of their final solution. Prototype: https://vimeo.com/110805366 Project by Ryan Kiley.

Conclusion

Motion is a critical part of the UX experience. Every element we interact with inside of the user interface requires certain movements to engage, inform, and entertain the user. As content has itself become part of the user interface the UX design process, information design and data visualization are interconnected and must be designed together to better communicate a unified design solution and functionality. The motion prototype allows for the designer to bring the information alive using animated prototypes and informational graphics. Beginning with the investigation of data and user centered design goals a visual direction guides the overall data structures and movements. When delivering complicated information effective use of motion can not only enhance understanding of information but also give personality and feeling to create a connection to the user.

A robust skill set is required for today's designer that leverages a unique blend of creative and technical knowledge in design and motion around interactive displays and form factors. Motion design isn't a passive viewable format but a design challenge that bridges the creative and technical fields in industry and education.

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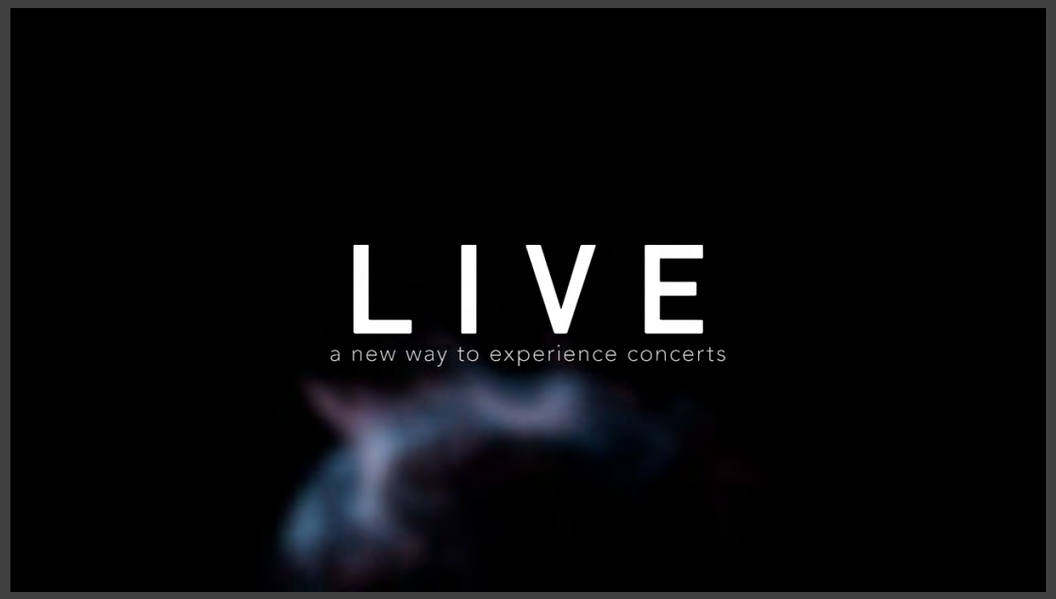
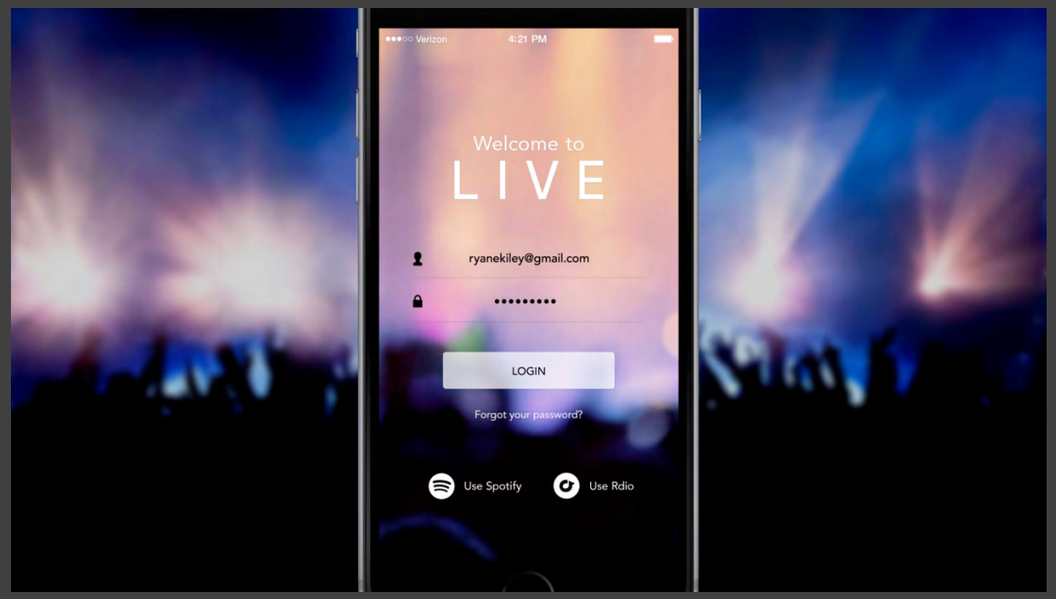
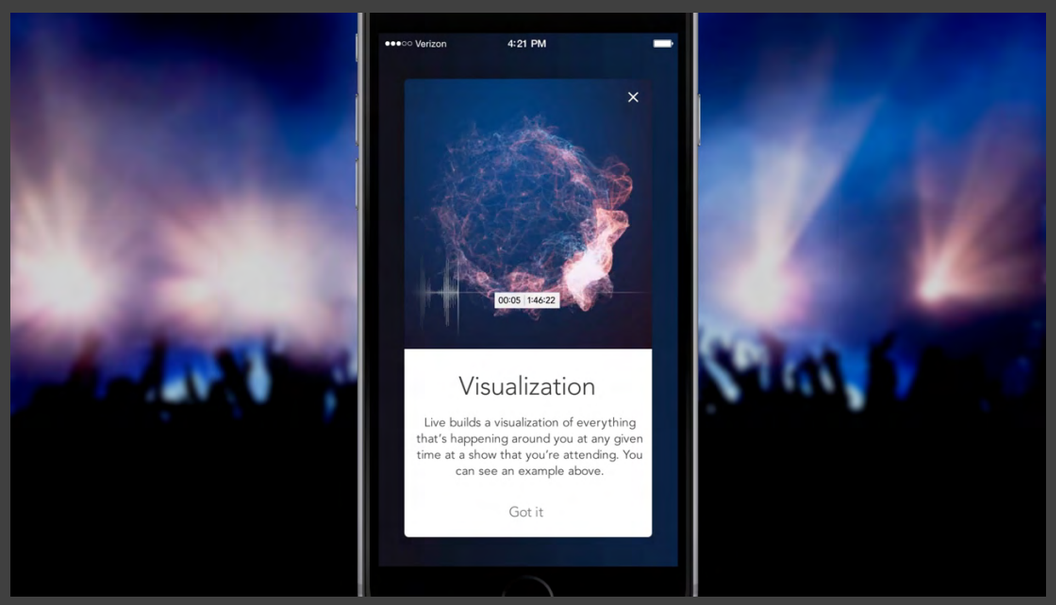
Author Biography

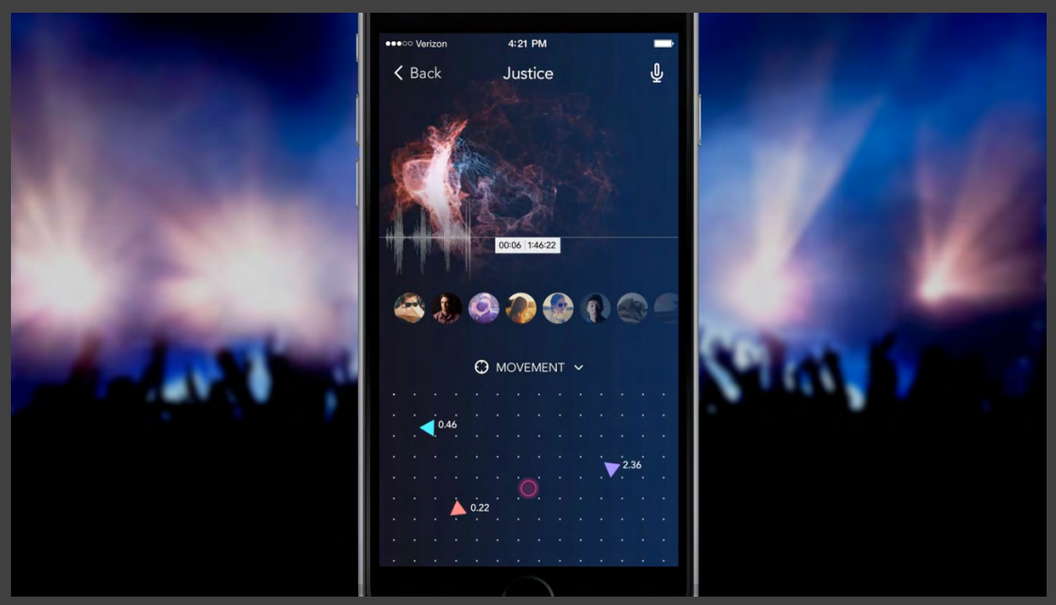
As an award-winning and patent holding designer specializing in user experience design, Hye-Jin Nae brings her diverse and detail orientated drive to every project and class she encounters. Originally from South Korea with a background in fashion design, she is currently Assistant Professor in New Media Design at Rochester Institute of Technology. Prior to this current teaching position, she held the positions of Visiting Assistant Professor in New Media Design and Assistant Professor in Graphic Design at RIT. She holds a MFA in Computer Graphics from RIT, a BFA in Graphic Design from University of Wisconsin and a BA in Clothing and Textile Design from Sungshin Women's University.

Prior to her academic career, she worked in the user experience design industry as a creative director and lead experience architect at EffectiveUI, lead designer at Yahoo! Inc., and sr. visual interaction designer at Eastman Kodak. She specializes in researching applied UX design and bringing that design sensibility and multi-disciplinary thinking into the classroom. Her diverse background and knowledge from designing experiences for applications, retail point of sale, consumer products, a wide variety web applications and web properties are directly integrated into the classroom. Her detail oriented approach to design is shared with freshman to seniors from basic design elements to cutting edge UX design projects. She continues to research UX for traditional and new paradigms while building the foundation for tomorrow's design education.









Media from the paper *Motion Design for Data Visualization and Interactive Prototypes*
Source(s): Hye-Jin Nae

PAPER CATEGORY: PRACTICING

Using Animated Visual Narratives to Improve Patient Experience and Health Literacy in Pediatric Oncology

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University of Cincinnati

Lesley Breech (MD) and Karen Burns (MD)

Cincinnati Children's Hospital

Abstract: The challenge of communicating complex health information to adolescent cancer patients and their families is significant. A new diagnosis can be emotionally and cognitively overwhelming. Visual storytelling with content developed using an empathetic patient-centered approach can be a powerful means of improving a patient's understanding of complex health information and increasing the likelihood that they will follow their treatment plan.

Since Fall 2015, Oncologists, Nutritionists, Social Workers, Patients, and Caretakers from the Cancer and Blood Diseases Institute (CBDI) at Cincinnati Children's Hospital have collaborated with motion design students from the University of Cincinnati's College of Design, Architecture, Art, and Planning (DAAP) on the creation of a library of animated visual narratives aimed at improving pediatric oncology patients' understanding of several topics pertinent to their journey through treatment. Topics have included general overviews of Nutrition; and Fertility Preservation, as well as specific explanations of various types of Feeding Interventions, and Fertility Preservation options.

Using the aforementioned projects as case studies, this paper presentation discusses the important benefits animated visual narratives and multi-modal presentations can play in improving patient engagement, deficiencies in health literacy, and institutional efficiency. Empirical evidence is shared from a randomized pilot study that comparatively measured the social validity of two different methods of presenting introductory information (animated visual narratives vs. printed handout) for Nutrition and Fertility Preservation ancillary services offered to pediatric patients diagnosed with cancer.

Keywords: Animated Visual Narrative, Health Literacy, Cognitive Theory of Multimedia Learning, Social Validity, Patient-centered

Introduction

For pediatric patients and their families, a new oncology diagnosis can be both emotionally and cognitively overwhelming. Compounding the situation is the staggering amount of new information they receive in a short, stressful period of time. Multiple care team members may introduce the same information using different terminologies and styles of delivery. This inconsistency can create additional angst and confusion.

Clear communication is critical to successful healthcare. However, little attention has been devoted to enabling patients to better understand their condition and treatment, or to make the best decisions for their care. Tens of millions of U.S. adults are unable to read complex texts (Nielsen-Bohlman, foreword xi). This includes many health-related materials. Healthcare providers routinely take for granted patients' ability to read and understand all types of health-related materials. The use of jargon and esoteric language commonly results in information requiring higher reading skills than those possessed by the average American reader (Stossel et al. 1165). Furthermore, diversities in learning styles and information modalities have rarely been considered. Unfortunately for those with limited health literacy, as health care is becoming increasingly complex and health information is becoming more diffuse in the public domain, there continues to be more reliance on written materials to educate and inform people about their health.

Together, these factors can lead to lower levels of understanding, retention of information, and low utilization rates with ancillary services (Johnson and Kroon, 72) (Murphy et al. 2529). As the Institute of Medicine's 2004 report *A Prescription to End Confusion* explicitly expresses, "...health literacy—enabling patients to understand and to act in their own interest—remains a neglected, final pathway to high-quality health care" (foreword xi). The evidence suggests providers should not routinely assume that patients correctly understand their diagnoses and treatment plans.

Health Literacy: A Brief Overview

A 2003 report by the Health and Medicine Division (HMD) (formerly the Institute of Medicine) of the National Academies of Sciences, Engineering, and Medicine (the National Academies) on *Priority Areas for National Action in Quality Improvement* specifies health literacy as a "cross-cutting priority" (41). The *Patient Protection and Affordable Care Act of 2010,* defines health literacy as "the degree to which individuals have the capacity to obtain, process and understand basic health information needed to make appropriate health decisions—capacity is the potential a person has to do or accomplish something. Health literacy skills are those that people use to realize their potential in health situations. They apply these skills either to make sense of health information and services or provide health information and services to others" (cdc.gov). This definition underscores the importance of knowledge acquisition.

According to *A Prescription to End Confusion,* "nearly half of all American adults—90 million people—have difficulty understanding and acting upon health information" (1). The roots of health literacy problems have grown as health practitioners and health care system providers expect patients to assume more responsibility for self-care (Parker, "Health Literacy: A Challenge" 278). Groups with low health literacy often lack the health-related background knowledge that is required to understand information (Chin 222). Health providers often give too much background information, rather than simple, essential information that helps the patient solve their problems (Parker "Health Literacy: A Challenge" 279). Low health literates are more easily at risk of cognitive overload when presented with health-related information (Wilson 318).

Although health literacy research has primarily focused on adult care, there is a growing body of knowledge connecting low health literacy in parents with adverse effects in the wellbeing of their children. Nearly 30% of U.S. caregivers have "below basic" or "basic" health literacy. Low health literacy in caregivers has implications for child health (Kutner et al. 5) (Yin et al S298). Parents with low health literacy may face more barriers to care or lack the communication and processing skills required to act appropriately on health care information for their children (Yin et al, "Health Literacy of Parents" S298) (Yin et al., "Perceived Barriers to Care" 118). Having good health literacy is associated with good health outcomes (Schillinger et al. 475). The National Institute of Health (NIH) now urges pediatricians to pay attention to the literacy development of their patients.

During clinical encounters, health practitioners need to make their communication 'fit' their patients' actual health literacy (Parker et al. "Patient and Family Education" 63). Health educators stress that people of all literacy levels prefer materials that are simple and easy to understand. Many standard patient education materials are written at a high school or college level. As a result, they are often inaccessible to patients. When written materials are required, they should use plain language at the fifth-grade level or lower (cdc.gov). Practitioners should also consider using non-written materials such as videos, animations, or multimedia presentations to convey important information to patients with limited health literacy (Calderon et al. "Animation as a Venue for Enhancing Health Literacy" 91) (Leiner et al. 595) (Schnellinger et al. 996). In general, video-based programs are a successful strategy to improve communication with patients and increase short-term knowledge, and they have consistently outperformed written material (Feek 16) (Silverman et al. 249). One research study has shown animation to be a valid approach for improving improving diabetes health literacy among Latino/Hispanics (Calderon et al. "Improving Diabetes Health Literacy by Animation" 361).

Cognitive Theory of Multimedia Learning: A Brief Overview

The cognitive theory of multimedia learning was popularized by the work of Richard E. Mayer and other cognitive researchers who argue that multimedia supports the way that the human brain learns. Mayer's 'multimedia principle' asserts that learners attempt to build

meaningful connections between words and pictures and they learn more deeply from a combination of words and pictures compared to words alone (Mayer "Cognitive Theory of Multimedia Learning" 47). The words can be spoken or written, and the pictures can be any form of graphical imagery including illustrations, photos, animation, or video.

One of the key aims of multimedia instruction is to encourage the learner to build a coherent mental representation from the presented material. The learner therefore makes sense of the presented material as an active participant, ultimately constructing new knowledge. Multimedia instructional design attempts to use cognitive research to combine words and pictures in ways that maximize learning effectiveness.

Cognitive theory of multimedia learning is based on three assumptions: 1) Dual-channel assumption (sometimes referred to as Dual-Coding theory); 2) Limited capacity assumption; 3) Active-processing assumption (Mayer and Moreno 312). Based on Baddeley's theory of working memory and Paivo's dual coding theory, the dual-channel assumption states that working memory has two separate channels for processing information—auditory and visual. Animations and static presentations of information like printed material fundamentally differ by text modality, or the way in which text is presented. In static messages, the eyes process both text and pictures as visual imagery. In contrast animations can consist of both auditory text and visual imagery. By using two channels for processing information (auditory and visual), animations can decrease the likelihood that a learner experiences cognitive overload.

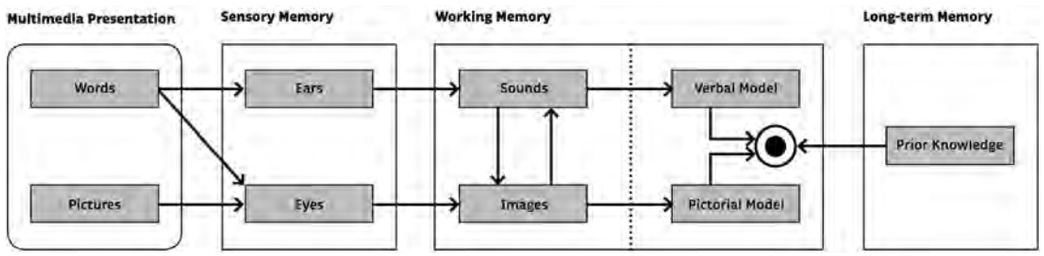


Figure 1 : Mayer's Cognitive Theory of Multimedia Learning

Moving visuals is another feature that distinguishes animations from static presentations. Mayer and Moreno describe animation in the following way :

> Animation refers to a simulated motion picture depicting movement of drawn (or simulated) objects. The main features of this definition are as follows: (1) picture—an animation is a kind of pictorial representation; (2) motion—an animation depicts apparent movement; and (3) simulated—an animation consists of objects that are artificially created through drawing or some other simulation method. In contrast, video refers to a motion picture depicting movement of real objects. Similarly, an illustration is a static picture of drawn (or simulated) objects whereas a photo is a static picture of real objects. (Animation as an Aid to Multimedia Learning 88)

In a meta-analysis study titled *The Effectiveness of Health Animations in Audiences With Different Health Literacy Level,* demonstrated that animations generally resulted in better learning outcomes, particularly for people with low health literacy. The study specifies that, "when exposed to spoken animations, people with low health literacy recalled the same amount of information as their high health literate counterparts, whereas in all other conditions people with high health literacy recalled more information compared to low health literate individuals." In addition, "Animations alone did not improve recall, but when combined with spoken text, they significantly improved recall in this group" (Meppelink et al.).

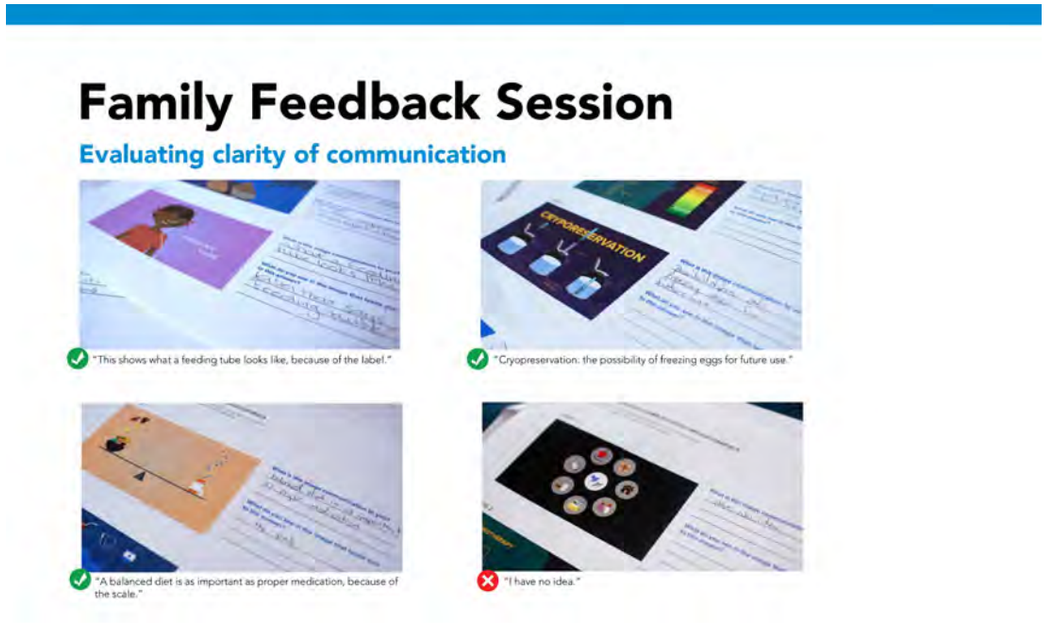
Project Purpose and Scope

Since Fall 2015, Oncologists, Nutritionists, Social Workers, Patients, and Caretakers from the Cancer and Blood Diseases Institute (CBDI) at Cincinnati Children's Hospital and Medical Center (CCHMC) have collaborated with motion design students from the University of Cincinnati's (UC) College of Design, Architecture, Art, and Planning (DAAP) on the creation of a library of animated visual narratives aimed at improving pediatric oncology patients' understanding of several topics pertinent to their journey through treatment.

Topics have included general overviews of Nutrition; and Fertility Preservation, as well as specific explanations of various types of Feeding Interventions, and Fertility Preservation options.

Projects begin with the identification of relevant topics by members of CBDI's patient caretaker team. In consultation with content experts and under the guidance of design faculty from DAAP, motion design students interning at the Live Well Collaborative (LWC) as a part of UC DAAP's Experience-Based Learning and Career Education program, spend approximately 20 hours per week for a 15-week period developing the animated visual narrative. In Weeks 1-5 students engage in mixed methods generative research, including interviews with patient/caretaker dyads and content experts, online benchmarking of best practices, and iterative writing. Week 5 concludes with a research report whereby students present a communication strategy. Leveraging their research-based insights, students summarize key communication concepts in the form of a written outline and a preliminary draft of a script. Over the following two weeks, students iterate on the script, incorporating revisions and refinements based on further consultation with content experts and patient/caretaker dyads. A final script is sent to a Content Review Board at Cincinnati Children's who optimize it for age appropriate comprehension.

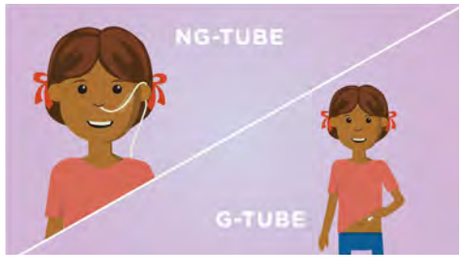
Approved scripts are translated into rough, hand-drawn storyboards. Careful consideration is given to establishing a visual rhythm and conceptualizing opportunities to incorporate sophisticated transitions between key frames. Content experts review preliminary storyboards for concept accuracy and visual clarity. Feedback is integrated into a second round of storyboarding. The second round transitions to full color, digitally developed compositions. Patients and caretakers are re-engaged to provide further insights into the clarity of communication. Patients were asked to look at visual compositions and describe what they thought was being communicated. Based on audience feedback, revisions were created in an effort to improve the communicative effectiveness.



Figures 2 & 3 : Examples of patient evaluations of key concepts

One of the practical challenges of working on long-term projects—or a series of projects—within an experience-based learning setting where students rotate through internships every 15 weeks is establishing and maintaining visual cohesion. To address this issue, a conscience effort was made in fall of 2015 to establish a consistent visual language based on basic geometric elements and

modular construction that could be easily evolved by individual students and maintained across numerous projects and terms. Following this flexible framework, old visual assets can be reused and new ones can be created, as each specific narrative requires.



Figures 4 -6: Examples of modular visual language

Week 10 concludes with the presentation of an animatic prototype. Key frames from the digital storyboard are integrated with spoken narrative to demonstrate the relationships between audio and visual. Prior to recording the voice overs, motion design students recruit and audition peers from the Voice, Dialect, Speech and Communication program at UC's College Conservatory of Music (CCM). The final five weeks are dedicated to production and refinement with an emphasis on principles of kinetic communication.

Figures 7: Visual sequence demonstrating a cancer patient's changing relationship with food

Project Evaluation

In *Multimedia Learning,* Mayer identifies twelve multimedia instructional principles that were developed from nearly 100 studies over the past two decades (harvard.edu). Animated visual narratives with voice over narration integrate a majority of these principles including: Redundancy Principle; Spatial Contiguity Principle, Temporal Contiguity Principle, Modality Principle, Multimedia Principle; Personalization Principle, and Voice Principle.

It is anticipated that the animated visual narratives with voiceover narration developed for pediatric oncology patients and their families at Cincinnati Children's Hospital will positively affect recall, increase understanding, and lead to more informed decision-making—particularly with those with low health literacy. Improved understanding could also improve adherence, lead to shorter consultations and/or more targeted inquiries. In addition to knowledge improvement, the information presented often aims to convince people about the benefits of specific behaviors—like proper nutrition—or ancillary services, such as fertility preservation. According to Ajzen and confirmed in health research, in the theory of planned behavior, attitudes toward the behavior affect behavioral intention (179). If the presentation of a message enhances information processing, it can be expected a positive attitude toward the message will result from an experienced fluency.

Several of the animated visual narratives are currently being evaluated. The purpose of this quality improvement (QI) initiative is to evaluate the use of standardized animated visual narratives to introduce fertility preservation interventions for new patients in the Cancer and Blood Diseases Institute (CBDI) at Cincinnati Children's Hospital Medical Center (CCHMC).

Evalution Methods

New CBDI patients (and their parents/caregivers) who received a fertility consult were invited to participate. No patients/families declined to participate. Those who enrolled received an introduction to the service via an animated video containing introductory information about the need for fertility preservation consultation. Enrolled patients/caregivers completed a questionnaire using a Social Validity framework. The Social Validity Measure (SVM) and Social Validity Measure-Patient Version (SVM-PV) were designed uniquely for this study, based on adaptations of established Social Validity measures in the field. Patients then received the complete fertility consultation as per institutional standard of care. Additional data was collected including the patient's diagnosis, date of diagnosis, treatment dates, and other pertinent demographics. Clinical measures included satisfaction of service introduction method, time spent for consultation, and rate of utilization of services.

The data was analyzed using descriptive statistics (quantitative results from social validity measures; time spent introducing services; utilization of services, duration of consultation, and number of subsequent visits before decision was made about intervention).

Results

The standardized introductions were administered to 11 patients (5 female, 6 male). Social validity measures (SVM) and data were recorded for all 3 patients (> 13 yrs old) and SVM for 17 caregivers (10 mothers, 7 fathers). Diagnoses included leukemia (3), hepatoblastoma, neuroblastoma, Fanconi anemia with myelodysplasia, sarcoma (3), cartilage-hair hypoplasia syndrome, congenital erythropoietic porphyria & photosensitivity. Patient ages ranged from 0 years to 29 years (x = 10.91 years).

Preliminary findings indicate that the use of a video is a socially valid method to introduce fertility preservation services for both patients and their parents. That is, both patients and parents indicated that they were satisfied with the use of a video to introduce these services, and provided evidence of their understanding of the information presented about fertility preservation through the use of the video.

Both parents (x = 4.65) and patients (x = 4.67) indicated positive agreement (>3) relative to understanding the purpose of the video showed, with nearly identical average responses as per the 5-point Likert scale.

Parents indicated slightly greater likelihood to watch the video again (x = 3.94) than patients (x = 2.5), who indicated that, on average, they would not likely re-watch the video.

A majority of the parents (n=9, 53%) and patients (n=2, 67%) understood that chemotherapy, age, time before first treatment, and gender played a role in determining the procedure options and risk for infertility; however, there seemed to be some uncertainty about the role of gender relative to fertility preservation in both groups. This may be an area warranting further clarity in future iterations of the video. Likewise, the video does not directly address fees associated with fertility preservation; thus the majority of parents (n=13, 76%) stated they were unsure about the cost of this service. Future iterations of the video may need to more explicitly address the potential fees associated with fertility preservation, and the role of insurance in determining an exact out-of-pocket cost for families who elect to undergo such procedures.

Evaluation Summary

The primary aim was to assess the social validity and acceptability of a standardized animated introduction to fertility consultation services for new patients receiving care in the CBDI at CCHMC. Social validity data collected suggested participants understood the information well and were able to answer questions about it. We found that the use of an animated visual narrative with an empathetic patient centered approach can be valuable and beneficial to patients and families. The data suggests that this approach is both acceptable to patients and families and demonstrates favorable social validity. These results will be used to standardize the introduction of fertility services with maximal social validity.

Project Future

In addition to social validity results concluded from this pilot study, more broadly, theory and research-based evidence has shown that animated visual information combined with spoken text is a beneficial way to communicate complex health messages to people with low health literacy. Moving forward, it is our intent to test the ability of the animated visual narratives we created to evaluate their ability to improve understanding, adherence, and ancillary service enrollment amongst low health literate pediatric oncology populations. Another, parallel area of investigate is to design, produce and evaluate culturally and linguistically appropriate versions for emerging populations in the Middle East who are seeking pediatric oncology care at Cincinnati Children's Hospital.

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