Changing Worlds

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Over the past decade we have seen a magnificent convergence of media. Mobile phones can play music and display web pages. Computers are capable of crisp, legible text and high quality video — sometimes on the same page. Movies capitalize on advances in display technology with immersive 3D experiences.

The tools to build media have also evolved from the highly specialized toward the generalized. Thirty years ago the reproduction of text required a printing press. Music making needed at least a mixing console, some multitrack tape, and a microphone. Filmmaking necessitated at least half a dozen specialized skills and many distinct pieces of equipment.

Making and viewing can now happen on a computer almost instantaneously, changing the nature of the media and the tools that we use to create it. Genres of entertainment are colliding toward a total reality rather than as separate, static media. Moving pictures, text, and sound can be experienced simultaneously using a computer or mobile phone as an instant input and output device for multimedia platforms such as YouTube, Vimeo, Flickr, and others.

Gene Youngblood, in his 1983 essay "New Renaissance," described that a computer "in principle can become anything that can be precisely defined." His essay continued that the computer as the tool and feedback device would engender a "non-hierarchical structure of authority and reality."

The delineation between creator, viewer, and participant in non-hierarchical online platforms such as YouTube or Flickr is blurred. Members can comment or respond to content with their own content and can reorganize or reframe others' content using platforms such as web blogs or RSS feed aggregators.

These early platforms only scratch the surface of what we're capable of producing.

SENSE SYSTEMS

Building a platform requires knowledge of how we, as humans, work. Modern platforms

are instantaneous feedback devices in which humans are the variability. What we see and hear as a result of what we change gives us clues as to what's happening in all stages of the platform's experience. All of our sense inputs, in effect, can be taken advantage of in creating dynamic media. Touch, sight, hearing, balance, temperature can be approximated by sense and sensors that interface computers with humans. The more sense we incorporate, as input and output in dynamic media, the closer we get to total reality.

Sound and image are two obvious collision points for creating a synaesthetic experience. Every day we are presented with audiovisual messages from our television, video games, neighbors, and the public address systems on the subway. Our analysis of how these commonly conveyed senses work together (or not) can give us clues about how traditional and dynamic media are similar or different from one another. We see what we touch and listen to the sound it makes.

A spoon hitting the side of a half-full glass of water will produce one sound and a spoon hitting another identical, but nearly full glass of water will produce another, higher pitched sound.

We can create this kind of variability using dynamic media rather than mixed media. Mixed media creates a multisensory experience by placing distinctly different media in the same space. Dynamic media marries the two as one in a repeatable, playable format that utilizes both senses as output to inform one input or action by the participant.

TEACHING WORLDS OF SENSE

In the Dynamic Media Institute course *Sound for Dynamic Media,* we turn the tables on visually minded students and ask them to look at the world through their ears. Sound can be visualized, images can be interpreted aurally, and finally computer manipulation can influence how both are perceived together.

What makes the interaction between light and sound most interesting is not what we think we may know, but what we don't know. We know that the spoon creates a sound against the glass. We know that pouring water out of the glass creates a different sound when we hit it again. We don't know exactly how much water to pour out right away, although we can repeat the experiment until we do know.

What cannot be explained through science or repeatability is what sound gives us pleasure (or not) when we hit the side of the glass. This method of exploration is encouraged in class. Equivalencies of light and sound have more subjective than scientific significance.

On the first day of class students are asked to find somewhere inside or outside of the school to sit, close their eyes, and listen to the world around them. They draw these sounds on paper in any method they wish, keeping in mind light and sound equivalencies such as location, height, depth, composition, and relative volume. Afterward, students are invited to share their findings with one another and to compare the visual output of their sound drawings. More often than not, we see more similarities between the drawings than differences. The most exciting part of these conversations is the discovery of these commonalities. The drawings help students gain a visual foothold in, and to create to a base perceptual pattern language for, a medium they may have never been exposed to previously.

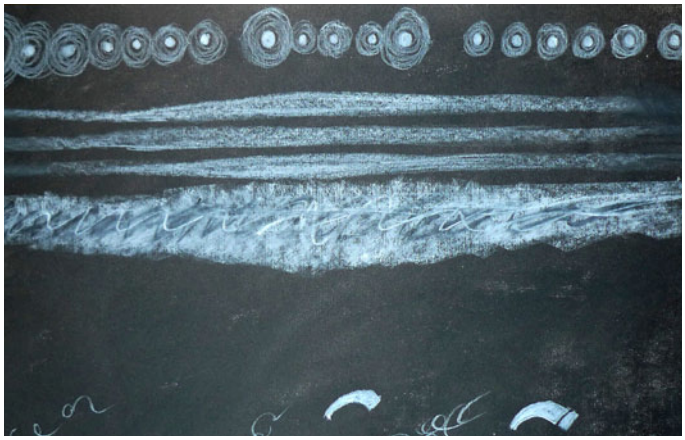
EVERYTHING IS MUSIC

The next step is to break down the qualities of the audiovisual objects into repeatable signifiers that show a sound's influence on a visual object in time.

The exercise is named "Everything is Music" after John Cage, who once asked: "What is more musical: a truck passing by a factory or a truck passing by a music school?" This post-modern questioning of music helps frame the questioning of media from a wholly different angle.

Students record a series of sounds. The important part is that they own their material. Their sounds can be anything: their own voices, the sound of motors, the jiggling of keys, sound generated by a synthesizer, and so on. They are also asked to take notes about the quality of these sounds.

Guest John Owens leads the class in an impromptu musical ensemble



Sound drawing by Kent Millard (MFA 2010)

Then they categorize distinct sounds according to metrics of their choosing and match them to their own created visual objects. This becomes the database.

TOOL TRANSFER

To test their theories they render each of the objects as time-based media and place them in a two dimensional environment (much like the historical works of Oskar Fischinger and Norm McClaren). The visual representations animate with the sounds. The objects have both visual and auditory relationships with one another and can illustrate properties like harmony, pattern, and rhythm that change over time.

My own experience with testing these parameters gave me the body of research that became the project *Shapemix,* but since it was based partly on my own empirical evidence, how many other possible permutations exist? It is the intersections and differences between people's perceptions that make this project personally interesting to me.

Difference in approach created different challenges. In one example, Jason Bailey (MFA 2010) made several moving three-dimensional timelines of his soundtrack. As the sounds came into prominent view, the eye matched the sound with the object according to its convergence with a static vertical sightline.

Bailey says, "I think the big thing there was trying to create a shape in 3D that would visually map to the sound regardless of what angle you are viewing it. That was really hard to do because as you move around the shape what you see changes dramatically."

Scott Murray's (MFA 2010) approach produced different results. His project presented each visual object randomly around a semicircle. As each object moved into view, its sound became more apparent and its size changed according to its volume.

Elaine Froelich's (MFA 2010) method presented visual appearance (and disappearance) choreographed with the timing of sounds. Each sound had its visual equivalent, with motion and repetition handled through visual patterning on-screen.

VARIABILITY & DIGITAL HARMONY

Once students establish a language of audiovisual equivalencies, they translate their work to dynamic sketches. These sketches serve as platforms for understanding how sound and image work together. The perceived objects have multiple states and those states have visual and audio outputs, and possibly inputs, that are controlled by participants. Variability and significance of change in sound and its visual representation(s) play a large role in what is perceived.

Sound drawing by
Kyoung (Emily) Lee (MFA 2010)

Dynamic interpretation of final
project for "Everything is Music" by
Scott Murray (MFA 2010)

Each approach is different and is selected by the student to test an idea or series of ideas, rather than moving toward a preconceived goal, and can range from musical instruments, random-yet-sequential proofs of audiovisual objects, or experiments in pure aural perception.

Kyoung (Emily) Lee (MFA 2010) created a video-chat program that used sound as input to produce an overlaid visual output to create perceptual significance for participants. Elaine's Froelich's timer experiments ranged from pure audio to audio-as-supplement. Murray's *Aural Data Plot* worked with pure sound:

> *If visualization was not an option, what about an auralization? I created the* Aural Data Plot*, which takes x/y values and plays through them like music. It's essentially just the audible version of a simple bar chart, with left/right panning indicating the x position and pitch indicating the y value.*

CONCLUSIONS

At the end of this course students have created their own pattern languages and have created platforms for sound and vision. Students take their experiments of sound and image and incorporate them in further studies beyond the class and in some cases explore sound as part of their thesis. At the very least they have devised ways of working with their material so that it reflects who they are and what they perceive combined with continual feedback from their peers and others.

Platforms create new realities. Creators of platforms would do well to learn the layers of programmatic abstraction in order to understand what the medium's potential. In the same way mechanical typographers must know the intricacies of manipulating press machinery in order to produce a useful printed design, designers of dynamic media must know how to incorporate logic and variability into platforms that appeal to as many of our senses as possible.

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