

3D Across Media: Ceramics, Print and VR

Julieta Aguilera
Academy of Creative Media System
University of Hawai'i Hilo
200 W. Kawili St
Hilo, HI 96720

J. Goebel
Art Department
University of Hawai'i Hilo
200 W. Kawili St.
Hilo, HI 96720

M. Mann
Humanities Department
Hawai'i Community College
200 W. Kawili St.
Hilo, HI 96720

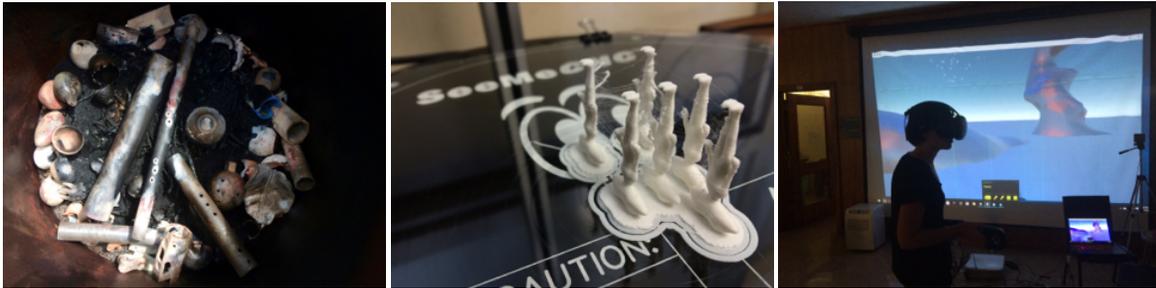


Figure 1: Class pit fire ceramics, 3D print of LIPS by Kristiana Traves, virtual world by Kala'i Blakemore

ABSTRACT

Unlike art courses that are designed around particular media or techniques without digital tools, the 3D immersion workshop at the University of Hawai'i-Hilo [Hughes 2016] was designed across three different media - ceramics, 3D printing and virtual reality (VR) - with the specific intention that students would explore the three dimensional form as tactile and malleable with their hands, digitized and then altered and printed, and finally arranged in space as a virtual environment to be navigated. Faculty in ceramics, printmaking and VR worked together designing the assignments and making adjustments as the class progressed. Students used a wide variety of techniques, software, methods and devices to respond to the assignments in a unique way.

CCS CONCEPTS

• **Human-centered computing** → **Virtual reality**; • **Computing methodologies** → **Virtual reality**; *Perception*; • **Applied computing** → **Fine arts**; *Media arts*; *Education*;

KEYWORDS

VR, ceramics, print, education, art, perception, 3D

ACM Reference format:

Julieta Aguilera, J. Goebel, and M. Mann. 2017. 3D Across Media: Ceramics, Print and VR. In *Proceedings of SIGGRAPH '17 Educators Program, Los Angeles, CA, USA, July 30 - August 03, 2017*, 2 pages.
<https://doi.org/10.1145/3092878.3092880>

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

SIGGRAPH '17 Educators Program, July 30 - August 03, 2017, Los Angeles, CA, USA

© 2017 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-5078-5/17/07...\$15.00

<https://doi.org/10.1145/3092878.3092880>

1 INTRODUCTION

Art education courses are traditionally tied to a specific media such as drawing, sculpture, photography, painting, or various non-digital media as a series of exercises in foundation courses. On the other hand, devices such as screens, microphones and cameras have been developed to address particular senses, such as vision, sound or motion. Research leading to a better understanding of the perceptual system as a whole compelled faculty in the areas of ceramics, printmaking, and virtual reality to emphasize the senses in a collaborative manner within the studio art education setting. The course is an example of incorporating traditional materials with emerging technologies in an integrated process.

2 LOGISTICS

The Summer Arts Institute Hilo [SAiH 2016] is an intensive six-week workshop that in 2016 explored three dimensionality across the continuum of different media. A dozen art students from various degree levels experienced how perception changes when modeling directly with hands, digitally altering scale, drawing and sculpting in computer graphics, and moving through three dimensional forms in VR. The opportunity to work with tangible materials provided rich sensory stimuli to confront the same forms in virtual environments that one can navigate through and interact with. Students took advantage of a ceramics studio, clay extruder, kiln and pitfire, 3D scanning and printing facility, 360 degree camera, slow motion smartphone video, and HTC Vive. They also got to experiment with particle systems and skeleton Kinect tracking, adjusting time, orientation, gravity, color, and other physical and visual qualities. These cutting edge resources were funded in part by the Academy for Creative Media System [ACM 2017].

The Big Island of Hawai'i is a unique location where natural materials carve and mold each other, resulting in textures, patterns, and forms. Students were encouraged to explore and research this extreme variety of environments and matter in various states, from

volcanoes to waterfalls to coral reefs, including a group field trip to Kaumana Caves Park, a nearby lava tube. The Big Island also provides for some of the best astronomical observation in the world, and students visited the 'Imiloa Astronomy Center ['Imiloa 2017] where they experienced its CyberCanoe collaborative visualization platform [CyberCANOE 2014], a large stereoscopic display with motion tracking capabilities which enabled students to experience immersion and interaction as a group. These activities informed a sequence of exercises designed to open venues of aesthetic reflection and handling of abstract relationships, an understanding rooted in the natural experience of the body as it exists in space and time. In turn, these relationships were extended to larger and smaller scales once arranged in virtual worlds.

Faculty met throughout the six-week course to fine tune what each discipline was doing in relation to each other. The first week was an introduction, the next four sessions were presented as individual exercises related to the classical elements that represent states of matter (earth as solid, water as liquid, air as gas and fire as plasma). The class met all day Saturdays starting with ceramics in the morning, 3D printing after lunch, and virtual worlds in the evening, then for open discussion on Sunday evening. It was organized around a closed social media group [Facebook 2017] where students could share photos of their models, interact with their digital scans, exported drawings/models created with a Vive VR Head Mounted Display (HMD) system, saved SculptGL or Maya models from their Sketchfab accounts, and share their observations of environments that they captured in 360 photography, as well as 360 snapshots of their virtual worlds. Vive navigation of their worlds in the studio was further enhanced by projecting the headset view onto a large screen. In this manner, students could comment and discuss with each other despite having only one headset.

3 TO VR FROM R

Affordable, accessible, and increasingly better programmed and designed digital tools have helped reduce the emphasis on learning how to simply use the software or operate the devices, and instead, focus on the experiences that are envisioned by professionals in various disciplines. Artists utilize media to show what is not perceivable by the human body and understand how we are conditioned by living in a body in the world. In recent centuries, perception has been segmented to various media for representation (visual, motion based, sonic, tactile and others). Conversely, the design of devices that perceptually construct experiences have isolated one sense at a time, for example vision (paintings, photography), motion (dance, theater), or sound (musical instruments), that is, until various sensory arrangements in VR came about, utilizing visual depth, sound, and tracked motion for specific tasks. By organizing the class in three sections that relate to each other, we sought to bridge some of the perceptual gaps left by media and device specialization.

In order to bridge the gaps, and make the creative process more fluid and collaborative, we encouraged the students to move their ideas between the sections and share models and 360 image captures in social media. To reflect on how space can be arranged, students were asked to do studies using 360 photography captured from within spaces of different sizes, placing the 360 camera inside (or by) objects, rooms, streets, caves, tunnels, forests, cliffs, or seashores.

In the virtual worlds, students were asked to make their models large enough to be able to “walk” over them or be inside of the models. A couple students created figures in clay, scanned and 3D printed multiple copies of them, as figurines or jewelry, and then created environments where the figures were flying or used as building blocks. Another student created a form inspired by corals, printed it to hold an underwater air pump, and used it to create mazes in a virtual world. Another one modeled a hand that was printed and became a virtual forest in VR. Another student modeled a microscopic looking shape, printed it very small, but created a virtual world where you could move around inside of the form. Some students had never used a computer for anything but email and web browsing, but were willing to try everything. Whenever the digital tools proved too alien, they would shift to the tangible media of ceramics or hold their 3D prints, carry them around, and eventually get back to their virtual worlds.

Why is it important to work with real materials and tracked motion today? The dexterity in handling actual objects and modeling reflects an understanding of form in space and over time, by identifying with it through the sense of proprioception (where tracked physical movements that affect the virtual world increase immersion), informed by the other senses like vision, touch and sound. On the other hand, observing a form that is affordable by most of the senses, a form that has gone through digitization and been put back in the actual world, or a form in virtual space (where weight is gone but physical memory makes you feel as if you could still touch it), open up potentially novel observations regarding concept development, motivation, and process.

4 CONCLUSION

The accompanying talk to this brief abstract will expand on the syllabus, students' processes and a compilation of observations gathered at the end of the course. The media utilized in the workshop is not new, but working directly with materials and with the latest generation of electronic devices helped bring together a unique combination that shifted the focus from medium to perception. While art courses are usually taught divided by technique, this course focused on how various media address and inform a realm, in this case 3D space. Art students are usually expected to integrate the various courses they took in school once they graduate, but this workshop questions whether this integration should happen sooner. VR does not emerge from nothing. It is based on reality. Working with tangible materials and studying actual environments through the process, can only make stronger connections that infuse more vivid, effective, and profoundly present virtual worlds.

REFERENCES

- ACM 2017. Academy of Creative Media System, University of Hawai'i at Mānoa. <http://acmsystem.hawaii.edu/>. (2017).
- CyberCANOE. 2014. CyberCANOE. <http://lava.manoa.hawaii.edu/>. (2014).
- Facebook. 2017. Class Social Media group. <https://www.facebook.com/groups/SAiH2016/>. (2017).
- Lara Hughes. 2016. UH Hilo art students learn a new kind of literacy: Transferring natural experience into a virtual world. <http://hilo.hawaii.edu/news/stories/2016/10/04/uh-hilo-art-students-learn/>. (2016).
- 'Imiloa. 2017. 'Imiloa Astronomy Center. <http://www.imiloahawaii.org>. (2017).
- SAiH 2016. University of Hawai'i at Hilo Summer Art Institute (SAiH) 2016. <https://hilo.hawaii.edu/~art/summer-art-institute-2016/index.php>. (2016).