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Diversity and Making: A Living History Quilt

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Due to a lack of diversity found in the maker movement, makerspaces are going through an evaluation. Academic libraries have an opportunity to rebuild makerspaces and programming from a place of equity. At a University located in the Midwestern United States, the Library maker program collaborated with the Asian American and Asian Resource and Cultural Center (AAARCC) to make a quilt from printed archival photos, student photos and recorded stories. The result was a "living history" quilt that reflected Asian community and culture on campus. This paper explores diversity in making through collaboration, details of the project process and lessons learned.

Introduction

Due to a lack of diversity found in the maker movement, makerspaces are going through an evaluation. Academic libraries have an opportunity to rebuild makerspaces and programming from a place of equity. At a Midwest university with a focus in science, technology, engineering and math (STEM), a library makerspace reached out to campus partners to broaden their ideas of who makers are and what constitutes making. Instead of inviting Black, Indigenous, and people of color (BIPOC) makers into their existing maker programming as guests, the program collaborated with cultural centers across campus to learn how students' community and culture could be the foundation of the maker project and the environment in which to host the project. Specifically, the Library maker program collaborated with the Asian American and Asian Resource and Cultural Center (AAARCC) to make a quilt from printed archival photos, student photos and recorded stories. The result was a "living history" quilt that reflected Asian community and culture on campus. This paper explores diversity in making through collaboration, details of the project process and lessons learned.

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Background

As libraries have transitioned from supporting large physical collections to supporting primarily digital collections, more space is devoted to studying and collaboration, but increasingly space is also allocated to the creation of knowledge. By incorporating makerspaces, for example, a fundamental shift in libraries has occurred: libraries not only provide access to knowledge, but also opportunities to create knowledge (Burke, 2014). Incorporating makerspaces supports learning through the process of knowledge creation and community building (Wang et. al, 2016).

Johnson argues that libraries are particularly well-positioned to host makerspaces because "the kinds of creativity they support are at heart about the integration of information (that is, knowledge creation) and the sharing of the same" (Johnson, 2016, p. 5). Farkas warns, though, of perpetuating the idea that libraries are a neutral space. When the majority of knowledge held in libraries comes from a Christian, white, heterosexual male perspective, perpetuating the image of neutrality "represents indifference to the marginalization of members of our community." Instead, a commitment to social justice is required for equitable representation (Farkas, para. 3, 2017).

Spaces designed to make things have always existed, but what is currently recognized as a makerspace was defined and marketed by *Make* magazine in 2005, its resulting Maker Faires, and Neil Gershenfeld's MIT fabrication laboratories (Fab Labs) (Anderson, 2014; Burke, 2014; Hlubinka et al., 2013). Dale Dougherty (2011), founder of *Make* magazine argues that we are all makers. He defines makers as enthusiasts and amateurs, who, through playing and tinkering, have the freedom to push boundaries to innovate.

Defining what a makerspace looks like, though, varies. It can include tools such as 3D printers and CNC routers, or robotics and electronics, or even knitting and pottery. The tools do not define the space; the space is defined by what it enables, which is making, and particularly making within a community (Burke, 2014). It calls upon makers to think outside the box; to create with their needs and the needs of their community as a driving force (Peppler & Bender, 2013).

Leaders of the maker movement branded it as a democratic process in which everyone had equal opportunity and access to becoming a maker. Despite such enticing democratizing narratives of making, makerspace scholars have been questioning the definitions of who is a maker and who is welcome in makerspaces (Vossoughi et al., 2016). Closer examination shows the movement to have been primarily white males with the income to purchase materials marketed to them. For the first ten years of *Make* magazine, the majority of people on the cover of the magazine, and the article authors, were males displaying predominantly technology-focused projects, including electronics, vehicles, robots, rockets, and synthesized music. There were zero people of color from underrepresented minorities (Buechley, 2014). Research on makerspaces within academia reveal an emphasis on making in STEM fields (Andrews & Roberts, 2017; Heintzman, 2018; Hynes & Hynes, 2018). Makerspaces across universities emphasize the message that interdisciplinary collaboration and diverse communities can provide solutions using combinations of expertise, but STEM consistently dominates the space and projects (Hynes & Hynes, 2017). Jennings et al., asked for makerspace design recommendations from university engineering students. What they found was "that women and ethnic minorities tended to recommend social change in makerspaces, while men of all ethnicities tended to recommend equipment and technology changes" (p. 1, 2019).

With a call to not only diversify the maker movement, but also address the systems in place that render participation from BIPOC communities invisible, some makerspace scholars turn to Critical Race Theories (CRT) which emphasize the importance of counter-storytelling. Counter-storytelling values, includes, and retains BIPOC histories and lived experiences in the daily institutional practices of makerspaces.

> Instead of taking the theme of openness and technology as democratizing at face value, we can use CRT tenets of counter-storytelling to begin unearthing real lived experiences that BIPOC users have in our spaces, while also threading in elements of making, creativity, and identity expressions" (Brown, 18).

What does it look like for makerspaces to include minoritized communities while maintaining the altruistic message of democratization, community building, and the endless possibilities of creativity?

An approach often taken is to expand collaborations and programs with diverse makers by inviting them into existing spaces. The problem with this approach is that it perpetuates the dominant view of makerspaces as non-inclusive by only inviting the occasional participation of BIPOC makers, and then showcasing them as inclusion success stories (Masters, 2018). A more thorough investigation and redesign of the pedagogy is needed. It is important to consider, *How can makerspaces be rooted in the histories and experiences of BIPOC makers?* This approach argues that if history, culture, and political experiences are taken into account when we consider a makerspace redesign, then we offer more than token attempts to rebrand the space; rather, spaces are rebuilt with the language and tools that reflect people's experience (Vossoughi et al., 2016; Chachra, 2015). Instead of incorporating BIPOC experiences as part of the "programming" in spaces and systems that may have historically excluded them, this approach seeks "alternate spaces" and collectives where minoritized communities have been engaging and will engage in community building (Masters, 2018; Masters et al., 2018; Lin, 2019). A social justice framework that critically questions a system that renders the participation of minoritized communities invisible is required to guide the work (Buechley, 2014). Marshall and Melo (2019) argue that when evaluating makerspaces and programming, it is important to focus less on identifying the needs of the community than on the question of who holds the power. Marshall and Melo offer a framework to identify this. Guiding questions with follow-up suggestions about the people who work in the makerspace, the space and equipment, events and programming, and outputs (what students will create) lead the reader through identifying who holds the power in these areas and ways to shift the power equitably (2019).

BIPOC community-centered programming should take into account the "reconciliation of personal self and professional self" (Cirell et al, 2020, p. 66). How can makerspaces think about the collective communities these makers are part of when designing potential impacts, for the individual makers and their communities? Cirell et al. (2020) give an example of how a makerspace attendee from an underrepresented group uses the space to fix appliances around their house to "make up for the socio-economic challenges of being an impoverished student" (Cirell et al., 2020 p. 66). Brown (2020) emphasizes the importance of workshops "that promote the safe sharing of counter narratives" (p. 21). Examples of such workshops which

move away from a tool-centered approach to an identity-centered approach, are guided meditation, a making process based on topics that BIPOC communities often have to navigate, or using materials that are personally meaningful for the attendees' wellness (such as a self-care calendar, tarot cards, and pages from coloring books). Poudyal et al. (2020) describes how the work of making can be described as "relational" (p. 213) – in this case a very specific meaning of respecting and acknowledging Indigenous history and the space in which the makers are dwelling. Redesigning makerspace programming to focus on the individual makers and their identities and communities, will perhaps be an opportunity where the ideal makerspace's democratizing potentials can be realistically felt.

Examination of BIPOC communities on social media provide positive examples of identity through community and a model of alternative spaces where BIPOC communities have been engaging with each other. An interview with Mac Housely done by *Love to Sew Podcast* (Somos and Wilkinson, 2019-Present), reveals the initiative from Housely to "break out of the social media bubble" or "break the algorithm" to find other Black maker individuals and other women of color on social media. Housely founded @meetmakersofcolor, an Instagram community where makers of color share their projects and speak on national political issues of impact, such as the tragic death of George Floyd. Housely highlights her maker work and the work of diverse makers by providing their social media handles and links to their current projects.

The Aunty Sewing Squad provides another example. Free writes that Kristina Wong, artist and comedian, was planning a one-woman show when the COVID-19 pandemic hit. When she asked on Facebook if anyone was in need of masks, the response was so big she had to recruit friends to help. Her friend saying, "There are squads of aunties being deployed right now", inspired the name of her group (Fara, para. 8, 2020). Wong further elaborated on the name: "In Asian communities, 'auntie' is a term of endearment and trust…. An auntie is someone who helps you feel loved and cared for" (Fara, para. 9, 2020). Her originally small group of friends has grown into a large collective of people from varied backgrounds and professions collaborating with organizations to get supplies to people in need. The Squad sends masks to vulnerable populations with lack of access to supplies, such as migrant workers, day laborers, people being released from prison and Native Americans who live in isolated areas (Free, para. 10, 2020). Wong's website states, "We proudly trace the lineage of this sewing to our mothers and grandmothers, immigrant and refugee communities in America, and underpaid women of color garment workers globally" ("Who We Are," n.d.).

The shared reality of discrimination and oppression that minoritized communities often face cannot be ignored if makerspaces aim for inclusivity. Natasha Lee, who identifies as an Asian American maker living in the Midwest, states that her decision to post about social justice issues (e.g. solidarity with the Black Lives Matter movement) stems from her past struggle with self-hatred due to racism that she experienced and her promise to not be silenced:

> "A friend asked me a few weeks ago if it scared me to talk about "political" things on here (I don't consider anything Ive [sic] posted truly political... but I went with it) and it honestly never occurred to me... I grew up hating myself. Hating my ethnicity, hating the shape of my eyes, hating that my hair wasn't red like my mom & sisters, hating that when my family came to my school musicals they were speaking Hokkien instead of English... and I've fought too hard and too long to love myself to EVER abandon any part of myself or my beliefs EVER again" (@natashaleecreative, Instagram, 2020)."

This review of the literature challenges the idea that makerspaces are places of democratization and that library makerspaces are places of neutrality. In order for diverse communities to feel welcome and diverse making to happen, makerspaces need to include the historical, cultural, and political experiences of BIPOC communities in the design of spaces and programming. To better support diverse students, makerspace administrators should consider how to facilitate, as Hira (2018) states, "reflective practice and identity formation in the context of educational Makerspaces" (p. 8). Finally, when designing, it is important to seek alternate makerspaces and seek communities with BIPOC leaders that already exist, such as in the examples of @meetmakersofcolor, The Auntie Sewing Squad and @nastashaleecreative. Redefinition of makerspaces and programming eventually needs to move towards a goal of equity with clear plans for hiring, retention, and mentorship of BIPOC students, faculty, staff leaders of the makerspaces. In an effort to design diverse maker programming, what follows is a description of a makerspace collaboration between the University Libraries and the campus Asian and Asian American Resource and Cultural Center (AAARCC).

A Living History Quilt

The University Libraries began its maker programming in 2017. Although held in campus libraries, making lacked a designated space, so program activities were mobile. Being that the University has a strong focus on STEM, the maker programming revolved around STEM topics. The STEM projects were partnered with an effort to highlight tools the Libraries had available for student use, such as 3D

printing services, and tools to check out, such as 360 cameras and handheld 3D scanners. Quickly, the programming turned from STEM to STEAM (including art) to engage students from liberal arts programs. It was evident, though, that even with including art in STEM, the programming drew a limited demographic. Discussions on diversity between the maker organizers emerged. Two questions guided the discussions: What defines a maker and what is considered making? Organizers agreed to pursue broader definitions of maker identities and the act of making. To learn from diverse voices across campus, the maker organizers asked to collaborate with the campus Civic Engagement & Leadership Development (CELD) department. CELD connected the maker organizers with the directors of five of the cultural centers across campus. Each director met individually with the maker group to decide on an activity they believed would have meaning and impact on the students who utilized their centers. Each event was held at a different cultural center, and CELD hosted them over a lunchtime series, called Lunch & Learn, where the maker events were accompanied by food from local restaurants. Specifically, the AAARCC collaboration is addressed in detail in this case study.

Project Planning Between the Libraries and AAARCC

In the initial planning meeting with the AAARCC, a variety of tools including 3D printers, 3D pens and GoPro cameras were displayed to spark brainstorming. The AAARCC Program Administrator suggested making a quilt and offered a quilt project named "120,000 Tassel Tapestry" as an example. The quilt was the result of a grade schoolteacher looking for ways in which she could put an end to her students "mocking Asians." She began teaching Japanese American history and found the students knew very little. To commemorate the Japanese who were incarcerated in internment camps during WWII, the students made a quilt with grant support from an Asian American non-profit organization in the Midwest. The students continued to explore Japanese culture through building a Zen garden and pond, among other activities, and the quilt went on to be exhibited across the country (Kubesch & Fugita, 2012).

With all of their maker bells and whistles, the maker team briefly went silent. They had not planned for crafts as a possibility. They were ready to 3D print and offer activities they typically associated with making. The head of the maker programming saw an opportunity to combine resources specific to the Libraries with quilting. Having printed images on fabric in the past, she offered the idea of locating images in the Library archives that represented the Asian American and Asian community on campus through the years and printing them on fabric. Using a regular inkjet printer, images could be printed on plain cotton fabric squares that could then be decorated and quilted. People started to add different elements that could be included. Information, such as date and circumstance, could accompany the images, so students could learn about snippets of campus history. Students spending time decorating the image quilt squares would be a way to connect with people and events of the past. The organizers decided that students could also bring in their own images to be printed and decorated, in order to create a quilt which would set the current campus experiences of students of Asian heritage amidst the historical. One of the maker organizers located an article that described a "Partnership Quilt" that was the result of human computer interaction (HCI) experts, quilters, and a human rights organization that serves underrepresented and vulnerable populations. The authors drew the comparison that, just as a quilt is about piecing together disparate pieces of fabric into a pattern that could not be achieved by any single square, so the project itself was the act of people from different spheres of life coming together to make something greater than themselves. Participants quilted squares, but they also recorded their stories. Capacitive touch sensor technology (Bare Conductive Touch Board) enabled the recorded stories of people to be embedded in the quilt. Viewers could press a button on the quilt and hear people's stories, thus creating a "living archive" (Strohmayer & Meissner, 2017). The organizers realized that using an interactive sensor would add an engaging element to the AAARCC quilt.

Coincidentally, starting in fall 2019, the AAARCC organized an effort to preserve their history by collaborating with the Libraries' Archives and Special Collections. The AAARCC staff members were excited to learn that their collaboration with Archives and Special Collections would benefit this event. It was an opportunity for their students to see their cultural history on campus. This event would create a "living history" archive. Previous Lunch & Learn events were presentations with questions and answers, so making and makerspaces were a new topic for the AAARCC. Early emails and discussions revolved around what making is, how the project would benefit students and how the different elements would work together to make a single quilt. The AAARCC decided to call the quilt a "Living History Quilt" to highlight the continuity of Asian American and Asian history and community on campus.

Figure 1. **"Living History Quilt" Making Activity in the AAARCC Living Room**

Day of the Event

The "Living History Quilt" Lunch & Learn event was an hour and half long. It was the most highly attended Libraries maker event to date. It began with the lead maker organizer showing a sample of images the Library Archives and Special Collections have of the Asian community on campus, then giving a brief description on process. Participants jumped into action once given the opportunity to start. The AAARCC is located in a two-story repurposed house on campus (it used to be a residential home) and thus lends a professional but also home-like atmosphere. Students were choosing archive images, printing the images they brought in, and decorating in what once was the living room. They were recording their stories in the welcome foyer/lobby, and decorating all around the Center because the event was so full, including in the second floor conference rooms and computer lab, spaces not typically used for past Lunch & Learn events. The maker organizers could not keep up with the demand for students wanting to print their own images. Photos of campus experiences that participants brought to the event included themes of favorite seasons, memorable events attended with friends or families, and milestones such as graduation. People who chose archival images from the Archives and Special Collections learned about the presence of Asian and Asian American communities on campus from as early as the 1900s, including a much discussed image of three well-dressed students heading home to Japan to serve in the war after Pearl Harbor was bombed. The images left behind were collected and the audio files stored to complete the quilt at a later date.

Material Details

Images

The images from the Archives and Special Collections were printed on 8.5" X 11" jacquard, ink-jet cotton sheets before the event.

The Epson Expression Home XP-440 printer, which could both scan the images students brought in and print on fabric, was set up with a laptop to standardize the size of the images in Photoshop. Students brought in all sizes and resolutions of images, so it was important to find a couple of sizes to use throughout that would fit on the cotton sheets.

Using Camtasia recording software and an Audio-Technica AT2020 + USB condenser microphone on a desktop stand, the story-recording booth was set up in the front room of the AAARCC house for some privacy. At the front of the main room were the black and white images from archives printed on fabric. Pieces of paper with any provenance information that came with the image were next to the images. Three long rows of tables were set up with fabric markers, buttons, needle and thread.

Figure 2. **Decorated Quilt Squares**

The images and stories were brought back to the maker organizers' library to piece together. Because time was limited at the event, and because the organizers had never worked with the Bare Conductive Touch Board technology, they decided to work through the piecing themselves the first time. Once they learned how the technology worked, they could host an additional session for piecing the next time they ran the event. Although there were many images from archives and personal images decorated, a number of students took their pieces home with them. What was remaining made up the quilt in Figures 3 and 4.

Story Capture and Touch Board Process

The stories that had been recorded during the event were saved as MP3 files. These were later edited minimally in Camtasia to make them uniform. The Bare Conductive Touch Board used comes pre-coded to run the tracks on its included micro SD card. If one wished to modify the code, the Bare Conductive site has detailed instructions on how to install the Arduino IDE (integrated development environment).

For this project, the organizers did not have to modify the code. Instead, story MP3 files were renamed to match the file names on the micro SD card. The code was already set up to play these tracks when the board was touched. By pressing the E0 touch point, TRACK000.mp3 would play, E1 would play TRACK001.mp3, etc. As soon as the files were renamed in the TRACK### format and copied to the micro SD (replacing the original sample sound files) touching the associated contact point caused the stories to play. The

Figure 3. **Decorated Quilt Squares**

Figure 4. **A Close Up of the "Living History Quilt"**

sensitivity of the touchpoints was calibrated to account for wiring. Once the wiring of the quilt was in place, the calibration was set by pressing the reset button on the board and waiting until the red light stopped flashing. When the light was green, the wires did not trigger the sound files unless their exposed end was touched by conductive matter.

Dupont wires were used to wire the quilt. This, the makers realized in retrospect, was a mistake. Dupont wires are about eight inches long and have small plastic connectors (F) or pins (M) at the ends. They connect easily to one another, but also disconnect easily. They can be secured with tape, but when seven or so are connected to stretch across a quilt from a story square to the Touch Board, it creates six different connection points which may escape from their festoons of tape and cause one to whale fruitlessly upon a story square, surrounded by the silence of failure. For future projects, the organizers decided that using a 22-gauge electrical wire would be advisable.

Once the wires had been placed within the quilt from the story squares to the Touch Board, they could be attached to their external touchpoints. The touchpoints were created by poking the wires through the quilt beneath their associated squares, stripping the insulation off of approximately three inches of Dupont wire and threading it through a large button. The exposed wire was then covered by a small square of aluminum foil, which was overlaid by a square of cloth and sewn down.

At the Touch Board end, the Dupont wire was connected with an alligator clip to the assigned terminal. When all the cloth, foil, buttons, wires, and clips were in place, the reset button was pressed so that only additional resistance (like a finger pressing the foil down) would trigger the stories to play. A "Sound Off" button was added by wiring one of the unused terminals. There was no associated track file for this terminal, so when pressed, it immediately ended whichever audio track was currently playing.

Currently the quilt is using a small speaker plugged into the headphone jack of the Touch Board. By using a Bluetooth headphone jack adaptor, it could be connected with any Bluetooth speaker. The board uses a micro USB connection for power, and with adaptors it can be plugged into a wall outlet or powered by a portable power bank. With these modifications, the heavily wired quilt, playing stories through hidden speakers and running off an external battery, would appear completely wireless. The beauty of this project is how effectively it uses technology to create a user experience which feels entirely personal, tactile and sensory. In other words, not technological.

Discussion

The event was a success in that it served the students in a meaningful way, and the organizers gained insight on how to run the event better the next time. The "Living History Quilt" is an example of making that considers the history, culture, and political experiences of the participants as recommended by Vossoughi et al. and Chachra. The project attempts to answer Cirell et al.'s (2020) call to develop programming that will help students reconcile their professional selves (as students) with their personal selves. The intention was to shift from a needs analyses for the event, to an experience where students hold the power for which Marshall and Mello (2019) argue.

Rather than a token attempt to diversify programming, this project aimed at building the participants' language and the tools to reflect their experience into the very fabric of the making session. The maker organizers did this by asking leaders from the AAARCC to be designers of the program and by responding to the request for a quilt that incorporated the archival work the AAARCC had already begun to accrue. Additionally, by hosting image creation and storytelling, students could see themselves as being active writers of the current story. Masters' warning that this programming could still be in the vein of inviting BIPOC communities into the dominant culture of makerspaces instead of redesigning the space from the ground up with BIPOC voices in the fabric of the design remains valid; however, this programming functioned as an important first initiative. The maker organizers shared resources and expertise on making, and the AAARCC leaders taught the maker team about the quilt, their archive work, and the power of making within an active community versus inviting a community to an event.

In the future, the organizers plan to make the project two hours and two sessions. Because the Bare Conductive Touch Board technology was new to them and they only had one session, the maker organizers chose to program the touch board and piece the quilt themselves. With the knowledge gained from assembling this quilt, the organizers feel confident in hosting a second session in the future where the touch board technology could be demonstrated and students would be able to piece the quilt themselves. The plan was to unveil the quilt as part of the Asian Pacific American Heritage Month in April, 2020. There was to have been a Lunch & Learn event in the Libraries' Archives and Special Collection where participants could discuss the importance of building diverse archive collections, specifically Asian American and Asian collections. Unfortunately, the COVID-19 pandemic hit, so the event was cancelled. The quilt was displayed in early fall 2020 at the AAARCC. The Center has received questions from students who are interested in how the interactive/electronic components worked and were installed. Future research will include observational assessments and focus group conversations.

Conclusion

This project was important because it contributes to makerspace programming that goes beyond an invitation to a prefabricated session, to an event designed at every level from diverse perspectives. The questions: *What defines a maker?* and *What is considered making?* were actively posed throughout the design process.

It was clear a connection was made, not only with engaged participants during the session, but also when several participants approached the maker organizers about the progress of quilt at later interactions. This project was just the beginning of conversations and action taken in regards to diversity in making. Future programming with assessments will continue to inform the organizers' work.

For the 2020-2021 academic year, the AAARCC and Libraries have continued their collaboration by hosting a podcast and project series. The aim of the project is to host makers from diverse backgrounds doing diverse making with a spotlight on Asian American makers. The makers are interviewed for an hour and then the podcast hosts collaborate with them to design a project that relates to their work. Free material kits are provided to interested students to complete the project.

This collaborative effort represents ongoing discussions, and further action, to redefine makerspaces and center the counter-storytelling of BIPOC communities in the maker programming. The continued and evolved collaborations where BIPOC see themselves in the work, and the designers of the spaces and programming, reflects the goal to build an equitable makerspace where students, particularly BIPOC students, are encouraged to create diverse work that serves them and their communities.

List of Materials

- Epson Expression Home XP-440 Wireless Color Photo Printer with Scanner and Copier
- Audio-Technica AT2020USB+PK Streaming/Podcasting Pack
- Inkjet cartridges – black and colors
- Jacquard Ink Jet Fabric 8.5" x 11" Cotton Sheets (10 Pack)
- Fabric markers
- Quilt batting
- Cotton fabric
- Borrowed quilt frame
- Scissors
- Thread
- Needles
- Plastic rhinestones to glue on fabric
- Fabric glue
- Donated buttons
- Type of microphone
- Camtasia recording software
- External speaker with AUX cable
- Bare conductive touch board
- Micro USB cord with wall outlet plug
- 22-gauge electrical wire (not Dupont wires)
- Alligator clips

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