



Open Portfolios

MAKER EDUCATION INITIATIVE

The importance of portfolios for makers

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The Maker Ed Open Portfolio Project:

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HOW ARE MAKERS USING PORTFOLIOS?

The capturing and sharing of work is critical to maker culture. The world has come to know the maker movement through the documentation of maker projects—many imaginative and quirky—through photographs, videos, and step-by-step tutorials openly shared through social media sites, online communities, magazines, and in-person events like World Maker Faires. The portfolio of work created by makers reflects the individual makers, their local makerspaces and their surrounding communities, curated as they are through individual and group practices that determine the shape, intended audience, and depth of documentation. And yet, the frequency and extent to which makers are involved in capturing their work, as well as the role that portfolios play within maker culture, is unknown. Given the increasing acceptance of maker portfolios in job and college applications—MIT, for example, accepts portfolio submissions as a demonstration of the applicant’s ability to “learn, create, and problem-solve in an unstructured environment” (MIT Admissions Office, 2013—the time is right to reconsider how portfolios can most effectively translate the value of one’s making to a broader audience.

A SELECTION OF NATIONAL MAKERSPACES AND THEIR APPROACHES TO PORTFOLIOS

In our work, we have sought to illustrate how makers are currently approaching portfolio design and creation. In this brief, we present three cases of how portfolios are being utilized in makerspaces, whether these are large lab spaces in museums, mobile carts in classrooms, or a shared corner of a community library. In particular, we are highlighting how the practices reflect open portfolio characteristics, such as how young makers maintain control of the content and the curation process. Those presented here are compelling cases, among many, within the rapidly growing network of maker education programs and youth-oriented makerspaces. Throughout our

research brief series, we will return to these sites and introduce several other innovative makerspaces with emerging portfolio practices (see Appendix A).

THE CHILDREN’S CREATIVITY MUSEUM: ENCOURAGING DOCUMENTATION IN MUSEUMS – The Children’s Creativity Museum (creativity.org), centrally located in San Francisco, California, is a family-oriented art and technology museum in a light-filled building that offers imaginative hands-on maker activities on two floors. Children and adults are invited to actively engage in the digital media learning opportunities related to the museum’s exhibits. Museum visitors can explore stop-motion animation and green-screen karaoke, for instance. Seamlessly integrated into the activity itself are digital documentation workflows, as well as nearby physical documentation stations that enable visitors to easily record and save their work.

The museum’s public showcase of projects, as well as the accompanying emphasis on documentation, helps to develop a greater sense of community-connected learning that extends beyond the walls of the museum. For example, the stop-motion Animation Studio contains not only animation stations but also shelves filled with colorful materials and tools. Each station is composed of a background, a camera, a large screen for viewing animations in progress, and a table for arranging animation sets and props. Children and families construct clay characters and tell stories together, with the option to take the whole experience home. Animations can be sent to the museum’s file sharing account and from there, shared with individual filmmakers. Families may download their movies at home that very evening.

The Music Studio includes a green-screen stage, two microphones, and a full production station run by museum educators. Children dress up in costumes provided by the

Children’s Creativity Museum, perform or record music videos, or recite nursery rhymes alone or in groups. A camera is positioned in front of the stage, recording the performance and projecting it onto a large screen behind the camera. Young performers watch themselves on TV as they perform, and all video-recorded performances are temporarily stored for performers, should they choose to burn them to DVD to take home. Visitor’s creations can be easily used in their own lifelong portfolios; they can interact with their files beyond the museum setting, as individual media files are shared and accessible after a museum visit to strengthen their learning across learning spaces (Ito, et al., 2013). No additional login information or membership to a particular service is required.

Evidence of work is visible throughout the museum. Artifacts from past experiences are interwoven into the open character of the space. This type of display demonstrates the museum’s ongoing focus on not only the activities but the documentation of them as well. The showcase of finished work and works-in-progress invite visitors to create their own unique projects, and in turn, visitors create products that they can take home, evidence of their engagement while in the museum. The Imagination Lab on the museum’s first floor includes crafting tables with daily hands-on activities for children, featuring past projects that are displayed above or behind each table. Visitors are encouraged to document their creative process through prompts from museum educators and instructional signs. The museum itself continues to evolve, demonstrating the improvements and attention towards the importance of capturing work. An older 2D animation station reflects that evolution, as a sign there reads: “Sorry there is no saving at this station. Make, save and send on Snap It 2.0”, referring visitors to the newer animation stations with increased capabilities.

Another strategy to motivate visitors to make and capture their work is a constantly changing exhibition throughout the museum called “Imagine Your Art Here.” On the wall in the stop-motion Animation Studio, a group of picture frames displays photographs of children’s past clay figures, as well as printed statements of “Imagine Your Art Here.” These framed glossy prints show animation sets in-progress and animation production processes in-action. Additionally, educators at the Children’s Creativity Museum are currently redesigning “Imagine Your Art Here” into an interactive and multi-media representation of work.

Children’s Creativity Museum staff are also actively de-

veloping ways to capture visitor work in other parts of the museum. For example, they are thinking of ways to better document the process behind the mystery box challenge, in which children are presented with a certain level and challenge, then pick a box of random materials with which to rapidly prototype an invention. In addition to taking photographs, there may be an opportunity for children to use an iPad mobile app to explain how their invention works, pitch their ideas through storytelling, and share their inventor’s thought process articulations. Continuing to encourage documentation at the museum and beyond, educators at the Children’s Creativity Museum are also designing ways to feature and share stories of visitors’ making on their official website.

THE LEARNING PORTFOLIO PROJECT: USING “PROCESS-FOLIOS” – The Learning Portfolio Project (<http://xy1234567890.wix.com/copy-of-learning-por>) is a collaborative effort between the DreamYard Project, Parsons The New School for Design, and DreamYard Preparatory High School in New York City, aiming to increase access to expansive portfolio development for 9th- through 12th-grade students. The multi-year portfolio initiative bridges in-school, after-school, and college level learning through shared portfolio practices. While the first year of collaboration focused on the integration of portfolio practices in the afterschool program at the DreamYard Project’s Art Center, and the DreamYard Preparatory High School program, the efforts of the second year are to extend the experiences to more educators at each of those locations and to faculty of portfolio documentation courses of the pre-college program at Parsons The New School for Design. The collaborators meet once a month to share experiences and develop a shared vision across the intersecting spaces.

Similar to the principles of Project Zero’s ArtsPROPEL (Gardner, 1989), the initiative encourages youth to capture, share, and communicate the process of learning. Currently, in concert with public in-person showcases, young makers use blogs to show their process and document their work. Their projects, which are often infused with social justice themes, include such areas as the exploration of urban cultural appropriation and ethnic identity through the creation of fashion and interactive fashion photography activities.

The project trains and supports educators and youth in the use of blogging tools to capture the process of learning and creating, including project iterations and reflections on decision-making. In the process, it illumi-

nates effective practices around portfolio development achieved through the balance of tool use and facilitated practices. For example, young makers are instructed to record and post at least three photographs of their material choices and products in progress. They may use their own smartphone devices or the computers offered by educators. They are also required to write short reflections about their progress, sometimes requiring prompting from educators and suggestions of sentence starters. Each young maker has his or her own blog that is linked to a main teaching blog, curated by the program educator. Educators model the work by showing their own blog entries to youth, helping to inspire youth work and also naturally allow for reflection on past activities.

When presenting work to funders or the general public, the initiative often shares one adult-driven blog and some youth blogs. While no separate blogs are created for these occasions, the overall collection of blogs acts as a repository of evidence to draw from. The Learning Portfolio Project goes beyond traditional portfolio approaches in art and design to include other subject areas, such as global studies, math, anatomy, fashion, and digital media. As the project continues to develop, the educators involved in the Learning Portfolio Project are hoping that youth will maintain their own learning blog to showcase in-school and afterschool learning, as well as personal interests, helping to paint a holistic portrait of the youth beyond test scores and lists of activities.

Findings from the Learning Portfolio Project reflect all aspects of portfolio design and development, whether related to educator practices or the affordances of traditional and new tools. For example, the initial act of hand-writing blog posts plays a surprisingly helpful role, as transferring handwritten content into digital posts encourages additional iteration and reflection, allowing young makers to take a deep look at their own personal development. To aid in training and support, educators create shared resources that include tutorials, worksheets, and templates for creating various posts, example class blogs, and rubrics for assessing the quality of posts. The DreamYard and Parsons team also find that the generation and collection of content, prior to actual portfolio development, is an important first step. Creating repository-like blogs for documenting all learning (whether project-related or not) over time automatically leads to further reflection and curation.

The Learning Portfolio Project blogs are hosted on a public site, and young makers retain their accounts after completing the program and can continue to curate and

post new work to the blog in the years that follow. The programs openly share their approach through monthly professional development opportunities for area teachers. The greatest challenges of the project so far include: supporting the range of comfort and familiarity with digital literacy skills (including typing and navigating the web and blogging platforms); ensuring access to shared technology in the school setting; and helping educators find the time to both plan and teach new lessons that incorporate blogging.

[THE CHEVRON MAKER ANNEX OF THE CHILDREN'S MUSEUM OF HOUSTON: DIVISION OF LABOR AND SPECIALIZATION](#) – The Chevron Maker Annex (kidmakers.org) is a recent addition to the Children's Museum of Houston. A makerspace for museum patrons and youth to create hands-on projects with help from staff, it is located on the lower level of the three-story-tall museum and within the Invention Convention gallery. In contrast to many of the other museum galleries also open to youth and adults, including large groups of campers, the Chevron Maker Annex seems like a calm island, open during scheduled demonstrations and sign-up workshops. The space includes state-of-the-art tools and materials, such as a 3D printer, laser cutter, numerous crafting, woodworking and electronic hand tools, and general space to accommodate large electronics, soldering, and work areas. During the summer, staff in the Chevron Maker Annex primarily consist of Maker Corps Members, who are young adults (college age or older) taking part in Maker Ed's Maker Corps program to deliver summer programming and work as makers-in-residence at host organizations around the country.

Four engaged Maker Corps Members drive many emergent portfolio practices through a Children's Museum of Houston website, kidmakers.org, to document and reflect on project milestones. An in-progress documentation space, kidmakers.org includes profile descriptions of the adults working in the space, descriptions and reflections of workshops facilitated at the Chevron Maker Annex (e.g., creating a light-up robot using e-textiles or building a wooden box), projects created by the Maker Corps Members for children to duplicate (e.g., a video game controller made with play-dough and a Makey Makey board, and an Arduino controlled robotic arm), and explanations of tools available at the space (e.g., 3D printer and hot glue gun).

Through the kidmakers.org website, which continues to evolve as practices are refined, Maker Corps Mem-

bers, whether intentionally or not, present themselves as both participants in and resources for the maker and maker education community. Their work naturally folds into maker culture while also drawing out key pieces that help to delineate themselves from others. For example, Maker Corps Members create and post detailed step-by-step guides of their projects to instructables.com that are then linked to kidmakers.org. They strategically tag posts and projects on both websites with popular keywords and are motivated by community feedback, the number of views they receive, the duration of website visits, and the understanding that they might help others undergoing similar processes. As a third branch, these posts and projects are often linked to the Maker Corps G+ Community page as well, sharing their work with yet another dedicated audience of makers in education. These pieces lead to self-assessment, iteration, improvement of work, and most importantly, continued sharing of work-in-progress, promoting openness as an integral aspect of maker culture. As they present their work and themselves, an ongoing question that the Maker Corps Members at the Chevron Maker Annex often ask is: How can we showcase, communicate, and share our work to inspire and invite others to engage in similar projects?

Currently, Maker Corps members are documenting their own work and are beginning to build a portfolio culture at the site. Their practices are visible to the youth participating in Chevron Maker Annex workshops, for example, who might reference the website during a workshop and look at past projects to see what a final product could look like. Besides a mobile documentation station, no formal process for documenting workshops and making exists; the emergent process actually helps springboard the documentation process for young makers. These staff are engaging in and exploring the kinds of practices that they are hoping for the youth to practice at a later time.

In shaping emerging portfolio practices, questions have surfaced at the Children's Museum of Houston and, in particular, in the Chevron Maker Annex and Invention Convention exhibit. The lead educator, responsible for Invention Convention and the Maker Annex, wonders about the authenticity of documentation. In managing the Maker Corps Members and watching as the website and practices evolve, he senses a tension between the motivation to document process and the motivation to finish a project, as a product that is "camera ready is different than [the] finished product." Displaying a visually appealing but unfinished product may compel makers to

stop short of the whole process, potentially missing out on important making and learning experiences along the way. In light of this question, the museum educators are further developing ideas around documentation.

WHAT ARE SOME OF THE EMERGING IDEAS FOUND ACROSS THE CASES?

Several commonalities, whether successes or challenges, emerged across this early selection of makerspaces and their approaches to portfolios. These cases speak to the ongoing progress that educators, facilitators, and youth are making in the development of effective practices for maker portfolios. Across these cases, several ideas related to the effective design of portfolio practices surfaced, including (a) strategically placing visual and audio prompts that remind young makers to document; (b) supporting inclusion and merging of digital and non-digital practices; (c) establishing open portfolio practices by offering ways for young makers to use and access their work independent of one institutional space; (d) taking advantage of and harnessing the possibilities of using common digital media tools, including blogs and tagging features; and (e) encouraging adults to model documentation practices for and with young makers by participating in the same activities and portfolio work as youth. At the same time, it is important to stress that maker portfolio practices need to be adapted to suit the needs of a particular setting and, as such, there is not a set of universal practices or tools or workflows that can be espoused at all settings.

With these evolving design ideas, we also acknowledge the challenges that arise when creating opportunities for open portfolios. Some of these include questions of how to document, related to comprehensive and automated documentation, selective and manual documentation, individual and collaborative practices, and mobile and stationary documentation spaces.

Additional findings from our field observations and design research experiments will appear in forthcoming research briefs. The next research brief will highlight hardware and software tools for documentation, including Do-It-Yourself (DIY) documentation stations and how they may help young makers explore and start thinking about their own open portfolio needs and wishes.

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