Build in Progress: Building Process-Oriented Documentation
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Making often involves an iterative cycle of testing and re-designing in response to setbacks as well as serendipitous discoveries. Anyone that has created a design project knows that projects rarely work on the first try; instead, they are constantly tweaked and refined to function as intended. Yet this iterative process is rarely spoken about or shared in traditional forms of product-oriented documentation that focus on final products or recipes for creating those products. What might documentation look like that captures the story of how a project was created, including the various experiments and attempts that led up to a final design?

To support a storytelling and process-oriented approach to documentation, I developed a website called Build in Progress in which Makers can share their personal journey of developing a project as the project is being built (rather than after a project is complete). Build in Progress explores how Makers can be supported throughout their design process and how messy, iterative design processes can be visually represented. Creating a design is often not a straightforward process; to accommodate this, Build in Progress enables users to represent their design process in a non-linear format.

In this chapter, I describe the design of Build in Progress and share four vignettes of Makers capturing, sharing, and reflecting on their design process using the site. These vignettes highlight how Build in Progress has helped Makers seek feedback on their projects, help others through their documentation, build reflective “living” documentation, and tell the story of their design process. I end with describing several open challenges and opportunities for supporting Makers sharing their design process online.

BUILD IN PROGRESS: RELATED WORK AND DESIGN PRINCIPLES

Build in Progress [http://buildinprogress.media.mit.edu/] is a platform in which Makers share the story of how their DIY projects develop, including the various iterations and experiments that lead to a final design. To support young people documenting and reflecting on their design process, Build in Progress was informed by research on design documentation in education as well as insights about practices on existing online DIY communities.

Documentation and reflection is highly valued in arts, design, and engineering education. It is common practice for both students and professionals in these fields to create portfolios in which they curate documentation of their own work. Research around portfolio development has supported their use for identity development and their value for communicative and reflective practice (Barrett, Brown). While portfolios can focus on showcasing finished work, others instead capture a designer’s process (Barrett, Bierut). For younger audiences, the Reggio Emilia approach integrates documentation as a way for learners and teachers to capture a students’ growth (Giudici). Documentation in this fashion is often gathered through photographs and comments written both by the learner and the educators and are visibly displayed in the classroom. The philosophy behind documenting work-in-progress has also been integral to strategies in arts treatment.
education, such as the *Process-Folio* project from Project Zero in which learners capture their design process in portfolios that are discussed and shared (Gardner).

Existing DIY communities for sharing design documentation are typically structured to support designers sharing finished work. For example, Torey et al. explored how adult computer and electronics hobbyists developed “How-to” guides that instruct others on how to build projects (2007), while Kuznestov & Paulos conducted a large survey of DIY communities such as Ravelry (a craft community) and *Instructables* (a more general DIY community), finding that a potential barrier for people sharing their work is the current norm of “DIY sharing as a practice of showcasing function and completed work” (2010). Instead, the authors suggest that reframing DIY communities as studios where designers can receive feedback on works in progress may broaden participation.

Further research involving the *Instructables* community revealed a distinction between recipe-like and story-like documentation practices; when communities emphasize recipe-like step-by-step documentation, authors may omit elements of their design process for the sake of creating efficient instructions (Tseng & Resnick, 2014). At the same time, the 230 *Instructables* users surveyed in this work reported valuing activities other than “looking for projects to recreate” on the site. Instead, users valued customization and personalization, which sometimes came out of necessity due to a difference in resources from those outlined in the original documentation. What might a DIY community look like that enables users to share alternative approaches and multiple versions of a design? For users utilizing such documentation, would it be helpful to see the various attempts the original author underwent before settling on a final design?

Based on prior work supporting the value of documenting work-in-progress, *Build in Progress* [BiP] was conceived as an alternative platform for sharing *process-oriented* documentation that is created throughout the development of a design project (rather than after a project is complete). In this way, the tool was designed to support Makers gathering feedback and reflecting as their projects evolve over time. At the start, the following three design principles were outlined to guide the development of the site:

1. **Bring transparency to the design process**

   The platform should serve as a venue for sharing experimentation and iteration to convey the effort that went into creating a DIY project. Additionally, the community should encourage knowledge sharing about successful and unsuccessful techniques in an effort to help others avoid similar mistakes.

2. **Encourage feedback in progress**

   Users should be able to solicit feedback as they develop their projects by reaching out to others in the community for advice. By documenting throughout the design process, authors continually build context for others to refer to as they provide feedback.

3. **Create opportunities for authentic reflection**
The design of the platform should encourage users to reflect on their own design process by visually representing the process in a compelling way and socially situating documentation in a format that can serve others.

![Figure 1: Build in Progress project page](image)

**BUILD IN PROGRESS: PLATFORM DESIGN**

Designed to bring transparency to the design process, encourage feedback on works in progress, and create opportunities for authentic reflection, project pages on BiP are structured to highlight different pathways in a design project. An example project page is displayed in Figure 1, which incorporates two complementary views: navigation in the form of a two-dimensional tree-structure called the *process map* (on the left) and the *step post* (on the right). A new project starts as an empty page in which users can add entries, called steps, that describe their project at a particular point in time. In a step, users can add images, videos, design files, and text descriptions. Each step is represented as a block in the process map, and users can click and drag individual steps to arrange them into branches.

The Process Map enables users to share iterations in their design process in distinct branches; additionally, it presents a birds-eye perspective of the design process, which makes navigating the various iterations in a project easier. Additionally, users can annotate branches through the use of branch labels, which can be colored red, green, blue, or grey to signify the nature of the branch (for example, red labels typically represent unsuccessful attempts while green labels are commonly used to lead into final versions).
To learn more about a particular step, users can click on a step in the process map to reveal additional information about the corresponding step on the right side of the page. The corresponding step post reveals any images, videos, and text shared by the user to describe their project at that particular stage.

To encourage feedback, BiP includes several social features. The most fundamental is the commenting system in which users can leave text-based comments on any step. Users receive email notifications when comments are left on their own projects. To explicitly solicit feedback, users can embed questions in a step, which flags the project with an orange question label and adds the question to the Community Activity section of the homepage (Figure 2). The Community Activity section cycles between recent questions and comments left on the site to draw users into projects.

![Figure 2: Questions featured on homepage](image)

Overall, the site encourages users to be open about their design process. For example, incorporating questions and comments into the homepage draws attention to the fact that projects on BiP are under development rather than complete and that the platform can be used to get advice and feedback. Additionally, projects that incorporate branches and iteration are featured on the top of the homepage, further emphasizing that the site is designed for sharing process- rather than product-oriented documentation. Finally, by default, project pages are publicly accessible and viewable to encourage users to share their design process as the projects are being developed (rather than creating private projects that are only published once they are complete).
METHODS

Since the site launched in May 2013, it has gone on to host over 650 projects (as of February 2015). I built the platform using an iterative design philosophy, with new features continually being developed and introduced to the live site over time to improve usability, help users connect with one another, and provide new opportunities for users to reflect on their design process. The development of new features is made transparent through a meta-project on BiP that highlights how and why the features on the site are created and invites users to give feedback (http://buildinprogress.media.mit.edu/projects/103/steps).

Registration to BiP is open, so anyone can create an account and begin sharing projects. From the start of the project, I collaborated closely with the Computer Clubhouse network, a community of after-school centers in which youth work with adult mentors to create and design projects incorporating technology. I ran several in-person workshops with teenagers at the Flagship Computer Clubhouse, located in the Boston Museum of Science, and also ran a workshop at the Annual Computer Clubhouse Conference for adult coordinators who manage the day-to-day activities in their respective Clubhouses. Clubhouses were invited and encouraged to use BiP but were not obligated to do so. The Clubhouses have a culture of sharing projects on an internal network called the Computer Clubhouse Village, but projects are typically shared in their final form through a single image. Introducing BiP to the Clubhouses was a step towards helping Clubhouse youth create richer, more descriptive documentation for their work.

The BiP site hosted two virtual challenges (in December 2013 and June 2014) specifically for Clubhouse youth, where they were invited to build projects under the umbrella of a particular theme over the course of several weeks. The challenges were promoted through emails to select Maker-oriented Clubhouses as well as through postings on the Computer Clubhouse Village. In August 2014, a more general Arduino-based challenge was hosted on the site, drawing Makers of all ages outside of the Computer Clubhouse Network.

Concurrently, BiP was also used in higher-education settings such as design courses at New York University, Rhode Island School of Design, and Welingkar Institute (Mumbai, India) and shared at several conferences in 2014, such as the Digital Media and Learning conference. Finally, press from LifeHacker in the fall of 2014 attracted users outside of the Computer Clubhouse network. In total, 85% of all 970 registered users on BiP are from outside of the Computer Clubhouse network (as of February 2015). The site does not solicit demographic information from registered users, so the average age and geographic location of users has not been collected.

As projects on BiP are publicly shared, I used the information shared on project pages to analyze patterns in how people organized their design process, reflected on what they created, and used the site to support their design process. I describe some of these results in the following section with an emphasis on youth Makers capturing their design process using BiP.
BUILD IN PROGRESS CASE STUDIES

The following vignettes are case studies in four different Makers’ approaches to using BiP, highlighting their underlying motivation for sharing their projects, strategies they used for documenting their projects, and interactions that helped shape both their documentation and the direction of their projects. I selected these four examples to show a range of styles in which people documented their projects and, in particular, how features of BiP supported the youth creating their projects.

All of the following examples involve young people (between the ages of 10 and 17) developing and documenting design projects of their own creation over the course of several weeks. Two of the four projects involve youth Makers building projects in a Computer Clubhouse setting while another involves a Clubhouse alumnus. Finally, I include the story of a teenage Maker who participated in an Arduino-based online challenge hosted on BiP, which was open to Makers of all ages from anywhere in the country. All four Makers were interviewed about their documentation process after their projects were completed on BiP. These interviews were all conducted online and audio-recorded, and each interview was transcribed and analyzed using thematic analysis and deductive coding to highlight motivations and strategies for documenting design process (Miles & Huberman).

The four projects are drawn across a year of development, from October 2013 to October 2014; during this time, new features were being introduced to the site. In each example, I discuss how the projects inspired the development of new features to improve the site. Self-identifying usernames are given pseudonyms, and links to the described project pages are provided for viewing.

Getting Feedback

“Elucidator’s-Kirto’s Blade” is a project created by the user blamb, who was first introduced to BiP through an in-person workshop I led during his summer internship at a Computer Clubhouse in 2013. Several months after his internship ended, blamb, then seventeen years old, continued to use BiP on his own to document his personal projects. One project he documented was a final project for his art class in which he developed a sword replica from one of his favorite anime series, Sword Art Online (Figure 3). Over the course of 5 weeks, blamb captured his experience of conceptualizing, prototyping, and fabricating his design, with a BiP project that spans 22 steps.
Figure 3: Process Map and selected images from "Elucidator’s Kirto’s blade" (http://buildinprogress.media.mit.edu/projects/207/steps)

Upon completing the art class, *blamb* created a step titled “The Final Product,” which showed an impressive, life-sized sword with color-changing LED strips along the side of the blade (Figure 3). However, his images revealed that the LEDs were plugged in directly to a wall using an AC adapter, limiting its mobility.

Users on the site suggested that *blamb* consider battery options for powering the sword; for example, one user left the following comment:

> Does this even run on batteries? The IR control box you're using draws a fair amount of power, with different colors corresponding to different currents. Can you think of any way to make this sword mobile?

In response, *blamb* created a new branch in his *BiP* project listing battery options he began to experiment with. This led to a longer discussion on the site in which other users suggested resources and alternatives, including RC batteries, voltage boost converters, and 9V batteries.

With these suggestions, *blamb* created a step called “THE FINAL wireless product!” where he shared his new battery-powered sword that used two 9V batteries connected in series. He also subsequently retitled his previous step “The Final Product” to “The ‘Final’ Product,” highlighting that he had continued his project even after it had been marked as complete.
Several months after completing his project, I interviewed blamb to learn more about his motivations for using BiP. While the sword was built for a class project, documentation was not required; instead, blamb voluntarily chose to use BiP to “keep track of what I'm doing and keep me accountable for what I needed to do.” He spoke of it as a tool to help him capture his “thought process,” and contrasted this with his experience with Instructables:

This isn't like an Instructable where you have to do this, then do that. You can just ask out questions and roll out your problems, and other people try to help out. That encouraged me to be more vulnerable with the weaknesses of my projects, so that if anyone would try to do it [remake the project] they could see the mistakes I made and go about it however they want.

In this quote, blamb highlights how the platform encouraged him to be open and even “vulnerable” because of the willingness of others to help out. The candor with which he wrote about his design process, especially challenges he was facing, is exemplified in the following quotes drawn from his BiP project page:

In hindsight this was not the best idea and it led to the wood cracking and me trying to fix it with wood glue.

They didn't come out perfect but what can I say, I'm not an expert painter.

Man it's tough to cut this plexiglass t.t.

These types of personal reflections, both about his design process and his own abilities, exemplify the “human” nature of BiP documentation that captures in-the-moment sentiments and also highlights flaws as a means to help others who may build similar projects.

Finally, blamb saw BiP as a tool for developing a portfolio. After building the project, he shared a link to his BiP user profile on his resume, which he gave out during a career fair. His BiP profile (http://buildinprogress.media.mit.edu/users/blamb), which links to all of his projects on the site, became a way for him to establish an online presence and point others towards his design work.

In this example, blamb's BiP project helped him keep track of his progress and share this process with others, including fellow Makers and potential employers. The feedback he received encouraged him to extend his project and think through design issues in an authentic and meaningful way. His openness to revealing the weaknesses of his project provided context for others to reach out and provide suggestions, ultimately helping blamb enrich his project and revise his design. Projects like “Elucidator-Kirto’s Blade” led to the creation of the Question interface to streamline the process of asking for feedback on BiP. It also was one of the longest projects shared on BiP at the time, leading to a rethinking of ways to annotate and organize process maps that culminated in the introducing of branch labels in May 2014.
Storytelling

At a Computer Clubhouse on the West Coast in the summer of 2014, high school interns developed arcade games as part of the Games for Social Change initiative. The coordinator of this particular Clubhouse had previously been introduced to BiP through participating in a BiP-hosted online challenge and decided to incorporate the tool into the summer internship program. At the start of the program, she demoed BiP to the summer interns, and each team of students created their own collaborative BiP project page for documenting the development of their projects. While the teams were encouraged to update their documentation, they were not assigned to do so, leading to documentation of various levels of resolution and completeness.

One of the interns in the program was a 16-year-old user named joekol, who worked on a team with four other interns to develop an arcade game to bring awareness to global warming issues. While all five interns were added to the multi-author project, joekol did the majority of the documentation, authoring 20 of the 24 steps in the project. He was the self-proclaimed documenter of the group but also played a key role in programming the game, which underwent several iterations.

The team created a “tower defense game” in which players try to eliminate carbon-emitting enemies such as cars using natural objects such as trees and lakes (Figure 5). The game was programmed using the Action Script programming language, and the physical elements of the game (such as the arcade box and buttons) were designed with wood and 3D-printed parts. The elements of the game were represented on BiP through photographs and videos of the physical elements and interactions, screenshots of the game interface, and links to download and test various iterations of the Flash game.
While the average project on BiP contains a total of 350 words, joekol's team's BiP project is highly descriptive, with a total of 3313 words. When I spoke to joekol several months after he finished his internship, he described how he considered documentation to be a key component of the engineering process: “That's kind of the purpose of the internship and the whole engineering process: to document everything that you do.” He expressed how much he enjoys writing, particularly when it is not something assigned to him in school. Documenting using BiP was joekol’s first experience sharing his writing publicly online, having previously kept a design journal with sketches and notes for himself.

His approach to documenting was to create a public “diary” that would tell the story of each stage of their design process: “It would start from our initial thoughts and the way we changed our minds about something and removed some things and added aspects.” He especially felt a responsibility to document in a way that would keep readers engaged: “I know reading about projects is usually really boring...I didn't want to make something that people would be bored and click away from after a couple minutes.” This style of documentation stemmed both from joekol’s general interest in creative writing and the Clubhouse coordinator’s encouragement for the youth to capture their entire design process.

Beyond the writing, joekol’s project was also organized into branches that walk through the different stages of the project. Branch labels separate the software and hardware elements of the project, while the software branch is further broken down into...
stages, including the original prototype, modifications, and finalizing the game (Figure 4). He explicitly solicited feedback through the creation of a branch titled “Bug Board” where he included links to prototypes that others could test and provide feedback on.

The team’s BiP project captures the ups and downs of developing a game in a lighthearted and humorous tone, exemplified in the following quote:

While the following days are certain to be wrought with terror and distress, I alone seem to have total confidence in our group's future, progression, and completion of our project.

As for now, bottles of Martinelli's Non-Alcoholic Sparkling Cider are flying open, cheers being given, glasses clinked, and our under-aged group is rejoiced with the happiness and enthusiasm of a professional game development studio.

Descriptions of the emotional learning experience, including anxiety about finishing the project on time and enthusiasm towards what the team had already accomplished, were woven into technical descriptions of the game, capturing a rich picture of his summer internship. Personal reflections on his process added to the diary-like nature of the posts:

This internship, and project, has been one of the greatest experiences of my (and hopefully my group's) life. I am VERY proud of all the work we have done, all the things we have learned and the achievements we have strived for.

The format of BiP encouraged joekol to creatively capture the backstory of his team's efforts towards developing an arcade game. It brought transparency to the design process by showing how the game developed over time, from early modifications of existing games to additional features added at different stages. It also provided a platform for getting feedback on their project and reflecting on his own experiences.

Helping Others

In August of 2014, BiP hosted a 3-week Arduino Bluetooth Low Energy (BLE) challenge where participants received a new Arduino BLE board and a $50 budget for additional materials. The challenge was designed to test how people of all ages creating projects independently might collaborate and share their design process using the BiP platform. The BLE board, which enables designers to connect with Bluetooth-enabled mobile devices, was chosen to attract hobbyists interested in testing new technologies and because of a lack of existing documentation about the board online. The goal was for participants to generate documentation that would be useful to others during the challenge to fill the void of available documentation about the product. Importantly, there were no winners to this challenge – instead, participants were motivated by the opportunity to try out new hardware, test a new documentation platform, and connect with other Makers online.

Participants to this challenge were recruited through emails to Hackerspaces and Makerspaces, and 10 participants from diverse backgrounds were chosen based on their
interest in the challenge and in documenting their design process. These participants were geographically distributed across the continental United States and ranged in age from 14 to 54 years old.

Notably, at the end of the three weeks, none of the 10 participants had been able to successfully integrate the given BLE board into their projects. However, many documented the struggles they faced in attempting to do so.

One project that thoroughly captured these attempts was created by a 14-year-old named *slittle*. From the start, *slittle* had a very clear idea of what he wanted to build. He proposed an Internet-connected sprinkler system that would enable him to water his lawn on demand from a web interface (Figure 5). In his journey to develop this system, *slittle* documented many of the trials and errors he faced, including realizing that he could not connect directly to the BLE using his laptop's built-in Bluetooth module and unsuccessful attempts to connect to the BLE with Python. He represented these challenges in several branches, with colored labels indicating the relative success of each attempt (Figure 5).

When asked about his motivations for sharing these trials, *slittle* spoke about helping others participating in the study: “The amount of detail I included was definitely to help other people who were working on it, because I knew a lot of people were going through the same thing. I thought I'd try to be as helpful as I could and include as much

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*Figure 5:* Process Map and selected images from "Internet Monitored Sprinkler System" (http://buildinprogress.media.mit.edu/projects/1721/steps)
code as I could.” Through this quote, slittle describes his motivation for contributing knowledge to other participants, which was especially important as everyone was sharing their development in real time over the course of three weeks. At the same time, slittle reported that his BiP documentation also helped him reflect on his own experience: “Looking back at what I've created, there's a lot of trials, which I probably would have forgotten about. But after I've documented it, I'm able to look back and maybe use it.” This suggests that slittle was interested in formatting his documentation in such a way that would serve both himself and others. Finally, slittle also discussed using his BiP project page to apply for internships: “I found having it documented has been really nice because when I want to apply to places, it's nice to just be able to send them the link.” Similar to blamb, slittle valued his documentation as tool to communicate his skills and thought process to potential employers.

"Internet Monitored Sprinkler System" also includes two versions of the design separated into branches. The “Version 1” branch ends with a step titled “Reflection” in which slittle reflects on his process by listing the new features he plans to add in Version 2 and the biggest problems he identified with Version 1. Through the use of distinct branches, slittle shows how the project underwent an iterative design cycle and highlights how he is continually improving his design.

Comparing BiP to his previous documentation experiences, slittle described documenting with BiP as extending beyond capturing what has happened:

I found that using BiP isn't really just a tool to document your project, but it's more of a way of doing your projects. [With] each additional step, I was creating it before or while I was doing the step. It was just much different where I kind of wrote about what I planned to do.

In this way, BiP was used as a planning tool in which slittle outlined what he was setting out to do, which is distinct from product-oriented documentation that typically only captures design process after-the-fact. By combining what he was going to do with capturing what he had done, the documentation served as a way for slittle to remember his efforts and remind himself of what there was left to do. This idea is further emphasized by slittle's response to whether documenting throughout was a “disruption”: “It's not at all a disruption. In fact, it helps keep you on track.”

The "Internet Monitored Sprinkler System" project exemplifies transparency through the public documentation of failed attempts to connect with the BLE board. His detailed documentation of hardware issues could be referenced by other participants throughout the challenge, serving as a tool to help others avoid similar problems. Iteration was visually represented in branches such that viewers of the project could distinguish between various attempts. Further, slittle’s use of BiP as a dual planning and capturing tool shows how documentation can support one’s thinking throughout the design process rather than solely after a project is complete.

Building Living Documentation

With younger audiences, mentors and workshop facilitators often play a key role as documenters. An example of such documentation occurred through a series of Maker
workshops hosted by another West Coast Computer Clubhouse led by adult coordinator anetten. Anetten was first introduced to BiP through a Clubhouse challenge hosted on BiP in December of 2013 and continued to use the platform independently after the challenge was complete. She integrated documentation with making activities within her Clubhouse by actively involving youth in building what she called “Living Documentation,” or documentation that is collaboratively built over time.

Anetten’s motivations for documenting included both developmental and practical purposes. On one hand, documentation is important to her as a tool for showcasing activities in the Clubhouse to outside evaluators and funders. However, anetten also employed strategies to make the documentation more directly meaningful to the youth participants as a tool for reflection. Below, I describe her strategies for involving the youth in creating documentation that is useful for both of these motivations.

Over the course of two weeks, Anetten led a 4-session electronics workshop in which eight youth between the ages of 10 and 13 built felt bracelets incorporating electronics (Figure 6). Each session lasted between 40 to 60 minutes, and two mentors (a teenager and an adult) were on hand to assist with the activity and with documentation. In total, 11 people (3 staff and 8 children) were involved in all four sessions. Anetten created a BiP project page titled "Remix: Soft Circuits," which was kept open and visible on a large 45” display in the space throughout the workshop sessions. She stated, “We had the screen open while we were working so individual youth could see their past project and look at how the website actually functioned...it let them know how they were going to be
sharing.” The display thus gave the documentation a physical presence, serving as both a reminder to document and as a means to reflect on the workshop experience.

The BiP project page was updated both during and after each workshop day. During the sessions, several youth volunteered to take photographs of the activity and would typically come in and out of this documentation role, switching between building and documenting. While the youth photographed the experience, the two mentors organized the BiP project page, incorporating the photographs and writing accompanying text descriptions. Many of the descriptions were drawn directly from physical Post-it notes in which youth wrote reflections about their experiences. These Post-it notes were created through group discussions taking place at the beginning and end of the sessions and included the following quotes, which were shared on BiP both through images and text transcriptions:

It [the activity] was hard because I was running out of thread. It was fun because I learned and had new experiences.

The part that I thought was hard was the conducting wire making sure that it wasn't touching the other but it was fun because later the work would be all cool and creative.

At the start of each session, the group would begin by reviewing the BiP documentation to catch up any participants who may have missed the previous session. The coordinator spoke of the youths’ excitement in seeing themselves represented in the documentation through photographs of themselves and their work and quotes of their reflections.

"Remix: Soft Circuits" captures not only the process of developing a specific design project but also the experience of facilitating an activity. Each session of the workshop series is represented in a separate branch, highlighting the youth’s journey from learning to sew to integrating LilyPad Arduinos into their projects. The coordinator, anetten, described the BiP project as “nesting individual and group experiences”; the project page combines the goals and structure of the entire workshop series, representing the entire “group experience,” with photographs and quotes of individual youth's experiences.

The fact that this documentation was built throughout the four workshop sessions contributed to an idea anetten called “Living Documentation,” in which the mentors collaboratively built the documentation with the youth over time. She contrasted this with creating “static postings” of “past history.” For example, over the summer, her Clubhouse had participated in Maker Camp, a DIY summer camp in which sites around the world host Making activities and share media from their projects on a Google Plus community (Maker Camp, 2015). While her Clubhouse shared photos of products they had made on the Google Plus community, the “in-the-moment” documentation on BiP gave the youth agency to edit and contribute to the documentation at any time. She described this as “narrative, descriptive, and rich storytelling as the project develops.” Additionally, BiP gave the entire group a sense of where the workshop was going by providing opportunities to look back at their experiences.

"Remix: Soft Circuits" goes beyond sharing a final product by sharing an entire group's making experience, embedded with individual stories of the youth's experiences.
In this example, BiP provided opportunities for reflection by being visibly present in the space and thus easily editable at any moment as “Living Documentation.”

**CONCLUSIONS AND NEW DIRECTIONS**

*Build in Progress* was developed as a platform for Makers to capture the story of creating a design project. The four Makers described in this chapter used BiP to share their design process as a means to connect with others to ask for advice, help others avoid similar mistakes, and showcase the techniques and skills they used to build their projects. Additionally, the documentation posed opportunities for authentic reflection, helping the authors remember and communicate the effort they put into creating their projects.

As users continue to document projects on BiP, an area for future work is understanding how Makers’ documentation habits develop over time. As young Makers begin to document their work, how can facilitators support them in developing their own documentation habits and thus help the youth take ownership of their documentation? At what point does documenting projects externally become important or valuable for Makers, and does documentation change as Makers create longer-term, more complex projects? These questions are all exciting directions for further developing tools that enable Makers to capture and share their creative process.

**References**


