

Studio 775 Change Proposal: Formalizing the Volunteer Onboarding Process

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INTE 6750 – Spring 2019
University of Colorado – Denver
May 6, 2019

Background:

I am the coordinator for Studio 775, the makerspace at Lafayette Public Library. The makerspace equipment was purchased and installed at the library in the spring of 2018. The room is staffed primarily by community volunteers to help visitors make projects using the machines in the space. Most of the volunteers joined the program over the course of several weeks during the summer of 2018. Many of them had limited or no prior experience with makerspaces, or the types of machine in the space. Others had used similar machines in school or at home. All of the volunteers were excited to learn about the general concept of a community workshop and public access to shared technology. This communal environment and philosophy of shared learning are a primary focus of public library makerspaces. (Mann, 2018) We began the learning process by hosting two-hour shifts on a weekly basis over the summer for volunteers to work in groups of varying experience levels to learn about the machines and practice teaching others about them. Studio 775 opened for public drop-in hours in September 2018. As new volunteers have joined the program, we have brought them in to train by working alongside the more experienced mentors in a fairly informal apprenticeship during regular public hours. Many volunteers have also availed themselves of online resources such as YouTube and equipment forums to enhance their knowledge base about particular projects and equipment. These are common methods that users gain and increase makerspace competencies. (Moorefield-Lang, 2015 and Mann, 2018)

Problem:

The training method described above was very organic and allowed for good, albeit sometimes spotty, exposure to typical experiences in the space. Peer training remains a common method of training makerspace staff, along with online resources, especially since few more formal methods exist. (Moorefield-Lang 2015) As we move forward with the program and hopefully expand both open hours and volunteer staffing, the time has come to move towards a more formal training process for new recruits. This will provide more uniform and thorough training for future new volunteers and a more consistent experience for visitors to Studio 775.

Plan for Intervention:

I planned to oversee and participate in the creation of a series of checklists and job aids to guide new volunteers through a variety of projects and experiences. There were plenty of options within these exercises, to allow learners to make choices and create items of interest or personal meaning, with the support of more experienced volunteers. User guides would be illustrated to offer additional entry points for those using them and to assist guests that may struggle with some aspect of the English language. After completing the new training process, learners should have experienced a typical set of projects for the space, and have a solid background for explanations. Trained mentors will be able to guide new users with more confidence in the set-up of new projects, basic troubleshooting, and analysis of designs for suitability to the machines.

Timeline:

- February 11 – 28: I created an initial list of topics to be covered by gathering data from current volunteers as to usual tasks and questions they encounter when working in the space. I created an open – ended survey on paper and asked mentors to answer collaboratively over the course of their shifts as items occurred to them.
- March 4-10: I produced a rough draft of the comprehensive checklist and asked for feedback from current volunteers.
- March 11- 31: We created/adapted job aids for use of each of the machines in the space. The machines consist of a Carvey CNC router, two Prusa i3 #D printers, and a Cricut Explore Aire 2. I worked collaboratively with the existing staff of mentors in the makerspace to produce and test these checklists/procedure guides to verify that they answer the most commonly-asked or frequently misunderstood questions without unduly limiting opportunities for personal exploration. Volunteers have already created preliminary instructions for each of the machines. The bulk of the project was overseeing and contributing to the refinement and enhancement of these.
- April: It was likely that we would have new volunteers to train by this time, so we should get an opportunity to test the new onboarding process and make adjustments to documents and timing as needed.
- April 29-May 3d: Finalized wording and layout to create a polished project to use in the likelihood that summer will be the next surge in volunteer interest for the space, and we will have a spike in training needs.

Evaluation and Anticipated Results:

As I introduced new documents, I gathered input from current mentors, then used that input to enhance and edit the products. To gather input, I will provided an iteration, asked for suggested edits, and talked to makers after they used the instructions to see if other adjustments arose as we discussed. I also planned to create a knowledge check for use as volunteers finish with the initial training period to demonstrate both to themselves and for the benefit of the program that they have mastered the basics of our makerspace's usage. As we started using the new training

materials, I anticipated a decrease in the number of shifts before new mentors feel comfortable with their knowledge level about working independently with the machines and guiding new users. (Early experiences seemed to average about eight weeks.) I also expected to see a higher baseline for all volunteers' expertise with the full array of machinery, as opposed to the original pattern of a certain amount of specialization on only one or two types of equipment. This should result in a more seamless experience for visitors to Studio 775. Right now, one of our machines, a Cricut Explore Aire 2, is best used by visitors during only a couple of our open times, when particular volunteers staff the space and are available to help with it. Since the makerspace is a community learning space, we can continue to create more advanced help sheets and enhance the more basic ones as time allows around visitors. This will be a means of extending the volunteers' knowledge in addition to facilitating more advanced uses of the machinery by the public. Because the space is staffed entirely by volunteers, additional training must be accessible and not burdensome in order to be effective, as volunteers have a bit more leeway in skills development participation than paid staff. Because our volunteers are invested in the makerspace and in improving their skills, I did not anticipate significant pushback, but I still wanted to create a system that was as efficient and palatable as possible.

Actual implementation

I began by creating a 3-page list of potential training topics for the makerspace. I shared the list with all of our volunteers and encouraged them to make additions as they thought of them. This process has created a robust set of topics to introduce to all new volunteers as they join the program. In some cases, that training is merely introducing them to the very basics of a machine and inviting them to create a project using the equipment. In other cases, it is better to show new staff where to find the multi-page documentation to get started with a piece of more complicated or sensitive equipment to give them a more thorough grounding. Contrary to my initial expectations, we have not had multiple new volunteers start during the time span of the project, so I have not had opportunity to thoroughly analyze the effectiveness of the checklist, though the simple project of creating and sharing it did foster several discussions within the crew and led to some of them asking questions about specific aspects as well as encouraging further sharing of their knowledge with each other. As noted earlier, this community learning and sharing is a frequent goal and outcome of library makerspaces, (Mann 2018) so I want to continue to foster that within our space, while providing enough additional guidance to mitigate unnecessary waste of materials and project time.

To measure the effectiveness of re-training and adding written guides, I created a spreadsheet to track misfires/project failures in the makerspace to look for areas that needed more or better training. In four weeks of initial tracking, it turned out that we had seven project failures. (Of about 15 project attempts.) Six of those were with the 3D printers, and one was a problem with our Carvey CNC router. Of these, the only reliable breakdowns happened in 3D prints. The Carvey failure turned out to be a random technology hiccup, according to internet research and consultation with a more experienced Carvey user at another library. This simplified my task a

bit, as it meant that the primary initial focus should be considerations of improvement in 3D printer training. As I looked at the failures, the problems fell quickly into these types:

- Models were poorly oriented in regards to the printing base, resulting in too little surface area, or bad overhangs when they could have been avoided
- Models had unavoidable overhangs, but supports hadn't been programmed, resulting in droopy and ill-settled prints
- Models had a relatively small footprint compared to their height, resulting in the figures coming detached from the base partially through the print, and not finishing correctly

All of these problems are predictable, and relatively easily avoided. A few other factors can be related, and can also be adjusted to improve results, but for initial purposes, solving these three common errors can drastically reduce print failures. When I started the process, I envisioned creating notebooks of job aids, and encouraging people to peruse them before starting prints. However, as I researched microlearning, I realized that the trend in that direction could enhance my process significantly. The continual emphasis on low cognitive load, point-of-need availability, and easy accessibility (Microlearning FAQs, 2018) made particular sense in a room staffed by volunteers and visited by a very fluid audience. Long, involved instructions were not likely to get looked at, much less utilized.

As I created the job guides, I began with a first step to break processes into single-objective pieces, both to keep them short and to minimize cognitive load. (How to Convert, 2018) This led to a single page on how to orient pieces to be printed, and make sure they have sufficient surface area and support. Since these are all interrelated, they seemed more sensible to talk about in a combined fashion than artificially separated. I also created a help page for each of our two slicing programs that turn a model into a succession of layers for the printer to produce. These help pages give a brief overview of the unique features of the two slicers and how to know which to use. In addition, I created another sheet regarding filament storage, and another for loading, unloading, and changing filaments. For all the job aids, I used as minimal verbiage as possible, and incorporated screen shots and photographs to ease understanding of the various steps involved. Rather than keeping all of the pages together, I laminated them or put them in page protectors and placed them around the makerspace near or on the way to the actions they described. I anticipate further suggestions from volunteers on each of them, and have all the files readily accessible for updates and enhancements.

Results

As noted, my new checklist has not gotten extensive use yet, as we are just now starting to get the increased interest that I expected about a month earlier. The one volunteer that did join us in the course of this process did come up to speed within just a couple of weeks, and is very comfortable with all of our equipment. However, she is also one that came in with previous experience with machines like ours, if not precisely the same models. That almost definitely contributed to her acclimation as well. The checklist did give us a much more structured way to

talk about various situations and policies that come up in the makerspace, so it did serve its purpose of helping to guide conversation and mitigate overlooked topics.

Regarding the success of 3D prints in the makerspace, the retraining does seem to have had an effect. I have not added any new problem records to my spreadsheet in over a month, as I haven't seen any of these problems repeated lately, nor seen novel ones arise, even though we have produced over 25 additional projects. These are not large sample sizes, in part because our makerspace is open limited hours, and can only serve a few people per day. On the other hand, it has made a significant difference in my time usage, as I have spent significantly less time opening bad files to find out why the print has gone wrong, only to find a very basic error. I have been able to start most items printing in fifteen minutes or less and have them reliably finishing well, rather than my previous time expenditures of closer to averaging half an hour per item. Over the course of a week, this can easily add up to two or more hours reclaimed to spend on other duties, which can be a tremendous windfall. Another benefit is decreased material waste as fewer prints fail and produce a pile of misshapen plastic rather than the desired model.

Another benefit of the enhanced focus on training is that I have observed several of our volunteers showing more willingness to try out a machine they had previously been leery of. One of my staff that originally specialized in the Cricut has helped visitors to use the Carvey, and was able to identify and then fix a potential problem in a print before starting it. Another that was not familiar with the Cricut has started to try out simple projects with it.

Conclusions

Having seen significant success with initial efforts inspires me to continue supplementing more of our current manuals with more succinct, tightly focused job aids, as time allows. Clearly, a need exists for sources of more detailed information to give interested people context and better explanations for processes within the makerspace. However, having segments of the information available in exactly the amounts needed to allow visitors and staff to begin a project and provide support as needed throughout the process seems to speed mastery of skills and give users a better experience with more rapid success. Such success can then build on itself and encourage people to continue improving their skills and becoming more creative with the space and the equipment. (Mann 2018) For volunteers that are comfortable with our processes, I will continue to invite their input on creating these documents, and if they are interested, encourage them to choose a particular objective and create a matching job aid, based on the current versions. This is a promising new step in the development of our adolescent makerspace, as we move from the baby steps of opening it to creating a more robust program.

Sources Cited

How to Convert Your Aging Courses into Fresh Microlearning. [Web log post] (2018, April 25). Retrieved from <https://elogiclearning.com/how-to-convert-your-aging-courses-into-fresh-microlearning/>

Mann, L. (2018). Making a place for makerspaces in information literacy. *Reference & User Services Quarterly*, 58(2), 82.

Microlearning FAQs: Learn how to get smarter faster. (2018). *Professional Safety*, 63(7), 24-24.

Moorefield-Lang, H. (2015). Change in the making: Makerspaces and the ever-changing landscape of libraries. *Techtrends*, 59(3), 107-112. doi:10.1007/s11528-015-0860-z