A Brief Guide to Starting A Makerspace

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Introduction

This document is meant to provide you with some insights and guidance from my experience getting makerspaces started for the Mid-Valley STEM-CTE Hub. Since every makerspace has a unique community, space, and staff, I have tried to avoid being prescriptive and simply provide some helpful guidance to help you get started thinking through what your space needs. I have tried to provide external links and ancillary resources where helpful, but there are so many great resources available that an exhaustive list would merit its own separate document.

The sections move progressively from ideation and preparation, to purchasing and setting up the space, to assessing the user experience once you are up and running. At the end I have also included some important takeaways from my experience and resources that I have found particularly useful.

Remember you don't have to have everything figured out at the start, just keep asking questions and making things better!

-Forrest

Intro Survey

This survey is meant to get you thinking about who you want to serve with your makerspace and help you identify gaps in your knowledge and/or resources. Your answers for these questions do not need to be 100% accurate, but taking the time to really consider them will help you create a makerspace that serves the needs of your community.

1. Who will have access to the makerspace?
2.
3. What needs do the users have? (accessibility, economic access, etc.)
4. What is the demographic make-up of the user population?
5. What are the barriers to access?
6. What level of experience/expertise do the users have?
7. Who will facilitate use of the makerspace?
8. What level of training do they have?
9. Does the staff turn over frequently?

10. Will the supplies and materials be loaned out or will they live solely in the space?

11. Are there local experts who would be open to participating?

Space and needs assessment

It is a good idea to ask a lot of questions when you are planning where to put your makerspace and what to put in it. Here are some questions that I have found useful:

Building

These are questions that are going to help you make sure that you can use all of the great stuff you are going to put in your makespace.

1. Where will the space be located?

2. Is there space for storage and shelving or will that need to be located elsewhere?

   (Where will you store: Consumables, electronics, extra furniture, user projects, etc.?)

3. Are there sufficient electrical outlets?

4. Is there ventilation?

5. Is there a water source?

6. What seating arrangements best suit the goals for the space?

7. Does the furniture fit the target audience, equipment, and space?

8. Is there space to make large projects?

9. Does the space need to be mobile

10. Are there sources of static electricity (this can have an affect on the function of some tools)?

Use

These questions are to help you think through what tools and materials you want to stock your space with. It sounds great to want to have a space where anyone can make or do anything, but even that requires careful planning.

1. What tools and materials are already in place?

2. What types of making do you want to facilitate?

3. Do you want projects to mainly be "take home" or do you want more experience-based projects?

4. How will using the tools and materials affect the usability of the other tools and materials in the space? (Clean vs Dirty, for instance)

5. How will you accommodate adaptive mobility users?

6. Will users be allowed to store their projects on site?

7. Will you have a space for quiet work?

8. What safety equipment will you need to have on hand?

9. What consumables will you need to have on hand?

10. Will you charge for use of consumables?

Material and Space Considerations

It is easy to get excited about buying a bunch of cool equipment for your space, but it is harder to make a plan for where it will all live that is accessible, practical, and workable. Alex Baddock's article [6 Essential Tips for Designing Your Makerspace's Layout](#) is a must read. In it, he covers considerations for creating a flow from design space to fabrication space, separating dirty and clean equipment, noise control options, power and electrical needs, furniture, and planning for mobility.

Purchasing

Picking out the awesome materials that you are going to use in your space is one of the most exciting parts of putting together a makerspace. There is lots of helpful advice and good lists for putting together spaces on different budgets, here is what we have found at the Mid-Valley STEM-CTE Hub.

Things to consider

● Amazon is cheap and usually does not charge for shipping. HOWEVER, it [compromises](#) on many of the environmental and human rights values that [makerspaces exist to uphold](#).

● Ordering from the manufacturer and other, non-Amazon websites will often incur shipping costs. Try to figure out a workflow that allows you to determine these added costs so that you can budget, shop, and purchase according to the actual cost and not just the list price.

● Know your reimbursement process so that you can gather the necessary documentation. Save your invoices and receipts!

Makerspace purchase lists

The following are examples of purchase lists that we have used at the Mid-Valley STEM-CTE Hub. While the prices were accurate at the time of purchase, the price and availability of these items will vary. These may provide a good starting point for you as you create your own purchase list.

- [Small $1,500 Mobile Makerspace for Elementary Age](#) (with forced copy)
  This is the purchase list we used for a series of small, mobile makerspaces in local Boys & Girls Clubs. We wanted to focus mainly on providing take-home projects in this setting.

- [Medium $20,000 Semi-mobile Makerspace for Elementary/Middle School Age](#) (with forced copy)
  This is the purchase list for a middle-grade makerspace we put together in a local public library. The goal in this case was to create a collection of maker materials and activities that could circulate around the consortium, as well as establish this particular library as a primary locale for youth making in the community.

- Maker Ed: [Tools and Materials](#)
  "Tools and Materials" contains lists and examples of useful tools and resources in making activities and makerspaces, including suggestions for consumables, hardware, machines, open source software, and other technologies. This category also includes guidance or tutorials on specific tools or skills.

Putting the space together

Now that you are ready to put the space together, here are some things to consider.

- Start by identifying the materials that you want to be available at all times and the items (if any) that will rotate.

- Use the storage bins to organize your tools and materials into kits where possible. Not all the tools and supplies need to be organized this way, but it helps to have all the supplies for some guided activities ready to go and easy to put out. This will also be a big help if you plan to distribute or mobilize your makespace at all.

- Use your rolling carts for items that will rotate and for items that need to be shuttled around in bulk and stationary shelving for items that are going to be available at all times.

- Remember that there may be accessibility needs and projects that require a lot of floor space. Don't fill the space with items that can't be moved.

- Try to incorporate and encourage participation from your community in setting up and decorating the space. Invite your users to create signage and help make decisions about what materials are available and when.

- Make sure any safety notifications are visible and easy for your users to understand, and make sure your signage is in any languages used in your community!

Continuity planning

Make a plan for maintaining and restocking supplies. If you have a grant, try to set aside a portion of the grant money for fixes and additional supplies over the next year. Additionally, start soliciting donations of reusable materials and begin to establish partnerships with local organizations who might be interested in supporting the makerspace.

Training for Design Thinking and Maker Mindset

Getting your staff on the same page on how to facilitate the makers in your space is as important as getting the coolest equipment and materials. In fact, the resourcefulness that comes from the maker mindset and design thinking will likely get people making things regardless of your budget and space.

The Mid-Valley STEM-CTE Hub put together this Design Thinking, Human Centered Design, and The Maker Mindset Presentation, which provides a basic overview of the principles and a few exercises to get you, your staff, and your users to start thinking about making and what you want to accomplish in your community.

Maker Ed: Program Planning and Management provides models of successful making programs in varied settings, including after school clubs, youth makerspaces, school classrooms, museums, and libraries. These examples also contain relevant tips on how to plan out a year, all the while managing students, project progress, supplies, and safety.

Check in/Getting usage data

Once you are up and running, it is important to start gathering feedback from your users as well as your staff. At a minimum, you want to know what your users are using in the space, what they think is missing, and to give them a place to let you know if there are other problems or things you are doing particularly well. Gathering some demographic data is also a good idea to help you identify what populations you are serving and whether you can or need to adjust to reach the communities that you are missing.

Non-Survey Assessment

There is some good evidence that using portfolios, design journals, reflective writing, and badging for assessment in makerspaces is preferable to the standard user survey. These methods provide a more natural, nuanced, and comprehensive picture of your users. Anthony Chuter's article [What Does Assessment Look Like in Makerspaces?](#) Provides a good introduction to these methods and how to implement them. This 2017 survey of youth makerspaces and makerspace assessment practices (particularly portfolio driven assessment) will help you as you look to contextualize your assessments: [Surveying Maker Education Demographics & Assessments](#). The article also provides a helpful Maker Site Survey.

User survey

While portfolios, badging, and reflective journals are excellent tools for assessment, some settings and/or circumstances are better suited to traditional surveys. Here are a few that should help you start gathering information about your users and space.

A Short Makerspace User Survey [Link](#)

Thank you for taking this survey to help us understand the qualities, characteristics and experiences in our makerspaces!

Any reports we deliver back to your space or publish on (your organization) or anywhere else will NEVER contain any personally identifiable information.

1. Age
   - ☐ 3-4
   - ☐ 5-6
   - ☐ 7-8
   - ☐ 9-10
   - ☐ 11-12
   - ☐ 13-14
   - ☐ 15-16
   - ☐ 17-18
   - ☐ 19+

2. Gender
   - ☐ Male
   - ☐ Female
   - ☐ Prefer not to say

☐ Other

3. What school (if any) do you currently attend?

4. What did you use in the makerspace for today?

5. Were the tools and resources you needed available and accessible? If not, please tell us what was missing or inaccessible.

6. Have you used the makerspace before?
   ☐ Yes, more than once
   ☐ Yes, once
   ☐ No, but I have visited
   ☐ No

7. Is there anything else you would like to let us know about?

8. Was this form filled out for you by someone else?
   ☐ Yes
   ☐ No

Thank you for taking this survey to help us understand the qualities, characteristics and experiences in our makerspaces!

Any reports we deliver back to your space or publish on (your organization) or anywhere else will NEVER contain any personally identifiable information.

Makerspace Expectations: User/Member Survey Link

This short survey is based on:
"Nation of Makers Annual Survey of Makerspaces Report" on MakeTheData.org by the Nation of Makers Metric of Impact Working Group. The project is licensed under CC BY 4.0.

Changes have been made to fit the needs of the (your makerspace) community.

You can find the original survey here:
https://github.com/IttyBittyArtist/NOMANNUALSURVEY/blob/master/2019/2019-Survey-Questions/2019_M_Survey_Questions.pdf

1. How well is your makerspace meeting your expectations?

   Never meeting expectations   1 2 3 4 5   Always exceeding expectations

2. Where is it meeting your expectations?

3. Where is it not meeting your expectations?

4. Would you like to be more involved with the makerspace? If so, please provide your name and an email address or phone number so that we can contact you.

Detailed user survey [Link](#)

This survey is for when you want to do a deep dive into your makerspace users' experience. It is longer, so you may want to administer it to a targeted group. Since it is a bit long to recreate here, you can create a PDF by using the print option on the Google form.

Important Additional Takeaways

- Start by connecting with the person at the location who will be responsible for day-to-day management of the space/program. It is helpful to hear stories about where the space(s) is located, how the space is furnished, how the area is staffed, who the target users are, and what the target users are excited to work with. Ask about connections to community volunteers.

- Survey the stakeholders about what they want to see and what they can manage. Make sure to include the staff in the process if you can. Surveys of users of the space can be useful, but keep in mind that your survey likely won't reach all of your potential users, and that makerspaces are also about trying new things and exploration; try to provide what people want, but don't limit the makerspace to just those things.

- When you are making a plan for the space, make sure that you are considering adaptive equipment and accessibility. Don't pack things in so close that a wheelchair can't navigate the space easily. Choosing furniture that is mobile and equipment that is portable has the advantage of making the space even more flexible and accommodating for users as well as big projects!

- The materials and tools you choose are going to depend a lot on the age and skills of your target users. A makerspace that is open to everyone is a nice aspiration, but try to focus on a particular age and skill level and build from there.

- Try to have a mix of guided kits (something like [these](#)), semi-directed materials (Lego, Strawbees, etc), and undirected supplies to facilitate learning, invention, and creativity.

- As you set up the space, consider how the elements are going to interact with each other. If users are going to have unsupervised access, make sure you are comfortable with them using the materials that are available or that they are sufficiently secured.

Additional Resources

Makerspace guides

San Jose Public Library's Mobile Makerspace Guide
Texas Computer Education Association's "Ready Set Make!" Guide to makerspaces
Edutopia's Starting a School Makerspace from Scratch

Makerspace Education

Maker ED How to assemble and Distribute Home Maker Kits
WhyMaker's Maker Education Resources

Resource lists

Makerspaces.com's Ultimate Makerspace Resource Guide
Nation of Maker's Resource Library

Oregon Makerspaces

Connected Lane County's Spark Lab
Talent nonprofit Talent Maker City
Hillsboro Public Library Collaboratory

Closing and Contact

We wish you the best of luck on your makerspace journey. Remember that the process is iterative and you do not need to know everything to get started. Please feel free to reach out to us at the Mid-Valley STEM-CTE Hub at midvalleystemctehub@linnbenton.edu with any questions!