Makerspace Playbook Site Survey: STEAMLabs
March 2015

CONTACT INFORMATION

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Title: Chief Instigator

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ORGANIZATION

Organization Name: STEAMLabs

How would you describe your organization type (library, museum, school, community organization, etc.)? Community makerspace, educational curriculum development

Organization website: http://www.steamlabs.ca

Organization social media links:
https://twitter.com/steam_labs
https://www.facebook.com/STEAMLabsCA
https://instagram.com/Steam_Labs

Blog and/or site most related to programming, making:
http://steamlabs.ca/blog/

Organization news/publicity links: http://steamlabs.ca/blog/

Location (city, state): Toronto, Ontario

Is your organization rural, urban, or suburban? Urban

Is your space and/or elements of your programming mobile? Elaborate, if necessary.
We take our maker education activities into schools. By providing curriculum-connected tech activities, teachers can afford to give us large blocks of time to spend on these activities. We schedule our sessions once per week, giving the teacher time to elaborate on the education with research and computer-based activities. This makes the best use of our time as technology experts and allows many things to be taught that the schools could not otherwise make happen. Here's an example three-week activity involving 3D printing, Arduino programming, electronics, web development and more:
http://steamlabs.ca/2015/04/steamlabs-builds-programming-into-the-ontario-school-curriculum/

Target audience(s):
All ages, all ability levels. STEAMLabs is an entry point for both kids and adults looking to get started in electronics, coding, 3D design and printing, digital fabrication, and all kinds of hands-on making. It's also a space for seasoned makers, entrepreneurs, and artists looking to work with serious tools needed to get things done. We offer full-access memberships as well as standalone after-school programs, weekend workshops, and plenty of drop-in open make times.

Annual budget (indicate if public or not public): $250,000 (not public)

Percentage free and reduced lunch served (if known): Not applicable

Access: Is your organization open to public, age restricted (elaborate below), membership-based, free, and/or admission required? Are there specific groups that you serve?
STEAMLabs is open to the public. "Independent Maker" members pay a monthly fee to access the space and use it on their own. "Guided Makers" pay for workshops, classes, summer camps, and other programs that have a 6:1 maker:mentor ratio to ensure lots of assistance. We have as many pay-what-you-can events to ensure access for everyone.

Tell us about your organization. What distinguishes you from others?
STEAMLabs is different than most makerspaces in a number of ways. First of all, we tailor our programs specifically to all ages, from kid to adult. We also welcome all ability levels from beginner to expert.

Our space is located in the Centre for Social Innovation's new 64,000 sq. ft. building in the heart of downtown Toronto. By partnering with them we bring a purpose to our programs — making the world a better place. In addition to tech skills, STEAMLabs will specifically tailor its programs to enhance soft skills — confidence, entrepreneurship, teamwork, collaboration, resourcefulness, and more. We help youth and adults understand themselves and enhance their skills in all areas!

MAKING AND CORE VALUES

What is your mission statement?
STEAMLabs is a community makerspace, where people of all ages and abilities come together for access to high tech tools, to learn, and to create. It's a place for Science, Technology Engineering, Art, and Math to be used to invent the future!

What does it mean to "make" in your space/organization?
To make is to bring something new into the world. This can be a physical creation, a coding project, or an organization dedicated to improving the community. The core is to combine creativity with action to produce.

How does the above relate (or not relate) to your core values?
STEAM topics are best taught with a purpose in mind. Instilling the principles of making create people with agency — the ability to make the changes they want to see in the world.

What forms of making (all creative endeavors) occur?
All kinds! By providing high tech equipment and facilities, many technological forms of making occur such as robotics, 3D printing, laser cutting, video game programming, etc. We also provide more traditional tools, such as a fully equipped professional woodshop, sewing machines and more. By encouraging community collaborations, we also encourage any kind of making that those in the community want to do.

Are you influenced by any particular pedagogies (approaches to learning)?
Yes! Our main method of teaching is experiential and interest driven. Play-based learning is also very important. Our 5 step process is as follows:

1. EXPLORE TECHNOLOGY
   Discover something new by experimenting with it. We provide multiple options for participants to try. This step frequently involves taking things apart to see how they work.

2. BRAINSTORM IDEAS
   Think of interesting and useful ways to use technology to make something! Inspired by the exploration and play step, participants can now let their imagination run wild and come up with ideas.

3. MAKE A PLAN
   Grab some team members and turn your idea into a plan you can execute together. Understand that people have different strengths, and a team is much greater than the sum of its parts. This step first involves selective retention of the ideas formed in the previous step. What are the most awesome ideas? What are the most awesome parts of those? Refine this into a plan that can be accomplished.

4. BUILD, FAIL, REPEAT
   Get to work on your creation! You're sure to encounter problems - learning how to overcome them is the best way to learn. We guide participants to solve their own problems, and get used to being self-reliant.

5. SUCCESS!
   Celebrate your creation by sharing it and your process for building it. The process is more important than the final product, and sharing this through journals and presentations is an important part.

What are some good examples of especially powerful/ ambitious/successful making experiences?
With a grade 6 class, we built an Internet of Things interactive model of Ontario's power system. The kids designed it as a museum exhibit to teach visitors about power generation and consumption. This is more than a school project; it's an actual educational installation piece.

It has models of the major power generation methods in Ontario, complete with a web interface to control a display of LED-lit houses, designed and 3D-printed by the students. The LEDs are controlled by an Arduino-compatible Spark Core connected to the Internet by wi-fi and use data from the Ontario power companies to show the current live power generation and usage in Ontario! The finished model was accepted into an exhibit at the Toronto International Film Festival's Digiplayspace.

Here's a blog post with more details and pictures:
http://steamlabs.ca/2015/03/ontario-power-system-education/

GOALS

What are the goals of the programming and experiences provided?
The main goal is to make people realize that they can be the creators of the world around them. To give them the skills and confidence they need.

How do your environment, tools, and materials reflect these goals?
The space is designed to provide the resources people need for creating. It is designed to be easy to access and welcoming to all ages and ability levels.

How do you know when you've met your goals? What are your metrics of success?
Currently, we mainly track the number of participants. We're working on two additional tracking mechanisms: surveys and participant journals.

What are your plans and hopes for the future of your space and programming?
One goal is to provide a model for others to follow. We plan on documenting as much as possible to help with this. We are developing open-source curriculum for use by other maker educators ranging from makerspaces to libraries to schools.

TOOLS

What are your most frequently used and commonly available tools?
Computers
3D printers
Laser cutter
Glue guns
Scissors!
Soldering irons

In the wood shop, jig saws, drills, and drivers are the most common tools used.

List any special tools that require supervision, training, and/or certification.
Anything that needs to be plugged in needs supervision. Mentors supervising these need to be trained. We also keep box cutters out of reach and supervise these closely.

What are the favorite tools (most popular/most desired, even if you don't have many)?
Laser cutter! It's so versatile and easy to pick up. We teach Inkscape and people very quickly learn to make shapes and engravings. It's a very useful tool, too, as it is frequently used to make complex parts for projects.

Hot glue guns are an amazing and quick way to do woodworking. Very forgiving and easy compared to trying to screw/nail things together.

Are there any tools that go largely unused, or that are no longer provided? Reasons?

The table saw is mostly used by the adult mentors. It's just too powerful and the potential for kickback to strong. We're looking in to getting a wall-mounted panel saw to replace it as a more kid-friendly tool.

Our CNC machine has been underutilized, as it is complex to use. We need to develop some specific programs around this.

MATERIALS

What are some of the most popular and frequently used materials?
Wood! ¼" plywood is very useful for making all kinds of things. Laser cutter works well with it, too. Plastic gear motors are used in all kinds of projects; they're cheap and easy to connect to things with ¼" plastic tubing.

What are some of your most interesting/ unexpected materials?
Secondhand toys are cheap and very useful. The kids take them apart and use them for all kinds of projects.

What are the most continually reused materials? Most consumed?
Wood bits cut off from other projects are frequently used. We order plastic gear motors by the hundreds.

Share any specific or general sources for materials.
Aliexpress.com is a great source for affordable electronic parts. Local hardware and surplus stores are fantastic. Active Surplus in downtown Toronto is one of our favourite places to shop.

COLLABORATION

What are some of the institutions and organizations that are sources of inspiration, support, and influence?
Maker Faire is always a huge source of inspiration. Seeing what other people are doing in this space gives us lots of new ideas to fuel our programs. Presenting at any kind of conference makes us review our successes and refine our ideas for the future.

Describe any local, national, and global partnerships and collaborations.
The Mozilla Hive Network is a fantastic group of organizations focused on digital literacy skills. We come together to share ideas, resources, and plan projects. Funding opportunities are frequently available, too.

The Centre for Social Innovation in Toronto and New York is a great partnership for us. The Centre for Social Innovation is a social enterprise with a mission to catalyze social innovation in Toronto and around the world. They believe that society is facing unprecedented economic, environmental, social, and cultural challenges. They also believe that new innovations are the key to turning these challenges into opportunities to improve our communities and our planet. The hands-on making that STEAMLabs will provide directly in their largest location will be a big part of this.

SPACES AND ENVIRONMENT

In what physical places does making happen in your organization? A single dedicated space, multiple dedicated spaces, general use areas, a workshop (metal, wood, sewing, etc.), outdoors, a theater, a music studio, an art studio? Everywhere? Somewhere else?
Our newest makerspace is divided into several areas:

The great hall is the majority of the space. This is filled with workbenches and lined with tools and materials. We believe that a big part of innovation is bumping in to other interesting people and projects. The cross collaboration that happens in an ad-hoc manner is facilitated by having as many people in close proximity to each other as possible. With this in mind, we have as big an open area as possible. Ceiling noise dampening panels control the sound from being too loud.

Some activities need separate rooms. We have separate rooms for the wood shop and the CNC room. They need different rules and isolation for dust and noise. They are each soundproofed to prevent the loud power tools from interfering with other activities.

Elaborate on where making happens, if needed.
Making happens everywhere!

How are the spaces, tools, and materials organized?
Workbenches fill the center of the space. Shelves and racks around the edges contain the tools and materials. One thing we noticed with our original makerspace was that many tools take a while to set up. For example, getting out the soldering iron, placing the tool stand, the fume filter, the soldering tip cleaner, etc. Some larger makerspaces solve this by having dedicated areas for each type of task. We wanted to avoid this so that as much of the space is multipurpose as possible. So we are developing "Tool Pods" that have your whole soldering equipment setup on a board that slides out on to your workbench, ready to start.

How large is the space(s) where making happens?
The main makerspace "Great Hall" is 2200 sq. ft. The wood shop is 400 sq. ft., and the CNC room is 275 sq. ft. Adjacent classrooms and a lounge area are available for events and total another approximately 3000 sq. ft.

Please describe how your site and makerspace(s) are staffed, including numbers of full and part-time staff and volunteers.
Andy Forest – Director, Chief Instigator and Teacher – Full Time
Marianne Mader – Idea Wrangler, Board Member – Part Time
Jim Davison – Board Member – Part Time
Makerspace coordinator – Full Time
Lead Teacher – Full Time
4x Teachers – Part Time
Lots of volunteers!

First impressions of space(s):
Ideally, when participants first enter the makerspace, they see people making awesome things such as robots and 3D designs. They hear discussions about how to tackle a problem. They hear power tools. They feel inspired to try their own project or help someone with theirs. They experience a feeling of anything being possible. They leave with something that they made themselves with skills they just gained and a feeling of confidence.

Describe your approaches and priorities in creating environments for making/learning.
The space itself should encourage learning and exploration. There should be many tools and materials that should be free to use without asking. For more complex tools and materials, there should be a clear path to learning and using them. The space should encourage an atmosphere of sharing and learning.

PROGRAMMING

Describe the kinds of programming offered.

Independent Makers
Monthly memberships
Safety and basic usage tool training
Workshops

Guided Makers
Drop-in open make sessions
Workshops

Kids
Summer camps
After-school programs: These have a learning arc over a series of weeks where the participants learn and create projects together.
Clubs: These are more ad hoc, with no set start and end dates. Projects and teams form around interesting ideas of the teachers and participants.

Families
Events: Range from hackathon-style build- together sessions to guided workshops. This is one of the best ways for people of different generations to come together and learn and make.
Workshops

Community
Events run by STEAMLabs, either at our space or at other spaces
Events run by community members: There are so many passionate artists, makers, and scientists in our city! After 6 p.m. every day is community time, available for community-run events.
Design team: We offer support for makers working on projects benefitting STEAMLabs or the community. Support for the design team members ranges from free materials to free shop time to project planning assistance.

How did your space and programming get started?
We got started in Andy and Marianne's garage as a summer camp in 2010. The kids loved it and changed their whole attitude towards learning and making things happen. Andy knew that he had discovered his purpose and built everything up from there.

How do you decide on/design/ make possible the space and components of the program?
After running a kids-only space for years, Andy wanted to bring hands-on experiential learning through making to adults and older youth as well as kids. The partnership with the CSI also brings a stronger purpose to making. The world faces some complex problems, and helping to solve them is a strong goal for the community and activities of the makerspace.

How has your environment and programming evolved? What has worked well, and why? What has changed? What could still be improved?
One of the best evolutions of the program is seeing kids grow up into being confident and skilled mentors themselves. We've built this into our programs now, encouraging young participants to aim to be mentors themselves.

Early on, we were focused on trying to make sure that every participant in a project emerged with a completed project. Parents in particular are very concerned with their child working hard enough and finishing projects. We realized that goals should be important to the child, not to the parent. Our programs evolved so that the kids themselves set their own goals and explain their process towards them. If they don't reach their goals, that's OK; they just need to know why not and what they have learned and will do differently in the future. Clearly communicating this to parents has been very important and effective.

Metrics need to be improved. We who are immersed in this world of maker education can see the benefits of it every day. We need to find better ways to prove it to the rest of the world.

EQUITY AND ACCESSIBILITY

Are there segments of the population that you hope to serve better?
Due to the high mentor:participant ratio, our programs are out of the price range of many people. We have as many pay-as-you-can and free events as we can afford. We still need to find innovative ways to bring our programs to more kids more affordably.

What strategies do you employ to help increase the accessibility of your space/program to all learners?
Self-directed learning is fabulous for this. There have been so many times that a parent has warned us about their child's short attention span, and then that child is just completely engaged the whole time they're in our program. Letting them work on what they want works wonders.

We also build in to each program strategies for participants learning at different paces. One strategy is to get the kids with more knowledge teaching. Another is to have advanced challenges ready to give to kids that have already picked up what others are still struggling with.

What has worked well? What has been the greatest challenge?
Program cost is the biggest challenge to accessibility.