

# Building a Fab Lab: a How-to-Guide For Any Budget

Planning to build a Fabrication Laboratory can be an exciting and momentous time that welcomes innovation and entrepreneurial progression. However, it may also welcome some new challenges and feelings of uncertainty. This 10-step how-to-guide has been established to provide entrepreneurs, leaders or innovators with the basic knowledge necessary to create a Fab Lab on any budget.



#### **Step 1: Develop Your Mission**

What is your Fab Lab's mission statement? Before making any investments or hiring employees, you should have a well-established mission statement set in place. Your mission statement should be specific and also attainable. If your mission is to provide local entrepreneurs with the resources necessary to bring their ideas to life, make sure you fully understand how you will make this happen. A carefully planned mission will provide direction and a purpose for your Fab Lab. A mission statement should be realistic, easy to understand and well communicated.

#### Step 2: Find the Right Person

Once you have a well-established mission statement, you will then need to find the right person to be the director of your Fab Lab. This is a critical step and it should never be overlooked. The director is the driving force behind a Fab Lab and he or she is responsible for practicing the mission statement, providing insight and attracting users. This person will also be responsible for recruiting additional employees to help manage the Lab and instruct users. The director's passion for innovation and entrepreneurship should be clearly visible and they should have the experience you are searching for. Be sure to spend adequate time interviewing potential candidates before selecting the right one. The selected individual should be well aware of the risks associated with launching a Fab Lab and that his or her salary may be minimal until steady progress is made. The passion to help the community should be the driving force for completing daily Fab Lab activities for this individual. Some great candidates for this position may include an existing college employee, an adjunct, a retired school teacher or even a community volunteer.

#### Step 3: Choose Between Small, Medium and Large

Determining the size of your Fab Lab before building it will significantly help you understand what resources are needed. If you plan to start a large Fab Lab, then you will most likely be starting with a larger budget and require more resources. If you plan to start small, then you will most likely start with a smaller budget and utilize resources that you already have access to. Whether you decide to build a small, medium or large Fab Lab, it is important to plan carefully and understand what resources are needed and how you will attain those resources.

#### Step 4: Seek Funding

Since Fab Labs have all different types of budgets that can range from \$5,000 to \$500,000, it is important to understand your funding options. It is advised that you research the different types of funding options available in your area before making any large investments. If a local community college finds value in your proposal, they may be willing to provide you with free space or even a grant. Keep in mind that a successful Fab Lab can be started in a single classroom or an old building. Make sure that your funding resource clearly understands your mission and is willing to work with you to build a successful Fab Lab. Funding options may include government, community colleges, universities, local partners or community organizations.



#### Step 5: Choose a Location

When on a tight budget, finding a location for your Fab Lab can sometimes be a challenging task. However, you may be surprised at the resources that are already available to you. Many Fab Labs start out small and then expand in a short amount of time. A simple classroom at a community college can be a great starting point for a Fab Lab. If you have a larger budget, you may be able to utilize an entire floor for your Lab or even a new building. Keep in mind that the most important components of selecting your Fab Lab's location is the proximity to your target audience and the room for expansion. Your target audience should be easily able to access your Fab Lab and the Lab should have room for growth and additional equipment.

#### Step 6: Find Your Niche

If you have a Fab Lab that no one knows about, you will soon run into a problem. It is important to gain publicity and attract your target audience to your Fab Lab to ensure success and further development. Therefore, you need to find your niche. What will make you stand out from other Fab Labs? What will make your users interested in visiting? You should plan to make your Fab Lab have a welcoming environment for all individuals, no matter what their skill level may be. Keep in mind that many individuals have never heard of a Fab Lab before and therefore may not know what they are capable of achieving there. It is important to make this space appealing and not intimidating. Will your Fab Lab hold beginner laser engraving classes for community members? Will it provide inexpensive engineering classes for local students? Find your niche and market it to the right audience.

# Step 7: Equip Your Fab Lab

Once you have developed your mission, found the right director, determined the

size of the Lab, know your niche and secured a location and funding, you are ready to start equipping your Lab. Since purchasing equipment can be a large investment, it is best to determine what equipment is necessary to support your Fab Lab's mission. If you are targeting young-adult engineers, you may want to first purchase a computer with necessary design software and a small 3D printer to support their engineering projects. Once you have a Fab Lab and your user base and revenue begins to increase, you may then be able to supply the Lab with a laser cutter, ShopBot or router. Many successful Labs have started out with only a few computers and a 3D printer and in a short amount of time were then able to supply numerous types of equipment. Keep in mind that the price you charge for the use of equipment should be feasible. You want to provide your users with services that would not otherwise be available to them at a very affordable price. If you charge too high, you may lose users and if you charge too low you may lose money. Spend time developing a good pricing strategy that will attract users and also aid in the growth of your Lab.

Two examples of how a successful Fab Lab can be started with a limited amount of resources and a small budget include the Northampton Community College Fab Lab and the Patrick Henry Community College.

The Northampton Community College Fab Lab started out on a small budget and a limited amount of equipment. Jeffrey Boerner, manager and founder of the Northampton Community College Fab Lab, launched the Lab with only one 3D printer and a few computers. Today, the NCC Fab Lab now offers over 80 educational courses, led by a diverse group of 22 master craftsmen and expert technicians, in woodworking, guitar building, 3D printing, laser engraving, metalworking, electronics and audio. For more information about the NCC Fab Lab, click here.



Photo Credit: Phil Stein

In the middle of an economic devastation, the Patrick Henry Community College applied entrepreneurial thinking and partnered with the New College Institute and the Martinsville-Henry County Economic Development Corporation to establish a Fab Lab. The Fab Lab, located at the Thomas P.Dalton IDEA Center, is now equipped with a 3D printer, vinyl cutter, laser engraver, CNC plasma cutter, minimill, injection molder, vacuum former and welder. To learn more about this story, <u>click here</u>.



# Step 8: Develop a Pricing Strategy

In order to attract users, provide fabrication tools and also expand, you need to develop a pricing strategy. How much will you charge users? How much will you pay employees? The right pricing strategy will aid in the growth of your Lab and keep a positive return on investment. Researching different Fab Lab pricing is a great way to develop your own pricing. Some Labs utilize pro-bono teaching and allow their instructors to access the Lab for free if they teach a certain amount of classes. Make sure you develop a pricing strategy that supports your mission, keeps users engaged and contributes to the expansion of your Lab.

# Step 9: Follow the Golden Rule of Fab Labs

To ensure that you are contributing to the international movement of personal fabrication, created by MIT's Center for Bits and Atoms, make sure that you fully understand the mission of Fab Labs and are following this mission at all times. Your Fab Lab must be open to the public at little to no cost and should enable invention through access to various tools for digital fabrication. Your lab must follow safety

and operational procedures and provide ample instruction to users. Following the mission of Fab Labs will ensure that you are contributing to an innovative and exciting movement.

# Step 10: Get Ready for Take Off

Once you fully understand the basic steps above, you should feel ready to launch. If you plan properly and utilize online resources effectively, you should be on your way to creating a successful Lab that will welcome innovation and creativity. And remember, a successful Fab Lab can be built on any type of budget. Happy launching!

Please note that every Fab Lab is different and this how-to-guide is intended to help you understand the basics of building a Fab Lab. If you are not yet ready to start a Fab Lab, you are encouraged to use this guide as a starting point for building an incubator or Makerspace.

For more information about the mission of Fab Labs and for assistance in planning and operating your own Fab Lab, visit the <u>Fab Foundation</u> and <u>The United States</u> <u>Fab Lab Network</u> websites.



NACCE and the ARC sent a delegation of college representatives from Big Sandy Community & Technical College, Eastern West Virginia Community & Technical College, Virginia Community & Technical College and Roane State Community College to the U.S. Fab Lab Symposium in Bentonville, AK in March of 2016. In addition to applying knowledge learned at the symposium on their own campuses, the delegation will be leading a panel discussion at an ARC Conference that will be held at Big Sandy Community & Technical College in Pikeville, KY in the fall of 2016.