How to Make a Makerspace …in a Library!

Gui Cavalcanti
6/13/2013
Overview

- Introductions
- Overview and History of Artisan’s Asylum
- Applicability to Libraries
- Stages of Development
- Example Library Makerspaces
Artisan’s Asylum
What is Artisan’s Asylum?

- 40,000 square foot makerspace
  - Machine shop
  - Welding shop
  - Wood shop
  - Sewing lab
  - Bicycle repair
  - Electronics assembly
  - Silkscreening
  - Jewelry & Glass

- 300 members
- 142 rental studios
- 40-50 classes with 250-300 students a month
  - Teachers paid 50% of class income
- $1M+/year income
A Brief History

• Founded in May of 2010
• Started with $40,000 of heavy machinery
  – CNC mill, lathe, TIG welder, woodshop, sewing machinery
• Initially 1,000 square feet
  – Intended as a co-working studio to be shared by 10-20 people
  – 100 people attended the opening party…
• Nearby hackerspace had a 9,000 square foot space, was in the process of shutting down due to politics
  – Had enough money to pay for first month’s rent and move the machinery the first time, everything else was bootstrapped
May, 2010
Windsor Street

• 1,000 square feet
• Fully privately funded and run by Gui Cavalcanti and Jenn Martinez
• Members and classes were a nice-to-have
• $40k worth of equipment
• Not nearly enough space to run all of the equipment at one time
• Had machining, welding, woodworking, and sewing capabilities
June, 2010
July, 2011
Joy Street

- 9,000 square feet
- Mostly funded on earned income, significant income derived from charity
- Directed by Gui Cavalcanti (unpaid), run by super-volunteers called Wardens
- Members and classes paid rent; renters were considered a nice-to-have
- $60-75k worth of equipment
- Not nearly enough space or divisions to run all of the equipment at one time
- Added bicycle maintenance and electronics facilities; significantly bolstered existing capabilities
August, 2011
Tyler Street

- 40,000 square feet
- Fully funded on earned income
- Run by Molly Rubenstein (ED), Dmitri Litin (Controller), Rob Masek (Facilities), Gui Cavalcanti (Dev., half-time), member services coordinator (now hiring), publicity and marketing coordinator (now hiring), plus ~20 long-term volunteers manning the front desk and servicing shop equipment.
- Renters (and their memberships) pay infrastructural costs; additional members and classes pay salaries
- $300k worth of equipment
- Enough space to run all equipment at once, if noisy
- Added silkscreening, computer lab, glass and jewelry, and many CNC tools, as well as doubling capacity in all shops
In 3 years...

- 230 volunteers
- 140 instructors
- 7,000 hours of volunteer service
- 450 classes
- 2,400 people on our mailing list
- 4,000 unique students
- $4M in Kickstarter funding
- $3.5M in venture capital
Introduction to Somerville, MA
Somerville, MA

• Highest population density in the Northeast
  – 77,000 in 4 square miles
  – Neighboring Cambridge (100,000, 7.2 square miles) and Medford (55,000, 8.5 square miles)

• Highest artists per capita outside of Manhattan

• Young, but not too young; most citizens are 25-44
  – No colleges in Somerville, but Tufts is across the Medford border

• $62k/yr Median Household Income

• Average real estate listing is $472,709 (Trulia.com)

• Significant side-by-side mixture of residential, commercial, and industrial zoning due to history
Artisan’s Asylum in Somerville

- Over 50% of our members come from a 1 mile radius
- The remainder come from a 50 mile radius
- 15 minute walk from public transportation artery
- Relatively high real estate prices and incredibly dense housing means that members want private space
- Even distribution of hobbyists, artists, professional tradespeople, and technologists
- Increased the number of manufacturing businesses in Somerville by over 50%
Applicability to Libraries
Makerspace Goals

Public access to…

• …training and education in design, engineering, and fabrication

• …other members of the community

• …inspiration

• …tools and equipment
Craft Areas

• Craft areas can be broken up into the following building code categories:
  – No Hazard ("Office Use")
    • No significant infrastructure required
  – Light Hazard
    • Some building infrastructure required
  – Moderate Hazard
    • Significant building infrastructure and safety infrastructure required
Craft Areas: No Hazard

- Programming
- Breadboard Electronics
- Computer-Aided Design
- 3D Printing
- Silkscreening
- Vinyl Cutting
- Papercraft
- “Cold” Jewelry
- Fabric Arts
Craft Areas: Light Hazard

• Soldering Electronics
  – Needs light ventilation, some safety infrastructure

• Lasercutting
  – Needs dedicated ventilation, fire safety infrastructure

• Machining
  – Generates chips and smoke, needs heavy-duty floors and rigging, needs tooling

• Moldmaking/Casting
  – Needs ventilation and the ability to make a mess/clean up goo

• Foamcutting
  – Needs ventilation
Craft Areas: Moderate Hazard

• Woodworking
  – Needs significant ventilation, sprinklers, specialized equipment, etc.

• Welding
  – Needs a Hot Works permit, a non-combustible room, dangerous equipment, personal protective devices, sprinklers, etc.

• Glassworking & “Hot Jewelry
  – Needs a Hot Works permit, combustible gas storage, a non-combustible room, personal protective devices, sprinklers, etc.
# Craft Interest

Survey of incoming renters as Artisan’s Asylum moved to 25,000 square feet

<table>
<thead>
<tr>
<th>Craft Interest</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Metalworking (Mills, lathes, etc.)</td>
<td>54.7%</td>
<td>87</td>
</tr>
<tr>
<td>Sculptural Metalworking (Cold-working, sheet metal, etc.)</td>
<td>43.4%</td>
<td>69</td>
</tr>
<tr>
<td>Welding (MIG, TIG, Spot)</td>
<td>53.5%</td>
<td>85</td>
</tr>
<tr>
<td>Woodworking</td>
<td>57.2%</td>
<td>91</td>
</tr>
<tr>
<td>Electronics/Robotics Assembly</td>
<td>40.3%</td>
<td>64</td>
</tr>
<tr>
<td>Sewing/Fiber Arts</td>
<td>25.8%</td>
<td>41</td>
</tr>
<tr>
<td>Bicycle Creation/Repair</td>
<td>22.0%</td>
<td>35</td>
</tr>
<tr>
<td>Computerized Manufacturing (CNC mill, CNC router, lasercutter, CNC plasma cutter, 3D printer)</td>
<td>52.2%</td>
<td>83</td>
</tr>
<tr>
<td>Silkscreening</td>
<td>20.8%</td>
<td>33</td>
</tr>
<tr>
<td>None - I do not need access to your tools</td>
<td>9.4%</td>
<td>15</td>
</tr>
</tbody>
</table>
Computer-Controlled Equipment

- 3D printers, vinyl cutters and lasercutters are incredibly productive, highly desired, and easy to maintain, but they require…
  - 2D graphics or 3D modeling programs
  - Training in 2D and 3D design
  - Some amount of engineering training
  - Dedicated technicians
Space Priorities

1. Interesting classes, events and capabilities
2. Accessible community hours (usually meaning nights and weekends)
3. Membership communication
4. Critical mass of members and students
5. Functioning and useful equipment
Stages of Development
Development Priorities

1. Develop a community that’s accessible, interesting, and both recurring and constantly infused with new members

2. Develop physical infrastructure like tools, equipment, and training

3. Create a social infrastructure that doesn’t burn out organizers and instructors
Stages of Development

1. Find an organizer and instructors
2. Find a space
3. **Start running events!**
4. Acquire equipment
5. Create training programs on said equipment
6. Start running classes
“Build It And They Will Come”

• Can work for brand-new organizations

• **Extremely difficult to pull off** for existing organizations with inertia behind them

• Puts the onus on you to draw people in with organizers promoting events and classes
Organizers and Instructors

• The community will rise to, but usually not exceed, the passion of its organizers and instructors
Space

The ideal space has:

• Areas to be social
• Open work areas
• Classroom (i.e., sound-isolated) areas
• Plenty of electricity
• Well-laid-out equipment
• Some amount of consumables
• Projection capabilities
• Computers
Events

• Mini-Maker Faires
  – Invite makers in your community to show off their projects in a once-a-year event, licensed from and advertised by MAKE Magazine

• Organize Meetups
  – Pick an organizer, speaker, or instructor, pick an interesting design or fabrication related topic, and invite your community

• Host Meetups
  – Find groups nearby that need space for their design or fabrication-related meetup, and offer to host
Equipment

- Artisan’s Asylum leases 2/3 of its tools from members, in exchange for discounts on membership
- Most tools initially acquired from Craigslist
- As we’ve ‘grown up’, we’ve acquired industrial-grade tools new from the manufacturer
Example Library Makerspaces
Library Makerspaces

- Fayetteville Free Library
  - [http://www.fayettevillefreelibrary.org/fablab](http://www.fayettevillefreelibrary.org/fablab)
- Westport Public Library
  - [http://www.westportlibrary.org/services/makerspace](http://www.westportlibrary.org/services/makerspace)
- NC State University
  - [http://www.lib.ncsu.edu/spaces/makerspace](http://www.lib.ncsu.edu/spaces/makerspace)
A Library Pattern

• Offer high-tech, low-hazard computer-controlled tools, and all of the skills community members need to take advantage of such tools
Some Other Resources

- A Librarian’s Guide To Makerspaces
  - http://oedb.org/ilibrarian/a-librarians-guide-to-makerspaces/
- Library As Incubator Project
  - http://www.libraryasincubatorproject.org
- “Making Makerspaces” series I’m writing for the MAKE Magazine Blog
  - Google “Making Makerspaces”
- MAKE Magazine’s Makerspace.com
- “How to Start a Hackerspace” series on the Adafruit Blog
  - http://www.adafruit.com/blog/2012/11/12/how-to-start-a-hackerspace/
- Hackerspace Design Patterns
  - http://hackerspaces.org/wiki/Design_Patterns