IF YOU BUILD IT, THEY WILL COME

Reflecting on the Successes (and Failures) of Building the HCIL Hackerspace

HCIL Brown Bag Lunch
September 12th, 2013
If You Build It, They Will Come?
If You Build It, They Will Come?
If You **Build It**, They Will Come?

How?  
What?  
Who?
How computers have traditionally seen us
That is the old world of computing.

Things have changed.
for example
Seamlessly couple the dual worlds of bits and atoms by giving physical form to digital information.

— Professor Hiroshi Ishii
MIT Media Lab
A Founding Father of Tangible User Interfaces
http://tangible.media.mit.edu/vision/
how? why?
1. The recent emergence (or reemergence) of the DIY/Makers movement, which has led to widespread opportunities to interface and work with hardware that has rather low barriers of entry (e.g., the Arduino)
The Maker Movement: Forming the Next Tech Tidal Wave

Posted by Ashish Arora on June 25, 2013 at 9:06am

With a wealth of unprecedented tools and resources, it has never been easier for people to explore their own personal creativity. Technology is adding simplicity and removing barriers, allowing for a fuller range of creative expression, something particularly true in the emerging maker movement.

For the unfamiliar, the maker movement is a tech-infused subculture of do-it-yourself (DIY) culture. So where one would engage in a creative project – jewelry making, scrapbooking, fashion, etc. – a maker would leverage technology to complete it. Think using a cutting machine instead of scissors. It takes manual processes and makes them automatic, resulting in more professional-looking, high-quality work.

While perhaps best known by its use of 3-D printers, maker culture also consists of traditional arts and crafts, robotics, electronics and metalworking and woodworking. Its parent DIY culture is a burgeoning one, no longer confined to hardcore creative types. The rise of dedicated e-commerce platforms like Etsy and social services like Pinterest are contributing to a formidable industry, one to the tune of $29 billion.

So what has created this sleeping giant? There are a number of factors. The first, and most obvious, is advances in technology that streamline and simplify everything. Not a novel concept, but let me provide an example that illustrates what I mean.

Prior to Cricut, I worked at Logitech. While the Logitech name was synonymous with innovative keyboards and computer mice, we wanted to gain entry into the living room and establish our footprint there. If you remember in the mid-2000s, remotes were out of control – there was one for the television, the cable box, the DVD player, the stereo receiver, the game console...the list goes on. I led a team of researchers to observe in-depth how people watch television, consume content and control their entertainment system. 20,000 research hours later, we delivered one of the company’s most successful and well-received products – the Logitech Harmony One, a universal remote that added convenience and eliminated confusion by replacing people’s dozen-plus remotes.

As I look at the DIY industry and maker movement, I see a similar change under way, with easily digestible user interfaces and intuitive design humanizing technology. This is allowing the industry to attract a wider audience who may not consider themselves tech savvy. The movement has gained further momentum as the millennial generation, who are all “digital natives,” matures. Technology is not a foreign, unapproachable concept to them, but already integrated into every aspect of their everyday lives.
Maker culture

From Wikipedia, the free encyclopedia

The maker culture is a contemporary culture or subculture representing a technology-based extension of DIY culture. Typical interests enjoyed by the maker culture include engineering-oriented pursuits such as electronics, robotics, 3D printing, and the use of CNC tools, as well as more traditional activities such as metalworking, woodworking, and traditional arts and crafts. The subculture stresses new and unique applications of technologies, and encourages invention and prototyping.[1] There is a strong focus on using and learning practical skills and applying them creatively.

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Hackerspaces [edit]

Main article: Hackerspace

The rise of the maker culture is closely associated with the rise of hackerspaces, of which there are now over 100 in the United States, and many around the world.[2] Hackerspaces allow like-minded individuals to share ideas, tools, and skills.[3][4] Some notable hackerspaces which have been linked with the maker culture include Noisebridge, NYC Resistor, A2 Mech Shop, Pumping Station, One, Artisan's Asylum,[5] and TechShop. In addition, those who identify with the subculture can be found at more traditional universities with a technical orientation, such as MIT (specifically around "shop" areas like the MIT Hobby Shop). As maker culture becomes more popular, hackerspaces are becoming more common in universities.[6]

Media [edit]

Some media outlets associated with the subculture include MAKE (a magazine published since 2005 by O'Reilly Media) and the popular weblog Boing Boing. (Boing Boing editor Cory Doctorow has written a novel, Makers, which he describes as being "a book about people who hack hardware, business-models, and living arrangements to discover ways of staying alive and happy even when the economy is falling down the toilet".[7])

Maker Faire [edit]

Since 2006 the subculture has held regular events around the world, Maker Faire, which in 2012 drew a crowd of 120,000 attendees.[8] Smaller, community driven Maker Faires referred to as Mini Maker Faires are also held in various places where an O'Reilly-organised Maker Faire has not yet been held. [9][10][11][12] Maker Faire provides a Mini Maker Faire starter kit to encourage the spread of local Maker Faire events.[13]

Everything old is new again [edit]

Hobbyists have made custom things for a long time. Evidence is in ham radio and RC modelling where very early innovation came from the garage, the shed or the loft. Similarly, the evolution of hobbies into for-profit businesses has a long history.

A famous example is in the relationship between the Homebrew Computer Club and Apple Inc., in which Steve Jobs became involved in the maker subculture through his early interest in Heathkit electronics kits. "The kits taught Steve Jobs that products were manifestations of human ingenuity, not magical objects dropped from the sky," writes a business author, who goes on to quote Jobs as saying "it gave a tremendous level of self-confidence, that through exploration and learning one could understand seemingly very complex things in one's environment."[14]

"Maker-Culture" rebrands pursuits and processes that extend into prehistory — making things and communicating how that re-branding helps shift focus onto the new pursuits and processes enabled and reshaped by recent innovations: Internet, open-source memes & means, and the growing ubiquity of computing tools in smaller, faster, cheaper, more flexible forms.

Greater emphasis on some memes distinguishes the newer "Maker-Culture".
FitBit: Arduino in the workplace

FitBit is a company that makes a nifty little activity tracking device that lets you track your walking, running, sleeping, and general activity based on movement. We had a nice note from Shelten Yuen to say “We’ve been using Arduino for rapid prototyping for a few years now. It’s been a great tool for us in trying things out quickly.” It’s always nice to hear how people use Arduino at work as well as in their hobbies. Thanks Shelten and thanks Christine Brumback for the intros.

Shelten also mentioned that FitBit is hiring.
1. The recent emergence (or reemergence) of the DIY/Makers movement, which has led to widespread opportunities to interface and work with hardware that has rather low barriers of entry (e.g., the Arduino)

2. The pervasiveness of powerful, sensor-rich mobile computers in the form of smartphones and tablets that are constantly on and nearly constantly with us

3. The rise of inexpensive 3D-printing and CNC machines for easily forging new industrial forms and artifacts rapidly in the lab;

4. The "hardware renaissance" in Silicon Valley (and other places) that is fostering a renewed culture of hardware-oriented products and ideas such as the FitBit, the Lytro, the Pebble Smartwatch, Nest, Microsoft's Kinect, the Nike Fuelband, and low cost flying drones such as the AR.Drone.
A Hardware Renaissance in Silicon Valley

A move toward hardware development, and away from an obsession with dot-com services and Web-based social media,...
I want(ed) to make the HCIL Hackerspace...

A place to inspire creativity
A place to encourage and allow for serendipitous interaction between HCIL members
A place where students want to come
A place for playfulness and fun
A place to try and fail and try again
A place to build community and imbue a spirit of collaboration
A place to rapidly prototype physical computing designs
...

Collaborative Making
Collaborative Working
HCIL students Matt and Michael
Collaborative Working
HCIL students Joseph, Cy, Matt, and Jonah
Collaborative Working

HCIL students Yi-Chun, Michael, & Sean
Physical Making
Electronics Making
HCIL student Tansy McBurnie
Curiosity & Inquiry
HCIL students Anders, Leyla, and Matt
Rapid Prototyping
Paper prototype of BodyVis v. 2.0
Creative Making
HCIL Student Michael Gubbels showing SFF
Zany Making
HCIL student Leyla wearing BodyVis v. 1.0
Matt Sewing
HCIL student Matt sewing
Fun!
HCIL students Kotaro Hara and Allan Fong
More Fun!
HCL students Sean, Michael, Alexa, and me
Play With What You Make
Playing a driving game with a 3D-printed steering system
Space can have a profound impact on thought, creativity, and collaboration.

Given this, what can / should we do? How?

Not a new idea, of course.
“Space matters.” That’s the mantra at the Stanford d.school, where students and staffers have spent six years figuring out how to tweak an environment to make it a more fertile breeding ground for ideas. Now they’re going to find out if those ideas work.

The boxes were unpacked in late March, in time for the start of the university’s third quarter. But the official ribbon-cutting on the 40K square foot new building (which houses both the d.school and all other design programs at Stanford) isn’t until May 7. Fast Company got a sneak preview, and we’ll be giving you a guided tour (along with photos, videos and critiques of the space from the students themselves) in the days ahead. We’ll go behind the scenes to show how every nook, cranny, and fungible wall system has been smartly designed to maximize collaboration.

The school, which is officially known as the Hasso Plattner Institute of Design, began in a car park in 2005. It launched with 20 students and 10 staff. This year’s intake is 170 students and 75 staff.
Most talk of work these days revolves around the latest unemployment figures, the difficulties of getting and/or holding onto a job and/or how we are all working more hours for less money and less vacation time, or the bleak prospects for newly minted college grads (starkly rendered by cartoonist Jenna Brager in the new anthology “Share or Die: Youth in Recession.”)
When Yahoo banned its employees from working from home in February, the reasons it gave had less to do with productivity than serendipity. "Some of the best decisions and insights come from off-the-cuff conversations, which are most likely to occur when colleagues have the freedom to work where they work best," says Ari Berman, a political journalist and author of "Chains of Command: The 2008 Election and the Future of American Politics."
My Approach
Most importantly... have supportive colleagues
Human-Centered Design
Iterative Design

- Design
- Build
- Evaluate
My Approach
Read.
Learn.
Remix.
Design.
Sketch.
Communicate.
Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

...
My Approach
Read.
Learn.
Remix.
Design.
Sketch.
Communicate.
Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

I am a **creative kleptomaniac**. I’m interested in stealing things that really mean something to me. The things [ideas] that I can actually use in my work.

*Quote from the TEDx talk: Steal Like An Artist, [http://youtu.be/oww7oB9rjgw](http://youtu.be/oww7oB9rjgw)*

**Austin Kleon**
Author / designer
My Kleptomania
Being **playful** is of huge importance for being innovative.

[Re: DC3 Wing]. That’s décor. That’s ambience. That says, we’re **weird** and we’re **proud** of it.

**Try stuff** and ask forgiveness instead of asking permission.

---

David Kelley

Founder of IDEO & Hasso Plattner Institute of Design

Professor at Stanford
Oktavilla
Stockholm Design Firm
Design by Front
Ireland U/X Design Firm
Woodworking Shops

Pay attention to storage, workbenches, arrangement of equipment, open space, etc.
My Approach

Read.
Learn.
Remix.
Design.
Sketch.
Communicate.
Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

My Approach
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Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

“Messy Closet” -> “Hardware Lab” Makeover

Note: please feel free to edit this document directly with your suggestions/comments!

“Messy Lab” -> “Hardware Lab” Makeover

An Overview of the Plan

Layout
Windows
Timeline
Potential Issues
Security
Historical HCIL Records
Ventilation
Wish List

We are in the midst of planning the “Messy (Closet) Lab” makeover, which involves transforming this closet-like space to a nice, creative hardware workspace for students, faculty and staff alike! The HCIL will have a place to hack and build together. Fun, fun! Now, we are just in the planning stages for this. As such, we are seeking input from HCIL members on what they’d like to see from this space as well as to ensure that we accommodate everyone who currently relies on the “Messy Lab” for storage and other things. I’m hoping this can be largely a collaborative effort—though one that I am spearheading. This seems to follow the spirit of the HCIL culture.

An Overview of the Plan

There are four parts to the plan:

1. “Messy lab” cleanup: This involves throwing out old and unnecessary items and organizing/categorizing important content. My guess is that, at the very least, Evan, Mona Leigh, Allison, Charley, people with old research materials in the messy lab, and maybe some graduate students would want to be involved in this.

2. Layout and furniture purchasing: In my mind, we can purchase cabinetry and shelving to move many of the items that are on tables and on the floor up to...
Layout and Decor

The layout below is only a sketch and not definitive. The overall goal here is to maximize workspace while still allowing for sufficient storage. The 4’x8’ window, which looks into the larger HCIL space would be replacing, in part, the peg board. Evan notes that the peg board is useful, however, for quickly storing and accessing tools so we will have to come up with a plan here.

23.5’

Cabinetry / Shelving

10.5’

Maybe a 4’x6’ window here
(The HCIL logo, which is currently here, would be placed as an overlay on the window. I think that would look pretty cool.)

Hardware workbench(es)

Windows

As part of this transition, we are likely going to be installing two windows: one largish 4’x8’ window facing the HCIL and one smaller 4’x6’ facing the hallway. This will be dependent on cost and feedback from fellow lab members. The goal here is to make the "closet" feel less cavernous and more like a part of the larger HCIL. The windows will also bring in more light and allow passersby to briefly look in to see the activities in the lab.

Allison: I think the windows will be a great addition and Jon’s idea of putting back the logo on the hallway window is inspired. Jon- you’ll just need to let us know when we need to take down the shelf and pics on the lab wall that will get a window.

Krist: I think the windows will be great. A minor addition, maybe a curtain that you can
Google Docs enabled multiple parties to easily provide feedback and even make their own edits to the planning doc.

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Allison, I think the windows will be a great addition and Jon’s idea of putting back the logo on the hallway window is inspired. Jon, you’ll just need to let us know when we need to take down the shelf and pics on the lab wall that will get a window.

Krist, I think the windows will be great. A minor addition maybe a curtain that you can cover the "hardware lab" windows during brown bag or a private meeting in the main lab.

Tak : Adding windows is a great idea. How about a big twin glass door which can make the room feel much bigger? With a glass door the room may look like a part of the lab. But of course it will cost much more money.

Configuring the Space for Creative Work
I'm a huge believer in how space, architecture, and the overall flavor of a place can influence creativity and thought. I want the hackerspace (and the HCIL area as a whole) to inspire creativity, free thinking, and imagination. I also want the space to be equipped with the tools necessary to support creative work.
Designing the HCIL Hackerspace

To help inform the design of the new HCIL Hackerspace and, perhaps, to help us think about how to renovate/update other areas of the lab in the future.
My Approach

Read.
Learn.
Remix.
Design.
Sketch.
Communicate.
Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

After sketches, sharing design docs, getting feedback, I made more “hi-fidelity” prototypes of the space.
The easiest way to draw in 3D
You love what you do. Now love how you do it.

Download SketchUp

What's new in SketchUp 2013?
Implementation
Hard Work
Ingredient #1
Money
Ingredient #2
People
Ingredient #5
People
Ingredient #6
Transforming the Space
The Windows
6’ Glass window

Logo will be shrunk and reprinted to fit window. Should look awesome! 😊
Designing, Building, & Installing the Workbench
Building & Installing the Whiteboards
THE NEW ART OF BRAINSWARMING™

Download our free ebook to learn why executives and creatives from PayPal, Goodby Silverstein, and HUGE are leading swarms, not storms, to get better business results.

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IdeaPaint is a dry erase paint that turns virtually any surface into an erasable canvas, giving you the space you need to collaborate, interact and fully explore your creativity.

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\[
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\]

= $813
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Shop our wide selection of whiteboards today for one that's right for your office or workspace. More about ... Quartet® Basics Whiteboard w/ Aluminum Frame.

Amazon.com | Quartet 4 x 8 Feet Total Erase Classroom Whiteboard...
www.amazon.com/Quartet-Total-Classroom-Whiteboard.../B000BJBT1
Amazon.com: Quartet 4 x 8 Feet Total Erase Classroom Whiteboard (TEA408): Office Products.

How to Make a Custom Dry Erase Board or White Board for under ...
www.youtube.com/watch?v=FegqjQghjhw4
This video shows you how I made a 4'x8' dry erase white board for $35. It shows the parts to get at ...

4x8 Whiteboard | eBay
www.ebay.com > ... > Presentation, A/V & Projectors > Dry Erase Boards 
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5+ items - Find great deals on eBay for 4x8 Whiteboard in Office Dry Erase ...
Thifty White 32 sq. ft. Hardboard Panel Board

Model # 709105  Store SKU # 346428

$13.65 / each

Product Overview  |  Specifications  |  Customer Reviews  |  Shipping Options

**PRODUCT OVERVIEW**

The Thrifty White 32 sq. ft. MDF Panel Board can be used to add style to more functional spaces in your home, such as laundry rooms, utility rooms and mud rooms. The acrylic coating resists staining, fading and mildew for long-lasting use.

California residents: see Proposition 65 information.
Panelboard
Tablieros

Thrifty White
Blanco sencillo

- Genuine hardboard
- Resist staining, fading and mildew
- Great for utility areas such as laundry and mud rooms

THRIFTY WHITE PANEL BOARD

$13.65 ea

PK 30 702106
isle BAY 20 004

0000-346-428
Dremel tool with Mini Saw attachment
Long arms
Storage & Tools Ready At Hand

Making things visible but not overwhelming...
Stanford d.School
http://goo.gl/PKLwt8
Equipment
Materials List

At the d.school

Here are some supplies that we keep handy.
The idea is to use low-resolution nimble materials that can be manipulated quickly.

We use this with the Wallet, Gift Giving, Mechanic and other 1 hour design challenges.

**Closures**
- Velcro
- zip ties
- Magnets
- snaps
- masking tape
- duct tape (color would be ideal)
- scotch tape
- glue sticks
- paper clips, (asst colors ideal)
- decorative brads (square, crystal)

**Tools**
- hole punch
- scissors
- stapler (with staples)
- hot glue/glue guns
- rulers

**Base Material**
- assorted fabric swatches
- plastic
- textured cardstock
**Equipment**

3 soldering stations with carbon filter  
High quality oscilloscope  
4 digital multimeters  
2 AR Drones  
E-textile station w/2 mannequins, sewing machine, & materials  
12 Kinects  
Multiple Arduino platforms  
Beaglebone, Raspberry Pi, .NET Gadgeteer  
3D-Printer  
Multiple tablets, smartphones  
Various electronic equipment (sensors, actuators, etc.)
My Approach
Read.
Learn.
Remix.
Design.
Sketch.
Communicate.
Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

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Get Feedback.
Revise.
Build.
Use.
Iterate.
Use.
Iterate.
...

Hackerspace 0.1 Completed
1st student using space in summer 2012
(Sean Bae, high school intern)
Hackerspace 1.0 Completed
Hackerspace 2.0 Completed
Hackerspace Branding
Hackerspace Fridge
In Closing
IF YOU BUILD IT, THEY WILL COME
Reflecting on the Successes (and Failures) of Building the HCIL Hackerspace

HCIL Brown Bag Lunch
September 12th, 2013
End-User Design & Customization
Sparkfun Wall
By Dia Campbell
Sparkfun Wall
By Dia Campbell
Sparkfun Wall
By Dia Campbell
How To Start A Hackerspace: Part 2 – A Place To Hack All The Things

Now that you have a concrete idea of who your hackers are, you also know what kind of space needs they’ll have. Next, narrow down what will be done in the space. Don’t forget: there’s plenty of room to grow your space to include many different kinds of hackers as your Hackerspace matures (covered in later sections of this “How To”).

Talk to the people you’re starting the space with and make the most detailed list in a shared spreadsheet of what different hackers need to do their hacking (and keep in mind that you’ll probably be adding to this list as you get into your space).

Here’s an example of physical needs you may have on your list:

- 220 power
- Running water
- Ventilation
- Concrete floor
- Natural light
- Darkroom and darkroom supplies (have your photo hacker make a list)
- Air conditioned room for servers
- Area for physical hack projects
- Sound proof room for audio/video recording/editing
- 24/7 Access
- Spray paint booth
- Place to put a car lift
- Etc, Etc, Etc...

Once you have your list now you’ll need to go to the next step: How To Start A Hackerspace: Part 3 – A Home For Your Hackerspace — Step back tomorrow!
Lighthouse: Roadblocks and reflection

By Aaron Vanderwerff On May 11th, 2013  Add Comment

A couple months back, Cynthia and Flavio were very frustrated. As a matter of fact, they were about ready to give up. A key element of their iPapape Party Shirt (a shirt that will blink to the beat of the music) was a light organ kit, but it was incredibly glitchy and the [...] Read Full Article ➔

Pilot Profile: Piner High School Makers

By Stephanie Chang On May 3rd, 2013  Add Comment

Dante DePaola is a biology teacher at Piner High School in Santa Rosa, California, and part of our initial group of Makerspace schools. He also happens to run a successful motorcycle business on the side. His interest in making especially with regards to the rich, relevant experiences it provides for his students is [...] Read Full Article ➔

Three Transformative Tools: From Old Tech to New at Analy HS (part 1)
On April 10th, 2013 By Stephanie Chang

Editor's Note: This post comes from Casey Shue, who teaches math and a

WikiSeat: Standing Up for Education
On April 16th, 2013 By mooombo

The WikiSeat website About a month ago, I took the time to chat with WikiSeat co-founder Nicolas Weidinger, as a
make space
How to Set the Stage for Creative Collaboration
Scott Doorley and Scott Witthoft
with a foreword by David Kelley
If You Build It, They Will Come
Reflecting on the Successes (and Failures) of Building a Collaborative Workspace to Support Creativity, Experimentation, and Making
Could have movie and story of ARDrone: 00007.MTS
Where did all that stuff go?