The DIY Culture

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The DIY/Maker Culture

- The Whole Earth Catalog: 1968-1972. Magazine with a focus on DIY, self-sufficiency, alternative education, etc.

- The Homebrew Computer Club: 1975. A computer hobbyist group, several high profile hackers and entrepreneurs were members.

- MAKE Magazine: 2005. Magazine focusing on DIY and DIWO (Do It With Others). Abruptly closed down in June 2019 due to lack of funding, but is reported to be relaunching under the name “Make Community”.

The DIY/Maker Culture

Maker Faires: “the Greatest Show (and Tell) on Earth - a family-friendly festival of invention, creativity and resourcefulness, and a celebration of the Maker movement.”

The 1st Maker Faire was held in 2006 in San Francisco
“All of us are makers” - Dale Dougherty
The Ron Swanson outlook...
Hackerspaces

Community-operated physical spaces where people can meet and work on their projects

Comparable with other community-operated spaces such as Men's Sheds and FabLabs

The terms “Hackerspace” and “Makerspace” are often used interchangeably

Can be seen as spaces for peer-to-peer learning and knowledge sharing
Hackerspaces in Ireland

[Images of logos for the Dublin Hackerspace and 091 Labs]
FabLabs

Fabrication Laboratory, for personal fabrication, i.e. small scale manufacturing enabled by digital technologies

NOT mass production

Potential to empower individuals to create smart devices for themselves

These devices can be tailored to local or personal needs in ways that are not practical or economical using mass production
How did it start?

The program was started in the Media Lab at MIT, a collaboration between the Grassroots Invention Group and the Center for Bits and Atoms (CBA) at the Massachusetts Institute of Technology.

Exploring:

- how the content of information relates to its physical representation, and
- how a community can be powered by technology at the grassroots level.
How did it start?

Neil Gershenfeld, Director of MIT's Center for Bits and Atoms (CBA) began this as an outreach project of this center.

The FabLab concept also grew out of a popular class at MIT (MAS.863) named "How To Make (Almost) Anything". The class is still offered in the autumn semesters.
The Tools (from the last picture)

- A computer-controlled laser cutter, for press-fit assembly of 3D structures from 2D parts;
- A sign cutter, to produce printing masks, flexible circuits, and antennas;
- A precision (micron resolution) milling machine to make three-dimensional molds and surface-mount circuit boards; • Programming tools for low-cost high-speed embedded processors;
- A larger (4'x8') numerically-controlled milling machine, for making furniture- (and house-) sized parts (not all the FabLabs own this large machine).
Fabrication Supplies

- components for building devices and circuits
- vinyl film
- machineable PCB stock
- molding, casting and composites materials, resistors, capacitors, chokes, diodes, transistors, regulators, LEDs, photo detectors, thermistors, microcontrollers, resonators, buttons and switches
- magnets, headers, jacks and plugs, ribbon cable and connectors, heat shrink tubing
- soldering supplies
- transducers and stepper motors
Software

All software used in the Fab Lab is either open source or included with the equipment purchased and available free of charge to students.

A partial list of the types of software used and particular examples:
- CAD/CAM (eg: alien.cad, mold.cad)
- 2D vector (eg: inkscape)
- 2D raster (eg: GIMP)
- 3D (eg: SketchUp)
- Programming (eg: Python, Numpy)
- Schematic, PCBdesign (eg: Eagle)
- Circuit modeling (eg: Ngspice)
- Microcontrollers (eg: Atmel AVR)
- Lasercutter (eg: Epilog)
The key to a successful Fab Lab is the hours of availability and a good facilitator. It needs to be staffed by a technician familiar with the tools and equipment present. The idea is not for the staff to run operations but to maintain the safety of the lab, although some facilitation is usually necessary. The centers are sometimes attached to a technology incubator or used at an outreach in a community location.

The bottom line is that it has to be easy and painless to get to and to use.
Worldwide Network of FabLabs
FabLab Principles

3 important principles for operating a FabLab

- a FabLab has to be open to the public, and offer facilitation and guidance
- all the designs are uploaded in a library shared with all the other labs worldwide
- it has to adhere to the Fab Lab charter.
FabLab vs Hackerspace

FabLabs are run by an organisation of some sorts (university, research centre, innovation centre)

Hackerspaces are entirely community led

Adhering or not to the FabLab charter?

In 2011 in Germany there was only one official FabLab – the rest are hackerspaces.
Other Irish Makerspaces

NUIG MakerSpace

SEMS (South East MakerSpace)

LightboxLab Drogheda (Not active since 2018)

Farset Labs Belfast

Others (including MiLKlabs Limerick) have ceased operating
Dublin Maker

Dublin Maker is an event that takes place in Dublin on an almost-annual basis, in which makers, hackers, inventors (etc.) can showcase their work.

The event is not limited to any particular type of making, person or genre - if you are a maker you are welcome.
Other (semi-) professional entities

- 3Dprinting - Dublin
- Inspire 3D - Ashford
- Layerlabz - Dublin
- 3D Dave - Dublin
- Creodrone - Galway
- The Civic Works Dublin
- Fab All Things - Dublin

How do these differ from the aforementioned hackerspaces/FabLabs?

Providing services for money; No public access; Protecting their own designs.
Establishing a FabLab at UL

• In 2010 - visit at FabLab Aachen;
• 2011 - The Aachen FabLab manager visited UL;
• An initiative group was formed;
• We have Product Design, Architecture, Interaction Design courses, a Start-up Incubator and a Technological Park!
• FabLab Limerick started in 2012
FabLab and Personal Fabrication in UL

Ultimaker 2

Form 1
3D Printers at UL

**Ultimaker 2** - uses PLA or ABS (Lego is ABS) and prints like a normal printer would for the first layer, but then prints again on top of that layer, building up layer by layer to form a 3D object.

**Form 1** - uses a 3D printing process known as stereolithography, wherein liquid resin is cured, or transformed, into a solid material by the application of laser light.
Lowering the barriers for adoption

Home mini FabLabs are becoming a reality

There is a current trend toward Personal Fabrication and Personal Design (Borchert & Bohne 2013)

Are makerfaires encouraging the adoption of novel digital technologies that allow people to *make* instead of *buy*?

Will this trend continue to the point of home 3D printers becoming commonplace?
Sustainable (Interaction) Design

Is it necessary to go through an experimentation phase first, where we waste a lot, but also learn a lot?

OR

Can we implement sustainability constraints and still have successful experimentation phases?

OR

Does it really matter?
Sustainable Interaction Design

“As a starting point for a perspective of sustainability, design is defined as an act of choosing among or informing choices of future ways of being. This perspective of sustainability is presented in terms of design values, methods, and reasoning.” (Blevis, 2007)

We want our students to learn how to design and produce their own prototypes, and do so mindfully and responsibly.