

## "DIY Squared"

The effect of the Web on the diffusion of how-to knowledge in terms of ingredients, capabilities, costs and instructions.

Final Paper. Clay Shirky's User Generated Class. NYU, Tisch ITP.  
Caleb J. Clark. Jan. 2008.

Wikipedia's entry for "knife"<sup>1</sup> will tell you more than you ever wanted to know about knives, except how to make one. Wikipedia is gathering the who, what, when, why and where of the world's knowledge. But not the *how*. To learn how to make a knife, literally to forge one from raw steel without a blacksmith shop or steel plant, you'd need to go to a site like Instructables.com<sup>2</sup>.

There are several popular sites like Instructables.com that are riding the Web 2.0 DIY (Do It Yourself) culture wave: sites such as Ehow.com, Wikihow.com, howtopedia.org, howtoforge.com, Make magazine's site<sup>3</sup> as well as independent tutorials on Web pages and blogs<sup>4</sup>. DIY is generally defined as people creating things for themselves without the aid of professionals<sup>5</sup>.

I'm going to focus in Instructables.com because I have been using the site for the past few months. I created two "instructables" of design projects I worked on at school. Once was about a solar-powered safety light bike helmet and the about a video camera mount using a harmonica holder and a make-up mirror<sup>6</sup>.

Sites like Instructables are in fact DIY squared; in other words, they are DIY tutorials of DIY projects. You make, hack, or modify a thing,

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<sup>1</sup> Wikipedia entry on "Knife." <http://en.wikipedia.org/wiki/Knife>

<sup>2</sup> "The 20 Most Important Tools No. 1 The Knife" Forbes, Aug. 31 2005  
[http://www.forbes.com/personaltech/2005/08/31/technology-tools-knife\\_cx\\_de\\_0831knife.html?boxes=custo](http://www.forbes.com/personaltech/2005/08/31/technology-tools-knife_cx_de_0831knife.html?boxes=custo)

<sup>3</sup> <http://www.makezine.com/>

<sup>4</sup> "How-to Web Pages" IEEE Computer. Aug 07

<sup>5</sup> Wikipedia entry "do it yourself." [http://en.wikipedia.org/wiki/Do\\_it\\_yourself](http://en.wikipedia.org/wiki/Do_it_yourself)

<sup>6</sup> Instructables.com "The Green Helmet." <http://www.instructables.com/id/The-Green-Helmet/> and Instructables.com "2FerCam-1-Person-Interview-Rig-Captures-Both-Subj" <http://www.instructables.com/id/2FerCam-1-Person-Interview-Rig-Captures-Both-Subj/>

i.e. a soda can is turned into a wireless antenna booster. While you work, you document the steps with video, photographs and text. You upload these to a searchable organized site, including parts used and where to get them, and then monitor comments people make as they try to follow your how-to. The comments on my own Instructables varied from "nice job" to "out in the country you'd want to paint the helmet a bright color, not black." To "you invalidated the safety of the helmet."

Some say this kind of Web 2.0 content is a monumental change in design and manufacturing. New jargon such as "participative consumers" engaging in "convergence culture" as they influence corporate product development.<sup>7</sup> The founder of Instructables has called sites like his the "Dark matter of innovation"<sup>8</sup> I think there's a bit of irrational exuberance in these terms, and amnesia about our long history of DIY. But there are substantial changes taking place. One change is the effort to centralize and make searchable how-tos that share a set of digital tools to create them. Instructables toolset forces people to create step-by-step how-tos that follow the same structure.

This type of online information is technically called "procedural knowledge." It is quite different from an encyclopedia entry one reads and watches. As we all know from cookbooks, ingredients, capabilities and costs factor heavily into any recipe's success. You may have the recipe for scrapple, and even some old powdered sage in the spice rack, but you probably don't have a hog's head, or the skill to handle it if you had one.

Procedural knowledge is also much more dynamic than most encyclopedic knowledge, especially if it's technical in nature. We've all seen the how-to books on out of date computer software in the trash and at yard sales, and products that are hackable often change rapidly making the how-tos that tell you how to hack them invalid unless they are constantly monitored and updated.

Further, the gathering of the "how" presents a more complex challenge of imparting often subjective procedural knowledge and increasingly the use of multimedia to show rather than tell. Instructables encourages the use of videos and stills and is one of the most media heavy how-to sites. The use of photos, and especially edited online

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<sup>7</sup> "Grand designs by ordinary folk." The Irish Times, Feb. 12, 2007

<sup>8</sup> "How to improve it? Ask those who use it." The New York Times, Mar. 25 2007

video is a substantive change. Small, cheap digital cameras that can capture excellent photos and video make it easy then ever to document your work while you are doing it.

For example, here are two different tutorials on how to forge a knife:

1. Text based: <http://www.wikihow.com/Forge-a-Knife>
2. Stills and text: <http://www.instructables.com/id/Forge-a-Knife/>

You will notice that there's an air of guerilla rebellion here, of sticking it to the man who is trying to tell you that a booster antenna costs \$27 and is hard to make. More on that later. But first, before there were wireless signals bouncing around your house in need of boosting, and in fact before writing was invented, we did a lot of DIY.

We learned from others by example, instruction and rote learning. Perhaps we then modified and added to what we had learned to suit our local weather or ingredients. Then we in turn taught someone close to us our skills, and stayed around while they learned our craft before we died. Trial and error ruled and a "new and improved" thing took a very long time to germinate.

The Otzi Iceman died in 3300BC, 53 centuries ago in the Alps at age 45. He was covered in DIY stuff<sup>9</sup>: waterproof insulated snowshoes, clothes of leather, fur, and grass, knives, pouches, sheaths, medicines, a bow, arrows, fire starting tinder and flint, bark bags, and many kinds of medicine. His tribe and those who they could trade with had learned to make these things from other humans, using ingredients at hand with skills passed on from generation to generation. He himself was probably a metal worker and made the copper ax he was carrying. Knowledge was slowly localized, improved and passed on. Trade was much more restricted than it is today. If we could see the Iceman's home, it would probably be the center of its DIY universe, with most things being made for survival and use in the home. As cool as Web 2.0 is, it is simply acceleration and broadening of things humans have been doing for a long, long time.

When writing developed so did holy writs, bibles, then manuals, cookbooks and so on. Often, important or powerful information was controlled by the powers that were and limited to an educated elite. But the trades, such as building and cooking, were needed everywhere and the apprentice system was the school of choice for centuries, and still is in many trades. For complex, dangerous or expensive tasks, such as welding or five star cooking, we need someone around to

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<sup>9</sup> Wikipedia entry "Otzi The Iceman." [http://en.wikipedia.org/wiki/%C3%96tzi\\_the\\_Iceman](http://en.wikipedia.org/wiki/%C3%96tzi_the_Iceman)

coach us through months and years while we gain experience. Even today plumbers, electricians, cooks, and computer programmers use very effective apprenticeship structures.

The industrial revolution automated many trades and also brought down the costs of ingredients that fed the revolution. Nails and boards were no longer hand-made; yarn could be spooled by the mile and sold cheap. Distribution was faster. This enabled in part the development of the Arts and Crafts movement in the late 19<sup>th</sup> century in Europe, followed by the 1950s American home-improvement movement (that is still going strong with Home Depot and the like).

The reduction of cost of transistors and other electronics then helped Radio Shack and Popular Mechanics usher in a new era of DIY electronics based on the transistor, a precursor of the current digital electronics DIY revolution. The availability of cheap ingredients was common to both activities.

The late 1960s saw the Whole Earth Catalog appear with the tag line "access to tools," just as the hippies stuck it to the man and grew their gardens and chopped their wood. The acronym "DIY" first appeared in the 1970s<sup>10</sup>, followed by ancillary DIY activities such as back-to-the-landers, alternative energy, and in terms of social movements such things as punk rock and 'zines and pirate radio<sup>11</sup>. DIY became more guerilla-style and acquired a rebellious air of hacking cheap products and voiding warranties.

And then the Internet arrived. Housenet was a pre-Web home improvement BBS and when the Web hit, tutorial sites and cooking recipes were popular within a few years. In 2005 Instructables appeared, from a group of MIT grads that needed a way to document and share the things they were making. Instructables was timed perfectly with cheap bandwidth, storage and digital video a la YouTube.

If you look at Instructables most popular how-tos you will see a general pattern that is consistent with the Iceman. We make things for use around the home, use easy to find cheap ingredients, and capitalize on skills we already have. A very popular Instructable is a very clever variation on a bookshelf for example<sup>12</sup>.

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<sup>10</sup> Oxford English Dictionary entry for "Do-It-Yourself"

<sup>11</sup> Wikipedia entry for "Do It Yourself." <http://en.wikipedia.org/wiki/Do-it-yourself>

<sup>12</sup> Instructables.com "Hungarian Shelves." <http://www.instructables.com/id/Hungarian-Shelves/>

People may like looking at the Instructable on how-to forge a knife, but knives are fairly cheap and that is a complex and potentially dangerous tutorial. Basic carpentry, painting, cooking and knitting for example, lead to lots of DIY decks, off-white walls, pot lucks and funny looking ski hats.

What else has really changed besides a speeding up and broadcasting of knowledge and the use of digital media?

The head of Instructables, Eric von Hippel, was quoted in a recent New York Times story, saying that people, "expect innovations to meet their needs. If innovation isn't tailored to them, they expect to be able to tailor it themselves. That is a big change<sup>13</sup>."

This is due to a big change in ingredients and how we get them. We can buy the building blocks of the information age: chips, LED lights, wires, sensors, etc. and have them shipped to our door cheaply. Hackable electronics are in Kmart and toy stores. For example, digital picture frames are all the rage this year, and so are they on Instructables.com, to the point of having their own group<sup>14</sup>. Why spend \$300 when you can buy ingredients on eBay and Kmart products for under \$100, or even under \$15 and hack together your own digital picture frame? This is revolutionary!

Or is it? Costs are plummeting on digital picture frames and how many people really hacked one together this Christmas compared with those who are waiting for the cost to hit reasonable levels?

Some Instructables are really cool, and useful though, like a laptop stand for \$5.00<sup>15</sup>. This is however a simple acceleration of what still goes on all over the United States with country fairs once a year. Farmers gather to show off the biggest pumpkin, and most powerful tractor. These DIY sharing events are heavily localized and use local ingredients and skills and eventually made it into products if there was enough demand. The laptop stand is the same. It uses PVC piping common in local hardware stores, and maybe soon, Kmart will have a self-assembled stand just like the one on Instructables.

What we are seeing with DIY Squared is the established Petri dish of idea evolution switched to fast forward.

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<sup>13</sup> "In a highly complex world, innovation from the top down." July 29, 2007 New York Times

<sup>14</sup> Instructables.com bookshelf group. <http://www.instructables.com/forum/TMXHTHDFQAQED9XI/>

<sup>15</sup> Instructables.com "PVC Laptop Stand." <http://www.instructables.com/id/PVC-Laptop-Stand/>

It's not so much a sea change in design and manufacturing as a speeding up of a feedback loop between consumer and producer. If there is one, the sea change is the availability of cheap ingredients such as tiny digital cameras for video and stills, and new skills such media manipulation, that make it easy to make DIY squared publishing that span cultures, language and encourage innovation with materials at hand, just like the Iceman and his shoes and knives. Amateurs can now make professional instructional videos that in thirty seconds can teach the world how to do something. There is an Instructable on how to boost a home wireless Internet signal using nothing but a hole punch and soda can that uses only a simple video any TV-sensitized culture could follow<sup>16</sup>.

My hope is that as the Internet spreads we will see more positive DIY events such as the 14-year-old African boy who built an electricity generating windmill with information he found in a nearby library<sup>17</sup>.

Someday a Wikipedia may have edited language-neutral multimedia that uses local cheap ingredients and available skills. Then we would have a Wikipedia with the "how."

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<sup>16</sup> Instructables.com "Caffeine Boost Your WIFI."  
<http://www.instructables.com/id/Caffeine-Boost-Your-WIFI/>

<sup>17</sup> TedTalks: William Kamkwamba: How I built my family a windmill  
<http://www.ted.com/index.php/talks/view/id/153>