
Giving Things Away Is Hard Work

Three Creative Commons Case Studies

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Open-source software and the free-culture movement have created vibrant and thriving sharing-based online communities. These communities and individuals have created an enormous quantity of open-source and free-culture projects. Many examples of these are well-known and much heralded: Wikipedia, Linux, WordPress, and the like. These success stories primarily revolve around code- and/or text-focused projects and are much less common among other work whose medium is not code or text. While one could disagree from a semiotic or a materialist perspective, code and text are effectively immaterial in relationship to other forms of physical creation. A copy of the original is merely a keystroke's effort, and the basic tools to create or modify the original are so commonplace as to be universal: a keyboard and a mouse. Obviously one also needs fluency in the human or computer language of the project, but one does not need access to expensive or specialized materials or tools; nor does one need the physical skills of a craftsperson in the medium.

Unlike code- or text-based practices, art, design, and other creations that are manifest in nondigital forms require production outside of the keyboard-mouse-language toolset. While there may be a code- or text-based set of instructions, the final form of the project usually must be transformed into a physical object, either through a machine like a printer or laser cutter, a physical technology like a circuit board or paint, or an offline social process like agreements and collaborations with people or business entities that have the tools or knowledge to realize a project. It seems that this additional step often makes it more difficult to realize a physical project. Despite this difficulty, or maybe *because* of this challenge, there are examples of artists, designers, and engineers working in this model, myself included. After producing three years of art/design work with open licenses, I want to look back and consider the results.¹ The central question I seek to answer is if and how an art or design

idea/project/product is helped, hindered, or not affected at all by its open licensing model. I have chosen three key examples from my creative practice and explore their successes and failures as a way of assessing this question.

A Genealogy

“Open source” is a term used to refer to computer software for which the source code can be viewed, modified, and used by anyone. As the story goes, once upon a time all software was open source. In 1980, MIT researcher Richard Stallman was using one of the first laser printers. It took so long to print documents that he decided he would modify the printer driver so that it sent a notice to the user when the print job was finished. Unlike previous printer drivers, this software only came in its compiled version. Stallman asked Xerox for the source code. Xerox would not let him have the source code. Stallman got upset and wrote a manifesto, and the Free Software movement began.² Later, Eric Raymond, a fellow computer programmer, published *The Cathedral and the Bazaar*, which popularized the term “open source.”³ The two terms are frequently referred to by the acronym I use in this essay: FLOSS, which stands for “free/libre/open-source software.”⁴

More recently this concept has been extended from code to other forms of cultural production via Creative Commons licenses and what has become known as the free-culture movement.⁵ The Creative Commons licenses provide a legal tool for applying FLOSS licensing to media other than computer code: text, image, sound, video, design, and so on. Many websites that are focused on fostering creative communities, like Flickr or Vimeo, incorporate this license into their content-upload process. Creative Commons estimates that there are 135 million Creative Commons–licensed works on Flickr alone.⁶ While this has been a very successful initiative, most of these millions of works are digital. They are infinitely copyable, quickly transferable, and easily distributable. What I seek to answer is what happens when this license is applied to works that are not exclusively digital. What happens when the license is applied to cultural objects whose materiality prevents them from being effortlessly copyable.

Inside this larger free-culture community, there are groups of engineers, artists, and designers using open licenses for physical objects which are not as easily reproduced.⁷ The genealogy of the move to license physical works with Creative Commons licenses that I trace here comes out of Limor Fried’s work as an R&D fellow at the Eyebeam Center for Art and Technology’s OpenLab. Located in New York City, Eyebeam is like a think tank, where

artists, engineers, designers, and programmers work together on projects dedicated to public-domain research and development. In a sense, it is not so much a think tank as a *make* tank. I was a resident, fellow, and senior fellow at Eyebeam from 2006 to 2010, and my time at Eyebeam has strongly influenced my work and, thus, this essay.

One of the requirements for working in the Eyebeam OpenLab is that all work is published with an open license; this stipulation is written into the contract that all R&D fellows sign.⁸ This is easy to comply with as a programmer, but Fried primarily worked in what is known as physical computing, which is the intersection between computer and electrical engineering, and experimental art and design. Fried and Jonah Peretti, the director of R&D at the time, spent some time trying to figure out the right way to comply with the contract. In the end, the decision was made to publish a full instruction set and to make available DIY kits with the circuit board and all components.

At Eyebeam, one of the central goals is to be copied. At my orientation in 2006, then senior fellows James Powderly and Evan Roth of the Graffiti Research Lab gave a presentation of their work, tracing their LED Throwies project from its original form, a simple LED with a magnet and a battery, through the modifications made by hackers and aficionados across the world (one had a timed blinker, another used a photosensor to turn on only at night to conserve battery, someone offered LED Throwies for sale).⁹ They noted that the form of distribution that generated the most views of the project was not their blog or their video on YouTube but their instruction set at Instructables.com, a site that allows creators to give instructions on how to make things. The point of their presentation was that the life of a project as a social phenomenon is its most important form and is often the primary form to be evaluated for success. The sharing of the project creates participation. And participation is at the edge of the beginnings of community.¹⁰ It is not quite community, but it is one of the preconditions for community.

One of the most important points about this example, and a point that Powderly and Roth emphasized, is that these were ideas they would not have come up with by themselves, or if they had come up with the idea, they would not have had the time to execute it. They had one idea, which they shared with the world. People thought the original idea was interesting, but these people had their own ideas to contribute. The end result is something that is much greater than the original idea and something that could not have been created without the contribution of others.

That is the optimistic side of the Eyebeam model, a model influenced by Peretti and R&D technical director Michael Frumin. The flip side is that

success is also measured in pure numbers: YouTube, Vimeo, and Flickr views, incoming links ritualistically tracked via analytics software, Diggs, blog posts, and overall hits. This became known as “The Famo.”¹¹ Powderly, Roth, and Jamie Wilkinson coined the phrase, and by the time I arrived at Eyebeam, there were plans to create a complete Famo-meter, which would pull all the statistics from every possible source of views, hits, referrals, and rankings and crown a king of Famo. They even created and taught a class at Parsons (The New School for Design) in which the final grade was entirely determined by Famo.¹²

Famo is relevant here because in order to be copied, a project has to be viewed many, many times. As codified in the 1% rule (or the 90-9-1 principle), a very small number of people are committed enough to take up a project and modify it.¹³ If you have lots of eyes on a project, it is much more likely that someone will also put his or her hands on it. In the process of being copied, a change is made. No copy is a direct copy: every copy is a mutation in some form.¹⁴ When the ultimate goal is to change culture, the intermediary goal is to get copied.

One Example

Limor Fried was one of the first people to laser-etch the top of a laptop and publicly share the results.¹⁵ She and her partner and collaborator Phil Torrone figured out the process for etching laptops (specifically Apple’s Powerbooks), and then she did something really crucial: she published the instructions on her website with an open license. As a result, she created an industry. There is now a growing number of commercial engravers who focus on using the laser cutter as an artistic tool to engrave laptops, cell phones, Moleskine notebooks, leather accessories, fingernails, and so on. For example, etchstar was built off Fried and Torrone’s published materials;¹⁶ the business was purchased for an undisclosed sum by the Microsoft-funded Wallop and is now known as Coveroo.¹⁷

When I was in Portland, Oregon, in 2008, I was introduced to Joe Mansfield, who runs an engraving business called Engrave Your Tech. I met him right as he was scaling up from individual projects to larger runs and big architectural projects. He had just broken the news to the rest of the Moleskine-notebook fan community that despite initial disavowals, the Chinese manufacturer of the notebooks includes PVC in the covers, and they therefore could not be lasercut.¹⁸ It was clear when I met Mansfield that he was pretty well established in the scene. When I told him I was working out of

Eyebeam, he looked at me blankly. I said, “You know, Eyebeam, where Limor Fried, a.k.a. Lady Ada, came up with the idea to use the laser cutter to do what you make a living doing?” And he said that the name seemed familiar somehow. You could argue that this is a failure, because people using this technology do not know who created this use, but I would argue that this is a success: the practice has become so pervasive that the origins are no longer important.

Three Case Studies

I’m going to talk about three projects and try to evaluate their success in the terms I have laid out thus far. Notably, these three projects are design projects, not artworks; artworks would activate a different set of terms for success. I want to view all of these through the cycle of taking things and making them better I have laid out earlier in this chapter: participation breeds creative mutation, and creative mutation leads to better ideas through this collaborative process.

Steve Lambert and I made a laser-cut lampshade for compact fluorescent bulbs (CFLs) that we called the Bright Idea Shade. We identified a problem and tried to come up with a solution for it. The Eyebeam space is two dark converted industrial buildings; most recently one side was an S&M club, and the other was a taxi garage. When Eyebeam first moved in, it was only one floor with twenty-five-foot ceilings. When it was built out for office and work space, the architects lit the space with bare silver-tipped incandescent light bulbs in raw porcelain fixtures. This was very much in vogue during the 1995–2005 loft conversions in New York and San Francisco. It looks great in photographs and is an inexpensive solution, but it became a problem when we started to switch out our incandescent bulbs for CFLs. The bulbs were now *really* just bare bulbs. We needed a solution that made it possible to use CFLs without blinding ourselves.

After some initial tests, we settled on a polygon solution, based on an Instructable, which was based on a *ReadyMade* magazine project, which was based on the work of several designers from the ’60s and ’70s who each claim authorship of the original shape.¹⁹ We consulted with an intellectual-property lawyer, who of course would not actually give us an answer as to any potential legal liability. But from our discussion with him and the transformative changes we made, we felt comfortable making the project public.

To recap an earlier point: in order to get hands on a project, you have to get a lot of eyes on it first. We followed the internal Eyebeam model iden-

tified by Peretti, Powderly, and Roth and created an interrelated video and Instructable.com instruction set.²⁰ This video showed how exciting the project was and then explicitly stated that the whole purpose of the video was to give the idea away. The video clearly said that we wanted someone to take the idea and manufacture it and encouraged people to make money off the idea in the process. Through our Attribution-ShareAlike license (CC BY-SA) and our text in the video, we made it clear that we expected no money. We just wanted someone to make it.

Steve Lambert and I are artists, designers, educators, and activists, but we are not business people. When we design things, we generally make prototypes and give them away. It's great for code, but maybe it's not so great for objects. Many, many people who saw this video wanted to buy a Bright Idea Shade. But it isn't for sale. It is free, but not as in beer. All the patterns and instructions are there, but you have to do it yourself. A manufacturer could do it and then sell the kits, but manufacturers aren't used to this idea of taking someone's ideas, prototypes, and intellectual property for free.

There are business questions and problems with fabricating and marketing a free-culture product. Despite the fact that this project generated several million impressions in video, image, and blog views, there was only one failed lead, and that was from Urban Outfitters. When I tell people that Urban Outfitters was our only lead, they often laugh, as Urban Outfitters' business model is perceived to be focused on copying artists and designers and selling the infringing derivative work on the cheap. I had a direct connection to someone at the top of the company's design team. We offered the project to them, and they wouldn't copy us when we handed it to them.

There is a lot of fear built into this process by the law and capitalism. Intellectual-property law creates fear that companies *do* have some unknowable liability because there are competing claims on the original shape, and we may not have done enough to modify the original shape to make the new work outside the original copyright. It does not help that no lawyer can give an authoritative answer on this question, so the large company with highly suable assets shies away. Companies also fear that if they invest to streamline the production process, brand the product, and create a market, their competitor will jump in and produce it cheaper, and their effort will be for naught. If this did happen, it would be great for the end user/consumer/citizen who wants to use CFLs, but it is not so great for the bottom line of the profit-driven company that invested the time and money into producing the first version.

Part of me wonders about Urban Outfitters and the rest of the corporate design community that perpetually poaches art for their own uses. I jokingly

think that they can't even do anything legitimately. They actually have to rip off someone's art. Playfully, I think that maybe if we said, "Don't touch this. This is our artwork!" maybe they would have copied it. But I know this is a simple and incomplete response. There are larger problems that this example highlights. I came to realize that there were better ways of getting this kind of project scaled up and distributed, and to accept that we pitched the product and gave it away for free, and it didn't work. The lesson learned is that giving things away is hard work.

I took that lesson into my next major project, *Digital Foundations: An Intro to Media Design*, a textbook that integrates Bauhaus pedagogy and art-historical examples into a software-focused design primer.²¹ I coauthored this book with xtine burrough. Though this project is closer to the code and text projects I referred to in the introduction, it involves so much design work that it is not copyable and translatable like software or wikis. This book teaches the formal principles and exercises of the Bauhaus Basic Course through the Adobe Creative Suite. One prime example of this strategy is the chapter on color theory. We teach color theory using Josef Albers's classic Bauhaus exercises, which defined the modern artistic use of color, showing the interrelationship of color's components: hue, value, and saturation. We point out the way these principles have been directly integrated into the computer interface used to select colors. This is a classic exercise from the traditional Studio Foundations course that introduces students to the basic techniques and formal characteristics of art and design. The classrooms where these studio classes used to take place have been converted into computer labs, and more and more curricula skip this traditional analog foundations course and instead go straight into a computer class. Students are not trained in the basic formal principles of visual composition: balance, harmony, symmetry, dynamism, negative space, and so on, nor do they learn color theory or basic drawing.

We made a number of strategic decisions at the beginning that attempted to avoid the problems Lambert and I encountered with the Bright Idea Shade. Instead of waiting for someone to find the book and publish it, we went through the traditional book-proposal process. Once we had the publisher excited about the book, we then started negotiating the Creative Commons license on the work. Before the work was even finished, we actively worked to give the work away by partnering with an organization called FLOSSmanuals to translate the book from the proprietary Adobe design applications like Photoshop and Illustrator to the FLOSS design applications like GIMP and Inkscape.

We wrote the book on a wiki, which at the time was rather unusual for textbook writing.²² It was so unusual that we were concerned about the publisher's reaction. We decided to go ahead with it, as it was the most effective way for the two of us to collaborate, share the results with our peers who were providing feedback, and test the exercises from the book in our classes as we were writing them. When we did show the publisher, they were thrilled. They sent the site around to everyone in the company as an example of how they could start to adopt new peer production techniques for their books.

We wrote it on a wiki with the Creative Commons license we were in the process of negotiating with the publisher. We only used public-domain or Creative Commons–licensed images. After nine months of negotiating, during which time we wrote the majority of the book, we finally signed a Creative Commons–licensed contract with the publisher, AIGA Design Press/New Riders, which is an imprint of Peachpit Press, which is a division of Pearson, one of the largest publishers in the world. Their legal department took nine months to churn its wheels and finally agreed to a Creative Commons license. We licensed this work with a Creative Commons license on principle and also because I was contractually obliged to do so by my contract with Eyebeam. Most importantly, we did it out of the hope that this time we would be able to succeed at giving the work away.

As I mentioned, we were building plans with FLOSSmanuals to translate the book into FLOSS software. Run by Adam Hyde, FLOSSmanuals' mission is to create free manuals for free software. For *Digital Foundations*, FLOSSmanuals assembled a team in New York and ported the whole book to open-source applications like Inkscape, GIMP, and Processing. In a three-day book sprint, eight to ten people per day, with a wide range of technical experience, “FLOSSified” the whole book.²³ I attended the sprint primarily to observe and advise but did almost no actual translation; burrough did not attend. Since then, Jennifer Dopazo, at the time a graduate student in NYU's Interactive Telecommunications Program, led a translation of the whole book into Spanish.²⁴ This book has been published and is going to be released in an extremely low-cost newsprint edition sponsored by Media Lab Prado in Madrid and distributed for free to design centers, schools, Internet cafes, co-working spaces, and community centers. In addition, there are active translations into French, Farsi, Mandarin Chinese, Finnish, and German.

We succeeded in giving the project away, and the project continues to evolve into new transformations and uses. We were able to achieve this because we were more strategic at an earlier stage than Lambert and I were with the Bright Idea Shade. We formed a partnership early and made sure

that it was an open partnership that allowed us to make further partnerships with other individuals and organizations that were interested in the material we covered in the book and in the process by which we made the book.

The materiality of the two projects differentiates them in a way that may be instructive. *Digital Foundations* has taken multiple physical forms: a trade paperback technical book published in an initial 2008 run of eight thousand copies, with a 2009 reprint of four thousand copies; two print-on-demand books published by FLOSSmanuals; and in the future, as five thousand copies of a newsprint edition.²⁵ It has also taken multiple digital forms: the whole book is up on a wiki; the full FLOSS version is available in English and Spanish from the FLOSSmanuals.net website, where partially translated versions also live; and I put the entire master design file for the original book up as a torrent file on Clear Bits, a legal torrent site.²⁶ *Digital Foundations* was also closer in form to the more successful text/code-based examples discussed in the introduction, though the significant design work in the book differentiates it from these text/code examples. Conversely, the Bright Idea Shade was necessarily a physical object. It was effectively a prototype for a kit that could have been manufactured in large scale. Its digital form was a set of vector files that a laser cutter could use to cut copies and an instruction set on Instructables.com: these were not the product; they were procedural tools that would help get to the end product. The Bright Idea Shade was rooted in physical materiality, while *Digital Foundations* was whole both in physical and digital forms.

The demands of participation were very different between the two projects. For *Digital Foundations* we were able to make the process of sharing into a collaborative process, and one which accessed collaborators who had a range of experience, from expert to novice software users, to translators in multiple languages. Some of the most helpful participants in the translation book sprint were the people who had no experience with the FLOSS software into which we were translating the book; these contributors' responsibility was simply to work their way through the finished chapters, following the new instructions, and successfully completing each step along the way. When they got confused or encountered errors, the translators knew they had to rewrite that section. In the process they learned the software. With the translation process, contributions could be large or small. Though Dopazo translated the majority of the Spanish version, she did have collaborators translate and proofread. It is not all or nothing, and many small contributions led to a complete project. Conversely, the Bright Idea Shade was all or nothing. We were not trying to find a person to collaborate with but, rather, a company that had very specific capabilities. We were looking for a

company to commit to the large-scale production of the design prototype we had created. This was not possible through collaboration; this did not access multiple skill levels; nor did it allow for incremental production. It was an all-or-nothing proposition, and as a result, it was not successful.

Some time after we made the Bright Idea Shade, I covered my bicycle in black retroreflective vinyl. “Retroreflective” is a technical term that means that the material reflects directly back in the direction of a light source. This is the same reflective material on the backs of running shoes and night safety vests. I called the project Bright Bike, made a video, and released it online.²⁷ By this time I was beginning to see the flaws with the plan for the Bright Idea Shade and to see the potential successes of the way we were planning the *Digital Foundations* project. I tried to include some of this knowledge in the plan for the Bright Bike.

The vinyl comes in sizes starting at thirty-foot-long, fifteen-inch-wide rolls, but the initial kit required only six feet of fifteen-inch-wide vinyl. Eyebeam sold six-foot sections of the vinyl out of the Eyebeam Bookstore, but that was only accessible to people who happened to stop by in person. In an effort to expand that range, we approached our vinyl supplier to see if they would be willing to sell six-foot lengths of vinyl cut for the Bright Bike project. The supplier was interested, as the company happened to be run by an avid cyclist. They sold the vinyl in six-foot lengths to correspond to the Instructable that had the directions on it.²⁸

We achieved some success. Despite the kits’ being buried deep in the vinyl supplier’s website, people did order them. Somewhere along the way I also realized that, like it or not, I was going to have to become a businessman, if only a small-scale DIY one. In this, I turned to Limor Fried’s practice as an example. During her time at Eyebeam, she and Torrone had started a business called Adafruit Industries, selling the DIY kits she was making.²⁹ I made revisions to the original design, creating two different DIY kits that take five and fifteen minutes to apply each.³⁰ I made about one hundred of these kits on a friend’s vinyl cutter, sent out one e-mail, and quickly sold out. I launched a fundraising campaign via the crowdfunding site Kickstarter.com which raised \$2,500 from eighty-six different “project backers” who each received rewards in the form of DIY kits.³¹ Their support allowed me to buy a bulk order of the expensive vinyl and to make dedicated jigs, so I could fabricate the kits quickly (hand cutting with jigs proved faster and more accurate than using a vinyl cutter).

Presently, I have shipped wholesale orders to a bicycle shop in Portland, Oregon, and to several design boutiques and bike shops in San Francisco and Amsterdam. I have an assistant who cuts and ships kits one day a week. The

revenue from the kits is paying the wages of the assistant and for new supplies of the vinyl. The project is creating enough profit to sustain itself. By sustaining the project, I am creating the possibility for more people to get it in their hands, in the hope that one of them will use their hands and transform the project. It appears that this strategy is working: a number of Flickr users have posted creative applications of the kits, and I recently discovered that a bike shop to which I gave a sample has derived a modified version of the kit which they are putting on all of the bikes they sell.³²

I was at a family event, and a distant cousin came up to me to talk about the Bright Bike kits. She thought it was a great idea, but she was very concerned that I patent the idea as soon as possible, lest “one of the big bike manufacturers steal it from you and make a lot of money and leave you with nothing.” I told her that it would be wonderful if that happened, because I was really interested in design for bike safety and that a major bike manufacturer could scale up the project much larger than an individual like me could. I also told her that based on my past experience, it was pretty unlikely that her fears would play out but that I still hoped they might.

NOTES

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1. One of the potential pitfalls of this essay is trying to define the boundary between the two categories I am setting up. I do not set up this binary for the sake of defining borders and establishing categories but, rather, to articulate different modes of production. In reality, this is a continuum, with some interesting cases floating in the middle. A digitized photograph is code, but the image itself has to be inputted and outputted from the computer. Additionally, it cannot be reworked quite as easily as code/text. While interesting, the exploration of these boundary cases is not the focus of this essay.

2. Richard Stallman, “The GNU Manifesto,” <http://www.gnu.org/gnu/manifesto.html>; and Free Software Foundation, “The Free Software Definition,” <http://www.gnu.org/philosophy/free-sw.html> (accessed June 25, 2010). One of Richard Stallman’s most creative contributions to this movement was the General Public License or GPL, <http://www.gnu.org/licenses/gpl.html>. Software licensed with the GPL is required to maintain that license in all future incarnations; this means that code that starts out open has to stay open. You cannot close the source code. This is known as a “copyleft” license.

3. Eric Raymond, *The Cathedral and the Bazaar* (Sebastopol, CA: O’Reilly, 2001).

4. There is much debate in the subcultures of the free-culture movement about what terms to use. Some argue that the term “open source” is a neutered version of “free software” that caters to corporate entities like IBM that see the business potential in a software-authoring model that is built around sharing and group work but cannot allow the word “free” to enter into their business lexicon. While these disputes arise from time to time, the term “FLOSS” (or “FOSS”) is used as a catchall acronym to refer to both terms.

5. For more on the mechanics of Creative Commons licenses, please see <http://creativecommons.org/about/licenses/>.
6. Mike Linksvayer, "Creative Commons Licenses on Flickr: Many More Images, Slightly More Freedom," *Creative Commons Blog*, March 10, 2010, <http://creativecommons.org/weblog/entry/20870> (accessed June 25, 2010).
7. There are even limitations beyond the materiality of the works: one group of leading artist-engineers is currently working with Creative Commons on making it possible to license an electronic circuit via an open license, as it is currently not possible to fully do so. For video documentation, see Eyebeam, "Opening Hardware," March 17, 2010, <http://eyebeam.org/projects/opening-hardware> (accessed April 11, 2010).
8. Eyebeam has changed its internal structure to adapt to changing needs of its fellows and resident artists: at the time of Fried's fellowship, there were multiple labs with different licensing requirements. Due to external factors like the growing importance of free culture and internal factors like the fellows' desire to all work in one shared lab, the organization collapsed the labs into one lab. Fellows are no longer designated "R&D fellow" or "production fellow" but are simply "fellows," and all contracts require open licenses.
9. Graffiti Research Lab, "LED Throwies," Instructables, 2006, <http://www.instructables.com/id/LED-Throwies>. For modifications, see projects tagged "Throwies" on Instructables.com: <http://www.instructables.com/tag/throwies/> (accessed June 25, 2010). LED Throwies for sale: Hebei Ltd., <http://www.hebeiltd.com.cn/?p=throwies> (accessed June 25, 2010).
10. Lewis Hyde, *The Gift* (New York: Vintage, 1979); Adam Hyde et al., *Collaborative Futures*, FLOSSmanuals.net, 2010, <http://www.booki.cc/collaborativefutures/> (accessed June 25, 2010).
11. The term "Famo" comes from the URL www.internetfamo.us; without the TLD (top-level domain ".us"), the word "famous" is cut to "famo."
12. James Powderly, Evan Roth, and Jamie Wilkinson, "Internet Famous Class, 2007–2008," <http://internetfamo.us/class/> (accessed June 25, 2010).
13. Ben McConnell, "The 1% Rule: Charting Citizen Participation," *Church of the Customer Blog*, May 3, 2006, http://customerevangelists.typepad.com/blog/2006/05/charting_wiki_p.html (accessed June 29, 2011); Julia Angwin and Geoffrey A. Fowler, "Volunteers Log Off as Wikipedia Ages," *Wall Street Journal*, November 27, 2009, <http://online.wsj.com/article/SB125893981183759969.html> (accessed June 25, 2010).
14. For an edge case of this idea, see Michael Mandiberg, *AfterSherrieLevine.com*, 2001.
15. Limor Fried and Phil Torrone, "Adafruit Laser Information Wiki," *LadyAda.net*, first posted December 2005, last updated March 5, 2010, <http://www.ladyada.net/wiki/laserinfo/start> (accessed July 20, 2010).
16. Phil Torrone, personal interview, July 1, 2010.
17. Camille Ricketts, "Microsoft Social App Co. Wallop Rebrands as Coveroo," *Deals & More*, December 17, 2008, <http://deals.venturebeat.com/2008/12/17/microsoft-social-app-co-wallop-rebrands-as-coveroo/> (accessed July 20, 2010).
18. Vaporized PVC releases deadly chlorine gas.
19. Dan Goldwater, "Universal Lamp Shade Polygon Building Kit," Instructables, <http://www.instructables.com/id/Universal-lamp-shade-polygon-building-kit/> (accessed June 25, 2010). "RE-WIRE: Piece Together Pendant Lamps," *ReadyMade*, December–January

2007–2008. Antonio Carrillo, modular construction system, 1964; see, e.g., <http://www.ylighting.com/brs-lj-col-drop.html> (accessed June 25, 2010). Holger Strom, “IQ Light,” 1972; see overview at <http://www.sadiethepilot.com/iqweb/iqstory.htm> (accessed June 25, 2010).

20. Steve Lambert and Michael Mandiberg, “Bright Idea Shade,” Vimeo, 2008, <http://vimeo.com/1553079> (accessed June 25, 2010).

21. xtine burrough and Michael Mandiberg, *Digital Foundations: An Intro to Media Design* (Berkeley, CA: Peachpit, 2008).

22. xtine burrough and Michael Mandiberg, “Digital Foundations Wiki,” <http://wiki.digital-foundations.net> (accessed July 20, 2010).

23. FLOSSmanuals.net community, *Digital Foundations: Introduction to Media Design with FLOSS*, 2009, <http://en.flossmanuals.net/DigitalFoundations> (accessed June 25, 2010).

24. FLOSSmanuals.net community, *Fundamentos Digitales: Introducción al diseño de medios con FLOSS*, 2009, http://translate.flossmanuals.net/DigitalFoundations_es (accessed June 25, 2010).

25. burrough and Mandiberg, *Digital Foundations*; FLOSSmanuals.net community, *Digital Foundations*; FLOSSmanuals.net community, *Fundamentos Digitales*.

26. burrough and Mandiberg, “Digital Foundations Wiki”; xtine burrough and Michael Mandiberg, “Digital Foundations Master File,” Clear Bits, 2009, <http://www.clearbits.net/torrents/597-digital-foundations-textbook-master-file-including-all-files-links-images> (accessed June 25, 2010).

27. Steve Lambert and Michael Mandiberg, “Bright Bike,” Vimeo, 2008, <http://vimeo.com/2409360> (accessed June 25, 2010).

28. Beacon Graphics, <http://www.beacongraphics.com/brightbike.html> (accessed June 25, 2010); Michael Mandiberg, “Bright Bike,” Instructables, <http://www.instructables.com/id/Bright-Bike/> (accessed June 25, 2010).

29. The business, Adafruit Industries (<http://adafruit.com/>), is the creative outlet for Fried’s physical computing projects and distributes her work into the hands and soldering irons of those who want to use the tools she is making.

30. All of the images and blog posts about the first version that appeared online emphasized how *hard* it was to actually complete the project and how long it took those who tried. Michael Mandiberg, “Bright Bike v2.0,” Vimeo, 2009, <http://vimeo.com/8159498> (accessed June 25, 2010).

31. Michael Mandiberg, “Bright Bike DIY Kits: Night Visibility for Safer Riding,” Kickstarter, 2010, <http://www.kickstarter.com/projects/mandiberg/bright-bike-diy-kits-night-visibility-for-safer-r> (accessed June 25, 2010).

32. Michael Mandiberg, “Bright Bike Mod in Brooklyn,” Michael Mandiberg’s website, August 31, 2010, <http://www.mandiberg.com/2010/08/31/bright-bike-mod-in-brooklyn/> (accessed August 31, 2010).