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Conversations on Making

In a column last year ("Making: Movement or Brand?" January – February 2014), we argued that the maker "revolution" may be best understood as a brand rather than a social movement. While proponents view makers as part of a new creative class that circumvents conventional mass consumption, we noted that many makers become good capitalists, too—selling books, tickets, and magazines as well as seeding new businesses. By adopting and enacting maker discourse, makers additionally become proponents of an ideological stance wherein small-scale design gets portrayed as a catalyst for social change. Finally, we pointed out that surprisingly few women or people of lower socioeconomic means participate in these worlds despite rhetoric that aims to be inclusive of everyone.

Shortly after the column was published, David Cuartielles, co-founder of Arduino, wrote us with some concerns. First, he pointed out that we made an error regarding Chris Anderson's involvement with *Wired* magazine. We identified Anderson as the founder of *Wired*. In fact, as Cuartielles pointed out, Anderson was editor-in-chief for a long period. We regret the error.

Cuartielles also asked us to clarify some of our other assertions. In email exchanges that followed, we aimed to get a fuller idea of his concerns. We decided to publish some of the points Cuartielles raised in this exchange.

Bean and Rosner: Where did we go wrong? Specifically, can you identify the assumptions we have that you think are incorrect?

Cuartielles: I would say the assumptions you made in your column overlooked the history of electronics, crafts, and other fields over the past few decades.

Open source and free software have somehow infected the physical world, and many of us have started looking into ways to apply software-like licenses in areas where people were basically getting patents before.

That revision of the licensing around physical objects is not new, either. You can read texts by Victor Papanek in the 1960s and '70s, or even check out his books about collecting examples of nomadic furniture—de facto predecessors of the current *Make* magazine—which include clear instructions on how to build furniture that is designed to be copied. Papanek designed furniture to be built out of almost anything, and he couldn't understand why other people wouldn't be capable of doing the same. He saw the process of designing as very democratic and declared everyone a designer. Sharing the blueprints of design would help others get started.

The contemporary parallel to Papanek can be seen in the embedded electronics world. The life we live is becoming more and more digital; embedded electronics are the bread and butter of many of our everyday artifacts. One of the main characteristics of this type of electronics is that they are reprogrammable, and that the software for them is much simpler than the software produced for personal computers. It was just a matter of time until people started making that code open, which would also extend to the electronics. Arduino is a manifestation of that. Our system is based on the fact that the software we build upon is open, so opening the hardware design is only natural.

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This is the very basic aspect behind the maker culture: sharing. The possibility of others reusing what some did to apply it in a different field. I see this a bit as a mix between the U.S. "show and tell" culture and the tech-nerd naivete and willingness to basically "show off."

I think you got blinded by the fact that Maker Media is a company dedicated to the production of printed materials and promotion of events. I also think you forgot they could only build that small media empire if there was a group of people interested in not only the content but also the production of the content. Maker Media is a vehicle for a lot of voices that have something to say and couldn't find room anywhere else. Having your project shown in *Make* magazine is a validation that your work is relevant to this community. It is not peer-reviewed; there is no academic review panel; there is only a de facto expert committee ensuring the content is new and unique for this community.

Other experiments like this one have failed—even, as you mentioned, other magazines within the same company. There are plenty of reasons for this. I believe there is a better vehicle for the content previously addressed by *Craft* magazine. The blogosphere has been representing

the voices of people making crafts for a long time; there are traditional craft markets; there is Etsy as an alternative online market for crafts; and there are hundreds of books and magazines to be found in the second-hand market on stitching patterns and sewing techniques that are as up to date as anything you could find today. But electronics and software are evolving constantly.

Bean and Rosner: We agree on the value of a historical lens in understanding the so-called maker movement. With this in mind, we wonder how you relate current creative modes of activity promoted by Maker Media with the design activities promoted by members of the 1960s Bay Area counterculture and thought leaders such as Kevin Kelly and Stewart Brand? In particular, we were intrigued by your mention of Victor Papanek. Are there direct connections between Papanek's work and the maker movement of which we are not aware?

Cuartielles: I don't think there are. What I think is the work of Papanek, which is part of a context where other communities of creation were also looking into the idea of "democratic creativity," is today becoming mainstream, as part of the technological "revolution" of Web 2.0. Everyone can be a designer; everyone can create things by themselves; everyone can publish content, edit content, remix, or make something new out of the work made by others. Consumers of popular culture see little to no difference between original content and remixed content (from the point of view of consumption, what difference does it make, anyway?).

So I don't think there is a direct link. I think it is more of an emergent phenomenon that is taking some ideas created 30 years ago and amplifying them via the Internet to reach a larger demographic.

Bean and Rosner: You've described the work of this "grassroots" activity as new, but might this tell a familiar story?

Cuartielles: I agree with you here. This is history repeating. The difference is that we now see real effects at a global scale. One could argue it is not truly grassroots in the sense that it is not completely new; it is not a new construct coming from a series of assemblies made by people disconnected from the rest and then going public. It is more an evolution happening simultaneously at many locations, from people remixing ideas, content, and tools.

David Cuartielles

IMAGE BY DAVID MELLIS

Bean and Rosner: We're interested in how you see gender issues cropping up in these creative cultures. Earlier you said "we are winning the battle of gender." How do you account for the apparent fact that people who identify as makers are overwhelmingly male (81 percent, according to a recent study conducted by Intel)? How do the groups you've described (Maker Media, open software and hardware proponents) recognize the values, belief systems, and interests of people of different genders?

Cuartielles: If that was a study among adults, I have no doubt that the study is right. A couple of years ago, after reading a series of articles about gender participation in online forums, I decided to run a study on the Arduino forum. My goal was very simple: identify the amount of women vs. men. Turns out the ratio was very low. There is an option in the Arduino forum to show your gender, and there was a much higher number of people who registered as men than as women,

but there was also a whole lot of users who didn't use this option.

I don't have the exact data with me, but on the forum, female users were around one percent of the total. The reasons for this are something I couldn't identify. I discussed with forum members what they thought about it, and then I realized that these issues are similar to those you can read about in many other online communities. My conclusion from that experiment is that a forum is not the right place for expression and that it is hard to run a community of over 150,000 users using moderators/volunteers and keep a reasonable discourse regarding gender equality—even when applying very strong policies on how to use language and show respect to other users.

On the other hand, the thing that struck me is that I teach mostly at art and design schools, at B.A., M.A., and Ph.D. levels. And at those places, the female-to-male ratio is unbalanced—there are many more women than men. So why this disconnect? In my opinion it has to do with the differences in how each gender likes to use the Internet for communication.

We also did some things within Arduino:

• We looked for people working within technology who could show a different sensibility toward technology. We started to work very actively with, for example, Leah Buechley (creator of the Arduino Lilypad) and with Limor Fried (owner of Adafruit Industries), as well as with other players within the maker community like Ayah Bdeir and Alicia Gibb. We tried to highlight their work, collaborated with them on multiple projects, joined them in public discussions, and supported their initiatives (and we still do).

• We spent a tremendous amount of time designing a documentation system for our online presence that moves away from the traditional forum and that is more centered around the idea of allowing people to showcase their projects, make project collections, and so on. It moves away from the traditional forum concept, which is hard to handle. It will be called Scuola and should come online soon.

• We started working with people at younger ages. For example, the so-called Creative Technologies in the Classroom initiative that I run for Arduino is reaching 4,500 students in Spain, 600 in Ecuador, and 600 in Sweden this year. Forty percent of the students in Spain are girls (I don't have data from the other countries yet, as the study just began in September). This is the optional technology class the kids take in high school at around age 15.

• At a more local scale, being a company started by five men, we started hiring women at all of our offices to take responsibility for many of the day-to-day operations: global social media manager, Chiasso's office manager, Bangalore's office manager, Torino's office main project manager, Malmö's office art director, Malmö's office main project manager, main UX designer, Malmö's high school education liaison, global press liaison. We don't have a 50 percent female-male ratio in any of our companies worldwide, but we do not judge people by their gender, age, religion, social class, education, or political convictions.

Looking toward the future of making, we see the need for more reflection on the subjects and engagements of technology cultures. All three of us have developed, led, and participated in workshops using Arduino over the past six years. But our observations may say little about how Arduino and other maker technologies get taken up in people's everyday lives. They might not tell us how these technologies could be used to promote civic justice and community engagement. They may not tell us how these technologies could give certain people agency in their technological relations. Recent studies suggest that gender is not the only gap existing in the maker community. A 2012 Intel survey on makezine.com of people who consider themselves makers found the following of respondents: 81 percent were male, 97 percent attended college, 80 percent did post-graduate work, and their median household income was $106,000. These results invite us to ask what cultural work hacking and making does, and for whom.

We believe that Cuartielles—like many others involved in the maker movement— has been working tirelessly toward advancing novel forms of technical understanding, engagement, and empowerment. Cuartielles, in particular, has made unprecedented contributions to educational developments: running engineering workshops for under-represented groups and helping to envision and build the Arduino platform, a low-cost, easy-to-program hardware development toolkit that has seeded new modes of engineering education through physical computing and hobbyist do-it-yourself design.

In closing, we believe that members of the maker movement have made great strides in enabling new modes of participation within engineering cultures. Yet in bringing egalitarian participation closer to the fore, this work has also revealed possible impediments to those ends. Decades of social science theory and research show us that privilege reproduces power, even in the face of good intentions. The next phase of making might account for these issues by embracing a central tenet of feminism: the understanding that categories such as gender and power operate in manifold ways. Pointing to these limitations could help our communities continually work toward more equitable, sustainable, and peaceful societies.

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