The Dark Side of Making –

Reflecting on Promises, Practices and Problems of the Last 25 Years

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Abstract

The discussion of our panel of the *Dark Side of Making* takes up specifically the perspectives of software- and biohacking, do-it-yourself (DIY) practices, education, and open networks. Members of the panel represent a range of perspectives from an international group of academics, artists, and makers, including the local South African maker scene. The recent years have seen a growing interest and increase of practices that embrace a DIY attitude and Maker Culture. But there are also controversies attached to these practices that question their legitimacy, sustainability, and intentions: How is it better to build your own electronic device instead of buying a mass-produced one? Does it really make sense to self-build the automated watering, light and temperature control system for your house plants? And why do we all repeat the same experiments in a DIY biolab, e.g. the creation of transgenic fluorescent e-coli bacteria, which will be killed after we have seen it glow under a fluorescent lamp? These and other questions reference a possibility that there exists a dark side to these practices; but what and where is it?

Keywords

Biohacking, creative practices, critical perspectives, digital media, DIY, education, hacking, Making, open culture, open networks.

Introduction

Making, DIY, craft, hacking, biohacking – these practices are often perceived as empowering and liberating to the practitioners. They are seen as an alternative to a consumer culture and often claimed to question and flatten hierarchies. Proposedly, they effectively facilitate learning and empower citizens. This popular, if not predominant, reading of Making appears to focus on its perceived emancipating elements (e.g. Gershenfeld, 2012). As the recent decade has experienced a stark growth of these types of practices, it is time to step back and ask critically if there are 'dark sides' accompanying them. Are makers building a kind of frankensteinian monster (Fig. 1), that will haunt them? Are there situations where these practices "go wrong" – intentionally or unintentionally?

Figure 1. Building a *Making* monster.

Our panel aims to initiate a critical discussion by reflecting on the popular phenomena and their associated practices, underlying understandings and commitments, as well as scrutinizing the reality underlying the common rhetoric. The panel is meant to constructively question and challenge the current situation, and develop desirable scenarios for the future in discussion with the audience. The topic of *Dark Side of Making* is approached from a wide range of perspectives, such as political, philosophical, artistic, educational and design theoretical discourses. The conceptual framework of this discussion can be defined as a 'critique of openness' exemplified by concrete Making and hacking practices. Some of the potential issues addressed by the panel are concerning the situations and ways the practices become hijacked to other ends than what was the original vision? Who invests into and benefits from cultures of openness? Are there *dark sides* in educational practices? What kind of relation to the natural environment develops through DIYbio practices? What kinds of side-effects do these practices entail? The panel aims to establish a dialog with the audience addressing these questions in the specific local context to identify international differences in attitudes and practices in cultures of making.

A brief look into history

In the late 1940s, John von Neumann proposed in his lectures a thought experiment on a kinetic, self-reproducing automaton, which he later developed into the cellular automaton – today known also as the *Game of Life* (von Neumann, 1966). The concept of self-reproducing machines had existed for a long time when von Neumann proposed his concrete and realizable version of it. Today the same idea is still present and underlying parts of the developments in the fields of computation, robotics and also biotechnology with its interests to manipulate and even create biological life (Gibson et al., 2010). One can also claim that this very idea has been lurking behind various developments within DIY fields. A machine that can reproduce or print itself has been one of the visionary claims that have pushed forward contemporary ideas about democratizing production. A situation has been imagined in which anyone can afford to print anything anywhere. This vision has been approached by DIY practices with the development of low-cost equipment accessible to a considerable portion of Western populations.

When one looks into the past of the Western world, one can detect an emerging trend in participatory practices of end-users of technical media. Since the mid-1980s various forms of DIY subcultures have emerged, and continue to exist, but they have often focused more on craft and repairing using traditional materials in traditional settings (e.g. sewing, vehicle mechanics, gifts, decorations, and other handicrafts). The more recently emerged practices have centred around technical media with examples such as the *hacking* of online computer systems, and of software in general (i.e. creating it). Later appeared *Making* and *Maker Culture* that use Fab Lab technologies (such as laser cutters and 3D printers) and easily available computers and small-scale microcontrollers such as *Arduino* boards and *Raspberry Pi* controllers. A common motif in these developments has been the empowerment of the users (or citizens), preserving or (re-)taking control of their own affairs, questioning hierarchies and aiming to reverse power relationships.

We observe several reasons for the emergence of the bottom-up, participatory movements: (1) The popularization and spread of the digital computer into private households, and the explorative and playful modalities of interaction it promoted or even necessitated (Cermak-Sassenrath, 2015). It also introduced users to some appropriative (if not outright illegal) practices such as swapping (or trading) copied games and other software. (2) The World-Wide Web which experienced a massive surge of popularity in the late 1990s and sustained initiatives such as the EFF, the 'Declaration of Independence of Cyberspace' by Barlow (1996), the Open Source movement, and the Linux operating system. (3) As a reaction to the perceived takeover of many areas of life by computer systems, programs and algorithms which were seen, at least initially, and periodically after that, in parts of the population with reservations, if not with fear and hostility. (4) The possibilities afforded by new production tools to construct DIY and low-cost equipment; that have opened up areas for DIY development, which have been restricted before to experts within academic institutions and commercial enterprises, for example in areas such as hardware development, physical computing, life science and biotechnology in general.

Perspectives of *Making*

From early on, the use of digital media questioned existing conventions and frameworks of conduct, policies and laws. The first hackers at MIT used computers more or less illegally (Levy, 1994); hackers aimed to use dial-up data connections free of charge (*blue boxing*); gamers removed copy-protections from games (or used special tools) to be able to swap them; people exchanged manuals online for all kinds of unlawful activities (from breaking in, to building weapons, to producing drugs); among many other examples.

Educational aspects have been strongly present throughout all DIY-practices, Making and hacking. Within the Making community, there appears to be a belief that educating the general public with new skills and enabling them to build low-cost equipment will democratize the production of knowledge and, ultimately, society. However, if one scrutinizes the situation from an institutional educational perspective, there are several problematic aspects connected to Making which can spark conflicts: Making might purely replace one learning material with another, without questioning and revising the established contexts. Despite the introduction of innovative forms of teaching and learning, traditional forms of assessment such as oral exams might prevail. Making might promote a trivialization of learning, and students might mistake reproducing for understanding, artefact for concept, and product for result. Making might reveal itself to not be a way to individual and collective empowerment but a strategy of social control (Kozlovsky, 2007).

Digital media and communication networks have certainly facilitated a change of perspective for a rapidly increasing number of people. This has also impacted the attitude of consumers – for example, areas such as culture, politics and the economy are no longer something that one accepts as given, but something one can be involved in. Andreas Reckwitz (2017) points out that the currently prevalent focus on innovation within companies has provided a precondition for the universal regime of novelty that has become inherently a part of the so-called aesthetic economy. Economists are keen to promote creative industries that are deeply invested in the production of novelty and contributing to the aesthetic economy. DIY practices are often intertwined with creative industries and either directly or indirectly contribute to it. Two clear consequences, among many others, have emerged within these developments – the appearance of new workforce of the masses that is known in new-media lingo as crowdsourcing, and a new type of 'creative consumer' has emerged which is something between a producer and a consumer.

These developments have also led to the notion of so-called prosumer (producer + consumer) capitalism (Ritzer, 2015).

In the common rhetoric of *open culture* there is a common trope in which the network is a distributive structure that flattens hierarchies, disintermediates communications and creates equality of opportunity and outcome. However, simultaneously as networks become pervasive we see the opposite situation taking shape. The free flow of capital, resources, people and information leads to ever greater aggregations in each of these categories, highlighting an increasingly widening gap between rhetoric and reality. Neither networks nor the ideals of open culture have been able to impact the facts that e.g. capital is flowing to ever fewer pockets and social media is today known for creating ever-stronger eco-chambers that amplify existing beliefs and consensus. To what extent is the distributive function of the network exceeded as the network gains scale? One cannot help wondering what makes us believing in the rhetoric when reality presents us with contradictory and harsh facts?

A comparable strong rhetoric about equal opportunities and democratic decision making also surrounds the practices of biohacking, DIYbio and even biotech-based artistic practices. During the recent years, there has been a considerable increase in general interests towards these biology-related practices, which have emerged alongside of the above-described DIY and hacker movements that focus on technical devices and digital media. These practices typically concern of biotechnological methods for manipulation of living organisms. They also present one of the long-term dreams of scientists working within the field – the creation of life from scratch. This dream echoes strongly with the proposal of self-reproducing automata, which von Neumann visioned at the time as a mechanical machine; today however, this dream of creating life is projected onto the engineering possibilities within the field of biotechnology.

In the 1780s, Italian physician Luigi Galvani investigated the effect of electricity on dissected animals (Fig. 2). He discovered that a frog's legs twitch when electricity is passed through the muscles, a phenomenon called galvanism that led to the subject of electrophysiology (Lai, 2017). This is a historical experiment, which may today look to us rather dubious. It can also be seen as an early experiment that combined technology and biology.

Today's DIYbio practitioners often see themselves as a counterculture in opposition to the commercial biotech industry. They design and construct low-cost tools that are able to do the same tasks than expensive proprietary equipment in the laboratories. These tools are made as open source with an idea in mind that the tools can empower citizens to take part in the development of science and technology. But one can still question what is different in the DIY practices in comparison to industry research – is the ultimate goal not still the same; to innovate and create economic profit at the end? The shared ideology across DIYbio communities assert to open access, equal opportunities, and sharing of knowledge as the primary model of working. But there exists also a general belief surrounding the field, which presumes that the next big innovation in biotechnology will come from the DIYbio communities (Lorenzo & Schmidt, 2017). One can refer to this situation and question the persistence of the pronounced ideology, as well as one can easily point a finger to many ethical aspects (from western perspective) concerning the work with living organisms, or to the side-production of waste within laboratory practices. There are many obvious dark aspects present in today's biotechnology practices both in DIYlabs and in the research & industry. However, the panel-talk will not concern of pointing out these very obvious dark sides in the DIYbio practices, but rather investigates the existence of the technologically defined mind-set that treats everything (living and non-living) with a rational and top-down logic, and considers the natural environment predominantly as a resource to humans.
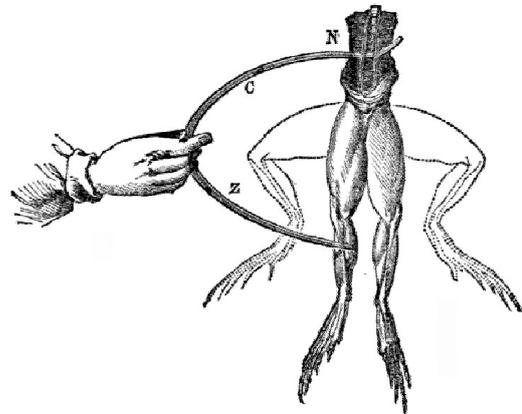

Figure 2. Luigi Galvani's 1780s experiment with frog legs and electricity (Wikimedia Commons[1]).

Our proposed panel discussion of *The Dark Side of Making* takes up perspectives of software-, hardware- and bio-hacking, including DIY-practices, education, and open networks. The panel presents a range of perspectives from international group of academics, artists, and makers, including the local South African maker scene.

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[1] https://commons.wikimedia.org/wiki/File:Galvani-frogs-legs-electricity.jpg [accessed Apr 12, 2018]

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Authors' Biographies

Daniel Cermak-Sassenrath is Associate Professor at the ITU, Copenhagen, and member of the Center for Computer Games Research (game.itu.dk) and the Pervasive Interaction Technology Lab (PitLab, pitlab.itu.dk). Daniel writes, composes, codes, builds, performs and plays. He is interested in artistic, analytic, explorative, critical and subversive approaches to and practices of play. Discourses he is specifically interested in, are play and materiality, play and learning, and critical play. He aims to integrate and contrast methods and practices of art, design, media studies, engineering and education. He runs the University's monthly workshop series which is about electronics, mechanics, alchemy, interface devices and dangerous things. In his own practice, he makes interactive works which are shown at art exhibitions, academic conferences and popular events. (More info at www.dace.de)

Dr. Laura Beloff (FI/DK) is an internationally acclaimed artist and academic researcher who has been actively producing art works and exhibiting worldwide in museums, galleries and art events since the 1990's. She has been a recipient of various grants, art residencies and awards. Her artistic and research interests include practice-based investigations into a combination of technology and biological matter, which is located in the cross section of art, technology and science. Previously, she has been Full Professor for Media Arts at the Art Academy in Oslo, Norway; and Visiting Professor at The University of Applied Arts in Vienna; and currently she is Associate Professor and Head of the PhD school at IT University of Copenhagen. www.realitydisfunction.org

Julian Priest is a New Zealand based artist and writer who works with participatory and technological forms currently focusing on gravity. He was co-founder of early wireless freenetwork community Consume.net in London and is a board member of the Aotearoa Digital Arts Trust. He has lectured at the Banff Centre, Whanganui School of Design, AUT University and Massey University. Recent exhibitions include: The Blue Marble, Machine Wilderness, Public Art Finalist Exhibition, Albuquerque (2012); Sink, Machine Wilderness, ISEA, Albuquerque (2012–13); and Local Time, Local Knowledge, Dowse, Wellington (2011–12). His interactive sound work La Scala was recently commissioned for the Chartwell Stairwell at Artspace Auckland (2014–15).

Walter Langelaar is Programme Director for Media Design in the School of Design Victoria University of Wellington (NZ), as well as an artist and subcultural activist from the Netherlands. His work in media arts and design questions our digitally networked cultures and infrastructure in varying dimensions through sculpture, installation, online performance and critical intervention. Walter's work is shown in numerous venues across the European and international media arts scene. Walter received several awards for his personal and collaborative projects and held artist in residence and visiting scholar positions. Walter's research is concerned with the plethora of recording devices employed in the post-Snowden spheres of networked interaction design. The recently launched SAM project (2017) aims to raise awareness as well as pose critical perspectives on AI cloud infrastructure, blockchains and social media mining while contextualising these tools in relation to contemporary Internet culture, political science and e-governance.

Natural born innovator, trained Engineer, Teacher, Artist and Entrepreneur – Steve Gray (BSc Eng) is a dynamic voice in the world of Technology and Innovation. Founder of the MakerSpace Foundation, he is a master at demystifying technology and unpacking the human implications of our rapidly changing world. Stephen offers an entertaining and insightful look behind the Tech curtain, unveiling a picture of the future and engaging listeners from all walks of life.