

# Civic Media & Data (h)ac(k)tivism: Environments, Tools and Practices for Critical Data+Code Literacy and Visualization

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*This paper is one of the contributions to an academic panel titled: “Bio-creation of informatics: Rethinking data ecosystems in the network economy”. The panel seeks to explore different approaches for trans disciplinary media art and design practitioners in re-imagining data ecosystems and at the same time engaging members of the general public to reflect and contribute to an inclusive discourse that may re-shape public policy surrounding data ecosystems , from the lenses of ownership, privacy, transparency, openness and choice of individuals. The panel is moderated, co-authored and edited by Catalina Alzate.*

### Abstract

A responsible data-driven environment must consider data as a political human construct, and be spaces for empowering citizens. One important aspect of citizen empowerment involves prototyping of tools and practices that challenge hierarchies, by blurring binary constructs like author / lector, developer / user, document / data, binary application / source code. On this line of thought, a set of tools and practices will be described that look at data from a critical perspective, contrasting the neutralized “Hello world” approach to technology learning, and allowing the emergence of diverse communities of authorship. The tools blend code, document, data, query and visuals, and propose strategies to make the source code and history of all digital artifacts open to share, for improving the traceability of data and data derived arguments. I call them “pocket infrastructures” because they are self-contained, work online and offline and run on modest common technologies, from USB thumb drives to modest laptops and anything in between and beyond. These infrastructures try to put data in “everyone’s pocket”, contrasting sharply the exclusionary ‘cloud’, ‘big data’ & ‘always connected’ discourses, where infrastructure can be owned only by the ones with “deep pockets”. This tool and its related practices are in dialogue with other approaches like the feminist data visualization (D’Ignazio and Klein 2016), literate computing (Perez and Granger 2015) and reproducible research.

### Keywords

Citizen Empowerment, Prototyping tools, Open Infrastructures, Data visualization, Data Narratives, Data Activism, Hacker Spaces, Democratization of Technology, Knowledge Commons.

### Introduction

With the aim of exploring reciprocal exchanges between communities and digital artifacts, and using design as critical enactive knowledge, I have been iterating on the question “How can we change the digital tools that change us?” or how to enable the reciprocal modifications between digital tools and communities? Approaching that fuzzy problem from a design research perspective implied to inhabit a particular community, in my case, HackBo in Bogotá Colombia, and to use prototypes to explore and communicate the problem (Saikaly Fatina 2005). Aiming to explore the direct relationship between design epistemologies and enactive knowledge (understanding by doing in a context), this text will present a historic development of that understanding process in dialogue with other theoretical approaches (design research as a reflexive practice). This reflexive trace of history would hopefully bring light upon this kind of contextual research by de-neutralizing the results and connecting them with the process that create them. At the end some provocations will be provided to connect these particular experiences with areas across bio-creation, data and power.

### Historical Perspective of HackBo and the Beginning of Grafoscopio

Hackbo is a hacker space in Bogotá exploring the community meant to propose from inside a set of iterative digital artifacts and practices around them to challenge the deconstruction of the binary divide between those who made them (“coders”) and those who use them (“end users”), and to find out if such processes were relevant in a hackerspace where most people are familiar and proficient with coding.

In the beginning (from late 2010 to early 2013) I tried building digital habitats (Wenger, White, and Smith 2012) by using web technology (wiki and customized Content Management Systems CMS), but the HackBo community's approach to them was mostly operational: the most used feature of the CMS was the one that allows to schedule face to face activities in the hackerspace. Some other parallel explorations about using CMS to publish data notebooks were made from 2013 to early 2014 with some participants of the hackerspace (Luna 2014b, 2014a)

But at some point in late 2013 the HackBo hackerspace was a focal point of resistance against gentrification of the hackathon (a prototyping by coding marathon) by the private and public sectors, with the implementation of the now common and oversimplified "social problem solving hackathon" (Lilly Irani, n.d.) the HackathonGEL. The proposal of a counter-hackathon (the Gobernaton (Luna 2013)) contextualized the hackathon as a performative act of civic critic and dialogue with public and private sectors and from there the idea storytelling with data (particularly the integrity codes called hashes, of the contracts for the execution of the HackathonGEL), brought some light over these alternative ways of data activism that could survive the volatility of hackathon prototypes. Techniques, infrastructures and knowledge to support data storytelling as a form of critical dialogue to deconstruct power, will last longer than the "app" or "social network" or "uber for" monocultural approach that has been built in the "social innovation" hackathon model.

Grafoscopio, a moldable tool for literate computing and reproducible research evolved from there with the companion Data Week, a recurrent hackathon/workshop where attendants learnt how to use and modify Grafoscopio to create data visualizations and tell stories with data. Both can be seen from the duality of experience (participation/reification) proposed by Wenger (1999): participation produces artifacts that enable (or not) future ways of participation and introducing feedback in the design cycle. The participation in the HackBo and Pharo communities created Grafoscopio<sup>1</sup>, (as detailed on Luna (2014)), and the existence of such an artifact allowed for the creation of the Data Week, to extend and deconstruct Grafoscopio and other digital related artifacts. The design issues behind such a duo are considered below.

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<sup>1</sup>Pharo provides the Technology ecosystem behind Grafoscopio.

### **Critical instances of Grafoscopio**

Grafoscopio crystallizes design positions belonging to the free 'libre' open source software (FLOSS) communities that are in dialogue with several authors: technologies as political devices (Langdon Winner 1989), code as an exercise of freedom of expression (Coleman 2013), knowledge as commons (Ostrom and Hess 2006), and software as a craft that embodies design experience and allows research through design (Blackwell and Aaron 2015). This way of embodiment draws on several sources and concerns reflected in the activities that Grafoscopio supports: deconstruction and extensibility of tools, open educational resources, alternative educational practices, non-hegemonic places, discourses and practices for knowledge, activist objects, reproducible research, garage and citizen science (early documentation of them are in (Luna Cárdenas 2014)) Grafoscopio is also 'a pocket-infrastructure' (explained in the abstract of this paper) and is based on Pharo Smalltalk, an environment that blends together source code, application, software development environment and adds/blends in the idea of interactive notebooks. On the other hand, Grafoscopio tries to mix ideas of Leo Editor, Jupyter/IPython notebook and Mathematica, by creating an interactive documentation environment with a tree-like (outliner) interface that organizes the document, giving it sequence and hierarchy.

### **Iterative design circumstances in the Data Week**

Given that the Data Week was related to data activism, storytelling and visualization, participants were generally interested in acquiring new symbolic and visual languages and knowledge to represent their concerns. Attendants came mostly from outside the core community of HackBo, including increasingly diverse lines of practice: journalist, teacher, philosopher, researcher, student, philologist and activist.

The roots of data activism from the Gobernaton were evident in the deployment of a critical approach to data and code literacy by choosing themes related to government transparency, like the political public discourse on Twitter and awareness of our own Twitter discourse with the implementation of Twitter data selfies (Luna Cárdenas 2016).

The above practices and artifacts took a critical approach to data, code literacy and visualization. Our curriculum included: a historic approach on computational traditions (comparing the Unix tradition

and the Smalltalk/Dynabook ones), design as the study of bifurcation points (Jonas 2007), linking tradition to our present understanding of computers as cognitive devices that can help us into putting into dialogue different representations to understand and express a problem—particularly symbolic (code), graphical (visualization) and quantitative (data) representations, the relation between technology, politics & power, mouldable tools, Smalltalk/Pharo learning from basic syntax to medium scripts to finally tackle an open problem (the Twitter data selfie).

Participants consistently reported a change from understanding technology as a given, to recognizing how technological systems can be constituted by more fluid devices. The idea of coding as storytelling instead of a practice to build apps or websites seemed more plural to most of them, although they recognized that as a form of literacy it does take time to acquire. Some questions remain to be used as future provocations, and have been outlined in the next section.

### Provocations on Bio-Creation, Data and Power

How can we foster a dialogue around socio-technological artifacts and practices in a permanent and powerful way, including institutional setups in academia, government and enterprise, without being co-opted by them? Is data at the service of bio-political forms of surveillance and control, the quantification of existence and the creation of equivalences between what exists and is visible, and between what is visible and what is measurable? If this is the case, how can alternative metrics, dark information (as a metaphor/analogy with dark matter and the relation between visible and invisible), and data activism propose alternative ways of governance, fluid power structures and hierarchies for a more plural and common world?

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## Panels

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### **Author Biography**

Offray Luna-Cárdenas is a long time hacktivist for knowledge and culture as common goods and digital technology as a particular embodiment and enabler in several fields: Free Open Source Software and Openness in Data, Science and Reproducible Research, Educational Resources and Government & knowledge management. His undergraduate degree was in Informatics-Mathematics, Masters in Education and a PhD(c) in Design and Creation. He is a founding member of the HackBo hackerspace in Bogotá (Colombia) and is working on the reciprocal modification between communities and digital artifacts, by building and bridging critical code+data literacy and visualization, as well as community practices with moldable digital artifacts and pocket infrastructures. He works as a consultant, coder, teacher and researcher.