Reaktio #3

THE OPEN BOOK

is a publication on open knowledge edited by Kaitlyn Braybrooke and Jussi Nissilä with Timo Vuorikivi.

Reaktio is a publication series launched in December 2011 to celebrate the twentieth anniversary of The Finnish Institute in London. The books in this series are reactions to contemporary critical issues, they pose questions and offer commentary. These books contain seeds for debate and provoke action; they are books to think with and books to act on. At the back of the book we have left space for you to make your own notes. What do you think?

—*Raija Koli*, Series Editor

To those who attended the world's first
Open Knowledge Festival in Helsinki, Finland
and who continue to travel across continents to promote
open knowledge and transparency worldwide.
You are a continued inspiration.

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THE OPEN BOOK

Colophon

Edited by *Kaitlyn Braybrooke* and *Jussi Nissilä* with
Timo Vuorikivi

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Special thanks to the authors of the articles, those who submitted events to the timeline, and everybody who knowingly or unknowingly contributed to the making of this book.

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Part One highlights the key events that have contributed to its coming-of-age as a movement.

Part One—Evolution

Introduction

by *Kaitlyn Braybrooke* and *Jussi Nissilä*

This September, year 2012, we witnessed the coming-of-age of a global movement for social change. This is no small claim, we realise. We understand if you don't believe us. A year ago, when we arranged our first meetings to discuss the possibility of organising an ambitious event—the first of its kind—called the Open Knowledge Festival, we wouldn't have believed it either.

Despite combining the legacy of two annual events—Open Government Data Camp and the Open Knowledge Conference—this festival was not expected to be a great success. It was planned on a shoestring budget augmented by an international team of dreamers from the Open Knowledge Foundation, the Finnish Institute in London and Aalto University Media Factory along with a slowly-growing list of partners coming from all sectors of society, and it featured a highly experimental and democratic programme, the majority of which was organised autonomously by festival participants themselves. By all accounts, strangely-arranged events with niche themes and a confusing set of organisers are not popular. They reach a small crowd of devotees and are soon forgotten.

And yet this remarkable festival defied all expectations. In the leadup to the event, we witnessed one surprising moment after another: The public took up our offer of a crowdsourced programme with gusto, organising into teams around 13 thematic Topic Streams examining manifestations of openness in fields as diverse as development, sustainability, hardware, civil society and education. On the Web, 214,000 cyberspace warriors picked up a DIY slideshow we had created to explain the event, sharing it with governments and organisations around the world. The event itself sold out within a month—and when it happened, over 1,000 physical and 12,000 virtual participants descended to the shores of Helsinki, Finland, producing more than 18,000 tweets with the hashtag #okfest and contributing to more than 200 features in mainstream and indie media.

What was most inspiring, though, was seeing the enthusiasm with which participants and partners got their hands dirty to engage with open knowledge in all its facets, working together to scrape government datasets and discuss the Open Government Partnership, to learn introductory coding practices, to further open access and education, to help build Open Source CNC Mills in the FABLab, to collaborate around the cultural commons, to build new visualisations with data journalists and to meet other open knowledge advocates from around the world. And each hackathon, lecture, workshop, satellite event and coding jam benefitted from an amazingly diverse, international crowd—designers, businessmen, activists, educators, hackers and government

Open Knowledge Festival 2012. Photo d2s

Hackspace—Open Knowledge Festival 2012. Photo Veikko Kahkonen

representatives combined in fascinating combinations of methodologies, backgrounds and ideas. Over 19,000 people virtually and physically watched the final keynote speech by revered data visualisation guru Hans Rosling, many leaving with tears in their eyes.

At the Open Knowledge Festival, *we witnessed the unfurling of a global movement for social change* in the midst of its own cultural renaissance, and we are increasingly seeing these manifestations across all sectors of society. From makerspaces to the School of Data, from digital archive workshops to international conferences, peer-fueled learning is being combined with concepts about open knowledge and innovation to build new projects and share ideas in ways we have never seen before. From its crowdsourced historical timeline to longer pieces from a diverse group of thought leaders, this book aims to explore these concepts, looking at value that can be generated by opening up knowledge, the ecosystems of organisations that can benefit from such sharing, and the impacts transparency can have in our societies as a whole.

In ending, while we hope that this very public chronology of thought will illustrate the continued importance of these aims for you as it has done for us, we encourage you to disagree with, debate and discuss this book with its contributors, to submit events to its live timeline on the Web, and to use it as a launching pad for your own ideas. In a period of rapid technological and social progress, a cultural artifact like The Open Book is only as successful if it is shared, mixed and remixed—and we challenge you, as its reader, to start that process. The future quite literally lies in your hands, and we already look forward to seeing what you come up with next.

Kaitlyn & Jussi

PS: You will notice that in this book we don't attempt to define open knowledge at all. Neither do we talk much about what open data is. This is because we hope that you as the reader will make your own conclusions about these ideas. However, if you'd like further clarification, we recommend doing a browse of wikipedia.org and the opendefinition.org. *It is our belief that open knowledge and open data can truly change the world for better—and now, what do you think?*

Kaitlyn (Kat) Braybrooke is a community organiser and researcher whose work explores how emergent intersections between technology, community and design can enrich urban environments. Kat works as Community Coordinator at the Open Knowledge Foundation which promotes digital transparency and openness worldwide.

Jussi Nissilä is an expert in research, education and international development projects. Jussi works as Programme Director of the Society Programme at the Finnish Institute in London, which works to identify and develop new insights and novel solutions to contemporary societal challenges.

The Evolution of Open Knowledge

1425 The first public library, Guildhall Library, is established in London, England.

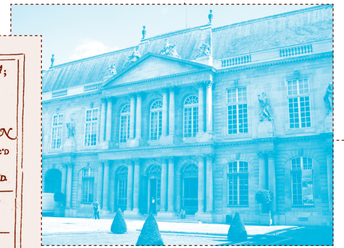
1440s Johannes Gutenberg's printing press is developed in Mainz, Germany, making the mass distribution of information possible for the first time.

1500s Literacy begins to spread among the masses in Europe, making printed information more accessible for people of all social classes and backgrounds.

1766 The world's oldest freedom of information act, the "Freedom of the Press Act 1766", is founded in Sweden to prevent political censorship of public documents.

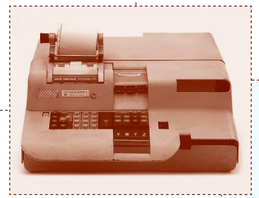

AREOPAGITICA;
A
SPEECH
OF
Mr. JOHN MILTON
For the Liberty of VNLICENC'D
PRINTING,
To the PARLAMENT of ENGLAND.
LONDON,
Printed in the Year, 1644.

1790 The Archives Nationales (National Archives), is founded in France during the French Revolution, becoming the world's first centralised archive available to the public.



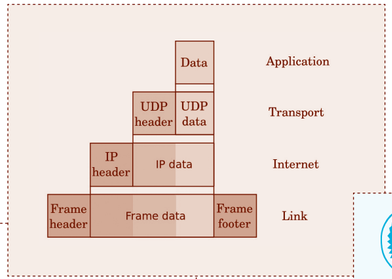
04/10/1865 Tilastokeskus (Statistics Finland) is founded to serve as a public information service, and starts to publish statistical data in more or less open formats.

1965 The first commercial "desktop" computer, Olivetti Programma 101, is introduced to the market.



1966 The Open Access movement is founded with the launch of the Educational Resources Information Centre (ERIC) in the United States.

05/08/1968 First public demonstration of the Advanced Research Projects Agency Network (ARPANET), widely known as the first predecessor of today's global Internet.



1982 TCP/IP Internet protocols are declared the standard for all military computer networking in the United States, enabling the Internet to become the "network of networks."

1983 Plans for creating a Unix-style operating system called GNU are made by Richard Stallman, allowing computer users the freedom to share and improve their software.

04/10/1985 The Free Software Foundation is founded to support initiatives that work towards providing the universal freedom to create, distribute and modify computer software.

12/11/1990 At CERN in Geneva, Switzerland, Tim Berners-Lee and Robert Cailliau propose to build a "Hypertext project" called "WorldWideWeb", enabling the world's first Web client.

1990 The first publicly available search engine, Archie, is created as a script-based data gatherer by Alan Emtage, a student at McGill University in Montreal, Canada.

1991 The first Global Systems for Mobile Communication (GSM) call is made by Finnish Prime Minister Harri Holkeri, lauding a new phase of efficient information sharing through mobile devices.

1997 A cooperative, decentralized platform for the electronic publishing of scientific journals, SciELO (Scientific Electronic Library Online) is founded in São Paulo, Brazil.

05/10/1991 The kernel for Linux, a new operating system using a model of free and open source software development, is proposed by Linus Torvalds in Helsinki, Finland.

2000 Dorkbot, a group of organizations worldwide that sponsor grassroots meetings of people working under the umbrella of "people doing strange things with electricity", is founded.

02/1998 The Open Source Definition is released on the Web, mainstreaming the principles of free software and making the sharing of software more attractive to commercial enterprises.

2002 The first FabLab opens its doors at the Massachusetts Institute of Technology (MIT), making personal expression in technology possible by turning consumers into producers.

12/2001 Creative Commons (CC) is founded and starts to draft its first set of copyright licenses for the public in order to expand the range of creative works legally available for sharing.

24/05/2004 The Open Knowledge Foundation is established in Cambridge, England to promote openness across all sectors, including open data, open content and open access.

10/2002 MIT's OpenCourseWare opens to the public, offering open and free courses of high quality to "anyone, anywhere" via the Internet.

2005 The Salvador Open Access Declaration is ratified in Bahia, Brazil at the International Seminar of Open Access, bringing Open Access to the developing world.

01/09/2007 The COMMUNIA network is started with funding from the European Commission in order to act as a point of reference for the study of the public domain in a digital environment.

05/2009 The first Data.gov website is launched in the United States with an intent to increase public access to machine-readable datasets generated by the Federal Government.

08/05/2009 The Members of Parliament "expenses scandal" hits the United Kingdom after a series of Freedom of Information (FOI) requests, provoking new efforts to free up spending data.

22/04/2010 The World Bank launches a new Open Data Initiative, bringing global economic and development data to the Web in freely-available and machine-readable formats.

20/09/2011 The Open Government Partnership is launched to promote transparency, increase civic participation and harness new technologies to make governments more accountable around the world.

12/09/2012 Europeana, Europe's digital library, releases over 20 million cultural records for free re-use, becoming the largest one-time dedication to the public domain using a CC-0 license.

15/09/2012 The Declaration on Parliamentary Openness, a call on parliaments by civil society to increase access to usable information and engagement of citizens in the legislative process, is launched on the Web.

17-22/09/2012 The world's first Open Knowledge Festival is held at Aalto University, bringing over 1,000 changemakers to the shores of Helsinki, Finland.

Something important missing?
The Evolution of Open Knowledge timeline is a living document –you can propose new events to the timeline at:
http://openbook.org.uk

Many thanks to Peter Troxler, Dominique Babini, Maarten Brinkerink, David F. Flanders, Ramiro Gomez, Simón Vialás Fernández, Gordon Joly, Pilvi Kalliomaa, Puneet Kishor, Stuart Childs, Antti Poikola, Alberto Abella, Everton Zanella Alvarenga, Augusto Herrmann and all the other contributors of this crowdsourced timeline who have helped make it happen. Dorkbot and Open Knowledge Festival photographs by Veikko Kähkönen.

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Part Two—A to Z

A to Z: Alphabet of Open Knowledge

OPEN CULTURAL DATA

Unlocking the World's Knowledge

by *Joris Pekel*

Avoin Glam

Thousands of institutions are digitising millions of their cultural objects. Complete archives that previously could only be consulted in the building of the actual archive are now being made accessible to anybody in the world with an internet connection. The consequences of this shift are immense, and we have only just begun discovering the possibilities. *The roles of archivists, librarians and curators are evolving from being a collector and preserver to a publisher of all of the world's memory.*

This shift from siloed institutions to connected collections from all over the world has huge implications for the roles of cultural institutions, and major issues need to be overcome. In this short essay, I will give a brief overview of what is currently happening in the field of open cultural data and why this is important for cultural institutions, as well as for the public.

As mentioned above, a lot of content is digitised and huge amounts of metadata records are being created. More and more institutions are giving online access to their collections on their websites, and everybody is able to browse through them. This is a positive development, however, it still maintains the silos that institutions currently find themselves in, and does not fully exploit the potential of the web. Opening up the data allows the collections not only to be seen, but also to be connected, cross-searched and used to tell stories about the history of the world in a way that was not possible before.

This is exactly what the Europeana project aspires to. By now it has aggregated the metadata records of over 2200 different cultural institutions in Europe, resulting in more than 20 million records. By making these available through its website and—more importantly—its API, it allows people to search for artworks in different collections, create timelines of historical periods, combine the works with other open sources such as Wikipedia and much more. Because the data is openly licensed, the public can take it and reuse it in ways that are impossible, or simply unimaginable, for institutions. Projects have resulted in people tagging artworks, removing errors from the metadata, adding personal stories, building new applications with it and much more. Open images have appeared on Wikipedia, which massively increased the amount of hits for the artwork and the institution. This was all done by the public.

All this is only possible if all the data aggregated by Europeana is openly licensed for reuse without any restrictions. In September 2012, Europeana therefore made the bold decision to only accept metadata from cultural institutions when their rights are waived completely using the CC0 public domain marker. During the OKFestival, Harry Verwayen of Europeana publicly announced this to the main auditorium and the world—a great milestone for open cultural data.

A question often asked by cultural institutions is how they can remain relevant. Why should institutions continue to exist when everybody can find all the material online? The answer is fairly simple: there is no other person in the world who knows the collection best. Curators, librarians and archivists are in the best position to guide their audience to the material they are looking for. They know what is lacking in their collection and can connect the relevant pieces to it. They are no longer the only provider of the content, but become the best provider of their content. This expertise will always remain important, perhaps even more so in the age of major data and information overload. Unfortunately, there are still many issues that prevent institutions from opening up their data. The main objections from institutions that we are currently hearing are:

1. Copyright. Even though institutions are willing to open up their data, how do they do it? As is evident on a daily basis, *when it comes to cultural content, the current copyright sys-*

tem does not work anymore. Especially institutions that own material from artists from the last century are in huge doubt as to what they can and cannot release under an open licence. Orphan works, renewed copyright and vast amounts of missing information result in a massive piece of our cultural heritage remaining in the vaults, not to be seen by anyone. Tackling this issue is not easy. In the end, it will come down to better copyright legislation that works in a digital age. However, institutions can already do a lot themselves. A few museums have understood this really well and are actively publishing their content under an open licence. A great example is the Rijksmuseum in the Netherlands. It recently made high resolution scans available for more than 111,000 cultural objects, which are available to download or via the API. Since all the objects are in the public domain, they can be used by anybody for any purpose, even commercial. The website clearly tells the audience how they can use the images. This has resulted in a huge amount of reuse and has created great interest in the collection. At the same time, it does not appear to have had a negative effect, for example on the sale of postcards in the shop.

2. Fear of loss of control. When data is open, anybody can do anything with it without institutions knowing about it. This means that in addition to all the good ways the data can be used, it can also be put into the wrong contexts or used to make false assumptions. How do institutions respond to that? When addressing this fear, it is important to realise that opening up data does not equal uncontrolled dumping of the data. For many institutions, opening up their collection is a great trigger to have a critical look at their data and to make clear statements about what can and cannot be done with it. Instead of losing control, I would argue that this gives the institution a lot more control than simply ignoring it. This fear is also a matter of trust. As several community-driven projects have shown, technical solutions combined with a dedicated community can maintain quality. And as Dominic Oldman, Head of Information Systems at the British National Library once stated: "[...] any downside of the inappropriate use of data is completely out-

weighed by the benefits of proper reuse that facilitate scholarly research and public discovery."

3. Resources. As much as we would like to think it is, open data is not free to produce, and resources are often scarce in these institutions. So if the data is free, who pays for it? As in most other businesses, going digital requires a new way of thinking about making money. The music and film industry showed that people no longer pay huge amounts of money for content if its free equivalent is also easy accessible. Institutions therefore have to make the shift from being a provider of content to becoming a provider of services. This means participating with the audience, meeting their needs and finding new ways to engage with them. At the same time, open data can also save the institution a lot of money. Think about the possibilities of the web for crowdsourcing. Thousands of individuals can do millions of micro tasks that would take institutions forever. Combined with the open source tools that are now available to facilitate this makes it a tremendous resource.

The issues mentioned here are tough, but can and should be solved—and now is the time to do it. Fortunately, there are many initiatives, organisations and projects that help institutions to overcome these problems, search for the appropriate solutions and implement them. The first step for institutions is to think about opening up their data, start experimenting with it and learn from each other. In this way, we can reach the goal of creating a better world where all knowledge is freely accessible to anybody, anytime, anywhere. After the Open Knowledge Festival, I am more convinced than ever that we are heading in the right direction.

During the Open Knowledge Festival, we organised the Open Cultural Heritage stream. When we started doing this, we got in touch with a couple of great people who helped us to build this topic stream to make it one of the biggest in the festival. The OpenGLAM initiative, which is part of the Open Knowledge Foundation, teamed up with groups such as Wikimedia, Creative Commons, Open Culture Data and many more during the festival. We shared experiences and discussed the most pressing current issues during the 'Building the Cultural

Commons' session. These insights were presented to about 40 representatives from Finnish cultural heritage institutions the next day during the OpenGLAM workshop. This day eventually led to the spin off 'AvoinGLAM' (Avoin = 'open' in Finnish), which will focus on opening up local heritage. Finally, we finished the day with a great keynote speech by Michael Edson of the Smithsonian Institution.

Special thanks

Sam Leon—Community Coordinator of the Open Knowledge Foundation
Maarten Brinkerink—Project worker at the Netherlands Institute for Sound and Vision and one of the founders of Open Cultuur Data
Sanna Marttila—Doctor of Arts candidate in New Media at Aalto University, School of Art and Design at the Media Lab in Helsinki and now leading AvoinGLAM

Joris Pekel has been working for the Open Knowledge Foundation since 2012 and works specifically with open cultural heritage data. He is coordinator of the openGLAM network that is working to open up content and data held by GLAM institutions (Galleries, Libraries, Archives and Museums).

More info about the topic stream can be found on openglam.org

Copyright Sebastian Verburg

TRANSFORMING WESTERN SOCIETIES

by *Joonas Pekkanen*

By the People

The old established democracies of the Western world are experiencing a renaissance of democracy—a phenomenon I refer to here as Open Democracy.

The movement is fuelled partly by the same factors as the Arab Spring: the proliferation of social media, real-time, mobile and ubiquitous means of communication and the availability of uncensored information (e.g. Twitter and Wikileaks). Traditional means of controlling citizens through centralised media are failing and governments are being forced to change their approach.

While the revolutions in the Middle East are taking place concurrently, I distinctly associate the Open Democracy movement with the renewal of the established Western democracies. It is a movement aiming for a peaceful renewal of the system from within.

Democratic institutions and operating models including the aggregative election-based representative models have been adopted over the past centuries not because they represent perfection or a utopian ideal of the democratic principle, but simply because they have been considered good enough with the means available. Or, from a more cynical angle, they have been adopted simply because they have suited the needs of the few in charge. The Internet has already changed the way people communicate, search and disperse information, consume and run their day-to-day lives. Now, slowly but inevitably, it is changing the way people choose to exercise their democratic powers. *People (demos) are starting to exercise their power (kratos) in new ways.*

Proponents of Open Democracy seek to improve the way democratic decision-making, budgeting and the flow of information take place. Local citizen councils, European citizens' initiatives, participatory budgeting, parliamentary monitoring and open data are only a few examples. Open Ministry—a CSO I founded in Finland—seeks to "crowdsource lawmaking". It encourages people to collaborate on draft law proposals online, helps formulate them into well-prepared law proposals with the help of volunteer experts and lawyers and advises them on how to build efficient campaigns to collect the 50,000 supporters needed for the parliament to vote on them. The Finnish Citizens' Initiative Act came into force on 1 March 2012 and allows supporters to sign the initiatives online. Iceland used crowdsourcing to completely rewrite the country's Constitution, which is now awaiting approval by Parliament.

At the same time pilots in liquid or delegative democracy are challenging the persistent notion that representative democracies need always be tied to election cycles. In liquid democracy people can switch their mandate from one representative to another in real-time. This requires representatives to behave properly and to communicate with their electorate continuously rather than only during election campaigns.

I associate the Open Democracy movement with the theoretical framework of deliberative democracy. Deliberative democracy holds that, for a democratic decision to be legitimate, it must be preceded by authentic deliberation, not merely the aggregation of preferences that occurs in voting. The deliberative process also requires that citizens taking part in the deliberation respect each other's deliberative capacity and are willing to debate their own and opposing views without prejudice.

The Open Democracy movement has found fertile ground in many Western democracies. I suggest that countries where the citizens are able and willing to participate (adequate education and standard of living, freedom of information and speech, Internet connectivity) and the governments function properly (properly separated powers, low corruption) are more fertile than others.

I believe Finland has a good chance of being the frontrunner in the Open Democracy movement. After all, not only is Finland the least corrupt country in the world; it was also the first country in the world

to pass an Access to Public Records Act (1766) and the first country in Europe to introduce women's suffrage (1906).

However, the Open Democracy movement is, in my eyes, intrinsically international by nature. The international community-based Open Knowledge movement and the intergovernmental Open Government Partnership are excellent examples of how joint efforts and best practices are currently being disseminated. The foundations for a new, open democracy have now been laid across Europe.

Joonas Pekkanen organised the Open Democracy and Citizen Movements stream at the 2012 Open Knowledge Festival in Helsinki and is a founding member of Open Knowledge Finland, a member of the Finnish Open Government Partnership committee and founder of the non-profit organisation Open Ministry.

www.avoinministerio.fi
www.openministry.info

CROWDSOURCING
Impact and Challenges

by *Tanja Aitamurto*

Collective Intelligence

Collective intelligence, as defined by Lévy (see Lévy's "Collective Intelligence: Mankind's Emerging World in Cyberspace"), is increasingly harnessed for democratic processes by crowdsourcing. Crowdsourcing has been deployed in participatory budgeting, for example in Canada and Finland and in strategy processes in the United States. Iceland pioneered in opening up a constitutional reform process in 2011. In that process, crowdsourcing was deployed as a tool to gather feedback and ideas from the public. Citizens' participation was then integrated into the process of rewriting the constitution.

The mechanism of *harnessing collective intelligence by crowdsourcing creates a promise of a more open society and the empowerment of citizens through participation.* However, the application of this method faces many design challenges, which this article will discuss and present solutions for. The article will also elaborate on the benefits of crowdsourcing for policy-making. In this context, crowdsourcing is used in processes which are initiated by established governing bodies, whether local or national.

Crowdsourcing is an open call for anybody to participate in a task that is open online (see Brabham's "Crowdsourcing as a Model for Problem Solving: An Introduction and Cases" and Howe's "Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business"). 'The crowd' refers to an undefined group of people who participate in an open call online. Outsourcing, on the other hand, means that the task is assigned to a specific agent. In crowdsourcing applications, the crowd is invited to participate in an online task by sharing information, knowledge or talent. Crowdsourcing has become a popular tool to engage people in processes ranging from urban planning (see Brabham "Moving the Crowd at Threadless") to designing processes and solving complex scientific problems (see Aitamurto, Leiponen & Tee "The Promise of Idea Crowdsourcing—Benefits, Contexts, Limitations").

In crowdsourcing, knowledge search is turned from people's local knowledge neighbourhood to a number of distant knowledge neighbourhoods, as we can learn from studies in management science and engineering (for example Afuah and Tucci, "Crowdsourcing as a Solution to Distant Search"). This makes crowdsourcing an efficient tool for knowledge search. For example, in the case of crowdsourced constitution in Iceland, the extended search brought in information that the Constitution Council wouldn't have known to search for.

Crowdsourcing also functions as a tool for sensing citizens' values. In a participatory budgeting process in Calgary, Canada, the city asked the residents to prioritise services by using simple, binary decision-making software. In a similar vein, the City of Chicago is inviting its residents for the second year in a row to share their ideas and wishes about the city's budget. If there's enough participation and residents' submissions are thoroughly analysed, the participation can reflect citizens' values.

As crowdsourcing in policy-making is becoming more common, the challenges that the method faces are becoming identifiable. Firstly, there should be a substantial volume of diversity in the crowd in order to realise the ideal of collective intelligence (see Hong and Page's "Some Microfoundations of Collective Wisdom" in Collective Wisdom: Principles and Mechanisms). The diversity can correlate with the volume of participation: the more people participate, the more likely the crowd is to have both cognitive and social diversity. Crowds easily lack that diversity, particularly in pioneering initiatives where there's little information available to people about the new method. Therefore, governing bodies should make serious efforts to inform the citizens about these possibilities for participation.

Several crowdsourcing processes in policy-making lack proper communication to citizens about the possibility and impact of participation. This raises the following question: how should governing bodies communicate this new opportunity to participate to the residents, for example in participatory budgeting? Should city councils send all residents a letter to inform them or have adverts on television? Citizens should also be informed about the outcomes of the processes in which they have participated. That feedback loop is important because it also

creates more transparency for the process: citizens can see what participation was like and what impact it has.

Secondly, crowdsourcing is easily reduced to political window-dressing, where citizens' voices are not truly heard. Citizens are asked to participate but their input doesn't really have an impact. This might not be intentional but it happens easily if the crowdsourcing process is badly designed. Policy-making doesn't have an automated 'pipeline', which transports citizens' input to the meeting agendas of governing bodies. That pipeline has to be created in order for crowdsourcing to function properly. If the citizens' input is not heard, this destroys people's motivation to participate in open processes—people will lose their interest in participation if their input is not valued.

Furthermore, it is important to note that crowdsourcing does not make policy-making fully open. Only certain stages of the process are open, and decisions are made according to traditional, still mainly closed policy-making processes. However, the openness that crowdsourcing creates helps citizens to make the power-holders accountable. For example, in participatory budgeting, the citizens receive information about the city's budget and they see what their fellow residents think about the budget's priorities. Therefore, the citizens are more informed about the budget and can question the reasoning behind politicians' decisions. This can lead to more informed and empowered citizens who use novel methods, such as crowdsourcing, to pursue the ideals of an open society.

Tanja Aitamurto is a visiting researcher at the Liberation Technology Program at Stanford University. She examines how collective intelligence, whether harnessed by crowdsourcing, co-creation or open innovation, affects processes in journalism, public policy making and design.

PEER COLLECTED OPEN DATA

by *Kari A Hintikka*

Data Volunteers

Open data from the public sector has increased rapidly in many countries, with many governments actively opening their data sets. An area of digital open data which has not received so much attention yet is citizen-collected open data. The phenomenon has not even been defined properly yet. For example, one can talk about 'people-created', 'peer-based', 'an individual's' open data or 'open peer data'. But the basic idea is quite clear: with mobile and other devices, ordinary people can easily measure, collect, organise, share and analyse data on the Internet. In the past these tasks had been reserved and restricted to qualified professionals with expensive equipment.

An example is OpenStreetMap.org, a global mapping service—like Google Maps—put together by thousands of volunteers. Ushahidi.com is a non-profit software company that offers easy mapping and crowdsourcing tools, like CrowdMap, which can be used to get a real-time perception and crowdsourced data collection about incidents in crisis areas, like in Haiti or civil wars in Africa. After Hurricane Katrina in 2005, people quickly started to create Internet services to announce where evacuated citizens were and what condition their houses were in, etc.

In this article I first introduce a case of citizen-based real-time collected radiation data after the tsunami and the meltdown of the nuclear plant in Fukushima in 2011. Then I study some possible consequences and examples from Finland as to what might happen when ordinary people get the same data resources as had previously been restricted to qualified experts only. And finally, I introduce one case, global HINi pandemic tracking, where ordinary people around the globe combined their volunteer activities with qualified experts.

Measuring Your Own Data Relating to the Environment

Mobile device technology is evolving very rapidly nowadays. We already have some app(lication)s with external miniature devices to measure real-time data such as the iSteth stethoscope and the Endomondo sports tracker app's heart rate monitor. Very soon a device the size of a car key will be coming on to the consumer market: Sensordrone, a sensor for measuring our daily physical reality. It can measure and detect in real-time things like air quality, carbon monoxide, gas leaks, humidity and hydrogen sulphide. After some years these sensors and trackers may be able to measure things like mould or the stability of buildings. When parents—and children—can measure things relating to school buildings, for example, they'll have their own data and something factual to report to the public authorities.

After Fukushima in Japan in 2011 there were citizen groups that did not trust the official news and reports or wanted more accurate data than those provided. People started to buy Geiger counters and these sold out very quickly. And, instead of just measuring their neighbourhoods, some of them created Internet mapping services to collect and share these measuring results while others drove to Fukushima to take readings.

Helped by Tokyo Hackerspace, one of these citizen groups, Safecast.org, formerly known as RTDN.org, started to design blueprints of a self-made Geiger counter. The idea was to offer open source specifications of a counter that anybody could produce at home, in their garage or in a classroom. Soon they had another idea: to crowdfund 300 Geiger counters in the Kickstarter service and give them to volunteers to measure radiation. Since then, Safecast.org and its global network have undertaken several projects, including a radiation check-up app for iOS devices and offering over 3 million measurement data points (550 megabytes in CSV format) on their website.

Peer Doctoring

In a few years' time, real-time measurement of aspects of the environment and other engineering properties might be as easy as Instagram and its filters now, reserved some years ago to talented visualisers with Photoshop and its expensive add-ons. In my view, opening up data is not just about opening and sharing it, it is also a course of

action. With the Internet, many daily routines have already changed, from checking timetables or using the dictionary to just doing a bit of googling and from empowering people by getting them to participate in legislative processes to crowdsourcing legislation and initiatives from citizens, as in Iceland. People need to get used to these new options. Common situations and habits relating to matters like neighbourhood quarrels or buying and selling anything from houses to food to cars—all of these can change dramatically when people themselves are able to measure everything that had previously only been able to be measured, tried and tested by qualified experts. This process might take a while for people to get used to.

There are already signs of a possible clash between ordinary people and professional experts in terms of the latter's earlier hegemony in the field of information and authorised knowledge. For example, some years ago people in Finland started to print out their Internet searches before visiting their doctors in public health care centres and making their own diagnoses as to what was wrong with their health. This phenomenon then became less prevalent as Finns started not to bother with doctors at all and increasingly crowdsourced advice by asking about their health problems on popular Finnish Internet forums like Suomi24.fi. They would ask recommendations for the best heart attack medicine or about the strange pain they had had in their upper back for the last three months. Other Suomi24 users would then reply with what they knew, maybe using what they'd learned by googling or consulting Wikipedia, and the person in need could order the medicines others recommended straight from online pharmacies. Who needs doctors any more?

These people started to avoid not just doctors, but also lawyers, estate agents, librarians, scientists and other professionals. They formed groups and movements. And we know that one of the key features of the Internet is that it reduces organisation and mobilisation costs bringing them closer to zero, as Kelly R. Garrett has summed up in his article "Protest in an Information Society". One example of these movements is the low carbers ('karppaajat' in Finnish). They have had longstanding Internet forums and communities, which, like any other peer support groups, serve many purposes: sharing experiences and peer learning for expertise, social interaction and maybe lifestyle and the opportunity

to organise themselves and mobilise their activities quickly. For several years the National Institute for Health and Welfare has officially warned low carbers in Finland that this diet might be very dangerous.

Actually, there has been entrenched warfare in the Finnish mass media about this issue for years. The National Institute for Health and Welfare and its experts feel helpless against the low carbers' online community and the information they use for arguing against scientific research results approved by the institute. The opportunity to use a mobile device to monitor and share in real-time one's bodily functions, for example, do not necessarily help to solve this kind of juxtaposition-ing—or propaganda war—between trained and qualified experts and a crowd of peer-learned and self-taught pro-ams (professional amateurs).

Open Peer Data and Co-Operation

Ordinary people and qualified experts can also co-operate well together. The Finnish open data movement, for example, has a very

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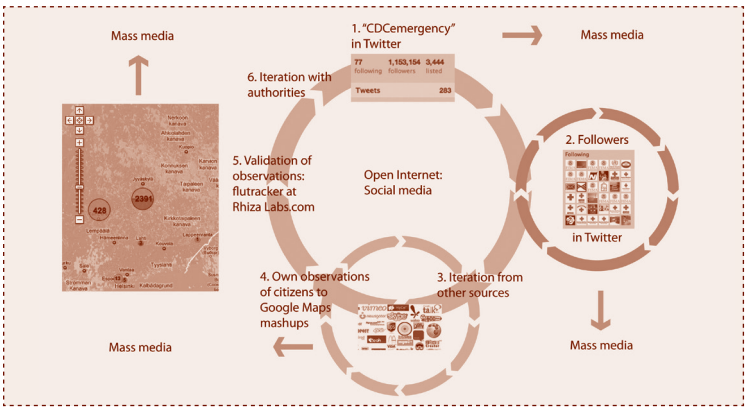
warm relationship with the public sector and other players. Here I'd like to introduce one case where instead of arguing who has the more current and reliable data or knowledge, citizens and experts co-operate globally. Actually, the global H1N1 pandemic tracking wouldn't have been possible without masses of volunteers.



Global tracking of the H1N1 pandemic with CDC and ordinary people.

Tracking H1N1-pandemic observations globally in the spring of 2009 was an example of real-time Web and coordinated self-organisation. CDC stands for USA Centers for Disease Control and Prevention (CDCemergency on Twitter). It started to send real-time info on Twitter about global spreading of H1N1. It rapidly got tens of thousands of followers on Twitter. People obtained validated information about observations and they passed it on. Ordinary people started to map both validated (3) and their own unvalidated observations (4) on mapping services on the Internet, such as Healthmap.org based on the Google Maps service. The possible pandemic cases were then iterated by the authorities (5 and 6) and CDC Emergency included them in the iteration cycle if valid (1). In addition to ordinary people, seventy-five organisations, including local Red Cross offices, followed CDC on Twitter. These were able to add their own validations and also validate the observations of others.

Conclusions

People-created or peer-based open data (or individual open data) does not have an exact definition yet. Business theories and reports are covering things like user-generated content (UGC) in the context of social media. Whatever its definition will be, (almost) real-time, shared and citizen-measured data will increase rapidly in the near future. Partly this data will be new, even to qualified professionals (things like tracking one's body functions), partly ordinary people will be able to access data (such as radiation and other issues relating to the environment) that had previously been the preserve of experts and had only been able to be measured with expensive equipment.

As with other mature technologies like the Internet, semi-professional cameras, data transfer of things like films, computer software like photo editing, etc., peer-collected open data becomes cheaper and easier to use without any particular training. From a sociological point of view, one can predict enormous impacts of individually measured open data:

- A. on modern society as a whole
- B. on the micro-level of social interaction between ordinary people

C. on the role of qualified experts. Society needs institutions and experts to run these institutions in the future but their role will change to more consultative and steering functions of collective intelligence and crowdsourcing.

Kari A. Hintikka is a Finnish internet researcher, concept and usability designer and futurist. He has been written over 20 faction and guide-books about internet and information society and their phenomenas and impacts. He has participated to Finnish open data activities since 2009, including the arrangements of the first Apps4Finland-competition.

SCHOOL OF OPEN

Peer Learning about 'Open' and How It Can Help You

by *Jane Park*

Educating Better

It's hard to define 'open' without referencing the word, which either means that you're not very good with definitions or the concept itself is difficult to define. I think that for a lot of people deeply entrenched in the open knowledge space, the latter is true. The same goes for scientists when they are asked to explain their subject: jargon flies and the layperson is at a loss for what questions to even ask to learn more. It's difficult to explain something when you know it too well, which is one reason why many obvious benefits of 'open' stay within the communities that engender it.

The School of Open aims to change all of that through online courses about 'open'—what it is, why it's important, where it applies to a particular field, and how you can use it to your advantage. The basic pedagogical approach, as currently agreed on by the School of Open community, is to *think about what people already do, and to help them do it better* using open content, tools or processes. This is in stark contrast to what you might expect, which is to start by thinking what people should learn or know about 'open'. We want to teach and learn together about how 'open' might help in certain scenarios, without assuming that it will.

Here's an example. You are a teacher seeking resources for your lesson plan on the solar system. You need several images, ideally a video, and some basic textual information. You have zero money, just some time and an internet connection.

But you have a lot of questions about finding and using things on the internet such as: where can I find free resources that cover the topics I need? Are these free resources credible? How can I use these free resources? For example, can I translate, cut or combine with other resources? How do I give credit? One course in development at the School of Open that answers these questions is 'Copyright 4 Educators'. This online course is facilitated for 6-8 weeks through a combination of meeting tools and an online platform, and it covers the basics of copyright and Creative Commons licences as relevant to the practical needs of educators. At the end of the course, the educator walks away with a basic understanding of copyright, Creative Commons licences, and how to find, use and share open educational resources on the web.

You can imagine similar user scenarios in other domains, such as the documentary filmmaker who is seeking filler footage, images, and music for his project, or the museum curator who is seeking to digitise her institution's archive of public domain materials online. Courses at the School of Open can help these individuals and their organisations, and because the School is also a community of learners, can equip them with the tools they need to teach others and proliferate the benefits of 'open'. Courses don't have to be 6-8 week endeavours either. Some courses at the School of Open can be taken in half an hour or less, such as 'Teach someone something with open content' or 'Get Creative Commons Savvy'. These courses are designed to be taken independently, where you can give and receive feedback through an asynchronous discussion forum. The School of Open allows for all kinds of peer learning models. So if any of this sounds interesting to you, come join us in building the School of Open at http://schoolofopen.org!

Jane Park is a Project Manager in education at Creative Commons. She is leading kick-off efforts for School of Open, a collaboration with the Peer 2 Peer University (P2PU).

SOFTWARE, POWER AND CONTROL

by *Karsten Gerloff*

Free as in Speech

With every day that goes by, computers become a bigger part of our lives. Our phone is a computer that we carry around in our pocket. Cars, as Cory Doctorow puts it (The Coming War on General-Purpose Computing. https://github.com/jwise/28c3-doctorow/blob/master/transcript.md), are just computers that we drive around in. Computers in every shape and form have become central building blocks of our civilisation.

Who controls these computers? If they are black boxes that keep their internal workings secret from us, and if their makers have artificially restricted them to limit what we can do with them, then although we may pay for these computers—we can never own them.

In order to be in charge of our own lives, we need to be able to control the computers we use. We can only do this if they run Free Software that we can use, study, share and improve. We can only do this if our computers aren't neutered to restrict their functionality, or loaded with spyware. We also need neutral networks to connect them to, so we can freely choose what to say, and to whom.

Android is an example of how ambiguous things can get. More than 500 million smartphones and tablets with the Free Software operating system have been sold so far, putting Free Software in the hands of more people than ever before. But this is also an operating system that sometimes limits what users can do with their phones, and invites users to let giant companies siphon off the data from their most personal devices.

Free Software isn't a question of technology. It's not a legal question either—the licence is just a means to an end. At its heart, *Free Software is an answer to the question of who should be in charge of our lives and of our culture.*

My background is in cultural sciences, not software development. Three things brought me to Free Software. One was the realisation that Free Software put me in charge of my computer. Whereas before I could only helplessly curse the screen when something went wrong, now I could go and do something about it. It wasn't always easy. But the information that I needed to solve my problem would invariably be out there somewhere, and I learned how to find it. I was no longer just someone who passively consumed software products. I could choose how I would conduct my digital affairs. I was in charge.

Another thing that attracted me to Free Software, and to the many interlocking scenes that have grown up around it, was the people working there. They not only advocated sharing, they went through with it, too. In Gandhi's words, they were (and are) the change they wanted to see in the world.

I did some of my first policy work at the World Intellectual Property Organisation. At the time, this richest of UN organisations was faced with demands from the global south to change the rules on copyright and patents so that they would no longer work exclusively in favour of the US, Europe and Japan.

Each of these week-long negotiation sessions was a formative experience in many ways. I learned just how many policy decisions are made from a position of near-complete ignorance. I learned that getting information and arguments to the right people at the right time was the way to arrive at rules that would help us live and learn in freedom. I learned that those companies that benefit from the status quo had long mastered this art. It was the people from the Free Software Foundation Europe and the many other non-governmental organisations working there who took time, even during these very hectic days, to share with me the knowledge they had gained in years and decades. Instead of seeing me, a young person, as a rival or a nuisance, they saw me as an ally who would become more useful the more he knew.

So I found that it's possible to beat the powers that be at their own game. Those of us working on giving people freedom—of giving them power over their computers, their knowledge, their ideas, their data—have a much easier time joining forces than many of the industrial dinosaurs. We have the force of truth behind us, and policy makers, ever attuned to the nuances of power, instinctively notice this. And this

was the third thing that attracted me to Free Software: it gives me the opportunity to make a difference.

Free Software is a quest to defend what is human not against technology, but within technology. Those who insist on their freedom, their own free will and their creativity at a time when everyone outsources the management of their social lives to a thug in a hoodie (https://www.softwarefreedom.org/events/2012/freedom-to-connect_moglen-keynote-2012.html) are Luddites, in a very positive, Pynchonian sense of the term (http://www.pynchon.pomona.edu/uncollected/luddite.html.).

And there are more of us Luddites every day, more people who believe that technology should serve us, not the other way around. The world is slowly changing. Every day, more people wake up to the power of working together and sharing what we know. Freedom is a way of life, and the foundation of our future.

Karsten Gerloff is the president of the Free Software Foundation Europe. He promotes Free Software and helps to build a free information society. Karsten explains Free Software to policy makers, lawyers and businesspeople in order to make the world a better place for everyone.

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WHAT'S NEXT FOR OPEN HARDWARE AND DESIGN?

by *Peter Troxler*

On Giants' Shoulders

Open hardware and open design are part of a larger open source idea. It is the idea that authors, creators and inventors need not and should not be overly protective over who reuses their works, for what purpose they use them and in what manner, but rather that they would actually want to make their works free to use, to modify, to distribute and to build upon. It is the idea that 'standing on the shoulder of giants'—first recorded in the twelfth century and attributed to Bernard of Chartres, commonly ascribed to Isaac Newton, e.g. on the British 2-pound-coin, delightfully studied by Robert K. Merton and popularised by Google Scholar—is a preferred mode of production, insight and creativity. This is because building on what others have already done does not require basic principles to be rediscovered over and over again.

In this chapter, I approach open source in hardware and design from a personal view, rather than trying to formulate definitions. Building on my earlier research, I outline the understanding of 'open source beyond software' through three stages: exploration, explanation and extrapolation. The chapter ends with the key questions that deeply concern us today when we plan to 'do' or implement open hardware and open design—beyond the current group of consenting nerds. But let me start with a brief sketch of where I am coming from and how I got involved in open source, and, more specifically, in open hardware and open design.

My motivation for working in this area dates back quite a bit. My earliest memories of open source are from my time as an engineering and computing science student in the 1990s when I was inevitably exposed to the open source phenomenon and hacking culture. It was the times of the first browser wars, the famous O'Reilly freeware summit, the US vs. Microsoft antitrust case, and the infamous Halloween documents—leaked Microsoft memos portraying open source as a 'long-term developer mindshare threat.' Having grown up in a humanities world—my parents met when they were studying ancient languages—I found the parallels between academia and open source to be immediately obvious. One of my first public interventions on the subject was at an otherwise placid seminar on literature and the Internet in September 2000 where I was co-organiser. While colleagues were presenting and discussing early hypertext fiction and Internet novels, particularly Mark Amerika's Grammatron, I introduced them to the concept of copyleft, to astalavista.box.sk and other, darker sides of the Internet. The topic was set and around Easter 2001 in Lucerne, Switzerland, we organised the literature festival 'surf—sample—manipulate'. Mark Amerika was present and on the fly wrote a short piece on the city, copying and pasting from tourist office leaflets, tax authorities' websites, Mark Twain and Leo Tolstoi; Raymond Federman performed Surfiction with his band Art | de Fakt.

A more recent experience stems from my time at Amsterdam's media think tank Waag Society where I was project manager for the Amsterdam Fab Lab and Waag Society's involvement in the Creative Commons movement. This must have been in 2008: we were discussing the potential extension of the work of Creative Commons Netherlands

into design and hardware—and found it to be outside our remit at the time; only now have Creative Commons Netherlands started cautiously venturing into the subject.

Explore, Explain, Extrapolate

My exploration of the open source phenomenon started in 2008 in this field of new media, where Creative Commons licensing had become a popular extension to traditional copyright terms. In the same year, the first international arts award of the digital era dedicated entirely to free culture, the Barcelona oXcars, was held, a not-for-profit gala with over 100 artists and seven hours of non-stop free culture. Indeed there are quite a number of case studies from the creative industries—be it musicians, filmmakers, news producers or moving image collectors—all of whom actively use open source principles to innovate their business models and earn money.

The book 'Open Design Now' (which I published in 2011 together with colleagues from Waag and Premsela, the Netherlands Institute for Design and Fashion) is an important snapshot of the state of open design as it stands now. The book explicitly did not want to produce a defining description of open design and I think we succeeded in collating a good and varied corpus of approaches: the purpose was to bring together an understanding from various perspectives. The authors of the book tried to make sense of what was happening 'out there'. The book puts different views and approaches from different disciplines into context. This is an important element of explaining the nature of open design, which essentially has to be a dialogue, not a monologue. This dialogue has been ongoing through a series of other publications, addressing the questions of business models, hybrid innovation systems that include both open and closed source and following and bending the rules of intellectual property regimes. A varied audience—from educators to ecologists, from designers to policy makers—have shown interest in the phenomenon. A number of more structured dialogues and discussions have sprung up around the topic of open design and open hardware, where further work is being done to explain what open design and open hardware are and mean.

The Open Knowledge Festival in Helsinki in September 2012 was aptly timed to start the transition from explaining to extrapolat-

ing—even if just from a provisional position—open hardware and open design (and what we believe to understand when we hear those terms) are far from being the 'place to stand to move the Earth'. The process of exploring and explaining will have to go on, and those varied discussions we are having on the definitions of open design and open hardware certainly still have their place. Yet definitions are not an end in themselves; they should serve as a means of helping to address the real issues that we face in open hardware and open design. I shall try to summarise those issues in five main questions, which I presented at the OKFestival and put in context in a couple of other texts.

Five Questions to Move Us Forward

In the context of open hardware, there is the emerging Fab Lab community, which can be seen as a representative of the wider open design and hardware ecosystem. This community faces some interesting challenges that are typical for the whole ecosystem: how to find adequate forms of organisation and institution. In design itself, open source can be seen as either a massive disruption to current practice or a new future that designers would like to achieve. All those developments are not only interrelated; they also take place in a global economic context that is marked by economic and ecological crises. These crises will lead —if we believe Jeremy Rifkin—to a third industrial revolution, which will strongly affect the designing and manufacturing of hardware.

Thinking about the future of open hardware and open design, I feel we need to address a set of five essential questions. These questions are strongly inspired by Elinor Ostrom and Charlotte Hess's book on 'Understanding Knowledge as a Commons' (2007). They are not so much concerned with what open hardware or open design are; rather the questions put forward some deep concerns as we strive to organise and arrange a world in which open hardware and open design actually play a pivotal role in that preferred open source mode of production, insight and creativity:

- How can we build effective forms of collective action and self-organisation?
- How can we break free from traditional systems and creatively design new systems that tap into the new capabilities?

- How can we protect the interests and creative freedom of individuals while also ensuring wide access to new knowledge, processes and products?
- How can we appropriately and effectively create and capture value?
- How can we achieve equity and fairness?

It would be presumptuous to try to solve all these questions in this chapter. However, I aim to present initial, tentative thoughts as to where to look for answers to these questions.

Effective forms of collective action and self-organisation can draw on best practice collected by social scientists over the past decennia. However, in applying those insights, it is crucial that we as a community take responsibility ourselves and that we do not rely on external 'professionals' to advise us; they might be a necessity in circumstances where thinking and doing, planning and executing are structurally separated, as is the case in traditional manufacturing industries. *In a situation where the designer-maker is the dominant paradigm, new solutions will have to come from within, from our peers who are actually part of and contributors to the open hardware and open design movement.*

Traditional systems of organising what we do—observational research, prescriptive theories, hierarchical organisations, power and influence as a function of institutional ranks—have clearly failed to create new solutions today. New, contemporary ways of organising will choose different approaches: participative research, engaged scholarship, lateral power and meritocracy. These, however, mean exploring the unknown (or little known) and we have to be prepared for a journey of ongoing trial-and-error and 'perpetual beta'.

In protecting the interests and creative freedom of individuals we will need to re-establish what those interests and that freedom really are—current understanding and propaganda portrays interests almost exclusively as efficiency in the monetary domain, while research and practice sketch a more varied picture of effectiveness: hedonic gains, altruism, positive effects of learning on future earnings (Mincerian earnings), reputational benefits and signalling effects. In such a new environment, copying could actually be OK (and there are

indeed disciplines in design where copying actually is OK and never was considered problematic—fashion, for instance).

Creating and capturing value, particularly monetary value, is typically discussed under the heading of 'business models'. Yet many discussions of business models are still too strongly dominated by age-old 'economies of scale' thinking, which approaches the issue from the supply side. No wonder—it's so much easier to ask how much (if at all) people would be willing to pay for what I have to offer than to reframe the questions, for example: what would people be willing to pay for? And are we actually able to supply what people are willing to pay for?

The last question about equity and fairness opens up a much wider field. Yochai Benkler and Helen Nissenbaum started that discussion in their 2006 paper 'Commons-based Peer Production and Virtue' where they argue that open source activities are not only an expression of virtuous character but actually a training ground for virtue. To put it even more strongly, they warn of a threat of omission: 'We might miss the chance to benefit from a distinctive socio-technical system that promotes not only cultural and intellectual production but constitutes a venue for human character development.'

However, I am convinced that virtue is not automatically guaranteed by being open source, and that on the journey towards that imagined better world we need two fundamental qualities: (1) to be prepared to be surprised and dare to fail; (2) to review decisions and choices critically as to whether they meet the requirements of equity and fairness. And I am sure we will probably disagree, though I hope it will be in a constructive manner.

Sources Used and Acknowledgements

Clearly this chapter draws heavily on earlier work by other scholars. I have mentioned the key references with bibliographical details that are as complete as possible in the material above without disturbing the flow of the text too much—Yochai Benkler and Helen Nissenbaum's paper 'Commons-based Peer Production and Virtue', which appeared in 2006 in the Journal of Political Philosophy (Vol. 16, Nr. 4, pp. 394–419), Elinor Ostrom and Charlotte Hess's edited volume 'Understanding Knowledge as a Commons. From Theory to Practice', which was published in 2007 by MIT Press, Cambridge, MA, and the book 'Open Design Now. Why Design Cannot Remain Exclusive', edited by Bas van Abel, Lucas Evers, Roel Klaassen and myself and published in 2011 by BIS publishers, Amsterdam.

Two more must-reads are Jeremy Rifkin's 'The Third Industrial Revolution. How Lateral Power is Transforming Energy, the Economy, and the World' was published in 2001 by

Palgrave Macmillan in New York—there is also a (video) summary by Jeremy himself, presented at the EU's Mission Growth conference (http://ec.europa.eu/avservices/video/player.cfm?sitelang=en&ref=85716, Jeremy starts around minute 47)—and 'The Piracy Paradox. Innovation and Intellectual Property in Fashion Design', a paper by Kal Raustiala and Christopher Springman on the low-IP regime in fashion (Virginia Law Review 2006, Vol. 92, Nr. 8, pp. 1687–1777, online at http://www.virginialawreview.org/content/pdfs/92/1687.pdf).

Robert K. Merton's 'On the shoulders of giants: A Shandean Postscript—The Post-Italianate Edition' was published in 1993 by the University of Chicago Press. Eric S. Raymond's writings are available online at http://www.catb.org/~esr/, all of which are worth reading: the 'Cathedral and the Bazaar' for its fundamental insights into open source practice, 'How to become a Hacker' for exactly that, and 'Homesteading the Noosphere' from 2000, from which I have taken the idea of not having to rediscover again; the leaked internal memos from Microsoft—known as the Halloween documents—are available there as well.

Mark Amerika's html novel 'Grammatron' is still online after all these years at http://www.grammatron.com/index2.html and his essay 'Surf-Sample-Manipulate: Playgiarism On The Net' (published by Telepolis on 23 July 1997) can be found at http://www.heise.de/tp/artikel/3/3098/1.html. Most of Raymond Federman's songs that he played with Art | de fact are available online at http://www.artdefakt.de/mp3/mp3.htm if you wish to catch some of that atmosphere.

Creative Commons Netherlands' first steps into the area of open hardware and design are Catherine Jasserand's 2011 paper on 'Creative Commons Licences and Design. Are the Two Compatible?' which appeared in the Journal of Intellectual Property, Information Technology and E-commerce Law (Vol. 2, Nr. 2, online at http://www.jipitec.eu/issues/jipitec-2-2-2011/3085), and Tomas Magroni's presentation on 'Open Design, IP and Creative Commons Licences' at the OKFestival, 19 September 2012 (there is a video online at http://bambuser.com/v/299312).

More discussions on open hardware and design can be found—among other great places—at High Wire, imagination Lancaster, Lancaster University, led by Leon Cruickshank (http://imaginarium42.blogspot.com); the Open Knowledge Foundation's Open Design Working group masterminded by Massimo Menichinelli (http://design.okfn.org); and the Open Design Meetup in Amsterdam facilitated by Bram Geenen (http://www.meetup.com/Open-Design/).

I drew a lot of my inspiration and insights from the many discussions I have had at various meetings and conferences, and I am grateful to the organisers who invited me: the Open Knowledge Festival in Helsinki in 2012, the Artilect conference, Toulouse (18–21 October 2012), Fab*Education, Bremen (15–17 June 2012); A–Z lezingen, Hasselt (8 May 2012), a meeting on prosumerism at the Institut für ökologische Wirtschaftsforschung (IÖW), Berlin (16 December 2011), the 7th Design Symposium Vorarlberg, Dornbirn (18/19 November 2011), a lunch talk at the European Commission, Information Society and Media Directorate-General (INFSOC), Brussels (15 November 2011), Futur en Seine, Paris (22–25 June 2011), the Creative Industries Syria Design Convention, Graz (1 June 2011), and Innovafrica 2010, Bamako, Mali (10–15 December 2010).

My podcasts from 2008 on 'Status, Use and Trends of Open Content Models in the New Media Industry' and 'Los oXcars 2008' are available at http://aworldofopen.cc/podcast/status_of_open_content_in_new_media_picnic_200 and http://aworldofopen.cc/podcast/los-oxcars-200 respectively. The chapter 'Open Content in the Creative Industries: A Source for Service Innovation?' appeared in 2009 in the collectively-edited book 'Supporting Service Innovation Through Knowledge Management' (with Patricia Wolf, Sami Kazi and Ralf Jonischkeit) and can be accessed online at SSRN (http://ssrn.com/abstract=1597357). A few more publications are 'Commons-Based Peer-Production of Physical Goods: Is There Room for a Hybrid Innovation Ecology?' (a paper presented at the 3rd Free Culture Research Conference, Berlin, 8–9 October 2010, http://ssrn.com/abstract=1692617) and 'Bending the Rules: The Fab Lab Innovation Ecology', a paper written with Patricia Wolf that I presented at the 11th International CINet Conference, 5–7 September, Zurich, Switzerland (http://square-1.eu/site/wp-content/uploads/2010/09/TroxlerWolf2010_BendingTheRules_FablabInnovationEcology_pub.pdf).

A couple of chapters on the open hardware and design ecosystem are due to appear in 2013: 'Making the 3rd Industrial Revolution. The Struggle for Polycentric Structures and a New Peer-Production Commons in the Fab Lab Community' in the book 'Shape your world with FabLabs' (edited by Julia Walter-Herrmann and Corinne Büching), and 'Open Source Design: Disruption, Desire, Destiny? On the Impact of the 3rd Industrial Revolution on Design' in the Swiss Design Network's publication on 'Disruptive Interaction' (edited by Massimo Botta and Martin Wiedmer). Together with this chapter they form a trilogy outlining the challenges we face in open design, hardware and manufacturing and making.

Peter Troxler is a Research Professor on the topic of the Revolution in Manufacturing at Rotterdam University of Applied Sciences. His field of research is the impact of readily available direct digital manufacturing technologies and the design and manufacturing practice of 'fabbers' and 'makers' on the creative and manufacturing industries, and the emergence of networked co-operation paradigms and business models based on open source principles.

HACKER ETHIC, OPENNESS AND SUSTAINABILITY

by *Jorge Luis Zapico*

Hands-on

Sustainability is a normative concept building on ideas such as justice, equity and responsibility, and based on human culture and society. Computers and the internet and the technologies that are central to our current societal paradigm of informationalism are not value-free neither. They embed normative values and a culture that can be understood both from the historical origins of the technology and the current community around it. However, the work combining computer technology and sustainability has been oriented towards practical applications for solving practical problems, and it has overlooked the more normative and ethical perspectives. Research in ICT for Sustainability, Green IT or Sustainable HCI has focused either on understanding the negative, direct impact of hardware, such as the energy consumption of the internet and the generation of e-waste, or on the applications for using the technologies with a sustainability purpose, such as increasing the efficiency of systems and increasing dematerialisation or triggering behavioural change. Computers and the internet are treated either as a system to be understood, or as tools that can be used for some purpose.

The set of values that has been central to the development of the personal computer as we know it is the hacker ethic. Being a hacker means being someone who 'programs enthusiastically', who believes that computing and information sharing are a positive good, and that it is their ethical duty to facilitate access. This is not to be confused with the use of the term in the media and popular culture, where it is mostly connected to cybercriminals—computer experts who steal credit card numbers and break into security systems. The hacker ethic originated at MIT and developed in academia during the second half of the nineteenth century (see Levy's historical account in "Hackers, Heroes of the Computer Revolution" and Raymond's "Brief History of Hackerdom"), and it contains a set of values and norms that were embodied in their work:

- 1. Hands on imperative: access to computers should be unlimited and total.
- 2. All information should be free.
- 3. Mistrust authority, promote decentralisation.
- 4. Hackers should be judged by their hacking, not by 'bogus' criteria such as degrees, age or race.
- 5. You can create art and beauty on a computer.
- 6. Computers can change your life (and the world) for the better.

The hacker ethic is present in many of the information technologies we use today, especially the internet, which has the hacker ethic values at its core, and the technologies and services around it. Open source software such as Linux, Firefox or Android is used by millions of users and has been demonstrated to be a successful model based on intrinsic motivation. The openness of information, for instance in the use of creative commons licences and open data, is also becoming widely accepted. For example, the online photo service Flickr now hosts more than 200 million creative commons licensed pictures. In recent years, *there has been a renascence of the term hack, using hack and hacker in the sense of sharing information, tweaking, hands-on change*, being used not only for computer-related activities, but also for things such as personal development, furniture or gardening. These communities may not hack in the traditional sense, but they share the principles of openness and creativity of the hacker ethic. The hacker ethic as

defined by the Jargon File, its master document, not only includes but also welcomes any kind of non-computer activity as part of the hacker community, "An expert or enthusiast of any kind".

In his book "The Hacker Ethic", Pekka Himanen argues that the hacker values represent a different work ethic that challenges the dominant protestant work ethic. Himanen discusses the current dominance of the protestant ethic, as defined by Weber in his book "The Protestant Ethic and the Spirit of Capitalism", tracing its origin to the monastery. In this ethic, work is seen as a duty that must be done for its own sake; the purpose of the work is not to get something done, but "to humble the worker's soul by making him do whatever he is told". Some of the defining characteristics are the emergence of the clock and fixed hours for control, money as the main motive, being busy as a status symbol and playfulness being removed from work. This protestant ethic is now secular and central to the capitalist system. The book defines the hacker work ethic in opposition to the protestant ethic, pointing out its origins in academia. The defining characteristics are having plenty of time (skhole) and being able to organise your own time; the main motivation is not money but passion. Working not for the sake of work but for creating something valuable together. For good, for kudos, for fun. This work ethic does not oppose work—Himanen presents the pre-protestant work ethic that was leisure-centric—but abandons the duality of work and leisure, again focusing the motivation on passion. Openness of information is presented by Himanen as a key concept for the hacker ethic, again connecting academia as a role model. Other important concepts are freedom of speech, privacy, passion and creativity.

While many sustainability problems are practical, such as reducing carbon dioxide emissions or pollution, sustainability in itself is a normative concept based on values. Sustainability is about justice, intergenerational and intragenerational, and about how we want society to be for us humans. Sustainability is not only about technological fixes, it needs a broader change in how we do things, how and why we work, how we deal with knowledge and how we innovate. The hacker ethic provides an alternative work ethic which challenges the status quo and can make an important contribution to sustainability. *Openness and a hands-on approach are the two main concepts that can be argued to be the most relevant for sustainability.*

Openness of information lies at the core of the hacker ethic. Open source, open knowledge, open data and creative commons have shown that there are alternatives ways of dealing with information based on creating and improving the commons, based on collaboration in a community. They have challenged the status quo of existing business models and also pragmatically proven a more efficient way of working. Sustainability and problems such as climate change are the 'wickedest' problem we have to deal with. It will require society to collaborate, to create new knowledge together and new ways of doing things; we do not have the time to fight each other over trademarks. We need open data about the state of the planet, we need transparency about emissions and the impact of products and industries, we need feedback and we need accountability. We need to export open licences to other areas key to a sustainable society, like people from Architecture for Humanity are doing with architecture, like institutions such as MIT and Harvard are doing with education, like people such as Vandana Shiva are advocating for seeds and traditional knowledge.

Together with openness, the 'hands-on imperative' is central to the hacker ethic. This points both to the need to bring computers to the people, and to the focus on doing and working hands-on with the systems as a way of learning and demonstrating ideas. The question of access comes from a time when computer resources, even at institutions like MIT, were scarce, highly regulated and bureaucratic, but it is still relevant to many places and social groups where access to technology and connectivity is still lacking. These hacker values of bringing computers to the masses can be seen in projects working to close the digital divide, such as the One Laptop Per Child project. The imperative of working hands-on is still one of the central ideas of the hacker ethic; hackers focus on results over ideas. Do you have a good idea? Get your fingers moving and code it. Do you want to defend open source? Shut up and show them the code. Get excited and make things. This philosophy is highly visible in hacker communities such as the maker culture, events such as hackathons and code fests, but even in the way internet entrepreneurs and companies work. In the hacker ethic there is also a belief that 'computers can change your life (and the world) for the better'. This belief is reinforced by the fast transformation achieved by computer technology in the last decades, making computers available to the masses, the

internet growing exponentially reaching billions of users and becoming a central part of how society communicates and mobile phones becoming the most widespread technological device in history. All these transformations are based on a practical approach, a belief that 'the best way to predict the future is to invent it'. This focus on doing things is very relevant to sustainability. We need to change how society works, we need to improve technology and we need to move from talking to doing.

Computers, the internet and new technologies can play an important role in moving towards sustainability. I argue that their role goes beyond technical applications and is not limited to applications like increased efficiency or better communication. The new way of doing things embodied in the hacker ethic presents a challenge to the status quo. The values of passion and creativity, openness and sharing, the creation of commons, the community-oriented thinking and the hand-on approach should be important values for a sustainable society. We need to keep promoting these values, to keep showing how they can create a better society. We need to open up knowledge, to prototype and iterate towards sustainability. And we need to do it fast.

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EXPLORING OPEN DEVELOPMENT

collaboratively authored piece

International Cooperation

'Open access', 'open knowledge' and 'open data': these phrases are becoming more common in the world of international development cooperation. But do they add up to something we can call 'open development'? Or is open development something more?

This article draws upon an informal survey carried out through online discussions before the 2012 Open Knowledge Festival, as well as interviews during it, asking a range of people to respond to the question "What does open development mean to you?"

Defining Development

"For me, open development means thinking about the word 'development' differently. It means that development happens everywhere, all the time, in many different ways, and that we are ALL complicit in the ongoing unfolding of development" says Katherine Reilly, Assistant Professor, School of Communication, Simon Fraser University.

International development is itself a contested concept, with a long history of 'new ideas' promising to transform the development process. For many people, international development essentially means aid, flowing from rich Northern countries to poorer Southern nations. Yet, although aid remains an important part of the development landscape, with over $130 bn a year spent by OECD countries, the idea of development as just a North to South transfer of resources is one of those outdated views of the world that Hans Rosling's gap-minder visualisations work hard to dispel.

The Wikipedia article on International Development explains that it is concerned with "greater quality of life for humans" and "therefore encompasses foreign aid, governance, healthcare, education, poverty reduction, gender equality, disaster preparedness, infrastructure, economics, human rights, environment and issues associated with these". Working with this broad understanding of development, we can see that the individuals and organisations involved in development don't just come from 'development agencies', and the challenges of development are significant, requiring wide-ranging action and collaboration. Even without a universal definition of what international development is, we can still explore the potential of openness applied to this broad development field, identifying learning from open knowledge for development, and learning from development for the open knowledge field.

Open Technologies: Tools and Templates

At first glance open development might seem to be about the application of open technologies and open data to the development field. After all, some of the high profile initiatives in the field, such as the International Aid Transparency Initiative which brings together open data on aid funding, and the World Bank's Open Data Portal, have put a lot of energy into creating open data portals and open technology platforms. However, the consensus is that open development is about more than just technology. In 2005, Bellanet, a project of the Canadian International Development Research Centre (IDRC), set out their open development work as "an integrated package" involving "open standards, open source and open content...that not only provides opportunities for operating in an open manner, but also promotes the ideals of common ownership and collaborative development for the collective benefit of all" says Michael Roberts, Acclar.org (Bellanet–2005 'Open Development' work programme).

However, this does not mean that open development downplays the importance of open source or open data. The examples of collaboration and sharing seen in open source and open knowledge movements have provided the inspiration for many open development ideas. And in many cases open technologies and open information can play a foundational role in the development process: necessary but not sufficient conditions: "to have open development you need information, you need

open data—but open data does not equal open development" says Craig Fagan, Senior Policy Coordinator at Transparency International.

For many advocates of open development, open technologies are not just cheaper or more flexible tools, but are an enabler of new ways of working. Importantly, for work in a world where technology is not evenly distributed, these new ways of working may be accessible even when the technology is not. As Linda Raftree of Plan International explains: "development workers and organisations can learn from horizontal and networked structures, and from other attitudes and practices in the 'open' movement...structures inherent in the web and networked information sharing can be taken 'offline', and seen as models for helping 'development' become less top-down and more horizontal—open to a wide range of local actors." The desire for less top-down, more bottom up, and peer-to-peer processes in development did not emerge with the internet, or open ideas. Work on participatory development has a long track record, and those working in the area of open development can learn from philosophies like that of Paolo Freire, Robert Chambers and others who have a history of working in participatory ways. Open development can bring new insights, and new energy, to the journey, and integrate new tools and ideas along the way.

Ian Thorpe, UN aid worker, knowledge manager and blogger puts it like this: "Openness in development is more of a journey than a destination: new technologies and shifts in power structures will, I hope, make development more and more open—but there will probably never be a time when we can say that it is totally open and that there is no more work to be done."

Open Information and Knowledge

"Open development is removing the restrictions to accessing vital information in society" says Francis Fuller Bbosa, Statistician, Development Research and Training, Uganda. Access to information and knowledge was a key theme in our survey of views on open development. There are two sides to this: information and knowledge about development, and information and knowledge for development.

Anna Härri an intern at Pro Ethical Trade Finland explained that "for me, open development is about informing the masses openly about the efforts of the development community to eradicate world poverty,

and thus increasing donations and support for development aid." This sort of openness involves not only data on where money is spent, but also information on the results of development programmes. Ruth del Campo, Director of Open Aid Register, explains that this can be challenging, requiring donors and others in the development community to be honest when showing the whole picture. For Ruth, being open with development information involves also "being able to show all development projects and admit that development projects can fail, even when that is not the desired outcome". Combining openness about the limitations of particular projects with open information on who is doing what can support collaboration across boundaries. Ruth goes on to say that with open development we should "[be] able to see who is working in a specific zone, no matter which organisation [they] belong to". Balancing the demands and organisational incentives of openness to build support for development, openness for accountability and openness for learning and collaboration may not always be easy, but, as Philip Thigo of Social Development Network (SODNET) tweeted "Open development is not speaking truth to power, but making power truthful & truth powerful! Now that's a thought #okfest #opendev".

When it comes to open knowledge, not just about development but for development, then some put the case strongly: "personally, for me, open knowledge means no obstacles, no restrictions, no limitations, no copyright" Francis Fuller Bbosa, Development Research and Training, Uganda. So much knowledge that could be used for development is only accessible if you've got a university computer account that gets you the right journals, or if you can afford licence fees. While the growth of open access publishing, open data and open access policies from institutions like the World Bank are starting to shift the default in publishing from closed to open, there is still a long way to go in making sure all the knowledge that could support development is available. Janet Maranga of Ufahamu emphasises this point: "open development for me is knowledge and all the other facets that contribute to knowledge made open, not-restricted, so they become able to be shared and be used by everyone." Truly open access to research may involve more than just the price or licence of an article, but might also require attention to be paid to how the use of technical languages and formats can limit who gains real, effective access to knowledge.

In the pursuit of open knowledge for development, many practitioners emphasise that, while we may be seeking universal access to information, we need to be aware that there are many ways to access knowledge, and multiple knowledges that need to be included and transmitted in the open world. Janet Gunter, consultant, blogger and activist, states that "open development means different things to different people, and the stakes are very different. Getting access to information in provincial Africa is vastly different than in the global north where we might be talking about IATI and aid data sets. Information is more than data, it emerges from social process; relevant and useful information often comes as metaphor and story." This is a point picked up by Ewen Le Borgne, knowledge sharing and communication specialist at the International Livestock Research Institute in Ethiopia, outlining that open knowledge needs to "...be about inviting the multiple knowledges concerned by micro or macro development initiatives to be aware of and have their say." Knowledge is not something static, captured once and for all in a document or website, but is constantly being constructed, shared, reshaped and transmitted in many ways—through audio, video and writing—and through statistics and stories. Openness of knowledge should not just be about openly sharing information created by those with resources and power, but should be about constantly working to open up the processes of knowledge creation too.

Participation, Freedom and Co-Creation

"I think open development is not just a process of getting information to people, but opening information for engaging in decisions, having discussions, debates. So it is about participation." says Craig Fagan, Senior Policy Coordinator, Transparency International.

Craig's comments were echoed by many taking part in the open development stream at the Open Knowledge Festival. Tony Roberts, Co-founder and Director of Web-Gathering states that "for me open development is opening development to other voices that are not normally heard", and Ineke Buskens of the GRACE Project articulates a vision in which "open development is about people co-creating according to their own design, the spaces, ways and means that will evolve humanity into experiencing more life, liberty and happiness through the connecting power of ICT". These visions combine a focus on both

individual and collective empowerment. Peter Ballantyne, also of the knowledge management team at the International Livestock Research Institute in Ethiopia calls for 'open' to be the "default individual and institutional setting for 'sharing' and 'engagement'.

Few underestimate the culture change this involves, and, as has already been noted, ideas of participatory development have been long discussed, and rarely fully delivered. Yet, in breaking down organisational boundaries through open access, open information, open data and open technologies—and by adding a genuine commitment to culture change— open development can be more than the sum of its parts. To quote Tony Roberts again: "open development means enabling the intended 'beneficiaries' of development (rather than technocrats) to be the authors, architects and artisans of any development activity".

The focus on sharing, collaboration and co-creation at the heart of open development highlights the specific forms of freedom that open development is in pursuit of. The openness of open development is distinct from the openness of open markets. As Matthew Smith of IDRC puts it, with reference to the ideas of Yochai Benkler: "to me open development means harnessing the power of sharing and cooperation over hoarding and competition to create a better future". An open space supportive of development is not one free of rules, structures and support, but is one in which the rules, structures and support that exist are oriented to enable and amplify co-operation, collaboration and sharing, tapping into human capacity for selfless action for particular and common good.

Conclusions

An articulation of open development raises challenges both for the international development community and the open knowledge community. For players in international development, it calls for a greater commitment to openness, collaboration and sharing. This is not only about exploiting the power of open technologies to do the same work more efficiently, but is about embracing openness as one part of shifting the balance of power towards the marginalised, ensuring that development activities are the result of co-creation, not impositions from outside. And for open knowledge activists and architects, a recognition of global inequality calls for attention to be paid

to who is empowered by open source, open data or open hardware, and to take the extra steps to ensure it is not just the educated and financially secure few who can make the most of the opportunities openness brings, but that the ability to contribute to, and benefit from, the entire realm of open knowledge is there for the majority. Realising open development requires vigilance that the openness movement stays true to this underlying intent of openness, keeping the promise and values of openness in line with reality.

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Collaborators: This article is a collaborative effort and remix, created with the contributions of all the people quoted above, and brought together by: Duncan Edwards (@duncan_ids), Linda Raftree (@meowtree), Mika Välitalo (@vatamik), Pernilla Näsfors (@pernillan), Sarah Johns (@geogrr), Claudia Schwegmann (@openAidGermany), and Matthew Smith (@open-ICT4D), and edited by Tim Davies (@timdavies). The Open Development Working Group of the Open Knowledge Foundation operates as a space to share news, updates and discussions on open development.

You can find the group mailing list at http://open-development.okfn.org

DATA JOURNALISM

Why It Has to be Open

by *Simon Rogers*

DIY Journalism

Punk was empowering to thousands of kids around the world. All you needed was a guitar and some friends and you had a band.

At the age of seven I liked writing and telling stories. I liked taking things apart to see how they worked. But there was one thing I really hated: maths. Like around two million children in the UK now, I had "maths anxiety", fear of arithmetic. My school report at the time said: "Tries hard, but has little natural ability". My first day on the Guardian news desk was 10 September 2001. The next day the world changed forever, and so did my plans. I had always wanted to tell stories and write, rather than count numbers. Now I am doing both. Telling real stories, based on data and numbers.

So, how did I get from having little natural ability to that? *The reality is that, with data journalism, like punk, "anyone can do it".* You just have to try hard. We live in a time where data and numbers are everywhere—and in the past this data belonged only to the statisticians. It was printed on paper in books, rows of numbers, difficult to understand unless you were an expert. Now those numbers belong to everyone—and they are becoming our way of understanding the world. It happened because of something quite boring. A web tool based out of Boston, something called Many Eyes. It looks a bit old fashioned now, but at the time it was simple and easy to use. It showed that you didn't have to be an expert to get an expert analysis. Since then, there have been more and more tools which help us do our job better—such as Google Fusion tables—which means you don't have to be a programmer to work with data.

When the riots broke out in England last year, we wondered what our role would be. This was a story about civil unrest, right? It turned out that what people craved was information—and we provided that. Raw information, mapped using free tools that anyone could download. And when people started getting arrested, we thought like journalists, but looked for scientific answers: forcing the Ministry of Justice to release court records so we could show who was getting arrested, how poor they were—or even how far they had commuted to the scene. Those raw numbers allowed us to tell stories we would never have been able to tell otherwise. But the numbers were based on wondering about a key question: was it a story?

Partly it's about trust. We don't trust our politicians or our institutions—and we don't trust our media. If you can provide the full facts behind a story, then you are revealing all to the world. Journalists don't like doing that. Traditionally, we have kept our sources close to our chest. We tell you a story and you receive it with gratitude. Now that process has become open—by showing our sources and how a story comes together, that story becomes stronger. And why does that matter? Because the mainstream media has a habit of missing stories—whether it's Occupy or the Arab Spring or even England's riots last year. Until they explode, that is.

By combining that openness with raw data, we have a new power. Like punk, we can change the world—and we don't have to be experts. As Joe Strummer said: "People can do anything".*

***This is the text of a talk given at TedX Sorbonne, Paris, 2012**

Simon Rogers is editor of guardian.co.uk/data, an online data resource which publishes hundreds of raw data sets and encourages its users to visualise and analyse them. He is also a news editor on the Guardian, working with the graphics team to visualise and interpret huge data sets.

A SEMI-SURPRISE WEDDING FOR PUBLIC INSIGHT

by *Miska Knapek*

Knowledge Visualisation

Information visualisation and open data are increasingly proliferating, and so is data journalism. Are these widely distinct phenomena that happen to have surfaced at around the same time, or is there something more to it? I'd like to suggest that (open) data, information visualisation and (data) journalism enjoy an often overlooked symbiotic relationship, developing and furthering one another. They're essentially the nutrients and catalysts for one another's growth. Their mutual histories reveal a great deal about how we understand the world and what lies ahead.

The symbiotic relationship between data, information visualisation and data journalism exists at an opportune time. We're at a historical point where the tools and knowledge for making tools for visual knowledge building are popularly accessible. (An information revolution is just around the corner, folks, and I'm not even an Internet salesperson from the '90s!). Knowledge about visual information empowerment, growing out of this symbiosis, could not have come at a better time.

So, how does it all fit together? Well, journalism has always been our eyes and ears on the world. Data of various types allow it to extend what it can see and narrate. Information visualisation helps make analyses of the data accessible where text is inadequate. (Data) journalism's appropriation of information visualisation has enhanced both the form of the medium itself and the amount of it the public sees. The evolution of information visualisation sees itself benefiting from the journalistic expertise of finding what's relevant and presenting it in a form that readers can understand. In turn, as the representation of visual information is becoming increasingly accessible, these are all beneficial developments for, potentially, heralding a new era of knowledge building through popular access to—and development of—visual information tools.

Journalism

These days of everyone potentially being an online publisher may obscure the historical origins, function and significance of journalism. It is effectively the origin of public knowledge of the world seeing tight parallel developments with public government insight. If we assume that knowledge guides action, then journalism has traditionally been our eyes and ears on the world beyond our eyes and ears. In these days of TV and a plethora of supposedly accurate news sources accessible on the Web, our historic reliance on the journalistic medium might escape us. It wasn't until very recently that making information about the world accessible involved great expense. Hence, our avenues for world knowledge beyond our immediate senses were quite limited. Whether the situation has improved is better answered elsewhere, but journalism still has a large part to play as our eyes and ears on the world.

Something of similar importance that might also be overlooked is the historical role journalism has had in keeping the government in check. A constitutionally legislated free press came as part and parcel of the first Enlightenment-inspired constitutional democracies, and their Enlightenment-inspired drive to provide public insight into government. The press was there to keep the government in check and accountable to the public.

While technically speaking not entirely a constitutional democracy, Sweden's parliament, with the King as head of state, legislated freedom of the press and freedom of public insight into government into its constitution in 1766. Shortly afterwards, following the American and French revolutions, the USA and France did likewise, although to a more limited extent. In effect, Enlightenment-inspired developments for less absolutist and more accountable rule materialised in legislating freedom of public insight into government activities (e.g. open data) and creating an instrument for keeping governments in check (a free press).

Data Journalism

Given that journalism has been our eyes and ears on to the world, its appropriation of data and information as additional tools for seeing and understanding the world is a rather natural development, benefiting journalism and public insight.

The use of data as source material for a story allows a different and complementary perspective to "regular" journalism. Data, whether from statistical sources or describing physical or societal matters of various kinds, typically allows for a more quantitative from-above perspective of the world than the more qualitative from-the-ground perspective offered "traditionally". It thus becomes possible to see societal and systemic trends that would be difficult to detect if the journalist had to gather the source material in person.

Information Visualisation

But what is a new information source without an appropriate medium? The from-above view of data also needs a medium to facilitate, as it were, this new and different knowledge paradigm. The traditional journalistic narrative tool, text, has its benefits, but it constrains thought development to a linear narrative structure and limits the possibilities for pursuing parallel thoughts, thus limiting what can be seen in the data. This bottleneck when it comes to showing what's in the data is exactly what information visualisation helps to overcome.

The trouble with text is that we need to remember what we've read in order to make comparisons with or inferences from what we've read. While doing this for a linear textual thread might work, provided it's not too complex, remembering more than a handful of numbers and comparing them is difficult. This is where information visualisation helps. Our visual memories and capabilities to process the visual (i.e. data) environment we see are far more advanced than our ability to remember text. I guess we evolved trying to more make sense of the potentially threatening physical environment in front of us, rather than remembering phone numbers and statistics. *By translating data into a form we can grapple with visually, we're suddenly able to understand more and analyse, compare and spot tendencies* in the data in much the way we can see visual patterns. So, with the adoption of information visualisation by journalists, journalism has gained a new narrative form and opportunity for keeping society and government in check.

Putting it all Together?

Then the question remains: how is data journalism benefiting data and information visualisation? Data journalism is where informa-

tion visualisation is seeing its greatest emergence, development and debate for the public at large. I'd argue that the journalistic imperative of finding what is significant for readers, and communicating it in a form that empowers them, is lacking from contemporary information visualisation. This is where the expanse of data journalism, and journalism's role of informing the public, is a great help for the development of the information visualisation medium, as well as the fields of visual knowledge building growing from it.

Information visualisation done right has always been about empowering people through the framing and presentation of context-relevant information. The combination of a new crowd making information visualisations and a "data and infovis hype" has, however, led to a plethora of nice-looking information visualisations flooding us with more data than enlightenment. The data is typically presented in its entirety, without helping us to fathom what data is important, why it's important, and how it relates to us. The viewer is simply overwhelmed, remaining visually excited yet uninformed. It's hardly surprising we recently saw a twitter meme like the following surfacing: "It's about finding the needle, not showing how big the haystack is".

How can (data) journalism help data and information visualisation, then? Chris Anderson's statement, "People don't consume data, they consume stories", neatly hits the nail on the head. It's about considering how people understand things. Journalism, in providing a world view and public empowerment, necessitates figuring out what's important to investigate, for whom, how and when, and, importantly, explaining it in a language accessible to the relevant readership. A lack of concern for the viewer/readership is what most often hinders contemporary information visualisations. Consequently, the adoption of data and information visualisation by journalists, as a tool on a par with their other tools, is very welcome for the evolution of information visualisation. Simply put, journalists are providing good examples of designing information visualisations from a reader-centric perspective. By considering what the story is for the public, journalists have made information visualisations that are increasingly graspable and enlightening for the public: empowering people to see the world more clearly through data, rather than blurring it. Thanks to journalists, information visualisation thus sees itself increasingly spoken about

and debated, evolving for public understanding and the common good.

All that glitters is still not gold, however, even in the land of data, information visualisation and data journalism. Data and information visualisation literacy amongst the populace might now be akin to text literacy a few hundred years ago. As a new language it is still developing its form, with various attempts occasionally causing more confusion than empowerment. Nonetheless, we're now at a significant turning point in the evolution and adoption of info-visual tools for knowledge building. There's usually a great deal of experimentation and learning needed when a new communications medium is introduced. And, thankfully, more often than not it's worth it.

With regard to visual knowledge building, one could say that we're now at an equivalent time to that of Gutenberg inventing movable type. The major prerequisites for a new era of visual information building culture are now with us. Computing is affordable, there is networked communication, a proliferation of available data describing our world and the tools for making visual information interfaces are becoming increasingly accessible. With a bit of experimentation, elbow grease, knowledge sharing and debate, we'll literally be able to see the world in a completely different way. As for public knowledge and the evolution of information access, the symbiotic interplay of data, information visualisation and journalism is not altogether accidental or surprising. It's a great ecosystem for revisiting and evolving knowledge and knowledge-building structures.

Miska Knapek is an information/interaction designer, and open society enthusiast. Miska works on making public information accessible politically and visually, and enjoys revisiting what citizenship is, in the age of networked communications and open knowledge.

OPEN CITIES

by *Haidee Bell* and *Hanna Niemi-Hugaerts*

Living Smart

Cities across the world have been competing to be if not the 'smartest city' then at least one of the first members of a new network of smart cities. The concept gained momentum at the beginning of the 21st century with a rather technical approach, but since then smart cities have expanded their focus to other aspects of 'smartness': knowledge cities, digital cities and eco-cities. In their article The Future of the Future: Being Smart about Smart Cities, Art Murray, Mark Minevich and Azamat Abdoullaev state, 'In reality, a true smart city must be all three types integrated in a holistic and systemic way.'

With the rise of open data and the civic tech movement, we are understanding more about another vital dimension of smart cities: open cities. The movement's reach has already gone far beyond the grassroots. Neelie Kroes, the European Commissioner for the Digital Agenda, confirmed this in her speech at the Open Knowledge Festival:

> *'I know you at the OKFestival don't need convincing about the benefits of openness, nor about the huge innovation that it can fuel. Rest assured, the EU is behind you.'*

The discussion about open cities has escalated globally with more exploitation of public sector data and engagement of new generations of problem solvers, such as data technologists, in the public service. *There is a demand for smart cities that are open for their smart citizens to contribute to their own living environment—whether in political decision-making, organising local events, participatory budgeting or developing new apps and digital public services.*

But open cities cannot stop here: they also need to be open to other cities in sharing what they do in order to offer their citizens the best possible solutions, no matter where these solutions have originated from. Collaboration between cities—willingness to share what we know and readiness to implement innovations envisioned elsewhere—is a step towards the open cities of tomorrow. At the beginning of 2012, one of the acknowledged smart cities, Helsinki, kicked off its World Design Capital year under the title 'Open Helsinki', stating on its website:

> *'The concept of Open Helsinki is literal—a city where information, ideas, thoughts and people can move freely without unnecessary creativity-hampering obstacles.'*

To tackle the challenges open cities are facing, we have identified three of those obstacles: the digital infrastructure, the mind-set and the system. All three need to be switched from closed to open for cities to thrive as connected, collaborative and attractive places to live and work.

Change the Digital Infrastructure: the City as an Open Platform

Cities are still known for and experienced through their physical infrastructure—their architecture and people, but they are increasingly designed, managed and developed jointly with ICT solutions. These solutions are often seen as the most crucial element of smart cities. A growing number of city dwellers are in touch with their cities via digital services, many of which offer the potential for 'active citizenship'—digital services, apps, interfaces and infrastructures which make it easier for people to find, choose and directly contribute to those aspects of city life which affect them.

With the growing role played by digital infrastructure in delivering city services, city service development has been moving from city government in-house IT teams to subcontracting from companies. The challenge this presents is that too often this leads to closed ecosystems that can result in vendor lock-in with third party providers who may have no vested interest in openness. In recent years, academics and activists have challenged closed systems together with local and global developers who would be willing to contribute to the city service development, if there were open interfaces to work upon and a system to connect with.

When aiming for an open city, how should urban ecosystems be designed, built and run? The global open government movement, one of the pioneers in addressing the openness of cities, wants 'to bring government into the digital age by making public data open by default and creating new opportunities for civic engagement through the use of web technologies.' Through their strategy, we can identify some crucial steps towards cities as open platforms.

To begin with, cities can develop open data policies, use open standards and introduce interoperable interfaces such as the ones developed in EU-funded Smart CitySDK and possibly agreed upon in networks such as Barcelona-initiated City Protocol. Hackathons and apps-contests can be organised together with community management to engage and connect developers and entrepreneurs. Procurement policies can be improved (Code for America has published Six Ways to Improve your City's Procurement Process) to increase uptake of open solutions and enhance developer engagement. Sounds simple, but it is all about implementation. Learning from Palo Alto, one of the cities recently adopting this 'city as a platform' approach as described by Paul M. Davis in How to Rebuild the City as a Platform:

> *'It's an incremental process that requires an engaged citizenry that sees tangible benefit from such initiatives, changes in municipal procedures and IT infrastructure, and buy-in from business leaders, developers, and entrepreneurs.'*

A process that has shifted their working practices towards one of a lean start-up:

'Our intent is to get more useful capability out to our community and City staff in shorter time. We want to function as close as we can with the community that we serve. And that's a lot of amazing start-ups.'

For a city authority to embed 'lean' behaviours, a good deal of cultural shift is required. It also means gaining total buy-in across teams and discarding systems which do not allow for agility and responsiveness to external change. And, vitally, an openness to where ideas come from.

Change the Mindset: Sharing—and Borrowing—Between Cities

We are experiencing a wave of change across city halls in Europe and beyond as a host of new digital civic services are being created, many built on newly released open data, frequently through collaborations with disruptive technologists, some directly with citizens. This is increasingly accompanied with a willingness to share practice, to find platforms and networks to tell others about these trials in a welcome move towards more openness between cities. That said, it would seem that those running our cities are much better at opening up their own inventions for others to imitate than they are at copying innovation from elsewhere. As Philip Ashlock, US Presidential Innovation Fellow, commented at OKFestival, cities are more likely to share than to borrow.

Herein lies a problem of supply and demand. While the application of open source principles to sharing practice between city halls is a trend to celebrate, it's not a simple case of 'if it's open, they will come'. Why is this? We know that some of the greatest innovations are iterations of earlier versions created by others. The iPod was not the first digital music player; Apple imitated others' products but made them more appealing. The copycats often end up as the winners, benefitting from lower development costs and less risk as the innovation has already been market tested.

There are examples of good practice which succeed at encouraging cities to get beyond the 'not invented here' syndrome. Code for America Commons is a marketplace for digital city applications, supported by the movement which Code for America has created in the US to connect technologists and civic leaders, and which has been a key resource in showcas-

ing innovations and providing a 'menu' for cities in devising their own digital solutions. ENoLL—the European Network of Living Labs—brings together over 300 labs from across the continent to share practice in their work involving experimentation with user-driven innovation. Nesta in the UK has encouraged cities to publish their priorities for innovation through its Creative Councils programme where authorities have come together to share, to suggest and to build on the experience of peers.

There are several lessons that these examples tell us. One is that it's important to provide safe spaces for sharing practices which break down preconceptions and encourage those running our cities to see similarities in their day-to-day work.

Second is the obvious point that it's not just local authorities who decide how our cities are run. City halls are wise to keep up with what services are proving popular elsewhere and may find they are being asked, 'why don't we have one of those?' The spread of bicycle hire schemes across European cities may be in part explained by cities seeking to keep up the offer to their citizens.

A third but strangely often overlooked point is that evidence of real impact can make the case for imitation a no-brainer. In a time of limited resources, there is a need to spend whatever money is available on the best, most successful approaches. If there's proof that a pilot or prototype service is delivering on a small scale in one city, just think what it could do for you. Nesta's Alliance for Useful Evidence is championing the use of and demand for evidence that is rigorous, accessible and appropriate.

Finally, ego often still rules. Those leading our city halls may still need to be convinced that being a world class city means borrowing from elsewhere. Should we create a high profile award for city mayors and leaders who are the best at imitating excellence?

Change the System: People-Powered Cities

'Forget top-down control by the ruling party—give citizens data and tools and let citizens govern themselves'. This is the call by Anne-Marie Slaughter writing in the December 2012 issue of Wired. The concept of 'city as a platform'—in which those governing our cities provide basic hardware and software infrastructure to enable greater citizen participation and collective action—has gained traction over

the past couple of years. In the context of dwindling public resources and increasing public needs, this has frequently led to criticism of participation policies as an excuse for austerity cuts. However, technological advances and more discussion about the power of self-organising groups (everything from the Arab Spring to the movement #wewillgather: 'getting people together to do good things') are shifting the conversation about the potential of citizens in shaping our nations and cities.

Enlightened city leaders like Henk de Jong in the City of Amsterdam might be considered a role model in proving what is to be gained at local level. De Jong is publicly passionate about governments' new role as 'convener', stating in his speech at Commons4Europe Launch, Amsterdam, in March 2012: 'This is a new era of governance. We must innovate to become truly social; to this end government may not have all the answers.'

In practice this has meant a series of pioneering social innovations in the city. Amsterdam has employed digital technologies to create a crowd-sourcing platform Amsterdam Opent that involves citizens not only in responding to government policy, but also in proposing new solutions for city challenges, suggestions the city actively takes on board. With the growing need for the public sector to cut costs, new forms of governance can be seen in new kinds of citizen engagement, as highlighted by McKinsey in response to the interview with Matthew Taylor, Chief Executive of the RSA, '...seeing citizens as sources of innovation and co-producers of services, rather than just consumers, opens new possibilities for a more productive government.'

In a transparent society, the ideal is that every member of the population has an equal level of physical, intellectual and social access to information, and can equally act on public information and take part in public discussion. Transparency activists are pressing hard for answers to questions of how to increase usability for all, stressing that the goal of open cities and nations cannot be achieved without meaningful citizen participation. The right tools are crucial; well-intentioned innovations to reach more people through online engagement platforms may inadvertently end up widening the gap in physical and intellectual access, especially in parts of the world where digital access is patchy. There is often a fanfare around opening up (of policy or data).

However, where the real value and true democracy comes is in how the data gets used, how this sets the agenda and, vitally, what effect participation has upon balances of power.

Cities and the network of hyper-local communities that form them have an opportunity to lead. As the City of Helsinki stated at the beginning of their year as the World Design Capital on their website: 'The most important thing is to involve people in the decision-making process that applies to their living area. Cities belong to their inhabitants.'

The more local the theme, the more level the playing field becomes: we all understand and have something to offer discussions about our neighbourhood, our open spaces and our high streets. Open governance in cities also allows for physical as well as virtual participation, thus providing access to more people. Early indications are that it is at this local level that genuine 'collective intelligence'—group work that generates outcomes beyond what could be achieved by the individual participants—can be achieved. Collectively intelligent systems combine elements, some virtual, some face-to-face, some standardised and some intensely personal: combinations that normally require a local focus. Cities need to employ a range of methods for wise decision-making.

Smart cities are cities of smart people. We must make sure we are open to finding ways to put this connected intelligence to best use.

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OPEN SOURCING MATERIAL

by *Catarina Mota*

Making Things

I have a friend in Portugal whose grandfather built a vehicle out of a bicycle and a washing machine so he could transport his family. He did it because he couldn't afford a car, but also because he knew how to build one. There was a time when we understood how things worked and what they were made of. So we could build and repair them or, at the very least, make informed decisions about what to buy.

Many of these do-it-yourself practices were lost during the second half of the 20th century. But now the maker community and the open-source model are now bringing this kind of knowledge about how things work and how to make them back into our lives. And I believe that we now need to take it to the next level, to the components things are made of.

For the most part, we still know what traditional materials like paper, glass, and textiles are made of and how they are produced. But now we also have all these amazing, futuristic composites: metal alloys that change shape, paint that conducts electricity, pigments that become transparent.

Conductive ink (see video here: https://vimeo.com/44351476) is a paint infused with tiny particles of metal such as silver or nickel. What is special about it is that it allows us to paint circuits instead of using traditional etched boards or wires. Until now, conductive ink has been mainly used by artists, but developments suggest that soon we'll be able to use it in regular laser printers or pens and create circuits by printing or drawing them. Muscle wire (see video here: https://vimeo.com/44353949) is a shape memory alloy that contracts by between 3% and 7% when heated by an electrical current. Thermochromic pigments (see video here: https://vimeo.com/44354467) are made of liquid crystals that display different colours at different temperatures. Thermochromic materials are used, for example, in baby bottles to indicate when the contents are cool enough to drink.

These are just a few of what are commonly known as smart materials. In a few years they will be in many of the objects and technologies we use every day. We may not yet have the flying cars science fiction promised us, but we can have walls that change colour based on ambient temperature, textile keyboards that roll up, and windows that become opaque at the flick of a switch.

I'm a social scientist by training, so why am I interested in smart materials? First of all because I'm a maker. I'm curious about how things work, what they are made of, and why they do what they do. But also because I believe that we should have a deeper understanding of the components that make up our world. And right now we don't know enough about these hi-tech composites our future will be made of.

Smart materials are hard to obtain in small quantities, there's barely any information available on how to use them, and very little is said about how they are produced. For now, these materials exist mostly in a realm of patents and trade secrets accessible only to universities and corporations. So, a little over 3 years ago, Kirsty Boyle and I started a project called open materials. It's a website where we, and anyone else

http://openmaterials.org/

who wants to join us, share experiments, publish information, encourage others to contribute whenever they can, and aggregate resources such as research papers and tutorials created by other makers like ourselves. We would like it to become a large, collectively generated database of DIY information on smart materials.

But why should we care how smart materials are made and how they work? First of all, we can't shape what we don't understand, and what we don't understand and use ends up shaping us. The objects we use, the houses we live in and the clothes we wear all have a profound impact on our behaviour, health and quality of life. So if we are to live in a world made of smart materials, we should know and understand them. Secondly, and just as important: innovation has always been fuelled by tinkerers. Often, amateurs, not experts, have been the inventors or improvers of things ranging from mountain bikes to semiconductors, personal computers and airplanes.

The biggest challenge is that materials science is complex and requires expensive equipment. But that's not always the case. For instance, two scientists at the University of Illinois understood this when they published a paper on a simpler method for making conductive ink.

Copyright Jordan Bunker

Jordan Bunker, who had had no experience with chemistry until then, read that paper and successfully reproduced the experiment at his hackerspace with mostly off-the-shelf substances and tools. He used a toaster oven and even made his own vortex mixer based on a tutorial posted on YouTube by another scientist/maker. Jordan then published the experiment on his website, including all the things he had tried which didn't work, for anyone to study and reproduce. Jordan's main innovation was to examine a process that had been created in a well equipped lab at a university, and then reproduce it in a garage in Chicago using only cheap materials and tools he had made himself. And

now that he has shared his experiment, others can pick up where he left off and devise even simpler processes and improvements.

PROCESS:

(All of the instructions I have listed here were extrapolated from the journal article from UIUC.)

Part 1

1. Make sure your glassware is clean!

2. Pour about 3 mL of Ammonium hydroxide into a glass beaker.

3. Use a pipette (and pipette pump) to draw exactly 2.5 mL out of the beaker and deposit it into a test tube.

4. Tare the scale with one of the weight boats on it.

5. Measure out exactly 1 gram of Silver acetate into the weight boat.

6. Pour the Silver acetate from the weight boat into the Ammonium hydroxide in the test tube. (It may stick to the sides of the tube. That's ok, just tilt and roll the tube to get the Ammonium hydroxide to dissolve into the solution.)

7. Vortex mix the test tube for 15 seconds.

8. Set the test tube aside.

9. Pour about 0.5 mL of Formic acid into a second glass beaker.

10. Use a second pipette (and the pipette pump again) to draw exactly 0.2 mL out of the beaker.

11. Drip the 0.2 mL of Formic acid into the test tube of solution **one drop at a time**, vortex mixing between each drop.

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Another example is the Kit-of-No-Parts created by Hannah Perner-Wilson. Her project's goal is to highlight the expressive qualities of materials while focusing on the skills and creativity of the builder. While traditional electronics kits are very powerful in that they teach us how things work, the constraints inherent in their design influence how we understand things. Hannah's approach, on the other hand, is to formulate a series of techniques for creating unusual electronic devices, based on both smart and traditional materials, which free us from pre-designed rules by teaching us about the materials themselves.

Based on research by Marcelo Coelho from MIT, Hannah created

several functional paper speakers that use a wide range of materials from simple copper tape to conductive ink and fabrics (see video here: http://www.youtube.com/watch?v=y1F5Gg4bG30). Like Jordan and so many other makers, Hannah published the recipes for all her experiments on her website. Paper electronics are one of most promising research branches in materials science in that they'll allow us to create cheaper and flexible devices. Hannah's artisanal work, and the fact that she shared her findings, opens the doors to a series of new possibilities which are both aesthetically appealing and innovative.

The interesting thing about amateurs is that *we create things out of passion and curiosity*. And we aren't afraid to fail. What this approach means is that we often tackle problems from unconventional angles and in this way discover alternatives or even better ways to do things. The more people take an interest in experimentation with materials, and the more scientists are willing to share their research and manufacturers their knowledge, the better chances we have to develop technologies that truly serve us all.

I feel a bit like Ted Nelson must have when, in the early 1970s, he wrote "you can and must understand computers now." At that time, computers were mainframes only scientists cared about and very few people dreamed of having one at home. So it may sound a bit odd that I'm now saying "you can and must understand smart materials now" when we don't even know exactly what they will be used for. Just remember that acquiring pre-emptive knowledge about emerging technologies is the best way to ensure that we have a say in the making of our future.

Catarina Mota is co-founder of openMaterials.org, a collaborative project dedicated to do-it-yourself experimentation with smart materials, and altLab, Lisbon's hackerspace. She is wrapping up her PhD dissertation on the social impact of open and collaborative practices for the development of technologies.

THE POWER OF LINKED OPEN DATA

by *Denise Recheis* and *Thomas Thurner*

New Opportunities

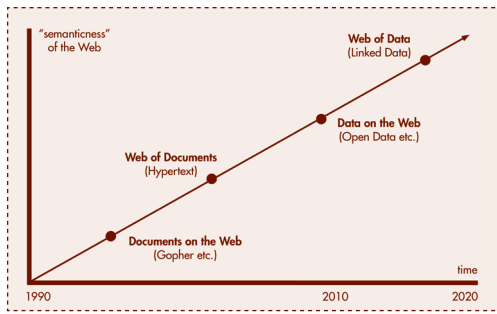
Open data and open knowledge are not only about availability. They're also about comprehensive interlinking, which makes data understandable and a useful resource for reaching a more balanced information society. Interlinking data is also one of the key concepts which reegle.info uses to act as an open data hub for the special domain of renewable energy and energy efficiency.

Since the beginning, the World Wide Web (WWW) has morphed into a more closely knitted web of information. To understand the World Wide Web Consortium's (W3C) future vision of a new web of data, one has to imagine the web as a giant global database.

Using this database, developers may want to build a new application that shows the correspondence between economic growth, renewable energy consumption, mortality rates and public spending for education. At the same time, they might also want to improve user experience with mechanisms like faceted browsing and automatic display of related content across the WWW. All this is already possible, but today's measures for integrating information from different sources, known as mashing data, are often too time-consuming and costly.

The reasons behind this fact are mainly:

- Very often, databases are still seen as 'silos', and people often do not want others to touch the database for which they are responsible. This way of thinking is based on assumptions from the 1970s: that only a handful of experts are able to deal with databases and that only the IT department's inner circle is able to understand the schema and the meaning of the data. This way of thinking is obsolete. In today's internet age, millions of developers are able to build valuable applications whenever they get interesting data.
- Secondly, data is still locked up in certain applications. The technical problem with today's most common information architecture is that metadata and schema information are not separated well enough from application logics. This leads to a situation where data cannot be reused as easily as it should be. If someone designs a database, he or she often knows what kind of application can be built on top of the database. If we stop emphasising which applications will use our data and focus instead on a meaningful description of the data itself, we will gain more momentum in the long run. At its core, open data means that the data is open to any kind of application, including from third parties, and this can be achieved if we use open standards like RDF2 to describe metadata.
- Ideally, if the related, actual data on the web is linked, it becomes possible to quickly retrieve many important facts. If machines can 'understand' how two sets of data are connected, the web becomes semantic—such data is called Linked Open data (LOD).



A good example of how the above-mentioned giant global database is already in existence, and has been actively used in the clean energy field, are the web portal reegle.info and Open Energy Information portal openei.org. All information on these sites is open—either produced or consumed. Both sites make use of mash-ups where data from various sources is combined and presented in new ways. The original content is made available for external websites, while suitable additional content is fetched from different open data sources in a self-maintaining way which ensures that users can always access the latest high quality information in a visually appealing presentation.

Consuming and Providing Open Data

A web portal can benefit in two main ways from using (Linked) Open Data technology:

- New sources meeting the portal's quality requirements can constantly be reviewed and then integrated. Open data is already provided by the UN Data, World Bank Data, DBpedia, Eurostat, OpenEI, RES-Legal, REEEP and many other organisations in various fields . Since all these organisations offer their data in structured form and with an open data licence, third parties are also able to merge data from different sources, like UN and World Bank data, to present totally new findings. Using LOD makes it possible to process multiple data sets and provide added value by combining different data sets.
- As a provider of Linked Open Data sets, developers of other applications/websites will use the opportunity to easily extract and use interesting data free of charge. This ensures that its datasets are widespread and reach their target audience even if they do not retrieve it directly from the original data provider. Therefore, all data must be clearly marked with its source.

Benefits of Using Linked Data

One of the largest benefits of using and providing (Linked) Open Data sets is the allocation of responsibilities. For smaller organisations, this means being able to offer a wealth of relevant information to their clients without the need to maintain a large database

with data. Without the possibility of using machine-readable data sets, more manpower would be needed to provide such a service.

(Linked) Open Data sets also make it possible to provide users with a comprehensive and up-to-date overview of various specific topics. Since third-party web portals are directly linked to data providers' information, any updates are reflected immediately and there is no need to update this information manually.

For more information about (Linked) Open Data and how to make use of this technology, please refer to Linked Open Data: The Essentials, a booklet provided by Renewable Energy and Energy Efficiency Partnership (REEEP) and Semantic Web Company (SWC) featuring relevant guest authors actively engaged in the semantic web.

Thomas Thurner has been coordinating Semantic Web Company's Transfer Division, as well as PR and campaigns since 2008. Thomas is also heavily involved with Semantic Web Company's Open Data Strategy Branch, where he is active in community building and consulting for the growing Linked Open Government Data scene in Austria.

Denise Recheis's primary area of work is the Renewable Energy and Energy Efficiency Partnership's (REEEP) Linked Open Data portal reegle.info. Her daily work includes clearing clean energy data and developing controlled vocabularies.

AMBIVALENCE OF OPENNESS

by *Mayo Fuster Morell*

Organisations and Power

The adoption of information and communication technologies (ICTs), the emergence of more fluid and open conceptions of knowledge and improved information accessibility—together with other processes such as the increasing level of education in the global north—are opening up possibilities for a society that is more free and just. But they also have the potential to create one that is more closed and unfair. ICTs have no directionality (or only a single directionality) for themselves. What the resulting overall balance of the adoption of ICTs (of a more free and just versus authoritarian and unfair society) is unknown.

What seems to be clear is that the adoption of ICTs, and the conditions under which they are adopted, are changing the relational and communicative matrix of current societies at very different levels –leading to profound changes in our societies, modifying the transaction costs of organisation, changing the balance between organisational forms, and reorganising sources of power. In this context, the "Open" paradigm, which is supported by the adoption of ICTs, is emerging as an organisational format–one which seems better adapted to the current organisational environment. What actually defines this open paradigm is also yet to be defined. But what is clear is that the open paradigm is also subject to ambivalence. In the more reduced vision, we could say that open paradigm is just another way of organising, neither better nor worse, but different.

First, as in any other forms of social organising, it involves internal power dynamics, forms of exclusion and sources of discrimination. *Openness, network or horizontal systems of logic do not imply the dissolution of power, but rather its transformation into other sources and forms of power.* Power does not disappear because it does not function the way it does in a closed system; it is simply rooted in another format. Even if it is common in the open movement to ignore or deny power dynamics, the issue is still very problematical. In contrast, there is also the need to examine how power might operate in a context of openness in order to anticipate how to control it, monitor it and counterbalance it. Research could be very helpful here to better understand how what form this new system might take.

Secondly, there is a need to rethink what the conditions are in which an open paradigm should be adopted. In a very unequal society, open knowledge initiatives might favour easier access to knowledge, but at the risk of not only reproducing, but also increasing other sources of inequality in society. Here again, research could be very helpful in casting light on these questions. Gender is one of the examples in which this become more apparent. We could look at it further in the case of the Open Knowledge Festival 2012.

According to a study a few of us did on gender balance at the OKFest, participation at the event was 73.16% male and 26.83% female and all thematic streams (except the gender and diversity stream) were predominantly male. If people in open formats depended on their own resources (time, skills, etc.) to participate, only those with a high level of

resources would be able to do so. To have in place some mechanism that assures equality of conditions of engagement seems to be a necessary condition for open formats, and basic income seems to be one way to achieve this. If the open format requires conditions that only very few have, then it is only open for them. According to the principle of open paradigm, not everybody should have to engage in the same way and to the same degree, but people should have the freedom to decide for themselves.

Finally, I address the adoption of open paradigm, which the reconfiguration of forces is going to promote. This suggests that we expand our views as regards the aspects that define openness, and not only focus on the legal licence and the software as conditions that need to be open, but also to the socio-political and economic dimensions of the processes around open knowledge. Is the open paradigm going to support the social economy or the equal value concentration of corporate power? Will open paradigm reinforce the current binary structure of corporate model and State, as they are today? Or will it promote a 'commons' model and agent, supported by another type of market and State? These are open questions that also need to be addressed and cannot be ignored just because we need to concentrate on specific open knowledge projects. The way in which the open paradigm is being built, what alliances are being struck and what governance models it is being based on—all of these will have an impact on how it turns out.

About Me and My Involvement in the Free and Open Movement

My involvement in the open and free movement is the result of an evolving process between several movement waves. Additionally, my involvement in action and movement organising tends to go in parallel with developing research. I first became active politically as part of the global justice movement in the early 2000s. I saw great potential in the ICTs for advancing social justice, so I started by building "techno-political tools" to support social mobilisation, and promoted projects based on participative ways of sharing, systematising and building knowledge connected to the "action" processes of social transformation. At some point, I felt the need to investigate how the adoption of ICTs shape organisational forms into networked political schemes and how power operates in those forms, and promoted collaborative research on the subject (networked-politics.info).

I also felt the need to investigate the governance of collaborative knowledge production online, and particularly the models of infrastructure provision, so I wrote a PhD thesis about it (onlinecreation.info) and it is something I am still working on (http://cyber.law.harvard.edu/people/mfustermorell). In between, I became part of the free culture and digital commons movement (mainly though Wikimedia and organising diverse sets for the confluence of the free culture and digital commons forums (digital-commons.net), and more recently the OKFN-Spain). When, in 2011, a new kind of social mobilisation emerged (Arab Spring, Spanish Indignad@s, Occupy World Street), I promoted the building of bridges and investigated the similarities and differences between the digital commons and the "society commons" initiatives.

Mayo Fuster Morell is a postdoctoral fellow at the Berkman Center for Internet and Society at Harvard University, and a coordinator of Internet, policy and commons research area of the Institute of Government and Public Policies at the Autonomous University of Barcelona. She recently concluded her Ph.D. dissertation "Governance of online creation communities

PEERAGOGY IN ACTION

by *Joseph Corneli, Charles Danoff, Anna Keune* and *Amanda Lyons*

Peer-produced Learning

We have been writing the missing manual for peer-produced peer learning: the "Peeragogy Handbook" (peeragogy.org). Throughout this work we have asked and aimed to address questions like these: What would a motivated group of self-learners need to know to agree on a subject or skill to learn, find and qualify the best learning resources about that topic, then select and use appropriate communication media to learn it together? What would these people need to know about learning to put together a successful learning programme?

It is clear to us that the techniques of 'peer production' that have built and continue to improve Wikipedia and GNU/Linux have yet to fully demonstrate their power in education. We believe that the Peeragogy Handbook can help change that by building a distributed community of peer learners/educators, and a strongly vetted collection of best practices. Our project complements others' work on sites like Wikiversity and P2PU, and builds upon understandings that have developed informally in distributed communities of hobbyists and professionals, as well as in (and beyond) the classrooms of generations of passionate educators.

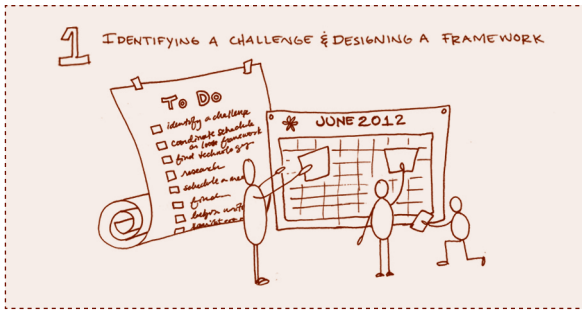
Here, we present Peeragogy in Action, a project guide in 4 parts. Each part relates to one or more sections of our handbook, and suggests activities to try while you explore peer learning. These activities are designed for flexible use by distributed groups, collaborating via a light-weight infrastructure. Participants may be educators, community organisers, designers, hackers, students, seasoned peeragogues, or first timers. The guide should be useful for groups who want to build a strong collaboration, as well as to facilitators or theorists who want to hone their approach. Together, we will use our various talents to build effective methods and models for peer produced peer learning. Let's get started!

Part 1: Identifying a Challenge and Designing a Framework

Setting the initial challenge and building a framework for accountability among participants is an important starting point.

- Activity—Come up with a plan for your work and a 'contract' for your group. You can use the suggestions in this guide as a starting point, but your first task is to revise the plan to suit your needs. Helpful questions can be: what are you interested in learning? What will your main outcome be? What problem do you hope to solve? What steps do you need to take to accomplish this? How collaborative does your project need to be? What sort of support do you anticipate needing personally? What problems won't you solve?
- Technology—Familiarise yourself with the collaboration tools you intend to use (e.g. Wordpress, Git and LaTeX, YouTube, GIMP, a public wiki, a private forum, or something else) and create a first post, edit, or video introducing yourself and your project(s) to others in the worldwide peeragogy community.
- Suggested resources—The Peeragogy Handbook, parts I ('Introduction') and II ('Peer Learning'). You may also want to work through a short lesson called 'Implementing Paragogy', from the early days before the Peeragogy project was convened (https://en.wikiversity.org/wiki/User:Arided/ImplementingParagogy). For a succinct theoretical treatment, please refer to our literature review, which we have adapted into a Wikipedia page (http://en.wikipedia.org/wiki/Peer_learning).

- Further reading—Boud, D. and Lee, A. (2005). 'Peer learning' as pedagogic discourse for research education. Studies in Higher Education, 30(5):501-516.
- Observations from the Peeragogy project—We had a fairly weak structure at the outset, which yielded mixed results. One participant said: "I definitely think I do better when presented with a framework or scaffold to use for participation or content development." Yet the same person wrote with enthusiasm about models of entrepreneurship: "freed of the requirement or need for an entrepreneurial visionary." In short, there are trade-offs to be made—hopefully in an informed fashion.



Part 2: Inviting Others

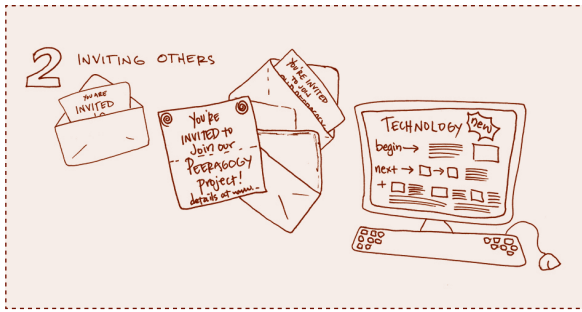
Other people can support you in achieving your goal and make the work more fun too.

- Activity—Write an invitation to someone who can help with your project. Clarify what you hope to learn from them and what your project has to offer. Helpful questions to consider: What resources are available or missing? What do you already have that you can build on? How will you find the necessary resources? Who else is interested in these kinds of challenges?
- Technology—Pick a tool that's new to you and could potentially be useful during the project. Start learning how to use it. Locate some people around the world who share similar interests.
- Suggested resources—The Peeragogy Handbook, parts III

('Convening a Group') and IV ('Organizing a Learning Context').

-----➤ Recommended reading—Schmidt, J. Philipp. (2009). Commons-Based Peer Production and education. Free Culture Research Workshop Harvard University, 23 October 2009.

-----➤ Observations from the Peeragogy project—We used a strategy of 'open enrolment': new people were welcome to join the project at any time. We also encouraged people to either stay involved or leave—several times over the past year, we required people to explicitly reaffirm interest in order to stay registered in the forum and mailing list. This choice cut down on 'dead weight'. Nevertheless, the project continued to accumulate content, which gave newcomers the discouraging feeling that there was a lot to catch up on. We've aimed to sum up the high points in the handbook!



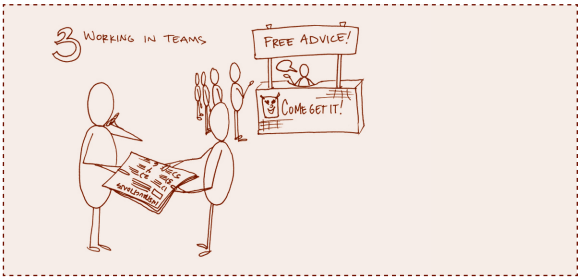
Part 3: Working in Teams

Solidifying your work plan and learning strategy together with concrete measures for 'success' can move the project forward significantly. Working in teams and sharing information with others will help you to develop your project.

-----➤ Activity—Concretise your ideas by, for example, writing an essay, making visual sketches, or creating a short video to communicate the unique plans for organisation and evaluation that your group will use. Then, edit the pages of the Peeragogy Handbook boldly: by this time you should have identified at

least one section that needs to be improved. Make the necessary revisions.

- Technology—Take time to mentor others or be mentored by someone, meeting up in person or online. Pair up with someone else and share knowledge together about one or more tools. You can discuss some of the difficulties that you've encountered, or teach a beginner some tricks.
- Suggested resources—The Peeragogy Handbook, parts V ('Co-Facilitation and Co-Working'), VI ('Assessment'), and part VII ('Patterns, Use cases, and Examples').
- Recommended reading—Argyris, Chris. "Teaching smart people how to learn." Harvard Business Review 69.3 (1991); and, Gersick, Connie J.G. "Time and transition in work teams: Toward a new model of group development." Academy of Management Journal 31.1 (1988): 9-41.
- Observations from the Peeragogy project—Perhaps one of the most important roles in the Peeragogy project was the role of the 'Wrapper', who prepared and circulated weekly summaries of forum activity. This helped people stay informed about what was happening in the project even if they didn't have time to read the forums. We've also found that small groups of people who arrange their own meetings are often the most productive.



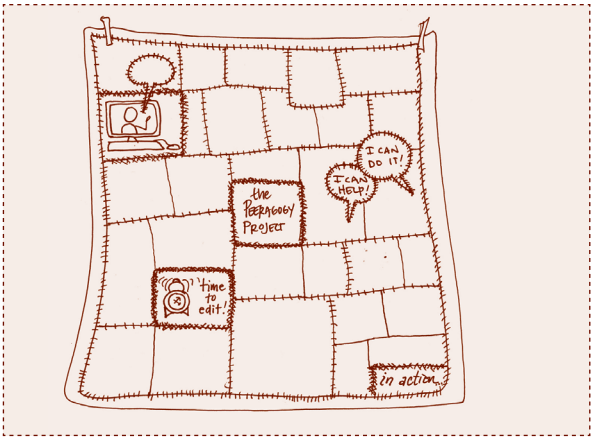
Part 4: Share Back

Wrap up the project with a critical assessment of progress and directions for future work. Share any changes to this syllabus that you think would be useful for future peeragogues!

- Activity—Identify the main obstacles you encountered. What are some goals you were not able to accomplish yet? Did you foresee these challenges at the outset? How did this project resemble or differ from others you've worked on? How would you do things differently in future projects? What would you like to tackle next?
- Writing—Communicate your reflection case. Prepare a short written (or video, or photo, ...) essay, dealing with your experiences in this course. Share the results by posting it where others in the broader Peeragogy project can find it.
- 'Extra credit'—Contribute back to one of the other organisations or projects that helped you on this peeragogical journey. Think about what you have to offer. Is it a bug fix, a constructive critique, pictures, translation help, PR, wiki-gnoming or making a cake? Make it something special, and people will remember you and thank you for it.
- Suggested resources—The Peeragogy Handbook, parts VIII ('Technologies, Services, and Platforms') and IX ('Resources').
- Recommended reading—Stallman, Richard. "Why software should be free." http://www.gnu.org/philosophy/shouldbefree.html (1992).
- Observations from the Peeragogy project—When we were deciding how to license our work, various Creative Commons licences were proposed (CC Zero, CC By-SA and CC By-SA-NC). After a brief discussion, no one was in favour of restricting downstream users, so we decided to use CC0. In connection with this discussion, we agreed that we would work on ways to explicitly build 'reusability' into the handbook content.

Micro-Case Study: The Peeragogy Project, Year 1

Since its conception in early 2012, the Peeragogy Project has collected over 3700 comments in our discussion forum, and over 200 pages of expository text in the handbook. It has given contributors a new way of thinking about things together. However, the project has not had the levels of engagement that should be possible, given the technology available and the global interest in improving education. We hope that the handbook and this accompanying syllabus will provide a seed for a new phase of learning, with many new contributors and new ideas drawn from real-life applications.



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Charles Jeffrey Danoff is the Owner of Mr. Danoff's Teaching Laboratory, an Educational Publishing and Services firm opened in 2009; specializing in developing Open Educational Resources for EFL/ESL students and teachers.

Anna Keune (M.A. in New Media) is a Designer/Researcher at the Learning Environments Research Group of the Aalto University School of Arts, Design and Architecture since the beginning of 2011.

Amanda Lyons is a Visual Thinker & Facilitator of learning at VISUALS for CHANGE. Amanda helps educators and facilitators foster deeper learning and connection through visual communication tools, experiential education and organization development methodologies.




THE TRANSFORMING FACE OF EDUCATION

by *Tarmo Toikkanen*

Questioning Status Quo

Why do we have formal, organised education? One reason is to expose the next generation to the culture, values and practices of society so that they become contributing members of society. Historically, education has been mostly about bringing knowledge to learners. In the Middle Ages, people outside of universities, monasteries or apprenticeships in guilds were largely unaware of anything outside their immediate surroundings.

This is not the case anymore. Access to information is an ever-diminishing issue as internet connectivity and cheap devices penetrate even the lowest income levels of developing countries. They also enable new ways of learning, teaching and collaborating. *Education is no longer about bringing knowledge to learners. What is the role of education in modern information society then?*

If the Wikimedia Foundation is gathering the sum of all human knowledge to be freely accessible to anyone anywhere, what is the role of libraries and textbooks? Do teachers need to provide information and knowledge to students, or should they rather act as guides in that endless sea of knowledge?

When video lectures by Nobel Prize-winning scientists are one click away, does it make sense for a teacher to lecture on the same topic? How could that video lecture be used as leverage to improve education? What activities in schools would be most meaningful?

When you can get peer support for your learning challenges in numerous online forums such as Peer to Peer University (P2PU), do you need classmates? What is the importance of learning face-to-face social rules and norms, as opposed to learning online norms? How do we grow into adults? Offline or online?

When you can get accreditation for your learning in the form of badges and certificates from various companies and private people (through projects like the Mozilla Open Badges), what is the value of a college or university diploma? Is it just to show that you're in the same social club as other powerful families? Is a good university merely a venue to mingle, network and form the basis for future business relations? Is it the contemporary caste system?

Are primary education institutions just day-care facilities to keep children away from trouble while their parents are working? What would an online primary school look like?

There are no clear answers to these questions, but they still warrant thinking, as formal education is a core factor in most civilisations in the history of the world. What should education look like, and what is its purpose?

Educational institutions are, of course, struggling to adapt to the changing open knowledge landscape. Openly licensed educational resources (OER), open courseware (OCW) and online authoring environments (such as LeMill or Wikiversity) enable collaborative authoring across organisational boundaries. Open educational offerings, including massive open online courses (MOOC), change the relationship between educational institutions and the outside community. Commercially motivated course offerings, as well as commercially supported scientific study, are a growing portion of university activities. How do public interests, commercial interests, openly available knowledge and the new, open methods of operation change our education? What does the primary school or university of the future look like, what do they provide for students and how do they operate?

Tarmo Toikkanen is a psychologist specialising in collaborative learning and technology. He is currently researching new media in classroom contexts in Aalto University's School of Arts, Design and Architecture.

OPEN SOURCE HARDWARE AND DESIGN ALLIANCE

by *Jurgen Neumann, Alison Powell* and *Tuomo Tammenpää*

Reclaiming Freedoms

Free software and Open Source software have made a big impact. They are at the heart of most modern servers, as well as being processes that harness the ability of many people to work together (peer production). In its original form, free software was based on four freedoms, as described by Richard Stallman. These are:

- Freedom 0: The freedom to run the program for any purpose.
- Freedom 1: The freedom to study how the program works and change it to make it do what you want it to do.
- Freedom 2: The freedom to redistribute copies so you can help your neighbour.
- Freedom 3: The freedom to improve the program, and release your improvements (and modified versions in general) to the public, so that the whole community benefits.

These freedoms are attached to free software licences like the GNU General Public Licence (GPL), and have meant that software code that starts out as free software code remains free software code—available to all who wish to use it to make new software. As designers and creators, we were interested in how a similar idea might be applied to hardware and design. This inspired the creation of OHANDA: the Open Source Hardware and Design Alliance.

Through OHANDA we want to foster sustainable sharing of open hardware and design. To us, the foundation for sharing hardware lay in the four freedoms from the Free Software Definition. We made the adaptations below just replacing the term "program" with the term(s) "device and/or design" to create the Four Hardware Freedoms.

- Freedom 0: The freedom to use the device for any purpose.
- Freedom 1: The freedom to study how the device works and change it to make it do what you want it to do. Access to the complete design is a precondition for this.
- Freedom 2: The freedom to redistribute the device and/or design (remanufacture).
- Freedom 3: The freedom to improve the device and/or design, and release your improvements (and modified versions in general) to the public, so that the whole community benefits. Access to the complete design is a precondition for this.

By granting these four freedoms for all documentation attached to a product, the sharing is on a sustainable basis. *Our ideal was that people would share hardware plans and designs so that they could have the freedom to work on things together (peer production) as well as the freedom to innovate designs.* But some things are more difficult to design than others. After a few years of trying to explain the importance of complete freedom to change designs, we began to see that we were talking about a specific category of designs and objects. These were designs and objects that we might want to re-use, to re-make, to re-cycle.

We started to think that the RE-visioning and RE-making of things might be a good way to explain the kinds of things that our vision of freedom applied to. These things were not just computer 'hardware' but other designs and objects: how about a RE-makeable pair of jeans? Or a RE-placeable part for a machine? A RE-thinkable tool with bespoke additions for particular tasks? A RE-engineered stove design that adapts to its environment?

We wanted to challenge and extend the idea that Free and Open Source could only apply to software. Tuomo spend a lot of time framing the new ideas into design. Now we are very happy to share the first drafts for the RE*CAMPAIGN.

Juergen Neumann is a free/open source activist and senior consultant for ICT strategy and implementation at http://www.econauten.de who has worked for major German and international companies and non-profit projects for more than two decades.

A*lison Powell* is a Lecturer in Media and Communications at the London School of Economics, researching digital media policy, politics and advocacy. Her research examines the role of hackers, activists and advocates on the structure, function and policy environment of the Internet.

Tuomo Tammenpää has a background in visual arts and design. He works as a media artist and designer in Finland sharing his time between practice-based research and development, art productions and commercial design work at concept agency YATTA.



OPEN SUSTAINABILITY

by *Jack Townsend*

Seven Billion Reasons

Can opening up the world's knowledge lead to a more environmentally sustainable economy? The Sustainability Stream of the OKFestival was an opportunity to answer this question; to survey the wide landscape of possibilities, and map out the routes from open knowledge to environmental sustainability. For me, there are three major major avenues, three key ways in which openness can help deliver sustainability. *Open knowledge can act as a technical resource for greater efficiency, a social medium for engaging with sustainability or a crucible of innovation.*

Efficiency

We have to get smarter. We live on a planet which is under growing pressure to provide ever more generously for increasing numbers of us; a planet on which we also wish to retain ancient biodiversity. Whether we like it or not, we need to learn fast how to better manage our environment and ourselves, and that means more intelligently, which, in turn, means more knowledge. There is an imperative to become more efficient in a very broad sense; we need to use far fewer environmental resources in exchange for the increasing human value we seek to gain. So how can open knowledge help us to be more efficient?

Firstly, we can often gain efficiency simply by sharing data. The release of public transport information, for instance, promises to help such transport systems use fewer resources to provide a better service, making them more competitive with more resource-intensive transport. Better access to our own energy data can help us manage our energy consumption better, as we discussed in the Open Knowledge and Energy Data session at OKFestival.

Secondly, once data is shared, increasingly intelligent algorithms can create even greater efficiencies through optimising systems. Thirdly, open data can help us rethink what we really want; what should constitute the human value we're striving to gain using our environmental resources. In the Open Data for Measuring Social Progress session of the OKFestival, we explored how open knowledge can help us move beyond simple GDP growth as a paramount measure of our progress, to a more mature perspective that also indexes social, psychological and environmental assets.

Engagement

How can open knowledge help us all to engage with the challenges of sustainability? Firstly, the beliefs that you hold are shaped by the knowledge to which you have access. Web projects created at the OKFestival, such as Future Weather and Helsinki CO_2, aim to engage people with the facts of sustainability using data provided by the World Bank and Siemens. What we believe drives our aspirations and our behaviour. So engagement can also lead to more pro-environmental behaviour and so more efficiency.

Secondly, better information can change more than just individual behaviour; informed individuals with access to reliable data are better able to hold larger institutions to account via the ballot box, purchase and investment decisions or activism. They can project environmental values, and identify and challenge negative actions and corruption. For example, the Land Matrix project—which was presented at the OKFestival—crowd-sources open data on major transnational land deals. This should provide an excellent resource for civil society to challenge corrupt or environmentally damaging acquisitions. Similarly, the Carbon Disclosure Project provides carbon footprint data on major corporations to increase accountability. Finally, open data can help us coordinate with each other in order to engage. One example is the Green Maps project which helps you find local environmental groups and resources.

Innovation

To do things smarter is to do things differently. Greater efficiency will require much technological innovation; engagement can leverage social innovation. How can open knowledge help us innovate?

Well, it seems reasonable to assume that the overall tempo of innovation increases with the quantity and quality of knowledge made available to more people. 'Open science' can go beyond traditional scientists to include 'the crowd of citizen scientists'. For example, the amateur Old Weather community digitises handwritten historical weather logs to increase the accuracy of the climate record and support science.

Open science includes large-scale open data, open access to scientific literature and open source software such as tools and simulations. Such open science could deliver not only greater innovation but also increased public engagement and well-founded trust in the facts of sustainability. More than just science, 'open innovation' is a fast-developing field. The Climate Colab project, for example, provides a Creative Commons licensed space where web-based 'collective intelligence' can be harnessed to innovate climate change solutions. Likewise, the Green Hackathon at OKFestival showed how open data is an excellent foundation for software innovation, the hacker's imperative to 'Get Excited and Make Things'.

Challenges

Opening up knowledge will not necessarily make the world more sustainable. However, opening up data provides a rich resource and a range of new options to tackle the challenge. It can help, but we will need to do our best to accentuate the positive and do what we can to eliminate the negative (or mitigate it, at least). As Rufus Pollock highlighted at OKFest, open knowledge isn't a panacea, it isn't 'fairy dust' that you can sprinkle liberally to make bad things disappear.

I believe the default for information should be open. However, open is not always the right option, far from it. The foremost exception is potentially sensitive information that identifies individuals, where sharing is prohibited by privacy. Unfortunately, making personal data sharable by anonymisation is an imperfect process. There are times when delivering the vision of a 'smarter planet' will mean compromising between privacy concerns and ambitions for efficiency, as infrastructure such as buildings and transport reacts intelligently to our behaviour and our intentions. Furthermore, as Pia Waugh highlighted at OKFestival, privacy isn't just for humans. For example, data on endangered species at risk from hunting is mostly best kept closed.

Sustainability is a particularly complex area to tackle; for instance, climate change is such a difficult problem that it has been classified as 'super wicked'. In the face of such challenges, we can expect negative, unintended consequences from any course of action. Rebound effects are a fine example of these. When technical improvements in efficiency are introduced, users' behaviours also change, so fewer resources are saved than one might initially expect. In fact, the rebound effect can be so large that efficiency improvements end up actually increasing the overall use of a resource.

Another difficulty with wicked problems is that there is little universal agreement on the nature of the problem, so we can also expect solutions to be controversial. Such differences in perspective present extensive challenges to openness in sustainability. If it's open, anybody can use it whatever their agenda. In addition, as Lawrence Lessig has noted, transparency can lead to negative false impressions that are unfair. Worse still, open information can be wilfully misrepresented: Mark Twain's "Lies, damned lies, and statistics".

We also need to make sure useful knowledge isn't neglected, even once it has been legally opened up. And when it is used for engagement, open knowledge needs to connect with both head and heart. We respond to stories that engage with our own life and outlook; we respond to imagery more than figures. Interactive, web-based, information visualisation projects have a great role to play here. At OKFestival, Tim Herzog described the World Bank's #Apps4Climate web innovation competition, which was held earlier in the year, and we introduced finalists that use open data to communicate climate change: Robin Houston's Carbon Map and our entry Globe-Town.org, which won third place. Opening up the facts is a vital foundation, but there is much more that needs to be done to make them engaging.

Conclusion

The challenges to sustainability—and to using open knowledge to tackle it—are significant and complex. But luckily, human ingenuity, our ability to learn, innovate and progress is also great, especially if our circumstances are conducive. And having ready access to knowledge is a key enabler. There are seven billion people on the planet and counting. We should see ourselves as a vast resource to take on these laby-

rinthine problems—James Cameron's "collective response to collective problems", or Al Gore's "massively parallel" human processing.

Opening up knowledge won't necessarily help with sustainability per se. However, it CAN help a great deal if we use it well. Therefore, open sustainability needs to consolidate itself rapidly as a new area of thought and as a community, so that it can press open knowledge into the service of sustainability, making it engaging, amplifying the positive and mitigating the negative. That's why I'm excited that we decided to launch the new Open Sustainability Working Group within the Open Knowledge Foundation, to work on opening up knowledge and to encourage its reuse for sustainability—putting it into action. If you're also excited by the potential of open sustainability, you're very welcome to join.

Jack Townsend is researching the role of openness and the web in tackling global challenges and advancing sustainability. This question has taken him from the energy sector, where he managed innovation with web applications and big data, to the Web and Internet Science group at the University of Southampton, UK. Jack was an organiser of the Sustainability Stream of the OKFestival.

THE BASQUE CASE

On Opening Up Government and Society

by *Alberto Ortiz de Zarate* and *Nagore de los Ríos*

Focusing on Transparency

An Open Government for an Open Society

The Basque Country is a small region of not many more than two million people; nevertheless we were one of the first societies to start up an open government strategy. Since 2009 the Basque Government has been addressing the systematic implementation of open government principles. In this article, I am focusing on transparency, but leaving some room for participation and collaboration.

In hugely simplified terms, we could describe our movement towards a more open and participatory society as a tension between two actors: citizens, who demand that governments be more transparent and more democratic, and governments that need to be legitimised by sharing power with citizens. This is how President Patxi Lopez explained the Basque approach in January, 2010:

> *'In the Basque Country that I want to see, the citizen is an adult who is able to think, decide and take responsibility by participating in jointly building the country. And I want to stress this: the times when citizens were treated like children who are led by the hand and are told what to do are over. The days when people looked to political parties or public institutions to be told where to go have come to an end.'*

So, we have considered transparency as a means for building a real civil society, as a way of engaging citizens in the joint construction of public welfare. *Transparency is never a goal in itself, but a requirement to get citizens involved in the design and evaluation of public policies.* It constitutes the basis for empowerment. It devolves power to the people.

Internal Change Is the Key to Transparency

To speak of transparency is to talk about opening up information. We can distinguish two ways of publishing information, both of which are essential. The first is to report to citizens by providing findable and comprehensible web content. The second is to release raw data for every citizen to build their own story. The big word is CHANGE. The transparency measures introduced have required substantial internal work to disseminate the following messages:

- Public information belongs to citizens.
- The default is that everything is to be published.
- The reuse of information is a right and also an asset for the country.
- Not just operational data should be released, but also sensitive information.

As regards change, the most challenging issue is internal change. In order to open structures it is necessary to modify the culture of the organisation, the very concept of leadership and the communication style. We address this as a four-stage process:

- 1. Transparency as a value, created from the combination of two principles: Clarity: the information is complete, reliable, relevant, up-to-date and easy to understand. Candour: we should also show what is usually hidden and could embarrass us.
- 2. Transparency as an attitude implies the task of changing minds. Every public officer and every public servant is now aware that any public action will be visible and debatable.
- 3. Transparency as behaviour. From the president to the most junior of public workers, everybody must act on the basis of transparency. In this new model, they have to make account-

able policies, work transparently, talk to citizens and respond to their input.

- 4. Transparency as a routine. Change should come supported by new procedures, laws and technology. The system is designed to provide transparency by default.

In the Basque case, political leadership has been essential for internal change. Those at the summit of power and senior officials must believe, and make their teams believe. And we must take into account that internal change is a never-ending process. To open up the Administration, we started by opening it up to internal participation, knowing that in public institutions there are many skilled people whose ideas have never been taken full advantage of. Change begins at home.Some actions for turning things around:

- Innovation workshops, open to all staff.
- Practice communities, for gathering professionals around an area of knowledge.
- Blogs and other social tools for internal use ... although they should be published openly so as to instil the principle of transparency.
- Trust: "Do it. Better to ask for forgiveness than for permission."

Irekia: Much More Than a Web Platform for Open Government

One of the first decisions taken by the Basque Government in 2009 was to create an online platform for Open Government policy. This platform is called Irekia, which means 'open' in Basque. Being pioneers, we decided to adopt an experimental approach; in other words, Irekia would be in permanent beta state. And so it has turned out. In three years we have laid out three different versions of Irekia, trying to adapt to users' needs. Irekia [irekia.euskadi.net] provides tools for the three principles of Open Government:

- Transparency: the information, all the information and nothing but the true information.
- Participation: not only on the government's platform, but all around the Internet.

- Collaboration: jointly building public welfare and taking care of the common people.

In fact, this is the shape Irekia's roadmap has taken. First, we focused on transparency by providing multimedia content for every piece of information about what the government does. Secondly, we focused on participation by setting out tools on the front page for sending in questions and suggestions. Recently we have added collaboration by supporting citizens' initiatives.

But Irekia is much more than an electronic platform. It's a global and cross-cutting policy, which is addressing change management towards open government. And the playing field is the world so we are listening all over the Internet and talking on every type of social media. The conversation takes place everywhere, not only on the government platform.

New Communication Guidelines

Open Government brings a paradigm shift in terms of institutional communication. For a start, the relationship is no longer one-way, but rather a real dialogue between government officials and citizens. And a dialogue always takes place between people. Institutions, by themselves, cannot have a discussion.

The consequence is that the usual intermediaries modify their habitual role. Every public official speaks in their own voice, without any filter from the press officer. The new role of the internal journalists is simply to empower department heads so that they can speak for themselves. Who better to explain decisions than the person responsible for them? And who better to propose solutions than the citizens experiencing the problems? The new communication guidelines are:

- Language: clear and simple, conversational.
- Storytelling: providing context and graphic expressions in order to explain the story.
- Accountability: that the person in charge is answering you, not just a community manager.
- Listening is more important than talking.
- Ubiquity: people are talking everywhere all the time; the place is the world.

- Face-to-face: the officials show their face, name and contact details.
- 24/7 availability. Using mobile devices to respond in minutes, not in days.

This communication must always be supported by data. Everyone has an opinion, but facts are facts. At every opportunity, we should be linking the headlines to the data sources.

Open Data Euskadi: Data for Transparency and for Innovation

Since April 2010 we have been releasing data sets in 'Open Data Euskadi' [opendata.euskadi.net], a catalogue with more than 2,100 data sets and a rate of 600 downloads every month. Going further in applying the 2003 European Directive on the reuse of public sector information, we have stated six principles:

- 1. Better data than documents: The duty of the public Administration is to publish raw data, in reusable formats, and let the citizens tell their own stories. PDFs are not reusable.
- 2. No authorisations, but free reuse: Public information belongs to the people, so no citizen needs authorisation to obtain and reuse the data. Instead we use a CC Attribution licence when necessary.
- 3. Information: better on-offer than on-demand: We try to make all the information available from the outset, instead of waiting for someone to ask for it. Everything can be useful. At the same time, we are listening to reusers in order to fulfil their requirements.
- 4. No charge, but free: We don't charge. It is a fact that reuse drops dramatically when charges are applied. And without reuse, an open data policy is useless.
- 5. Not technology-driven, but reuse-driven: In line with a pragmatic approach, our effort is directed at publishing as much data as possible, in formats that our users can easily process. We are not concerned with the greatest technological sophistication.
- 6. Sustainability based on web content: The priority is still to publish rich and easy-to-find web content. When you have that,

it's easy to extract raw data. This is a sustainable model: we are applying budgets below €100,000 a year.

Finally, we should remember that open data and transparency are not the same thing. Working for transparency, we are providing information about, for example, budgets, tenders, wages, plans, outcomes and many other sensitive data sets.

External Change: Devolving Power to the People

Open Government is about giving power back to the people, so that they have effective control over government action. Citizens are already debating, expressing opinions and participating in public affairs. Citizens should also work for the common good by sharing achievements with the rest of society. Our actions for social empowerment have included:

- Offering well-sorted and filtered information in all types of existing media: written, broadcast, video, photography, graphics or visualisations.
- Engaging citizens in the design of public services and in the evaluation of public policies.
- Building alliances with activist groups to help us improve our policies of transparency and open data.
- Educating Basque journalists to do data journalism.
- Encouraging the third sector, entrepreneurs and innovators to make use of the data.
- Facilitating contexts that promote citizen initiatives.
- Connecting local initiatives, helping them to grow and interact.

Transparency is nothing without a society involved in public affairs. *We say 'there is no good government without good citizens'.* Engagement is the keyword now. Every citizen can be a ruler, every citizen can be a journalist, and every citizen can be a public servant.

See next page for authors bios

Alberto Ortiz de Zarate is the Director of Citizen Services at Basque Government and Founder at Administraciones en red. In 2009, he laid the foundation of the Basque open data policy.

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THE UNSEEN CITY

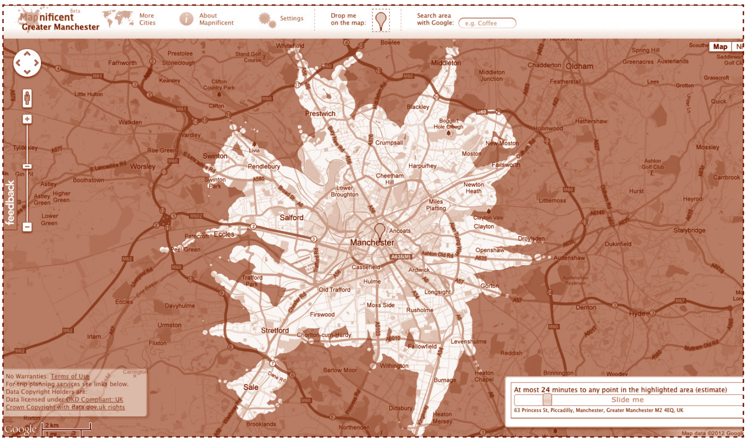
by *Julian Tait*

Urban Environment

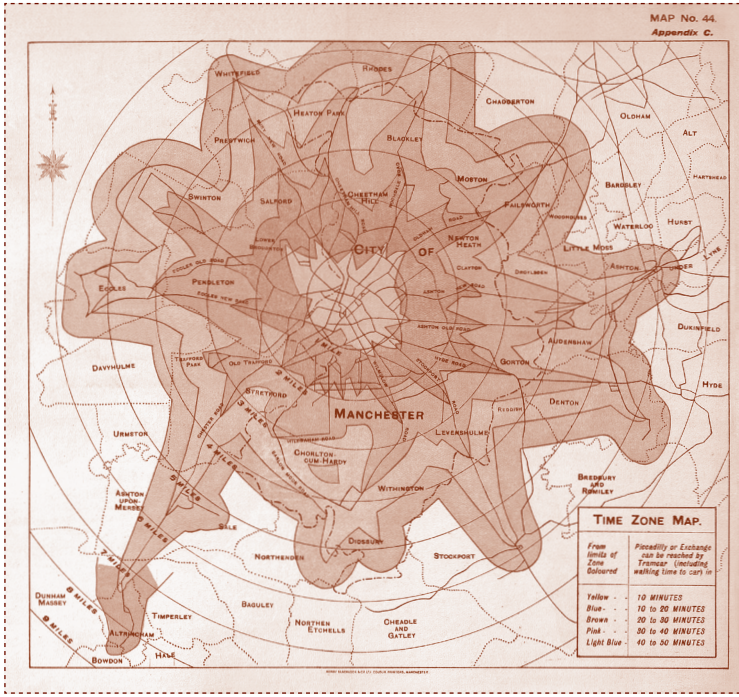
The majority of people in the world live in an urban environment. According to the United Nations, this watershed was reached on 23 May 2007. Cities are seen as places of opportunity, from London's streets paved with gold to New York's 'Big Apple'. They have a gravity that pulls in people, resources and land. Cities are places where disparate communities live cheek by jowl, where serendipity and spontaneity create potential for new direction and opportunity. This isn't a flat landscape. Within the city many factors create inequality—whether it is access to services, jobs, transportation or even opportunity.

Cities themselves are complex organisms composed of many layers that have, in most cases, evolved with the city. The physical manifestation of the city is that of roads and buildings, of built environment. It is tangible, concrete and visible. There are layers of processes, relationships and flows within the city, and what Matt Jones, Founder of Dopplr, described as the 'immaterial' layer. *The immaterial layer is data. It tracks, evidences and actuates.* Although a proportion of this data is in the domain of commercial organisations, much of it is created by the city as part of its normal function of service delivery.

Public data is often held ad-hoc by proprietary systems and constrained by departmental or quasi-commercial restrictions. This data, when released, offers a chance for analysis and interpretation outside of the narrow field of view of its creating body. When Open Data Manchester petitioned for the release of local transportation data in 2010, the reasons were practical—timetables and stop locations will make people's journeys easier. This, in a sense, suffered from the same myopia as that which created the data. It was when MySociety and then Stefan Wehrmeyer created dynamic isochronic maps (maps where travel times are overlaid onto a map with open data) that a new dimension to transportation within the city appeared.



On a base level, the map shows the distance that can be covered in a given time, which is very useful if you are looking for somewhere to live and commute—but the more interesting revelation is when you start to look at how communities are served by public transport. How do you travel across a city that has a 'spoke and hub' transportation system and, intriguingly, where could possible pressures on public services, housing and amenities arise in future. By describing schedules and stops, this data layer—when combined with other data such as fare structures, indices of deprivation or all manner of other datasets—reveals a previously invisible facet of the city.



Manchester is, like many cities, a post industrial city. This map of the transportation system is not unlike the previous map and reveals travel times from the centre of Manchester using public transport in 1914. It is a similar sort of visualisation, revealing the same spoke and hub nature of the city's transport system, the difference being that the city of 1914 was a heavily industrialised city, with coal mines, cotton mills, steel works, chemical factories and workers' neighbourhoods. The industrial city has long gone, but the traces of it can still be seen in the routes and stops of the transport system we have today.

Data reveals other traces of this past. Heavy industry sometimes leaves a lasting stain on the surrounding land and neighbourhoods. Local anecdotes give a clue as to what once existed. In East Manchester where factories were built in close proximity to the homes of the workers, stories abound of molten metal being transported

along residential streets, of blue pigeons or spontaneously combusting soil. What might seem like tall tales of a bygone era are incredibly important. UK local authorities have an obligation to map the legacy of heavy industry, with data being held in Contaminated Land registries. Often a charge is made to access it, restricting the supply of knowledge to the wider community.

By making this type of data openly available, we create an environment where whimsical tales of discoloured wildlife are confirmed or discounted and people are able to decide whether they can grow their own food, or move into or out of an area. The City of Manchester, as part of its commitment to open data, has started releasing Contaminated Land data and, although it is not perfect, at least it will enable people to start to understand the pollution that is around them. Some of the reports reveal land with unsafe quantities of arsenic and other metals—land that you would not want to grow your own vegetables on. Data such as this is contentious as it reveals something about the local environment that previously was only available to a few. Liberating this data has both benefits and challenges. On one hand, people can make more informed choices and on the other hand, someone might find that the value of their home declines or their neighbourhood becomes less attractive.

By exposing a city's data layer, we have the opportunity to reveal many of these insights and hopefully through this knowledge we can make our cities more equitable and understandable. Data is starting to be released revealing levels of deprivation, crime and access to services within the city. This sometimes reveals what is unknown or what is known only by a few, and some of the data reinforces what was only known anecdotally.

Perception of an area is sometimes not confirmed by underlying data. A classic example is perception of crime against actual crime. People may live in an area where the level of crime is high, but the community environment might give the impression of relative safety. The underlying factors behind perception of crime are complex but the challenges around the releasing of such data are not unique.

Knowing about something isn't the same as being able to do something about it, and work has to be done so that this new knowledge has a wider benefit. A local council representative, when asked about releasing contentious data, retorted "Who are we to tell people

how bad their neighbourhoods are?" This is an important point that reveals something about the way public service has traditionally been delivered, where knowledge was held by a few who saw that their role was delivering public service to, and not with, people. It also underlines the point that making data available is not enough. With openness comes responsibility—and this is incumbent on those who seek to create such an environment, that they also help create the tools and understanding necessary for everyone to understand and act.

Perhaps revealing and opening up the data layer is the easy part. Cities have always had asymmetries as far as access to knowledge, resources and the ability to act is concerned. But to return to the council official's comment, "Who are we to tell people how bad their neighbourhoods are?" The answer, I would say, is "Who are we not to?"

Julian Tait is a project initiator and creative producer interested in the societal impact of technology and mechanisms that bring about change. Since May 2009 he has been leading the Open Data Cities programme for FutureEverything. The programme sought to build a more efficient and equitable information environment for citizens, business and public bodies, laying the foundations for the Greater Manchester Datastore DataGM.

THE DARK MATTER OF THE INFORMATION WORLD

by *Ian Abbot Donneley*

Creating Value

In physics it is estimated that dark matter, accounts for 84% of the matter in the universe. This made me think that open data is a bit like dark matter—i.e. most of the data in the world could turn out to be open, we just haven't made it open yet. Whenever ideas like this surface, a quick search often reveals others have explored similar ideas. This is no exception, and my search revealed an enlightening post from David Eaves which talks about the need to focus not on open data itself but on how open data can make the world a better place. He explains that the impact of open data comes from three things:

- Using open data to drive policy outcomes
- Enabling data-driven decisions
- The ability to scale the use of open data by applying common standards

My view is that these are going to make many people feel uncomfortable—especially in old institutions, since it is a bit like when Copernicus discovered that the earth rotates around the sun—*not everyone wants to know about the data*. At the moment, much attention is focussed on creating ad hoc open data portals. This is indeed a useful step forward, but portals are not where the big impact will come from. These great insights set me off on a train of thought on how open data can create value.

Idea 1: Open Data Is a Tool That Enables Good Governance

Because open data drives transparency of knowledge it can create impact:

- Providing 'net new' insight to make better decisions
  Establishing feedback loops to help us understand the outcomes resulting from decisions
- Creating transparency to reveal potential sources of corruption. Better still, it can shed sufficient light on a situation so as to prevent corruption being considered as a viable option in the first place.
- Setting up evidence-based 'situational awareness', thereby making it possible for people and systems to become agile in our response to a rapidly changing world.

Idea 2: Open Data Enables People to Replace Use of Energy, Resources and Cost with Information and Design

Imagine a city trying to reduce its CO_2 emissions while improving its economy and creating a more liveable environment. Open data is a new resource to help change the way things are done: including everything from big infrastructure decisions to small, individual behavioural changes. The technology of large numbers of temperature sensors and city-scale Wi-Fi could provide the infrastructure. In addition, open data would need some smart analytics, some cool visualisation and some engaged people to complete the system. The people operating the city systems could move from 'guessing' what energy is being used for to 'knowing', and then use this insight to inform building use and highlight good practice. This real-time picture of energy use outcomes would facilitate a fascinating city-scale awareness of how things actually work in practice. It would allow all kinds of improvements to the system: spotting anomalies, understanding trends and managing the dynamics peak load etc. This data-driven insight would enable the confident implementation of new products and services that can optimise increasingly costly resource use.

Idea 3: Open Data has 'Unintended Value'

By putting data 'out there' as an open asset for anyone to use, it creates an opportunity for unintended value e.g.

- People can start to put open data together from different domains, thereby creating new insight: In the UK around 15-20% of all road traffic can be attributed to healthcare, which is an amazing way to look at these two systems—it includes people who are ill or visiting, 1.4 million staff and the diversity of people who are part of the complex supply chain. If you want to radically improve transport and reduce the CO2 footprint in a city then understanding healthcare could be a productive place to explore open data.
- Connecting open data with 'inside data': A fizzy drinks company that wants to know how its supply chain is performing can combine what its internal stock management system is saying with the comments of customers who tweet when the supermarket is 'out of their favourite drink'. With very little effort, the company has a real time auditing system at critical times in the process.
- Using open data to connect inside an organisation: I suspect that making data open is turning out to be one of the easiest ways of sharing data within an organisation. The silos of Department A and Department B can begin to collaborate without the baggage of internal politics and the complexity of coordination.

In essence, open data enables a 'system of systems' approach.

Idea 4: Knowledge has Shifted from a Question of 'What' to 'Where', and Open Data Is Increasingly where Knowledge will be Found

This idea of a shift from 'What' to 'Where' came from Douglas Thomas in his great talk on 'A new culture of learning'. Our world is using knowledge in ways that are changing significantly. For most of history, the challenge was all about what you know. However, with the rise of internet search as a tool it is now far more productive to search for knowledge as a primary step when we need to learn. In 1997, the number of searches for a leading search engine was about 9800 per day, whereas in 2012 it is now around 4.7 billion searches per day. This has serious consequence because people make decisions based on the data that is available to them—even if it is poor or inaccurate. Closed data is becoming increasingly invisible as the volume of open data grows.

Idea 5: Open Data Is the Fuel for a Cognitive Surplus in a 'Smarter City'

Clay Shirky has developed the great idea of cognitive surplus, which talks about people learning how to use their free time more constructively. My suggestion is that open data is a new resource that can amplify the impact of this trend. In any city, you will find a huge amount of intellectual capability inherent in its citizens. These citizens know first-hand the issues and the opportunities of the city and by using open data they can rapidly create tools (apps) and insights to make their lives better in some way. I would not be surprised that if we could add up the collective processing power of citizens in many cities, it would exceed the combined processing power in all the cities' industries and government agencies—this computing power is not only in the form of laptops, smartphones and most importantly in the heads of its citizens, but increasingly it is in the cloud-based solutions that are being used. Therefore, feeding open data to this cognitive surplus enables systems within cities to operate better at almost no increase in cost.

To be able to reveal large amounts of hitherto unseen open data, i.e. the dark matter, it takes some careful data regulation to ensure quality and accessibility. Often it is about keeping data formats simple (Simple Data Format, SDF) and creating open APIs (Application Programming Interfaces). In conclusion, my contention is that, like dark matter, open data is a lot bigger than we think.

Ian Abbott-Donnelly works as a European CTO for IBM 'Big Green Innovations' & Smarter Cities. Ian's current areas of focus in IBM are advanced water management, smarter cities and computing applied to environmental issues.

LINKING OPEN DATA WITH THE WEB OF THINGS

by Jindřich Mynarz

Semantics of Web

Since the open data movement started to appear, there has been a pervasive emphasis on open availability of data. Members of this newly established community have advocated for open access to public data. They have put pressure on public bodies to enable the public to access their data. Open licences granting citizens equal rights to data have been accentuated. In short, attention has mainly been paid to the supply side of open data. However, open access doesn't imply use, let alone effective use. Even though access is a necessary precursor to use and although it enables data to be used, obviously, it doesn't cause it to happen. While it was clear to the open data advocates that the impact of open data stems from the use of data and not from the access to data alone, there has been a systematic neglect of the demand side of open data. Solely emphasising the producers of data leaves data consumers out of the picture. In brief, in many cases insufficient consideration was given to enabling the use of data after its release.

In the last couple of years, we've seen a change in the discussions concerning open data that shifts the predominant focus on data supply to a more holistic approach which takes more account of the uses made possible by the open availability of data. *Instead of a narrow-minded focus on "giving us back our property", open data advocates have moved towards adopting a more user-centric perspective.* Here's the situation with the use of open data: effective use of data requires at least three things. Firstly, users need to have access to data. Since we're dealing with open data, access is granted by definition. Secondly, they have to have the skills and tools to work with data. In order to use data, we must be data literate. Thirdly, users must also have access to all the information that is necessary to understand what's described in the data. I would argue that this final ingredient is what is often missing from the debate.

When information about what is described by data is missing, it forms a barrier to use. Without this ingredient, data may be almost useless, since there is no guidance on how to use the data. At best, such information might be captured in a well-designed database schema or found in documentation or manuals. Documentation may be difficult to find, since it might be disconnected from the data it documents, associated with it only by co-occurrence on the same website as the one data can be downloaded from. Although it might be possible for you to find the documentation and read it, for applications its vague connection with data remains unreachable and its free text unreadable.

What's worse is when data is undocumented. With open data you don't usually have the luxury of asking the database administrator of the original data source to provide you with explanations. In the same way, you might be restricted from accessing the applications in which the data is used, which prevents you from reconstructing some guiding principles about how to use the data. In other cases, this information isn't available in any form. With familiar datasets you might be able to exercise your intuition to tell what's in the data. Applications can't do that unless you teach them how. Even smart applications have a hard time inferring semantics from the way data is used.

Let me give you a couple of examples of the kinds of problems I mentioned. Many of the openly available datasets are in a tabular data format, such as Excel spreadsheet or CSV. Without accompanying documentation, column headers in datasets of this type might be too ambiguous for the data to be used effectively. In some cases, it's possible to tell the meaning of a column name by looking at its values, but this is not reliable. Even if two datasets share the same column label, it might not refer to the same thing. Labels are surface forms of meaning, not identifiers. I have taken several examples of column headers that are used in CSV files listed in the Data Hub (http://thedatahub.org) to illustrate this point. They include cryptic codes such as 'V23_6', generic nouns like 'Object' or 'value', incrementally assigned labels ('Column 42') and unknowns such as 'X'.

It's not only dataset schema that might need explaining. In some cases, the content of data isn't descriptive enough, which makes data detached from the things it should describe. Plain values in columns of tabular data formats might be difficult to ascribe to the

real-world entities they refer to. For example, there are multiple cities named 'London', so this string would make an ambiguous value. Similar problems may arise when the scope of the referenced thing isn't clear. If we stick with the example of 'London'; does it refer to the City of London or the metropolitan area with the same name?

These are the types of issues we encounter when we represent and share data within the limits of our technologies. Frictionless exchange of data over the web forms a technological basis for open data. At the same time, it's context-free communication, in which all content must be enclosed in the sent messages, abstracting from the content's context. It's separated from the context, in which it was created, and from the context, in which it's used. Therefore, for the most part, data isn't an autonomous carrier and datasets aren't standalone packages. On the contrary, datasets have a multitude of dependencies, most of which need to be resolved in order to be able to use their data effectively. As Paul Saffo wrote in Wired back in 1994: "It's the context, stupid." Except when the content of data is self-descriptive.

Self-describing data is bundled or interlinked with all the information necessary to interpret it. There are two fundamental kinds of semantics that self-descriptive data should capture. The first is domain semantics, which is composed of relationships between data and the phenomena described in it. It accounts for what data is about, establishing correspondences between data and the domain it describes. For example, the URI http://dbpedia.org/resource/Open_data may be used in data to identify the abstract concept of 'open data'. The second type of semantics is structural semantics, which describes the relationships inside data, covering the ways in which structure within a dataset and between datasets may be expressed. An example of such a relationship is when a dataset is a slice or time-delimited snapshot of a data stream.

Linked data offers a solution for expressing domain and structural semantics. It's a publication model for structured data on the web that builds on a solid basis of web standards and a recognition that all knowledge lives in networks of relationships. Linked data is a way of describing relationships as data. Link is a universal formalism for expressing relationships in an explicit, machine-readable way, representing them in a way that both people and machines can follow. It can identify anything: data, real-world things or abstract concepts. Links

serve as access points to data, establishing paths that enable users to discover enough information to help them make use of data.

Let's return to the examples previously mentioned and see how using linked data helps. In the case of ambiguous column labels, such as 'value', there would be a URI instead of a string. A URI is a link you can follow to get insight into exactly what it's supposed to mean. When we come back to the second example, we apply the same procedure and use a URI instead of the string 'London'. Then by resolving that URI, we can provide additional information, such as GPS coordinates or boundaries, which is needed in order to tell which one of the cities named 'London' is meant and what's its area. As illustrated above, a key to the solution proposed by linked data is to make relationships between data and its described domain explicit by expressing them as links.

For this solution to work, open availability of links and the data they identify is required. The same principles of open access should apply not only to data but also to its accompanying description. Therefore, relationships described by links should also be available under the terms of an open licence. These paths need to be openly accessible in order for the data to be open to use. This is why linked open data is important. Knowing how the web of data is related to the web of things is an essential insight for turning data into networks of actionable knowledge. Inaccessibility of relationships in data is a barrier to use. We need to tear down this barrier and open the network of relationships in data for both humans and machines to leverage.

Jindřich Mynarz is a PhD student in Applied Computer Science at the University of Economics, Prague. As a researcher in the Knowledge Engineering Group, he explores linked open data with a focus on the intersection of public procurement and e-commerce, looking into the ways in which semantic web technologies can make public sector data more useful.

OPENNESS AS A TRANSFORMATIVE FORCE

by *Ossi Kuittinen*

Xtraordinary ideas

Change of Era

The 21st century global context is increasingly uncertain, rapidly changing and complex. These features confound and disrupt previously coherent frameworks, provoking distress in the external and internal worlds and the relationship between them. Institutions are broken and humans are disillusioned—could open data have the transformative capacity to fix broken institutions and empower people? Linear models and planning are tools for the industrial age, not appropriate methods in a complex systems era. In our postmodern era we need to embrace ambiguity and unpredictability. Focusing on the past as a reliable structure for a way forward is no longer a safe strategy. The future cannot be planned so an innovative, entrepreneurial and more experimental method is needed.

In modern times, the industrialisation of the human soul has gone a long way owing to (social) science's marginalisation of the human experience and the creative human impulse. If it is to claim relevance in our transitional era, the academy must develop a more sensitive ethic, recognising the embodied unity of humanity, nature and technology. Human beings are radically real, enactive, embodied and holistic: technologies for better life and wellbeing cannot be achieved before we have a more human-centric and open approach to technology.

Open society is based on open markets, open innovation and open data. In a complex and human-centric world public institutions especially should change their role in society from a controlling one to a more enabling one. This is possible with new co-creation and co-governance processes and tools, and with open data.

Co-governance—taking decisions at the lowest possible level of authority and creating new checks and balances on the overall decision-making activities of the state—is needed since public institutions as architectural monoliths are extremely difficult to develop, maintain and operate. Wiki- and Linux-society thinking could help us develop new structures. For example, in a Linux society, everybody can innovate on the periphery—but the kernel close to the processor is a strictly controlled domain. This principle, applied to democracy with open data, would mean more innovation and participation. Is it time for real democracies of action—democracies in which politicians and academics are measured like the rest of us?

We Need a Renaissance of Spiritual Capital

Intellectual capital is not enough. We need a whole new spirit and emotional energy to control the reasoning process. The success factor in this transformation from a closed institution-centric world to an open human-centric one is to enable transparency to build trust and encourage inclusiveness. This is how we can get our spiritual engines of innovation started. Transformation is always a business opportunity. The formula for success in creating sustainable peer networks, such as those around Wikimedia Commons and businesses of all types, is to increase their share of knowledge, which will then increase their share of innovation and customer intimacy, and finally result in increased market share. Openness helps with this formula. Why do leading organisations use open data? They do so because of their commitment to continuous improvement.

Embrace Ambiguity

Knowledge rationalises and legitimises, rather than causes, positive transformation. Unfortunately, knowledge has become both the authority and the power. In a complex system there is not one single truth: open data helps embrace ambiguity. Knowledge authority

is more democratic, which essentially gives us permission to act for those whose permission we are accustomed to waiting for.

Open Data is Not Correct Data

To be right or to be correct is to have power. People who claim to be right claim to have correct data. Rightness and correctness in human communication have evolved as a means of social domination. People and groups who dominate are either officially right or objectively right. These people control data. They own it. Data that is not open can be claimed to be right and correct as a matter of social domination, but it may only be helpful to those who belong to the group that has access to the data. Such data serves concentrated power.

Open data can be seen as more generally helpful data, as it is not an instrument of social domination. *The point of open data is not that it is correct. It can be messy and incorrect and yet it can be helpful.* The point is that, whether it is helpful or not, we can democratically come to our own conclusions. Openness of data can be reframed as the new objectivity. Open data skills will be a prerequisite in the complex global information economy. Open-data-based policy making is more democratic than closed expert-driven evidence policy making.

How to Build a Roadmap for the Transformation

What is required is systemic change. All system elements, i.e. civil society and the private and public sectors, need to rethink their role in society. Open up rigid institutions in stages. Start with ethical organisations and practical individuals. We can learn from nature when building a more sustainable society since in complex adaptive systems and biological systems more diversity tends to mean more stability.

The Nordic mobile ecosystem story teaches us about private- and public-sector partnership. In this new co-creation process we need people, a public-private partnership where people will have the leading role. Government as a platform, combined with increased citizen and business participation, will result in a faster innovation cycle and lower market entry and transaction costs. This will follow the laws of the network economy, which typically has a slow start and, after a tipping point, exponential growth.

Get back to coherent frameworks. Stop the mechanisation of

the human soul—we are emotional beings. Just putting our trust in rational thinking without any values will only continue the mechanisation process. An open data culture helps continuous societal improvement. It empowers citizens, rather than supporting things that leave people disconnected from themselves and from one another. It is important to direct public funds towards building an open data culture.

Systemic blind spots cause disasters like the 2008 financial crisis. Open data helps to reduce systemic blind spots so that citizens can participate in interventions that support a more democratic and caring society. This transformation needs a new type of causality: Transformative Causality where nobody is really in control of organisations but instead joint effort comes from complex cooperative communication.

Why do human sciences consider humans as a mechanism when it has been shown mathematically that organisms cannot be modelled as mechanisms? Humankind is at a crossroads. We have two possible futures: 1. Institution-based, where there are enormous business opportunities with social control 2. Human-centric, where we have enormous opportunities for a good life. Care for the self, care for others and care for the environment are key values in constructing a foundation for a human-centric society.

Open data is there to help inform or shape our shared world into a more creative, egalitarian world that has fewer systemic blind spots. We just need to open our heart and minds—open knowledge, an open society and open innovation will follow.

Ossi Kuittinen is a technology evangelist and an opportunity generator, working as the Director of Information Society Development at the Finnish Innovation Fund Sitra.

PARTICIPATORY BUDGETING

by *Raimo Muurinen*

Your Choise

If Knowledge Is Power, then Open Knowledge Is Empowerment

In order to be able to make decisions on good grounds, knowledge is an essential prerequisite. That is what the democracy group of the city of Helsinki, led by Mayor Jussi Pajunen, must have thought when it began to research the possibilities of new means of participation for the citizens of Helsinki. The group's report, published in the autumn of 2011, suggested participatory budgeting as one possibility worth trying. In December 2012, the decision was made to start a pilot project the following year. Is participatory budgeting going to evolve into a new significant model of democratic decision-making in the near future? Meanwhile, between late 2011 and the beginning of 2012, the Finnish innovation fund Sitra organised a forum called New Democracy for 30 guest experts with the aim of exploring, discussing and experimenting with new forms of democracy.

The members of the forum considered a new democratic method of deciding about public spending called participatory budgeting. They decided to try it out right away, as the forum budget involved an amount of about 120,000 euros intended for boosting new democracy initiatives. A start-up company called Avanto insight, working in the field of open democracy, organised the process where the members of the forum, the representatives from the initiatives that were the actual budget proposals and a few members of Sitra were all equal decision-makers. Four projects were voted upon to receive funding. They were Open Ministry, a platform that enables citizens to suggest law initiatives according to the new citizens' initiative law; Social Hub, a communal working space in the middle of Helsinki, open for non-commercial activities with social significance; Helsinki City Library's participatory budgeting project; and, finally, a data liberation project called Data Election that had the aim of opening up candidate and election data in the Finnish communal elections.

Co-Working with Library Users

The Helsinki City Library participatory budgeting project was a collaboration between the city library organisation, the technology company Emobit and Avanto insight. Emobit had previously opened up Helsinki City financial statements data and published them as a visualisation on the Open Spending.org platform. Avanto insight again became responsible for designing the participatory budgeting process. The project involved setting up a Finnish website with the theme, osallistuvabudjetointi.fi, which was used to communicate and document the proceedings. Everything was done in as open a manner as possible, to allow the audience to participate in the planning and learn from our experiences.

As another part of the project, Open Spending was used to create visualisations from the City library financial data. Besides sharing the links in social media, we actually presented the visualisations to live audiences in workshops. The participants reacted with curiosity and interest, and, according to the feedback, the colourful boxes view in Open Spending really helped people to understand the numbers more easily. The budget propositions were pilot projects that were planned on the basis of hundreds of ideas from library users, who were asked to think of the library of their dreams. In the end, after three workshops, participants had discussed and voted on their favourite four out of eight propositions, which will be funded and executed in 2013. For example, one project will bring children's birthdays into the library and another project aims at creating silent space for relaxation inside the library, in contrast to how the situation has developed over a long period of time.

A Good Beginning with Big Possibilities

In addition to the New Democracy forum for Sitra and the City library project, a third process was organised in Tampere. Demola, an innovation platform that brings together students and companies to solve real business cases as problem-based learning, was the first case of a Finnish company involving its community in a participatory budgeting process. Students created "education that your teacher would not think of" for themselves, as the slogan stated.

To sum up participatory budgeting in Finland in 2012, there

have been three processes, five workshop events, over 130 participants and 39 budget proposals, with more than 220,000 euros having been budgeted in the new way. The City of Helsinki published a report on the subject and decided to begin a project the next year with the youth of Helsinki. The Helsinki City Library project especially gained a fair amount of attention: it was covered seven times in the traditional printed media and broadcast on six radio programs. Journalists were truly excited about the new possibility of direct democracy, as the news tended to be more about the method than about the content.

Participants were also excited. According to most of the feedback received, they would be happy to see participatory budgeting grow and became a widespread method of decision-making. However, even though modern participatory budgeting is usually thought to have begun as far back as 1989, it has remained a marginal phenomenon everywhere outside its origins in Latin America. So the question is: what must be done in order to take advantage of the benefits that participatory budgeting has to offer? Can public spending be democratised?

What Do You Know?

For now, the politicians and political parties have the power to decide about public budgets. It is up to them whether they are willing to give away their power voluntarily. People can, of course, change their political representatives, but still, in this type of system, the ones who get to decide are in fact the politicians, no matter who they are. If one has an optimistic view about politicians' aims, then one may think that they might not be eager to give away that power because they can use it for the good of their supporters. And if the opposite is true, if one has a more sceptical view, the politicians will surely still hold on to their power, except with less altruistic goals. One participant in the Helsinki city library process compared participatory budgeting with an event involving a different participatory method she had attended previously. She had taken part in a participatory walk where citizens were asked to give feedback about the city's infrastructure. The participants had been told that their answers would be taken into account in future planning and the actual effects of their input might ensue in a few years. In her opinion, participatory budgeting was far more motivating as she could make the decisions within a small group and see

the results as early as the following year. And there it is. Who would not want to have a fast track to real power—and not have to question one's own decisions when one thinks that one is doing good for others?

On the other hand, in order to enable well-informed discussion about alternatives, the decision-makers need knowledge about the matters in hand. Even though there is no requirement for politics to be rational and values are actually an inseparable part of deciding what is best for the people, knowledge rarely decreases the likelihood of making better politics. Again, in the Helsinki city library participatory budgeting workshops, the budget item alternatives were introduced with a price tag with one five-digit sum and no further information. Participants were eager to know more about the basis of the prices and they felt a bit frustrated when there was not enough information available. The opposite happened during the opening part of the workshops, when the organisers presented visualisations of city library finances on Open Spending.org. Participants reacted positively and seemed satisfied that they had an abundance of information at their disposal. In those cases they could not end up in a situation where they lacked the information they needed in order to make well-grounded decisions.

Model for Revealing Secrets

For public administration, the most important benefit to be had from using participatory budgeting is achieving such information as is not available anywhere else. So if some officials have already learned to listen to the people and even devolved the decision-making power to the public, should we not now concentrate on the quality of the interaction? Once again, knowledge is key. For too long—practically always—information about public finances has generally been thought to concern only a few people, namely politicians and civil servants, journalists probably as well, but not the public. Is this sentiment healthy in a modern society? I would like to use this opportunity to suggest an idea for a model for changing this situation.

The model consists of three components, two of them already being in place. The Freedom of Information Act and Honest Leadership and Open Government Act are federal legislation in the United States. Among other things, they effectively promote openness, and have as one practical outcome that individual states must publish transpar-

ency websites to share information about their public spending. What is particularly pleasing is that the level of detail and comprehension is mostly rather good. Legislation is needed to enable and perhaps require administrations to take action to be open.

The second part of the model is technology. Public financial data needs to be open data. That means it must meet the basic requirements that the data is freely at people's disposal and it is stated that it may be used on the basis that there are no charges for acquiring it. In addition, it needs to be in a format that enables further usage. This leads to visualising financial data to make big numbers easily understandable for everyone. Open Spending has one particularly useful feature for an individual taxpayer, which is, clearly enough, called "Where does my money go?" Its view, "The daily bread", shows how the amount relating to one taxpayer's one day's worth of tax is used. In other words, it tells us what we buy from the public administration every day. But not only that, Open Spending is also useful to you if you are interested in the whole organisation's point of view.

Technology and legislation might be powerful tools, but there is one essential part missing to really make a difference. It is the people who are the only ones who can put open knowledge into action. So the third part is that there should be lots of interaction between all parties—the people, the politicians and the public officials. The principal form of interaction should be live meetings. Public officials should organise a systematic series of discussion events that could take place in schools, libraries, hospitals or parks that are close to the neighbourhoods where people live. The idea is that first the public officials explain (backed up by visualisations) about public spending. Secondly, they change their role and listen to what the people have to say and answer their questions. In addition to the live events, an online presence is also needed, in order to share the information with the people who cannot attend and also to allow the discussion to continue into more detail.

When planning these events, it should be borne in mind that it is important to match people's interest as closely as possible. For example, if an event is organised for the people of one neighbourhood, then, rather than starting by lecturing about the finances of the whole city, the lecturer should tell the participants about how the budget affects

them in particular. Another essential measure is to be careful about collecting all the feedback and storing it in a reusable format. People have always criticised politicians' decisions—why not turn the feedback into data and explore whether it can lead to a better solution?

Refining this model and taking into consideration previous experience from similar activities, it would be worth beginning to try it out in practice. Eventually, spreading out information and raising the level of public awareness about public spending will lead to an answer to the initial question. If the people are dissatisfied with how their tax money is spent, they will most probably demand an opportunity to participate in the budgeting—or it can even be the other way around: the politicians may want to get the people involved—in order to remain on good terms with their voters. The opposite, that people actually are satisfied with public spending, eliminating the need for participatory budgeting, would not be a bad outcome at all, but would surely be a little unexpected!

Raimo Muurinen is a facilitator for the Open Knowledge Finland network at Otava Folk High School and an entrepreneur in a start-up company Avanto insight. A Bachelor of Business administration by training, he is continuing his political science studies at Tampere University with a focus on open democracy and e-participation.

THE BUSINESS CASE FOR OPENING UP DATA

by *Ville Peltola*

Not a Zero-sum Game

"Why should I open up my data? What's the business case?" If you have a conversation with a company about accessing their data, these are the likely responses you will hear. This shouldn't be a surprise because businesses have always asked these questions. Unfortunately, asking about the business case for accessing your data leads nowhere. The question of a business case has one critical flawed assumption—you know all the ways that your data could be used.

People say 'data is the new oil'. Oil is a raw material which is used to produce petrol and plastics, for example. If I have two barrels of oil and I give you one barrel, I have one barrel of oil left. This example applies to all traditional raw materials and one can argue that it doesn't encourage sharing of raw materials. Data, however, is a different kind of raw material—its value can increase when it is shared.

Another friend of the business case is the ROI—Return On Investment. Frequently, people assume that both the words 'return' and 'investment' directly imply money. However, they can mean more than that. For example, 'return' can mean an increase in brand value, change in the company image or a better culture of innovation. 'Investment' can mean time, assets and resources like raw materials. Remember the oil.

Nowadays, it is widely accepted that innovation takes place outside your company. The term 'co-creation' means that you engage your customers in your innovation process. Co-creation requires humility to admit that you cannot come up with all the best innovations alone. That is why you ask for help from your customers. Netflix did this in 2010 when they opened up their application programming interfaces (API) for 300 consumer electronics manufacturers. Their subscribers grew from 12 to 20 million in one year and, at the same time, their competitor Blockbuster went bankrupt.

At the same time, a free iPhone app was created, as well as applications for Xbox 360 and Nintendo Wii. These were created by others—not by Netflix. Today, having an API for your company's products and services is just as important as launching a website was in the late 1990s.

Smart companies are humble companies. They understand that they cannot come up with all the possible use cases for their data alone. Instead, they ask for help and engage their customers, and most importantly, the developers. Data and APIs are like honey to developers—the more attractive data you provide, the more likely they are to come. The more your raw material—data—is shared and reused, the more valuable it can become.

This approach of co-creation doesn't mean that all data needs to be given away for free. After all, private companies need to make money. One approach is to give free samples of your data to developers to increase their appetite. You could create bronze, silver and gold level APIs for your data. Bronze could be free but for limited use only. Silver could offer more but for a price. Gold could be for unlimited use at a higher price. This approach feeds the innovation and co-creation which smart and humble companies will adopt with open and curious mindsets.

The logic and thinking behind calculating business cases still apply to traditional raw materials. Data, however, is a different kind of raw material which requires new approaches to making business decisions. In the digital world, business is not a zero-sum game; new business value can be created by sharing open data.

Ville Peltola is the Director of Innovation in the Chief Technology Officer's team at IBM Europe. During the past few years, Peltola has been focusing on smart cities and emerging civic innovation with open public data.

AFTERWORD

by *Rufus Pollock*

It has now been more than six years since we organised our first Open Knowledge Conference in London. Back then the world of open knowledge was a much smaller place. Steve Coast, Founder of Open Street Map, spoke about his first 'mapping parties'. The Guardian launched its 'Free Our Data' campaign. The idea of 'open data' was still something very new—with hardly any traction in government or in research communities.

The success of OKFestival 2012 is testimony to the growing enthusiasm and appetite for openness around the world, in a wide variety of different fields of endeavour. Governments are opening up raw data sets to enable civic hackers to develop new kinds of services. Scientists are opening up their research to enable citizens to participate. Journalists are giving readers the numbers behind the headlines to analyse and explore.

Open knowledge presents significant opportunities, but it is also not without risks. Opening up information is not a panacea that will magically solve climate change or eliminate corruption. It is what we do with it that counts. If we fail to acknowledge, and act, on this fact, then our hope and enthusiasm will be replaced by disappointment and disengagement.

Open knowledge does not generate value by itself. It needs people to be used to become useful. Collections of content and data do not by themselves dictate to us how we should use them. Using this material to provide value to society depends on our cunning and ingenuity. As well as opening up the world's information, we need to work to engage people around it—to help them to find ways to transform digital information into better decision-making, better science, better reportage and greater access to our culture.

The theme of this year's festival was "Open Knowledge in Action". Hundreds of people were involved in putting together its many topic streams and discussing the future of open knowledge in many different areas. This year more than ever it was clear that this event will become the heartbeat for a global open knowledge movement—a time for people to share their projects and ideas, reflect on the state of the digital commons, and coordinate around emerging issues and new areas of interest.

But what really matters is not just what happens in those few days when people interested in the commons gather together in one place, but what happens for rest of the year. What matters is keeping important conversations going, and working together to realise our plans and dreams. We need to scrutinise public policies that affect the way that information circulates in society. We need to work for greater literacy around information that matters—whether this concerns the acceleration of global warming, failing economies or the politicians that represent us and the institutions that serve us. We need to continue to engage with NGOs, governments, journalists, scholars and citizens to use open knowledge to bring about change and improve the world.

I hope you'll join us.

Rufus Pollock is co-Founder and Director of the Open Knowledge Foundation, a Shuttleworth Foundation Fellow, and an Associate of the Centre for Intellectual Property and Information Law at the University of Cambridge.

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About Us

The Finnish Institute is a London-based private trust. Our mission is to identify emerging issues relevant to contemporary society and to act as catalyst for positive social change through partnerships. We encourage new and unexpected collaborations and support artistic interventions, research, the creative industries, foresight and social innovation in new, socially central areas. The Finnish Institute is one of the 17 Finnish Cultural and Academic Institutes and is core-funded by the Ministry of Education and Culture of Finland. The Institute is a founding member of EUNIC—the London cluster of the European Union National Institutes for Culture.

The Open Book is a crowdsourced, multi-author publication built to contextualise the international movement for open knowledge in the words of those who are helping build it today. What are the aims of this movement's pioneers, and how does its prioritisation of digital transparency, open data, government accountability and the Commons impact society? This book will highlight the hopes of those who are working to provoke global change in these areas and introduce their passions to new audiences. Based on contributions from an international group of thought leaders working in fields as diverse as sustainability, design, business and development, The Open Book will serve as a platform for discussion and a launching pad for new ideas about the future of a global movement in a time of rapid technological and societal progress.

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