Towards Accessible Design Knowledge

Opening up design knowledge and its production in industry and academia

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1 Introduction

The global pool of design knowledge is steadily growing. Both industry and academia contribute through design practice and intentional design research. However, there is what could be called a "publication gap" between the knowledge that is being produced, and such that is published. Most of the produced knowledge is never made accessible to the design community outside of the own organisation, even less in industry than in academia.

It is also significant how little the design community publishes and shares compared to other disciplines (looking specifically at software development). According to Davis (2008), "the proprietary behavior of design practitioners will not make new knowledge widely available [...]". This is an unfortunate circumstance, as several movements show that both industry and academia can benefit from better access to existing expertise and experience.

In this essay, I present examples from the areas of open source and open patenting, which successfully illustrate how better access can contribute to innovation. I will further suggest ways forward for design towards more accessible design knowledge. I call for (1) proprietary design knowledge to be published, and I call for (2) it to be published in an appropriate form. My belief is that, with more design knowledge accessible, the design community will be able to learn and grow more quickly in manners of both practice and reflection.

2 Design knowledge publication

This section looks at different representations of design knowledge, and how—if at all—it is made accessible to a wider community of designers. Nigel Cross (1999) suggests three origins of design knowledge: people, processes, and products.

People, especially—but not exclusively—designers, *know* about the decisions that influenced a design. They bring their past experience and their world view to the process, shaping the outcome with everything they do. Cross also claims that designing "is a natural human ability" (1999). An extensive account of how design practice and practitioner are working in accord, making the practitioner's knowledge explicit in-action, is given by Schön (1990).

Processes are the "tactics and strategies of designing" (Cross 1999). Design knowledge in process resides in pattern libraries, design manifestos, and basically every method used to create and evaluate a design. It is made especially explicit if it is found in *byproducts* of the design process: in recorded interviews and user tests, in affinity diagrams and brainstorming sessions. It also becomes visible in the way we publish knowledge in academia: through magazines, journals, conferences and their proceedings.

Lastly, *products* are the most obvious outcome of design, "the forms and materials and finishes which embody design attributes" (Cross 1999). The product is a product of decisions based on experience and evaluation. The product is *design decisions made explicit*, a most concrete manifestation of design knowledge.

However, most of these instances of knowledge are not universally accessible. Accessibility depends on the form knowledge takes, how it is published, and the other designers' ability to make sense of it. As Löwgren (2013) points out, "it was the *video of the TED demo talk* on MTI [...]—providing a fairly rich mediation of the artifact itself—that swept through the HCI worlds of academia and business like wildfire, *rather than the previously published academic papers* on the project." (my italics)[1].

Design communities traditionally communicate through the artefact itself, mediated if necessary (Gaver 2012). Academia publishes knowledge mainly in a written account, through journals and proceedings. In conclusion, products and academic writing are the main representations of knowledge that reach other designers. But those are usually highly polished, and many less obvious reflections on the design are never made visible.

Companies keep the internals of their design and development processes proprietary for quite obvious reasons. They want to be first to market, outperform competition, and satisfy shareholder expectations. They do this by means of non-disclosure agreements, patents and other instruments of intellectual property law. By not making the knowledge they produce available—sometimes not even within the own organisation—other designers are not able to use it, learn from it, and build on it. This situation is unfortunate, since both the producer of knowledge and the general design community can benefit from sharing knowledge, as is exemplified in the next section.

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[1]   See http://www.ted.com/talks/jeff_han_demos_his_breakthrough_touchscreen.html, accessed 29-01-2015

3 Open knowledge in other disciplines

Disciplines other than design have been quite successful in sharing knowledge across their communities. This section will present two occasions of open collaboration in engineering: *open source software* development and *open patent pools*.

3.1 Open source software

Eclipse is a modular, general-purpose *integrated development environment*—a computer program made for creating software. Originally developed as a proprietary product and heavily funded by IBM, it was later released under an open source license and pledged to the Eclipse Foundation, which was founded to maintain Eclipse and the ecosystem around it with respect to stakeholder interests. The Eclipse Foundation is "a consortium of major software vendors, solution providers, corporations, educational and research institutions and individuals working together" (Eclipse Foundation 2007).

Eclipse is open source software, which means that anyone can use it, view its source code, make adjustments, and contribute back to the project. Through open governance and development, the foundation fosters transparency: "Project discussions, minutes, deliberations, project plans, plans for new features, and other artifacts are open, public, and easily accessible." (Eclipse Foundation 2007) Similar approaches are applied by the Linux Foundation, the Apache Foundation, the Mozilla Foundation, and others.

I would like to look at the position and behaviour of single companies and institutions within the foundation: they contribute their engineers' time and expertise to improve a product that benefits not only themselves, *but also their competitors*.

For companies contributing to and making use of Eclipse, the benefits are numerous: the collaboration reduces risks, as the sustainability of the technology is ensured by many stakeholders; companies can save time to market and reduce their development costs, as a product can be built on top of the existing platform; common standards are defined and a higher rate of standards adoption is achieved; and a great pool of professionals with relevant skills in the technology is available for hire.

From a competitive-economic point of view, however, a collaboration like this seems counterintuitive: why would a company contribute to the success of its competitors? Many OSS projects like Eclipse, Linux, Java, OpenOffice, or MySQL show that sharing knowledge (e.g. through code) does not eliminate competitiveness. According to Eclipse Foundation (2007), the competition is just moved to a different level: "Compete on products, collaborate on the platform". Technology is not a factor of differentiation anymore—the value is created on a product level instead. At the

same time, companies using Eclipse benefit from a technology that is far more developed than it would be if it was developed in a proprietary manner.

Vendors now create "complementary products, services and capabilities" on top of the Eclipse platform (Eclipse Foundation 2007). IBM has whole product lines based on the Eclipse platform, including end-user groupware client *Lotus Notes* and the software development tools of the *Rational* family. The official Android SDK by Google is built upon Eclipse. And many smaller companies offer commercial support and training for development using Eclipse.

3.2 Open patenting

In the development of new products, patents often play an important role. They are necessary to protect inventors, but they can also prevent innovation and progress—the patent wars between mobile phone and operating system vendors are a contemporary example.[1]

Several organisations and patent pools (consortia that cross-license their patents to their members) exist to protect certain *communities* instead of companies and their interests. They open their patents to the public for royalty-free use—a phenomenon called "open patenting" by Maggiolino and Montagnani (2011).

One such organisation is the WebM Project[2], which manages and develops the open WebM container format for videos. As part of WebM, Google irrevocably released its patents on the VP8 video technology and published the specification under an open license. The goal of Google and other browser vendors within the WebM project is to create an interoperable standard for video technology on the web—no matter if the user is on Firefox, Chrome, Internet Explorer or a different browser.

Another example is the Open Invention Network (OIN), which is "a shared defensive patent pool with the mission to protect Linux".[3] As even open source developers are not immune to the threat of software patent suits, the OIN pools software patents to be used by open source projects free of royalties.

A slightly more profit-oriented example, Quirky is an innovation company that helps makers and inventors to put their product ideas to market. In a collaboration with General Electric (GE), Quirky created what they call "inspiration platform"[4] where Quirky users can search for GE patents to apply in their inventions. However, the inspiration platform has received critique from makers and open source enthusiasts alike, as the patents are not *really* open, but licensed to

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[1]   See https://en.wikipedia.org/wiki/Smartphone_patent_wars, accessed 11-02-2015
[2]   See http://www.webmproject.org/, accessed 10-02-2015
[3]   See http://www.openinventionnetwork.com/, accessed 11-02-2015
[4]   See http://inspire.quirky.com/, accessed 08-02-2015

Quirky users only. Also, by submitting an invention, the user assigns all their relevant intellectual property rights to Quirky (Rowe 2013).

Maggiolino and Montagnani (2013) put forward a framework for companies to pledge patents to the public, in order to "foster both the free movement of patented knowledge and its business applications." Such a framework, with a standardised patenting license, would be able to "facilitate access to, transfer of, and use of patented knowledge."

As the previous examples show, several players from industry and academia are making a move towards open patenting. They show that patents—which are a representation of an inventor's knowledge—can not only be shared for profit, but also for the protection of thriving communities and for the benefit of a wider audience. It is safe to assume that design communities can benefit from the sharing of design knowledge in a similar way.

4 Ways forward

The examples of open knowledge in other disciplines all came from technology and (software) engineering. Of course there are efforts of design institutions to publish their work, especially in academia—but where is the design *industry*? While technology R&D seems to recognise the benefits of collaboration and knowledge sharing, design research and practice is still taking place in a mostly solitary way. Can design benefit from publishing knowledge in a similar way than engineering does?

Many of the ways that engineering shares knowledge and opens up for collaboration can be applied by the design community as well, without much hassle. We can share intellectual property openly, while using licenses to protect communities of interest. The Creative Commons[1] licensing system is an approach towards this. We can make use of open, interoperable standards (such as provided by ANSI, ISO, DIN, IEEE, IETF and so forth) as opposed to proprietary standards. We can release patents to the public, using a framework as was suggested by Maggiolino and Montagnani (2013). We can create foundations that protect the rights and interests of design communities, not companies.

All these activities are not specific to the design discipline at all, and companies are already following them. But most of the pieces of knowledge shared by patents, standards and so forth describe the *what* and *how* rather than the *why*. It also feels quite separated from daily design practice. We need ways of sharing knowledge that are *native* to design, that feel natural and do not require much effort to produce and maintain.

In software development, we can find such an example of the creation and distribution of knowledge that happens in a very *natural* way: open source. Developers make use of 'distributed

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[1]   See http://creativecommons.org/, accessed 08-02-2015

version control' anyway, and just hosting a project in a public space does not add any work overhead. 'Commit messages' (short lines that describe what a developer achieved or intended with a change to the code) annotate the evolution of a project. Developers document their work by creating self-explanatory code, accompanied by comments and API documentation. They have found a way to make their knowledge about the code obvious to other, properly trained developers. Where can we find such a natural way of sharing knowledge about our designs?

Design is very different from software engineering, with its own particular traditions and practices. I believe that we can find ways of publishing knowledge in a natural, effortless manner that can easily be integrated into our existing design and research practice. The following are thoughts on how to do this.

We can document the design process publicly. Many companies, design agencies and designers already do this, in the form of blog posts[1] or by describing their typical design process as a USP[2]. But these are efforts that do not provide too much detail, and are also quite 'artificial'—in the sense that those pieces of knowledge do not originate in the design practice itself.

I imagine to publish byproducts of the design process—such as flow charts, affinity diagrams, and interview recordings—using appropriate representations of intermediate-level knowledge (as described by Löwgren (2013)). Such representations could have the form of annotated portfolios, as suggested by Gaver (2012), or similarly, a collection of annotated byproducts of a single design process. They could also be a subset of design research artefacts that Pierce (2014) calls "'partially functionally', 'application-less' or 'abstract'".

Finally, taking a leap back to Nigel Cross's thoughts, we can look at the knowledge that resides in *people*. We can try to learn more directly from each other, observing each other's practice, and—most importantly—be willing and not shy to share our experience, successes as well as failures, with the design community in an appropriate way.

5 Conclusion

Design, as a discipline and an industry, can learn much from movements such as *open source* and *open innovation*. While software engineering is arguably, due to the very immaterial and digital nature of it, predestined and privileged to be taking place in the open, design practice often has material, informal, intuitive and unconscious components which are difficult to document in-the-moment. However, we can make use of existing, easy to create representations of knowledge that we share with the design community. Other disciplines show that sharing enables

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[1]   See http://bradfrost.com/blog/post/techcrunch/ for an example (accessed 09-02-2015)
[2]   See https://teamgaslight.com/process for an example (accessed 09-02-2015)

innovation, does not endanger competitiveness, and may move design forward. We only need to find the vehicles to do so.

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