

The making of a maker-space for open innovation, knowledge sharing, and peer-to-peer learning

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ABSTRACT

This short paper presents the initial steps in the establishment of Fabriken (the Factory) which is an open maker-space, and lab space for creating and experimenting with technologies. The space also provides a platform for peer-to-peer learning, and networked learning that goes on beyond the physical walls of the lab space. From a research perspective the development of Fabriken is a research intervention exploring how platforms for learning and innovation can be co-designed, and established in collaboration with the users. The aim of this paper is to present strategies behind this co-design process. To position Fabriken in a societal and cultural context some words are also said about the theoretical assumptions guiding this work, that is, socio-cultural theories on human action and learning.

Keywords: maker-space, open lab, peer-to-peer learning, co-design, socio-cultural theories, social and technological innovation, co-production

INTRODUCTION

This short paper presents the initial steps in the establishment of living lab Fabriken (the Factory), located in a cultural space/house that is run by a non-profit organisation, and owned by the municipal. Fabriken is an open maker-space where citizens, companies, public institutions, researchers, NGO's get access to tools, technologies, knowledge and skills in order to experiment with, and prototype ideas, products and services. In return the users provide input to the lab by sharing their ideas, knowledge, skills, and experiences. The basic concept behind Fabriken builds upon the belief that democratic access to technology fosters and supports grassroots initiatives, open and participatory innovation and co-production [4]. Besides being a lab space for creating and experimenting with technologies, Fabriken also provides a platform for peer-to-peer learning, and networked learning that goes on beyond the physical walls of the lab space.

From a research perspective the development of Fabriken is a research intervention exploring how platforms for learning and innovation can be co-designed, and established in collaboration with the users. The aim of this paper is to present strategies behind this co-design process. To position Fabriken in a societal and cultural context some words are also said about the theoretical assumptions guiding this work, that is, socio-cultural theo-

ries on human action and learning, see e.g. [5][7][8][9]. The lab was launched only a few months ago (April 1, 2011). During this short period of time studies have been initiated, but are yet not completed. More elaborated reflections, and profound analyses will be presented in forthcoming papers. Also, individual learning actions occurring at Fabriken are not specifically discussed in this paper, but will be treated in future work.

NEW TECHNOLOGIES, TOOLS AND LEARNING

Before going into presenting the process of establishing Fabriken, some basic assumptions within socio-cultural theories on learning in relation to new technologies and tools are briefly presented in order to set the scene.

The question of how the emergence of new technologies and tools change our world is certainly not only related to material advances and technological innovation. There is also a sense in which technologies changes the way humans perceive and act upon the world. This refers to social change, and how we on an intellectual level respond to the possibilities that new tools bring along. Socio-cultural learning theories view the usage of tools as a fundamental part of all human action and development [6][7][9]. Tools are regarded as active and not passive objects, since they influence how we think, act, and behave. They enable us to do, experience, and learn things that we cannot achieve without them [5].

In other words, new tools enable new kinds of actions. When watching a person solving almost any kind of problem, from navigating through the streets of a city to how to bake a cake, various tools are being applied that the thinking is supported and influenced by. “Higher mental functioning and human action in general are mediated by tools (or ‘technical tools’) and signs (or ‘psychological tools’)” [6] (p. 28), and processes like remembering, problem solving, or being creative, are tightly connected to the tools applied.

Thus, in order to understand what characterise human action, learning and development the tools utilised have to be taken in consideration since they are intertwined with the mental process that is taking place [5][7]. This claim can be illustrated by using a very simple example, the calculator. By having access to such a tool, and knowing how to use it we obviously can solve much more complex mathematical problems than without it. Using the tool probably also has an influence on our skills in mental arithmetic since that competence is not needed anymore, and therefore not being trained. Other examples of tools, such as books, databases, apps, shared digital photo albums, mobile broadcasting services, or other similar external memory systems [5] change how information and knowledge are codified, stored, and transferred. What kind of tools that is used change over time, and is connected to the introduction of new technologies [1]. These, maybe seemingly banal examples, exemplify how usage of everyday tools influence the way we think and act, and generate new patterns of behaviour, and actions.

From a Fabriken point of view these theoretical viewpoints result in two important conclusions. Firstly, from a democratic point of view it is of great importance that citizens from all kinds of socio-economic backgrounds get access to new technologies and tools

in order to get equal chance to learn, and develop skills and competences. Secondly, to put new technologies and tools in the hands of people result in new thinking, learning, and acting which support the process of social and technological innovation. The overall vision of Fabriken is therefore to offer an open lab place where different user groups from different background get access to advanced technologies and tools that otherwise would not be available to them. This will not only offer new learning opportunities and support exploration, but also result in solutions that would not have been possible without the tool. By being an open lab space, welcoming all kinds of users Fabriken also serves as a meeting platform that connects different user groups, resources and facilitates co-production initiatives.

STRATEGIES FOR CO-DESIGNING FABRIKEN

Based on the viewpoints brought forward above, “inclusion” is a core value in all activities taking place at Fabriken. Besides offering open access to the lab space, this also includes that users are involved in designing the lab space itself. Instead of offering a “ready-made” lab the infrastructure behind Fabriken is co-designed together with users in an on-going, dynamic process.

Up to now, this work has in principal consisted of two parts:

- A) Infrastructuring – building the physical lab space, purchasing tools and equipment, setting up booking systems, digital calendar etc.,
- B) Community-building – informing, inviting, engaging users from different backgrounds with a wide range of interest and intentions.

In connection to the inauguration of the (initially almost empty) lab space, the infrastructuring and the community-building activities were kick-started by the research team through a series of workshops, and interventions. Through this process needs and requirements in terms of equipment, technologies, skills and resources concretely became visible, and articulated. Users that participated in the workshops contributed to identify necessary investments to create a pertinent maker-space that could support and facilitate their desired actions. The users were also encouraged to organise their own workshops, and projects. Their specific requirements in terms of tools and equipment were considered by the lab manager and, if feasible, purchased. Through this still on-going process the lab space infrastructure is step-by-step co-designed together with the users.

The projects completed up to now have been of various kinds in order to appeal users with various kinds of interests and intensions. Examples of projects organised so far are: 48 h Hackathon, Open lab nights, workshops on themes such as urban gardening, Arduino, CNC drilling skills, re-design of second hand clothes, handicraft techniques, cooking, toy re-make, video art. Beside this, also users have organised their own projects and activities in the lab.

To summarise, projects and interventions organised up to now have been striving

to fulfil two aims: (1) to identify users' needs and requirements in order to step-by-step co-design a relevant lab space, and (2) to attract a wide range of people with different backgrounds and interests in order to establish a multifaceted community associated to the lab, and to link back to a core value behind the Fabriken concept, that is, "inclusion".



Image 1. Pictures from various workshops organised at Fabriken.

CONCLUDING COMMENTS

The process of establishing *Fabriken* will soon enter a new phase, that is, the process of establishing an autonomous peer-to-peer learning culture, and self-organising learning environment. The research team will step by step be phased out, and the community that currently is being established will gradually take over and run the activities happening in the space.

Many of the questions that aroused in the first phase had to do with how to identify and engage the wide range of *Fabriken* users that we are aiming for. How to in ensure inclusion, and create an open space for real, not only in theory but also in practice? What we learned is that new users' engagement initially needs to be facilitated. If people do not feel comfortable in that kind of lab space they will surely not turn up, if not for a specific reason. As previously mentioned, our strategy has therefore been to organise some seemingly farfetched workshops, on themes such as baking, gardening, toy making. By creating reasons for unexpected users to enter, discover and explore the lab space, we hope that they eventually feel at ease being there, and make the space to their own. The question is how well we have succeeded in this work so far? How to govern a situation that strives for inclusion and openness? To be self-critical; what users and what interests

have we unconsciously been excluding in this subjective piece of action?

A question that also came up is the issue of how to ensure long-term engagement among the users in order to build a solid community? It turned out that many of the new users came to one, or maybe two of the workshops. Despite the fact that they seemed to have appreciated the workshops, the lab space and the growing community, they did not return. Not surprisingly, to build a community takes time, and something to take in account and plan for.

Another challenge that became obvious is how to establish a culture of knowledge sharing, where users are willing to share their skills, and spending time doing so. To be able to act on affordances offered in the space, users need to have skills to manoeuvre machines and tools provided to them in the lab. Our hypothesis before starting the project was that this knowledge would be transferred and developed in a peer-to-peer learning process. Up to now, this has to some extent also happened. Lead-users, that is, advanced users who are willing to share their knowledge with others [8] have introduced new users to the environment. However, relying on that a small numbers of lead-users should educate the rest of the community is not a sustainable solution. Possible actions to take to handle this potential future problem are either to increase the numbers of lead-users, or to develop an introductory procedure directed to all new users, and organised by the lab management.

At the moment we are processing, and analysing data gathered and experience gained in the first stage of the project. Further elaborated research results, and analyses of the co-design process and learning actions will be presented in up-coming work. Next step is also to put our results in relation to results presented by other scholars operating in the same field, e.g. [2][8][3]. A question to explore in future work is what it means to a city to provide these kinds of open maker-spaces to its citizens in a longer run? One scenario is that open maker-spaces, such as *Fabriken*, could serve as future technology classrooms by providing learning spaces where youngsters learn about technology by experimenting with and prototyping ideas, and products, and by taking part in the community.

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