

Old Traditions and New Ideas - From Coal Mining to Education

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Abstract

The fab lab culture is inclusive by design. However we do not find many projects aiming at cross-generational collaboration in the sense that elderly are not just subject of the investigation but the makers and active designers of their own living environment. We therefore propose a systematic way for establishing cross-generational complementary collaborations between young and elderly in the fab lab to provide mutual knowledge exchange on a basis of cooperation and respect. Our fab lab is situated in the city of Kamp-Lintfort where coal mining was determining the life for 100 years. The exceptional working condition underground is probably one of the major reasons for the emergence of the unique miners' culture of friendship, trust and equality among the "Kumpel". We observe that this culture is quite similar to recent trends towards 'participative culture', such as new media, open source community, and fab labs. We set up a manifest that will help to form mutual understanding and social interaction.

Keywords

Cross-generational knowledge exchange, fab lab manifest, coal miners' culture (Kumpel)

1 Motivation

Since the first fab lab was introduced by Gershenfeld a global network of more than 350 (officially registered) fab labs has emerged (FabLabs 2014). The overall aim is to empower people to fabricate their ideas while being supported locally and globally by their community. Established and maintained by The Center for Bits and Atoms has established and maintains a constitution for all fab labs worldwide. The so-called Fab Charter defines principles and responsibilities all fab labs have agreed on (CBA 2014).

Basically fab labs provide an educational and productive platform for people of all ages, offering particular workshops and programmes on different topics, depending on the characteristics of each lab. Many fab labs are used by schools since they offer a platform for pupils to experience making something themselves. By doing so, 'students go through a cycle of imagination, design, prototyping, reflection, and iteration as they find solutions to challenges or bring their ideas to life.' (The Fab Foundation 2014) As a consequence, most fab labs have developed programmes that primarily focus on education, such as: Fab Lab Kids (FabLabKids 2014), FabLab@School (FabLabSchool 2014 & Bilkstein 2013), zdi-FabLab@school (ZDIFabLab 2014), or the Fab Lab Academy (Fab Academy 2014), and FabED (TIES 2014).

There are of course major differences between fab labs concerning size (number of members, available workspace), equipment and type of affiliation (e.g. as part of a university, privately founded, etc.), and mission. Besides this, some institutions offer very specialized programs or labs. One example is the Green Fab Lab (Valldaura 2014), which 'will be a research, education and knowledge center which will put together Nature, Technology, Architecture and Experience, in a mix of activities for the Barcelona community as well as international partners.' (Valldaura 2014b)

After analysing various papers and programmes we identified the following gap: Inclusive approaches to bring young and elderly people together. Even though fab labs are open to public in general and open to people of all ages and skills, it can be said that the main target audiences are pupils, students and young adults (Tanenbaum et al. 2013). Only few workshops for elderly and/or retired people exist. Studies in this field often aim at solutions where 'aging is often viewed in terms of designing assistive technologies to improve the lives of older people, such as those who are suffering from frailty or memory loss.' (Rogers et al. 2014, p. 7) Only Rogers focus on 'how retired people can contribute to future technological design and user experience – rather than being, themselves, the subject of technological assisted living. In particular, we are interested in how older people can explore, suggest and invent new ways of using technology for themselves and others.' (Rogers 2014)

Thus elderly people are starting to play an active role in the invention process. A systematic way of bringing elderly and young people together to make use of their diverse skills, views and experiences, to invent novel solutions by combining their complementary individual competences is missing.

We believe that it is important to foster community life not just by providing the environment (i.e. in a fab lab) but also by being open to experience. Apart from living in Digital Age we also experience demographic change. The demographic change is a worldwide phenomenon and should be of major concern for the fab lab community as well. It is a challenge but also a chance, which needs to be addressed. Skills in crafting as well as tradition and culture are threatened. The elderly have got life experience, great ideas and skills that can help younger people to solve their problems and to create innovative solutions. We strongly believe that we are neglecting the potential of these experts.

The cohesion of society especially of young and elderly people is one of our main visions and we are currently developing didactical and organisational concepts for the implementation of our ideas at the fab lab Kamp-Lintfort.

2 Local Challenges

The city of Kamp-Lintfort is currently being degraded because of industrial resign and the end of the coal-mining era in Germany. 3700 miners have been employed in the coal-mining industry, which has been the main economic basis and a source of welfare for decades. Nevertheless the character of citizens has formed a unique social culture of strong solidarity and friendship emerged from the particular miners' work situation, which is imminent to get lost as well.

To support urgent structural changes, the government of the Federal State of North Rhine Westphalia, Germany, decided to found Rhine-Waal University of Applied Sciences with two campuses. One of them is located in the city centre of Kamp-Lintfort in the vicinity of the old coalmine. Citizens, schools and local enterprises are very interested in the university since they are hoping for novel impulses for education, local business and social life.

Students are not only changing the cityscape with their presence; they are also taking an active part in its transformation as they have for example developed the current corporate identity of the city which now calls itself 'Kamp-Lintfort - University Town'. This underlines the on-going transition from coal production to knowledge production.

However, production itself is based on know-how. Without people's expertise no educational institution or fab lab can force production. Thus, knowledge is the fundament, which needs to be consolidated and cultivated. Here again, Kamp-Lintfort's special situation comes into play. Many of the elderly, well-educated and experienced coal miners went into early retirement. However, most of them are highly motivated to continue working, even if it is not in their field of expertise and for marginal salaries. These elderly can serve as professional experts in the fab lab environment. Thus, former coalminers, young students, professors and scientific staff can enjoy working together. By doing so they are able to realize innovative and creative solutions in cooperation with and for local enterprises. This activity not only has an economic but also a strong social component. We will manifest and pass on this unique social culture of strong solidarity and friendship from elderly to young in a novel way. This attitude is expected to have a considerable impact on research and education as well as on economy and industry.

Looking at the current social development of 'participatory culture' (Jenkins 2014), for example open source, fab lab communities, social media, etc. we conclude, that this is in significant accordance with the traditional coal mining culture: 'Not every member must contribute, but all must believe they are free to contribute when ready and that what they contribute will be appropriately valued.' (Jenkins et al. 2014). Jenkins defines participatory culture by particular characteristics. Among these are 'strong support for creating and sharing one's creations with others', 'some type of informal mentorship whereby what is known by the most experienced is passed along to novices', 'members believe that their contributions matter', 'Where members feel some degree of social connection with one another (at the least they care what other people think about what they have created) (Jenkins 2014). These characteristics have been inherent to the coal miners' culture for centuries. Therefore we assume that in this sense the transition from coal mine to education preserves this cultural inheritance and is a consecutive process.

In order to achieve this, we propose a manifest to establish this culture:

- I. Communality is above individuality.
- II. Share your ideas, thoughts and challenges.
- III. Share your knowledge and skills – do not be the only expert.
- IV. Provide help, whenever possible.
- V. Ask for support whenever needed. There is no reason to be timid. Trust in the community.
- VI. Everybody has equal rights. Social, demographic and educational backgrounds are of no importance.
- VII. Make use of shared knowledge and competences.
- VIII. Stand up for your own project, but also for the ones of the others.

3 Appliance

To verify our hypotheses we have already set up several projects and applied the principles of the manifest.

One of the most significant projects is called 'Kamp-Lintfort leuchtet' (Kamp-Lintfort is glowing) (KaLi 2014), founded by several sponsors (see acknowledgements). 'Kamp-Lintfort leuchtet' it is an interactive media facade installation. With the permission of the local coal mining industry we were able to get access to one of the old and historical buildings. It is an impressive building as it has 300 separate windows directly facing the city centre. The building is well known by citizens as the 'electric heart' of the coal mine. Due to the closedown, it stopped beating for industry but it will start beating for the population due to our installation, soon.

We are currently setting up multi coloured XLR PAR LED spots mounted behind 126 windows. The number 126 was chosen in view of the alignment of the window area. We are going to illuminate three out of five segments that look like three huge pillars. The resulting surface area is about 9 meters high and about 12m wide (the 3 elements in the middle of Figure 1). The pillars of led spots need a customized scaffolding to fulfil the static requirements (9m height, stand-alone, secure) and to avoid crossfading (each window needs to be encapsulated in form of a box).

The led spots can be controlled by software and act like a huge urban screen even though it is not just a screen. We used sensors in the close environment to identify patterns of external influence and to manipulate and control the visual output. Outdoor cameras track and analyse the situation in front of the building (e.g. motion of cars, people, etc.) and microphones capture the surrounding noise in order to derive patterns that can be used to cause events for the output. Live-access is also available, so that you can draw or play on the screen, using mobile phone or any mobile device having access to the Internet. We created a web editor for the public to invite everybody to create own individual content. Images can be drawn and sequences of images create animations. The sensors can be used to control the visuals. By doing this, the installation interacts with the citizens and the city – it starts to beat.



Figure 1: The old coal mining building (left) with its pillars of windows to be illuminated. The middle picture shows the windows segments from the inside. In the right picture, students test prototypes for the boxes together with coal miners.

The project started in autumn 2012 and we are now ready to run. It was hard work and due to the complexity of the software requirements and hardware installations we often had to face multidisciplinary challenges. Our university campus in Kamp-Lintfort does not offer a degree programme in Mechanical Engineering but the project's nature required skills like these. We were lucky to find support by elderly coal miners. They got aware of the project thanks to the media and contacted us. During the last one and a half years, we managed to set up a community of students, coal miners and university staff who joined to make this project happen. All along the process, we were happy to experience the strong coal miners' solidarity and friendship. We were fascinated by their enthusiasm and strong support. Without being funded and without expecting reward they offered weeks of spare time to develop solutions with us. Besides skills in mechanical engineering they also had the strong willingness to share their knowledge and skills. Thus, we set up workshops on how to make use of machinery and to perform static analysis, etc. (Figure 2). Students, staff and professors learned from the experienced practitioners. On the other hand, the coal miners were fascinated by the technology we developed, which in reverse was not their field of expertise. Autonomously, a self-propelling community has emerged in which young and elderly people work together and teach each other, on a basis of cooperation and respect.



Figure 2: Test set-up of the installation (left) during a Hackathon of students and coal miners late at night (right).

In the course of the project we found ourselves in an extraordinary situation. We experienced a participatory culture in which young and elderly interact not just to achieve one specific goal but rather to learn from each other, as it used to be in the past, when most people were multi-skilled and less specialised than today. During the project each of us learned something new by being part of this community in a process of self-perception.

4 Summary and Outlook

In this paper we have identified a gap in the educational approaches applied by most fab labs (not exclusively limited to fab labs). The demographic change is a worldwide phenomenon, which has to be considered. In an educational context the community of elderly is a valuable contributor. Many elderly are well skilled, especially in handcraft. Many youngsters are not much experienced in fields of handcraft. We came to the conclusion that a systematic way of bringing elderly and young people together is needed if we want to make use of their diverse skills, views and experiences to invent novel solutions by combining complementary individual competences. We presented a project and highlighted the insights it has concerning social community aspects. We set up a manifest that will help to form mutual understanding and social interaction.

In future the authors will further promote this approach at the university and at the fab lab Kamp-Lintfort. By having already included some elderly in the learning and teaching community, we feel confident to attract many more. We will develop new didactical approaches for teaching and learning, which we will further analyse.

We want to set-up and manifest a worldwide community of elderly and young fabbers.

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