

# Shifting towards community-building in opening up FabLabs for non-expert users

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## ABSTRACT

In the early days of Fablabs and other digital fabrication spaces (e.g. hackerspaces, makerspaces), these community spaces that offer public, shared access to high-end manufacturing equipment (e.g. 3D-printers, laser cutters) were often described as having the democratizing potential to empower everyone as future makers. However, research showed that non-expert users are often impeded to engage in such spaces due to various challenges (among other things, the unfamiliarity of available tools and machines, a lack of skills and experience). By describing a case study in which we elucidate different strategies that were used to engage non-expert users in FabLab Genk, this paper focuses on the mediating role of the design researchers who become part of a non-expert user community. This allows the design researchers to negotiate between the existing practices of the community and the potential of a FabLab. Furthermore, the case-analysis stresses the importance of networks of peers for opening up FabLabs for non-expert users. We also emphasize the complementarity between different strategies that can be employed to engage non-expert users in a FabLab. By highlighting these findings, the papers shows how a FabLab's shift towards community building can change the focus on the technical and spatial infrastructure towards social infrastructures, which is essential for engaging non-expert users.

*Keywords:* non-expert users; community-building; design researchers; networks of peers.

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## INTRODUCING THE SHIFT TOWARDS COMMUNITY BUILDINGS IN FABLABS

Maker culture can be described as a movement of amateur and professional designers who use digital fabrication technologies, open hardware and software as well as traditional manufacturing methods (e.g. woodworking) to create (often) personalized objects.

Characterized by a culture of openness and skill sharing, different types of digital fabrication spaces (FabLabs, hackerspaces, makerspaces, etc.), provide people with the infrastructure to make things, and are seen as physical representations of this movement (Anderson, 2012; Dreessen *et. al.*, 2016; Kuznetsov and Paulos, 2010). These spaces can operate as meeting places that adapt and outreach their activities, infrastructure and facilities to the needs and interests of local communities (Taylor *et. al.*, 2016).

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Recently, the democratic potential of FabLabs (and other types of digital fabrication spaces) has been criticized (Ames *et. al.*, 2014; Roedl *et. al.*, 2015). Research has shown that numerous challenges impede non-expert users to enter the maker movement and that the majority of people who do engage in FabLabs are a homogenous group of white males, coming from the middle and upper classes, whereas the presence of women and other minority populations remains low (Cuartielles, *et. al.*, 2015; Dunbar-Hester, 2014; Toupin, 2014; Sleight *et. al.*, 2015). For instance, digital fabrication spaces often seem challenging to non-experts users since the available tools and machines can be unfamiliar or even intimidating (Licks *et al.*, 2018; Taylor *et. al.*, 2016; Meissner, *et al.*, 2017; Niaros *et. al.*, 2017). The vast variety of technologies and tools available within these spaces makes it difficult for non-experts to experiment (Dreessen *et. al.*, 2015). Furthermore, most digital fabrication tools are not appropriated for an audience of non-expert users and require a significant investment in time and effort to learn how to use them (Ashbrook *et. al.*, 2016; Carrington *et al.*, 2015; Mellis, 2014).

To overcome these challenges and look for a sustainable future, most FabLabs organize some forms of outreach to engage non-expert users in their activities. This may include open days to academia, industry and public, and workshops that are organized with and for members of the public (Hardenbrook, 2017; Taylor *et. al.*, 2016). Taylor *et al.* (2016) state that by actively reaching out to local communities, FabLabs can attract a different audience and have the potential to become third places: “*informal public gathering places*” (Oldenburg, 1997, p. 6). However, in this community approach it is necessary to think about gaining access to these communities, transferring knowledge among and building relationships with them (Le Dantec and Fox, 2015; Taylor *et. al.*, 2017; Dreessen and Schepers, 2018). These processes of building relationships in stimulating long-term participation processes for engaging non-expert users in a FabLab can be framed within the Participatory Design (PD) tradition. In PD much attention is given to these ongoing and open processes of *infrastructuring*, characterized by building long-term working relationships with diverse actors or communities over time (Bjorgvinsson *et. al.*, 2012; Emilson *et. al.*, 2014).

Valuable work has already been carried out in the past to explore communities and their characteristics. DiSalvo *et. al.* (2013) propose three ways to understand communities. First, a community can be defined in relation to its geography. Here, it refers to a group of people defined by a distinct space or location, such as a neighborhood. Second, a community can also be understood through its identity. In many cases, communities form around shared identities, such as race or ethnicity. A third way of understanding community is to focus on

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shared interests and practices. As DiSalvo *et. al.* (2013, p. 184) point out: “*more than just a common interest, though, what is needed to constitute a community is an ongoing shared involvement or collective practice around a particular interest*”. These so-called ‘communities of practice’ entail a group of people who share a concern or affection for something they do and learn how to do it better as they interact on a regular basis. Carroll (2001) refers to ‘proximate communities’ in order to indicate the settings where individuals share a common geography and a need to negotiate access to shared resources; they also determine membership through moral and behavioral norms. Le Dantec and Fox (2015) argue that community-based research needs to engage with a ground-up effort to build capacity and support local initiative. The authors emphasize the need to develop research plans together but also pinpoint the challenge of translating the community contribution into research instead of translating the research into community contribution.

By describing some past initiatives and projects, taking place within the context of FabLab Genk, this paper focuses on the different strategies that were used to engage non-expert users in the FabLab. We specifically draw attention to the third strategy in which the mediating role of the design researchers is central. We show how becoming part of a non-expert community allowed them to negotiate between the existing practices of the community and the potential of a FabLab. Furthermore, the case-analysis stresses the importance of networks of peers as well as the employment of different complementary strategies for opening up FabLabs for non-expert users. In this sense, the paper shows how a FabLab’s shift towards community building can change the focus on the technical and spatial infrastructure (i.e. machinery) towards social infrastructures (i.e. community and people). We stress the importance of such a shift for stimulating long-term participation processes of non-expert users in a FabLab

## **1. CASE: THREE STRATEGIES FOR ENGAGING NON-EXPERT USERS IN FABLAB GENK**

In this paper, we illustrate three specific strategies of engaging non-expert users in FabLab Genk. In doing so, we focus on the role of the involved design researchers. As stated above, we claim that this role is essential in shifting towards community building in opening up FabLabs. Inspired by Gershenfeld’s (2005) initiative, FabLab Genk was set up in 2011 as part of a European project, Interreg IV. Although FabLab Genk initially – like most FabLabs – foregrounded its technical infrastructure, this approach raised questions regarding (economical) sustainability and opening up the FabLab for participation of a broader audience. Over the past years, an ongoing process has been set up in FabLab Genk to actively

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involve non-expert users. In doing so, the FabLab tries to overcome a well-known shortcoming of the traditional FabLab concept, namely being unable to set up sustainable relationships with local actors (Zijlstra, 2013). Crucial for community building, FabLab Genk attempts to nurture long-term participation from other and new groups than the traditional makers.



**Fig. 1: 'FanLab.'**

To do so, FabLab Genk employs three strategies: the 'open door policy', 'short term project' and 'long term community processes' (Dreessen and Schepers, 2018). The first strategy - 'open door policy' - are publicly announced days during which everyone can visit the FabLab and make, experiment, share, meet and work out their ideas. During these open days, approximately 3000 visitors per year (students, pensioners, hobbyists, designers, etc.) - assisted by two lab managers - use the FabLab. The second strategy entails several (rather short-term) participatory projects that have been initiated to engage (local) non-expert users in FabLab Genk. An example of this strategy is the one-day workshop of 'FanLab', in which the Fablab cooperated with screen-printing workplace KOPIJ and the local football supporters group Drughi (see: Figure 1). As a reaction to a ban on banners in the local football stadium, the participants created an open and activist toolkit for football supporters (Dreessen, Huybrechts, Schepers and Calderon, 2015). By combining the knowledge and expertise of all participants - being five members of the supporters group, two members of KOPIJ and two members of Fablab Genk - different tools were created. For instance, the workshop resulted in wooden alphabet stencils and a stencil of the group's logo to facilitate the creation (and reproduction) process of small banners. The third strategy explicitly departs from the practices of local communities. An example of this strategy is the long-term

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participatory process (2015 - ongoing) of 'Making Things!', that aims for designing FabLab workshops for the future together with children of 6 – 16 years old. This process entails collaboration with a local youth work organization ('LYWO') (see: Figure 2). Answering to the specific need of 'LYWO' to offer accessible STEM workshops to children, 'Making Things!' was set up to familiarize the children with the opportunities of a FabLab (for children participating in FabLabs or making activities, see e.g. Chu et al., 2015 and Dreessen and Schepers, 2016). By encouraging the children and youth workers to design the workshops themselves before effectively participating in them, the overall objective is to create appealing FabLab workshops, which can also be used after completion of 'Making Things!' or appropriated by other stakeholders.



Fig. 2: 'Making Things!'

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### 1.1. Participants and selection

The visitors of the FabLab's open days come from the surrounding region; no recruitment or selection takes place. In the 'FanLab' project five members of the supporters group, two members of the screen-printing workplace and two members of Fablab Genk were involved. The participants of the supporters group were invited by telephone and face-to-face communication. In 'Making Things!', around 60 local children from primarily Moroccan and Turkish descent (6 - 16 years old) participated together with eight youth workers of LYWO. Participant selection was based on the activities of the youth work organization. As participation in LYWO's activities was voluntary, the group of children changed every week; a core group of about 25 - 35 of the same children participated in the activities. Children and their parents were informed and had the opportunity to ask questions or refrain from taking part, before the start of the project. To present the results, pseudonyms are used in this paper in order to ensure the privacy of each participant and the youth work organization. Citations are translated from the original language to English.



Fig. 3: Making Things! workshop

### 1.2. Methodology

The process of engaging non-expert users in FabLab Genk was set up as a long-term Participatory Design process in which several years of ethnographic fieldwork (including participant observations (cf. Musante and DeWalt, 2010), participatory mappings and

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(group) interviews) was carried out. The field documentation included audio- and video recordings, sensitizing packages, transcribed interviews and logged field notes. The three different strategies and corresponding projects/processes were documented via 'thick descriptions' (Geertz, 1973), that are based upon the different data collected during the various strategies (including drawings, videos, articles, images, reports, posts on social networks, participant observations and interviews with the participants). In this way, not only the mere facts but also interpretations and comments of the participants were considered. This allowed us to interpret the interactions of and relationships between the participants (and involved design researchers) and put them into context, cf. Holloway's (1997) interpretation of thick description. Additionally, the two participating design researchers independently conducted qualitative analyses of the process documentation separately. Various coding iterations were performed, starting with an open coding to generate an initial set of codes describing the empirical data. The final coding iteration, in which the codes were clustered and grouped into categories, was a joint effort. Through the comparison of codes, different themes of categories emerged, which we will discuss in the following section.

## **2. INSIGHTS: COMMUNITY BUILDING IN FABLAB GENK**

Based on the analysis of the different strategies (and corresponding projects and processes) described above, we identified three important themes when foregrounding a community building approach in FabLab Genk. First, we discuss the role of the design researchers as bridge builders or intermediaries between the FabLab and the local community or organization. Next, we stress the importance of a community of peers in engaging non-expert users in the FabLab. Finally, we emphasize the complementarity of the different strategies that FabLab Genk used for engaging non-expert users and how these different strategies foster each other.

### **2.1. Design researchers as Bridge Builders**

Valuable work has been done in the past to explore the different roles that designers or design researchers can take on in design processes. Contributions include research carried out by Sanders and Stappers (2008), who discuss the role of facilitator and Lee (2008), who reconsiders roles such as design developers, facilitators and generators in order to achieve user participation in design. Light and Akama (2014) explore how, as 'custodians of care', the design researcher creates spaces for participants to reflect, make mistakes, learn, debate and change their own environment. Le Dantec and Fox (2015) address the role of researchers, confidants, advocates, interlopers, invaders, and collaborators within community-based PD

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to build relationships within the community. Huybrechts et al. (2016) point to the roles of the designer as catalyst, as facilitator or 'match-maker', as trigger of 'publics', as co-designer and as design activist. Finally, Yip et al. (2017) address designers' roles in design activities based on the role of the participating children, pinpointing the complementarity between children and designer roles.

Our case-analysis showed that the role of the design researchers in FabLab Genk was indispensable, but also shifted according to the strategy that was employed. During the open days, the role of the two FabLab managers is crucial. These managers embody the technical knowhow available in FabLab Genk and assist visitors when needed. This means that, upon request, the lab managers guide visitors in their thinking processes, help them use the available machines and advise them on their plans. Although the lab managers provide assistance when needed, our analysis showed that asking them for help often remains a barrier: *"you can get help but [the FabLab managers] almost speak a different language and you don't want to ask the same questions over and over again"* (Interview participant, 5 February 2018). Therefore, in the short-term project of 'FanLab', two design researchers assisted the two lab managers. Analysis showed that this was necessary to fulfill a bridging role between the FabLab and the project's stakeholders (i.e. football supporters and screen-printing workplace). In the long-term community process of the third strategy, the role of the design researchers became even more prominent. Departing from the FabLab as a making and community space (rather than from the machines), the technical knowhow of the FabLab managers was less needed. Meanwhile, the engagement of the child-participants in 'Making Things!' required a participatory approach to lower the threshold to come to FabLab Genk; this was something that the design researchers were able to provide. Next to that, one of the youth workers - 'Abby' - was intensively involved from the very start of the process and played an important role as mediator between the child participants and the FabLab. She helped the design researchers, for instance by taking on facilitation-related tasks (e.g. dividing the children into groups; her familiarity with the children was particularly useful for this).

The case analysis thus illustrates a reconfiguration of the FabLab team and the role of the design researchers. In the second strategy, the design researchers translated the life worlds of the participants to the context of FabLab Genk, acting as a mediator and even as a proxy (Grönvall and Lundberg, 2014; Sjölander et al., 2017). However, 'FanLab' was too short-termed to establish a considerate community-building process. Furthermore, these short-termed projects still very much departed from the opportunities of the FabLab for the



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community (e.g. how could the FabLab's machines be used to create a toolkit for the football supporters), rather than from the community itself. In the long-term process of the third strategy, the two design researchers were called the "*bridge builders*" or the people who translate the possibilities of the FabLab towards the community (Interview Abby, 27 October 2017). This idea of the design researchers as 'bridge builders' is closely related by Manzini's (2014) designing with communities approach in which the design researchers participate as peers with the community members in the process of community building.



**Fig. 4: One of the design researchers during a workshop of 'Making Things!'**

It goes without saying that this third strategy required a lot of time, effort and energy from the involved researchers. For 'Making Things!', it demanded engagement with the participants (both children and youth workers) in an intense, iterative methodological process consisting of (1) participatory observations and sensitizing packages; (2) a first iteration of the workshops; (3) evaluations; and (4) a second iteration of the workshops, followed by evaluative interviews. First, six sessions of participant observations (Musante and DeWalt, 2010) - of more than 60 boys and girls - were carried out in the period between April and May 2016, to gain insights in the children's lifeworlds and generate ideas for the design of the workshops. Inspired by Van Mechelen et al. (2015), 20 children also received a sensitizing package: two assignments in which the children - through drawing and crafting - expressed their ideas on the workshops. In the second project phase, 33 children (6 - 12 y/o)

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participated in a low-tech workshop on 29 June 2016. They created and customized paper ornaments, jumping-jack puppets and necklaces. In the period of July - November 2016, a series of three more low-tech FabLab workshops took place in which approximately 30 children participated. They experimented with some of the available machines to assemble and customize laser cut boxes. This allowed them to familiarize with the FabLab's infrastructure and provided us with insights in the making skills of the children. Third, informal brainstorming sessions were carried out (June - December 2016). The design researchers, youth workers and children brainstormed about their experiences and expectations of the past and future workshops. We also carried out semi-structured interviews with three youth workers (24 November and 15 December 2016). The last phase consisted of four high-tech workshops (April - November 2017) in which approximately 50 children experimented with electronics, hardware and software via LittleBits ([littlebits.com](http://littlebits.com)), Ozobot (<https://ozobot.com/>), Makey Makey (<https://makeymakey.com/>) and soldering. For the teenagers (12 - 16 y/o) that participated in the 'LYWO' activities, we organized - on their request and after some demonstrations in and introductions to the FabLab - a workshop in which they created, customized and designed jewelry during this phase. Afterwards, the workshops were evaluated via semi-structured interviews with the children and youth workers. Here, obviously, youth worker 'Abby' also played an important role in embedding the FabLab into the life worlds of the children. Through all this, the threshold to engage with FabLab Genk was made as low as possible.

## 2.2. Community of peers

Since the start of the FabLab in 2011, various activities were organized to engage local non-expert users (e.g. free workshops, info sessions, roadshows promoting the FabLab, etc). Furthermore, efforts were made in setting up relationships with local organizations such as youth (work) organizations, community gardens, cultural organizations, schools and city departments. The FabLab team (consisting of two lab managers with a background in Interaction Design and Product Design and two design researchers) noticed that these relationships were mostly linked to the organization of one specific activity or series of activities and that it was very difficult to set up long-term relationships. For instance, the youth department of the city and other youth (work) organizations were not very eager to take part in or organize activities with FabLab Genk.

Only since being engaged in the process of 'Making Things!' we witnessed a growing attention in the FabLab of different branches of the youth work organization 'LYWO' but also from other organizations working with children (e.g. city department, youth movement). One

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of the youth workers - 'Abby' - illustrated that because of her participation in 'Making Things!' her colleagues became curious about her activities in FabLab Genk:

"People sometimes ask: "where did you get that?" Not only interns and such, but also other youth workers. They ask: "how did you make that?". Then I tell them about the FabLab, and they reply: "wow, okay! Can they do that over there?" (Interview Abby, 27 October 2017).

The case-analysis made clear that Abby's (and her colleagues') engagement in FabLab Genk - through participating in the process of 'Making Things!' - sparked not only the curiosity of other colleagues at the youth work organization and peers from other organizations but also lowered the threshold for them to come to the FabLab. To illustrate, since the start of 'Making Things!', other youth organizations have reached out to the FabLab with specific questions about possible (long-term) collaborations or visit the lab during the open days. Interviews with several members of these new youth organizations made clear that the main driver for this increasing interest in FabLab Genk was the process of 'Making Things!' and more specifically the role of one particular youth worker -Abby - in making the (opportunities of the) FabLab knowable. Or as stated by Ferhat, a youth worker that was trying to set up a project together with FabLab Genk:

"Yeah, I knew that it [FabLab] existed because you invited us once but I had really no idea what I could do there with the kids. But then Abby told me what she did with you guys and showed some of the stuff. From that moment, I knew I wanted that too!" (Interview Ferhat, 24 May 2018).

This stresses the importance of peers and also shows that Abby, in a sense, functions as a so-called 'insider' for the FabLab. The concept of 'insiders' refers to the position of peers who are working within one's own cultural or social community (Vaughn et al., 2018). The case-analysis showed that Abby was perceived by her peers as more approachable and reliable due to her insider status, knowledge and shared experiences and became the intermediary between FabLab team and her own community of youth (work) organizations (Guta et al., 2013; Schatz et al., 2015; Vaughn et al., 2018). This was also corroborated by Valentina, a youth worker who visited the FabLab together with Abby:

"it was only because she [Abby] asked me to join. Otherwise, I would never have come but according Abby, I could definitely do stuff here with my group of children. She saw the things we are trying to do and almost yelled at me like 'why aren't you doing that with the FabLab?' So here I am [laughs]" (Interview Valentine, 20 April 2018).

Dreessen, K. & Schepers, S. (2020). Shifting towards community-building in opening up FabLabs for non-expert users. *Strategic Design Research Journal*, volume 13, number 01, January – April 2020. 24-41. Doi: 10.4013/sdrj.2020.131.03

However, this intermediary role works in two ways: Abby shares the perspective of the youth (work) organizations with the FabLab, but also shares the ideas and opportunities of the FabLab with her peers of the youth (work) organizations. For instance Abby stated that:

“yesterday, we were having a meeting, because we will soon have a Mexican night and we want to make cactuses and everything, and this and that. And they were: "yes, FabLab anyway, huh but how". And that's when I said, we can make them using the mill" (Interview Abby, 23 March 2018).

Through the case-analysis it became also clear that this influential role of the participant (in this case the youth worker) towards her/his network of peers (colleagues, fellow youth workers or organizations that work with youngsters and children) was only present in the third long-term strategy of community processes. Mainly the long-term character of 'Making Things!' and the relationships with the design researchers, provided the involved community members (youth workers) with the necessary skills, knowledge and confidence to spread information and exert personal influence about FabLab Genk in their personal networks.

### **2.3. Strategies feed each other, but the third one is central**

Through our case-analysis, it became clear that, to engage non-expert users in a FabLab, it is worthwhile to establish outreach that combines the strengths of all the discussed strategies. In the case of FabLab Genk, none of the strategies *alone* appeared to be beatific. Combining the first strategy of the open days with short-term projects (strategy 2) and long-term community processes (strategy 3) enabled the engagement of a broad scale of non-expert users and even a transfer of users between the different strategies.

The open door policy proved to be not sufficient for establishing long-term engagement with non-expert users, since this strategy has a high threshold for participation as people with no expertise often find the setting intimidating: the technical knowhow needed to use the machines, the technical jargon used and experts using the machines for creating high-level prototypes (Niaros et al, 2017). However, the case-analysis showed that after non-expert users get acquainted with the FabLab through participation in a short-term project or long-term process, they made the step to the open door policy (strategy 1). Or as stated by Gianluca:

“I got to know the FabLab when I took part in a project with the youth center [strategy 2] and also through participating in 'Making Things!' [strategy 3]. And now, I feel confident enough to come to the FabLab on my own whenever I need to use the laser cutter” (interview Gianluca, 19 January 2018).

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This was also the case for the members of the supporters group who took part in 'FanLab.' and - prior to the project - never visited the FabLab. It was only after getting the local football supporters group acquainted with the (possibilities of the) FabLab and by embedding this in their own practices of making banners, that it became part of their own community. Not only did the members of the supporters group become regular visitors of the FabLab, it also changed the internal dynamics of the group:

“normally, just two of us were in charge of the banners since they are the ones with the [graphical] skills. But now, after this project [i.e. FanLab], more of us can make the banners. [...] I think we come every month and not only for the football stuff but also for other - like personal - things” (Interview Vincent, 18 November 2014).

These quotes illustrate that the threshold of entering the FabLab during the open days is lowered by involving non-expert users in the two other strategies of short-term projects and long-term community processes. However, these projects and processes are not always initiated by the FabLab team. Often, people active in a certain community visit the lab during the open days with the intention to set up a joined project or process, directed at the interests and practices of the community.

Although the case-analysis showed that all three strategies feed each other, the findings foreground the importance of the third - long-term community - strategy since this strategy is specifically aimed at setting up capacity building processes to support these local communities in terms of self-organization, a central aspect to infrastructuring processes (Dreessen and Schepers, 2018; Horelli et al., 2015). In the process of 'Making Things!', the developed workshop will be translated into open, adaptable and workable formats in order that 'LYWO' can carry out the workshops and integrate the FabLab in their practices without the assistance of the FabLab team. And although 'Making Things!' is still ongoing, the first results in terms of the capacity building process and self-organization are already present:

“Since we have already been doing a lot of stuff for a long time with you guys, we are also becoming more confident of doing things on our own in the FabLab or ask the lab managers if it is really not working out. But it is no longer a strange technical place for us. [...] We get it now and we can actually use it for our sessions! [laughs]” (Interview Abby, 23 March 2018).

### 3. DISCUSSION: WORKING IN THE BACKSTAGE WITH RELATIONAL AGENCY

To engage non-expert users in a FabLab, different strategies can be used. By describing the three strategies used in FabLab Genk, we foregrounded the mediating role of the design researchers, the network of peers and showed that all strategies feed each other. However, the case analysis clearly showed the importance of the third strategy - long-term community

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processes - when opening up the FabLab and shifting from a technical infrastructure towards a community place. This shift towards community-building not only demands a different way of working but also emphasizes the need for different competences among the FabLab team.

When discussing community-based projects and processes, this is almost exclusively described in terms of frontstage design activities. These activities are oftentimes considered to be the drivers of PD processes and include workshops, meetings, design sessions, etc., wherein designer researchers, participants, and other stakeholders gather to work on the object of design (Bødker et al., 2017). Less documented is how designer researchers and participants contribute to the overall PD process by engaging in several backstage activities that are fundamental for the organization and success of the abovementioned frontstage activities. According to Bødker et al. (2017, p. 5), backstage design activities are the “*fuzzy and chaotic processes*” that tie particular (i.e. frontstage) design activities - such as workshops, meetings, and design sessions - together. Concrete examples of these backstage activities might entail informal gatherings, phone calls, coffee breaks or Facebook conversations. Setting up short-term projects and long-term community processes in FabLab Genk demands investing a lot of time and effort in these backstage processes. In ‘FanLab’ as well as in ‘Making Things!’, the workshops (i.e. the front stage activities) are embedded in a long-term trajectory of backstage activities (such as partaking in events organized by ‘LYWO’ and informal meetings with the youth workers or football supporters). These backstage activities allowed the design researchers to found meaningful relationships with the children, youth workers and football supporters, even before the workshops effectively took place. This was illustrated by us having informal conversations, becoming friends on Facebook and sending private messages via Whatsapp. These backstage activities were essential for gaining trust from the non-expert users (i.e. children, youth workers and football supporters) and were also important for getting to know how the opportunities of the FabLab could be relevant for their community practices.

To engage in backstage activities, design researchers require a set of new design skills: collaborating with diverse actors, constructing shared visions and supporting the community members with whom they collaborate (Manzini, 2014). In community-based PD, relational expertise (i.e. expertise in developing relationships) is considered as an essential competence for designer researchers, since it refers to the relational qualities in recruiting, building and sustaining relationships (Dindler and Iversen, 2014). Whereas relational expertise relates to the design researcher in a PD process, relational agency is a capacity that

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emerges as all participants work together to expand their understanding and opportunities for action in relation to the situation at hand.

Thus when engaging non-expert users in a FabLab, one needs to take into account the relational competence of the FabLab team. Less documented is the relational agency or the specific competence of the participants in engaging other communities of non-expert users in a FabLab. Although the case analysis touched upon the importance of the mediating role of the design researchers and the influence of the community network of peers, it would be interesting to investigate how the different communities (involved in the FabLab) could fulfill the mediating role between the FabLab and other non-expert users and how this would change the lab's way of working. How can we set up and nurture long-term relationships with communities of non-expert users in such a nonhierarchical and self-organizational way so that the FabLab become a shared 'third place' (Oldenburg, 1997; Olander et al., 2011)?

#### 4. CONCLUSION

Although the maker culture is often considered as an empowering open movement and FabLabs are described as having the democratizing potential to empower different groups of society, non-expert users are still often impeded to enter these labs, due to different challenges (e.g. unfamiliarity of tools and machines) (Ames et al., 2014; Roedl et al., 2015; Taylor et al., 2016). Moving away from being seen as solely technical infrastructures, FabLabs are reaching out to local communities. This paper discussed how FabLab Genk has employed three strategies (i.e. open door policy, short-term workshops and long-term community processes) for engaging non-expert users.

This shift towards community building requires a FabLab to change its ways of working. Emphasizing the importance of long-term community processes asks for foregrounding the mediating role of the design researchers who become part of a non-expert user community and try to match the possibilities of a FabLab with the community practices. Furthermore, the community's networks of peers that - through the second and third strategy - are tapped into become an extra vehicle for disseminating and promoting the FabLab among other non-expert users. And as the analysis showed, the three mentioned strategies of engaging non-expert users foster each other. By highlighting these findings, the paper shows how a FabLab's shift towards community building changes a FabLab's way of working: more attention for the essential backstage activities of building relationships and the related relational expertise of design researchers. By focusing on these long-term community

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processes FabLabs can make the shift from being a technical infrastructure towards becoming a social one for different communities (of non-expert users).

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