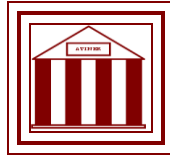


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**Children, Things and Culture.  
Observations in a FabLab**

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## Children, Things and Culture Observations in a FabLab

Christina Schachtner

"Even when one is no longer attached to things,  
it's still something to have been attached to them;  
because it was always for reasons which other people didn't grasp."  
Marcel Proust 'Remembrance of things past'

### Abstract

The main focus of this lecture is on the interactive relationships between children and things, including a presentation and discussion of the results of a study investigating workshops with children at the HappyLab in Vienna. The HappyLab is a Fabrication Laboratory (FabLab) open to everybody where pretty much anything can be produced with the help of computer-aided machines. The idea hails from Neil Gershenfeld, who opened up the first FabLab at the South End Technology Center in Boston in 2002. The analysis is influenced by the tradition of the 'material-cultural turn' in which increasing attention has been paid to the links between social aspects and the material world since the 1980s. It is assumed that we do not approach things in a neutral way but let them stimulate and challenge us, making things possible but preventing other things from happening; likewise we can learn when interacting with things but we can also come to grief. In sum, things are an important part of subjectification.

This paper is part of the academic discourse which has been known as the "material-cultural turn"<sup>1</sup> since the 1980s. Materialities and things are attracting increasing attention in different academic fields at present. This includes regarding things as carriers of meaning<sup>2</sup>, investigating the interaction between individuals and things in their relevance for subject construction<sup>3</sup>, seeing things as a materialized culture<sup>4</sup> or as new actors creating networks with human actors<sup>5</sup>. Bruno Latour's assertion that "humans are no longer by themselves" sums up the latter, challenging the modern-day subject-object split<sup>6</sup>.

In the following I understand things to be material-immaterial information units which are represented in the consciousness with a recognizable identity<sup>7</sup>. According to Roland Barthes, all material things have an immaterial dimension in the form of production and quality norms which incorporate the matter and shape it<sup>8</sup>. The immaterial character of things emerges particularly clearly in the world of digital things because computers, on the one hand, do not become digital machines until hardware and software interact and, on the other hand, because the digital world of cyberspace always relies on this interaction, whether it's a case of figures in a computer game or a website.

**Keywords:** material-cultural turn, FabLabs, evocative objects, discursive symbols, presentational symbols

**Corresponding Author:**

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<sup>1</sup>Bräunlein 2012: 18

<sup>2</sup>Lorenzer 1981

<sup>3</sup>Csikszentmihályi/Rochberg-Halton 1989; Habermas T. 1996

<sup>4</sup>Bosch 2011

<sup>5</sup>Latour 2000, 2007

<sup>6</sup>Böhme 2006: 74

<sup>7</sup>Csikszentmihályi/Rochberg-Halton 1989: 32

<sup>8</sup>Barthes 1988: 189

## FabLabs as New Locations for Producing Things

The main research focus of this lecture is on the world of things in cyberspace, and more specifically on the production tools which can be found in FabLabs as well as on what can be made with them. FabLabs or Fabrication Laboratories are high-tech workshops for everybody who would like to produce any number of products from jewellery and spare parts to furniture with the help of computer-aided machines like CNC cutters, 3D printers or CNC milling machines.

**Figure 1.** *CNC Milling Machine, 3D Printer and CNC Cutter*



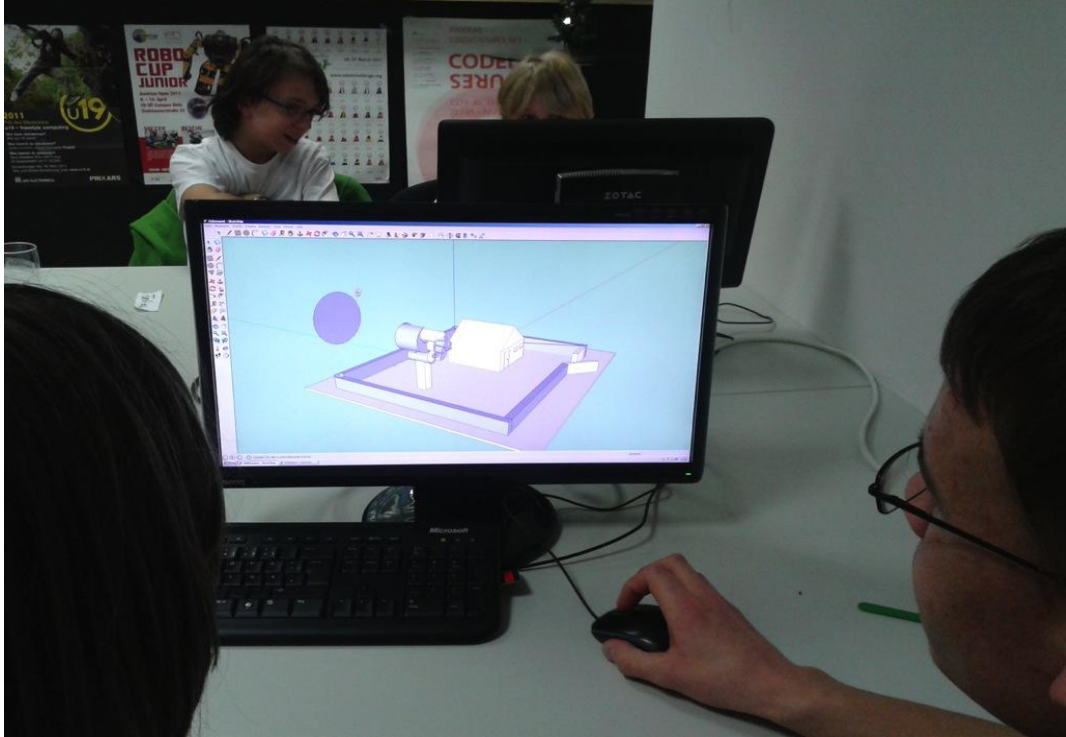
The idea hails from Neil Gershenfeld, who opened up the first FabLab at South End Technology Center in Boston in 2002. Now there are 346 FabLabs in more than 40 countries (access June 25, 2014)<sup>1</sup>. Gershenfeld wanted people to be involved in the manufacture of tools which they could then use for their own purposes so that they could find solutions to their own problems. FabLabs are seen as alternatives to mass production.

The study which this lecture is based on relates to the HappyLab in Vienna, a FabLab which was founded in 2010. Two workshops going under the title of "Fretsaws are passé!" which took place in December 2011 were studied in detail. They were attended by 23 children in all aged nine to fourteen. In the workshops under investigation the children printed a T-shirt which they had brought along from home with a design that they had produced on the computer under the guidance of workshop leader; they developed a prototype for their dream house with the help of the program Google SketchUp and printed out a miniature version of it using a 3D printer; they produced an electronic musical instrument which is known as a drawdio; and they programmed a computer game. The aim of the study was to investigate the interaction between the children and the things that they used or produced in

<sup>1</sup><http://www.fabfoundation.org/>

the FabLab and to explore the relevance of using and producing things for their identity.

**Figure 2.** *Emilia (aged 10) designing her Dream House on the Computer*



In order to investigate the workshops, various research methods were combined to triangulate the findings<sup>1</sup>. Before the workshops even started, six girls and six boys were interviewed both in connection with their expectations concerning the workshops and in relation to things in general which were or still are important for them. The workshops were observed and documented by several researchers. What they were primarily interested in was the running of the workshops and the children's creative activities as well as their interaction with each other, with the workshop leader, with the technical equipment and the products they made there. At the end of the workshops, group discussions were held in which they were asked to reflect on the production process. In addition they were asked to draw a picture of "Me and the things I made in the FabLab". The pictures were intended to give us some indication of what the children's relationship was with the things they had produced. In the following you can see a drawing by a 13-year-old girl which shows how she took possession of the things she made.

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<sup>1</sup>Flick 2000: 249 ff.

**Figure 3.** Laura (13 years old) Re-enacts the Process of taking Possession of the Things she made using the Words "my" and "our"



The visualization method contrasts both with the interview as a linguistic tool and the method of observation, which is based on perceptions and language. It presents scenarios to us, like Laura's drawing of a person surrounded by things.

### Things as Evocative Objects

When the children in the workshop came across the 3D printer for the first time, they assailed the workshop leader with questions like "Who invented the 3D printer?", "How long have 3D printers been around?", "How expensive is a 3D printer?", "Why can you only do it (=print things) with plastic and not with paper?" "Can you also print out electricity?". The children themselves are not the only reason why such questions were asked; rather the questions are the result of the relationship between the children and the impulses which spring from the things. Kurt Lewin regards these impulses as being challenging in nature<sup>1</sup> in a way which ensures that things do not encounter us neutrally but in a friendly or hostile fashion, in an enticing or enigmatic way<sup>2</sup>. Hartmut Böhme talks about a "script of appropriate operations"<sup>3</sup> which is embedded in things. A 3D printer wants to be operated, and in an appropriate fashion at that. Through their questions the children attempt to figure out how to operate the

<sup>1</sup>Lewin 1982: 64

<sup>2</sup>ibid.

<sup>3</sup>Böhme 2006: 82

3D printer in an appropriate way. Böhme builds on the production norms introduced by Barthes by adding specific norms relating to use which we encounter when we come into contact with these things.

*Discursive and Presentational Symbols and Identity Building*

Alfred Lorenzer provides an explanation for the evocative essence of things, characterizing them as the expression of human experience and social lifestyles<sup>1</sup>. For Lorenzer, things embody certain forms of thinking and logic, certain perceptions of practical behaviour, but also our longings and desires, as expressed, for example, in the wish for means of transport which can go faster and faster. Lorenzer calls things carriers of meaning and distinguishes between two types of carriers of meaning, in line with Susanne Langer, namely discursive and presentational symbols<sup>2</sup>. For the time being I will work with Lorenzer's approach as it includes proposed definitions and explanations which facilitate a theoretical classification of our observations in the Happylab in Vienna.

Discursive symbols are those things which embody the principle of cause-and-effect, or work in that manner, like a hammer, a car, a 3D printer, a CNC cutter or a CNC mill in a FabLab. They are made up of elements with an independent meaning; using them requires a series of clearly identifiable steps. Although presentational carriers of meaning also consist of individual elements, they are not independent in relation to their meaning to each other<sup>3</sup>. Rather, they appear as a whole because they have emerged from a holistic situation and illuminate part of a lifeworld<sup>4</sup>. Presentational examples from the workshops in the study include the designs which the children developed on screen and then printed on their T-shirts, or the digital designs of their dream houses. It was striking how often the children chose motifs from computer games, particular from the "Assassin's Creed" series, which indicates just how mediated children's lifeworlds are nowadays. But non-digital things were also printed on the T-shirts, including an eagle, a dragon, a palm tree, a piano and an ice cream cone.

**Figure 4.** *Emilia wants to become a Pianist. A Piano as a Presentational Symbol*



<sup>1</sup>Lorenzer 1981: 18

<sup>2</sup>Lorenzer 1973: 31; Langer 1965: 102 ff.

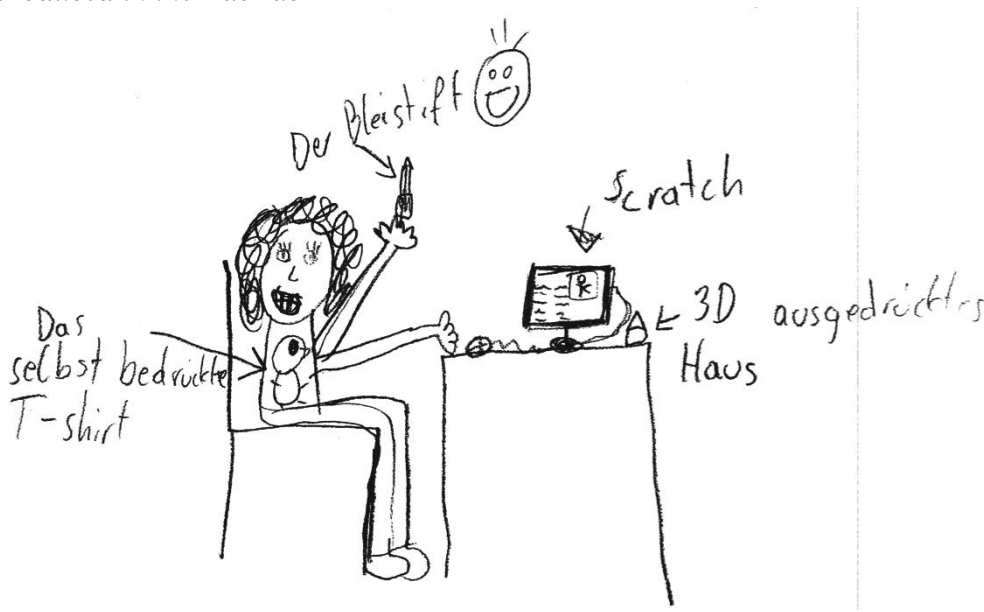
<sup>3</sup>Lorenzer 1973: 28 ff.

<sup>4</sup>ibid.: 31

The children did not randomly choose the motifs to be printed on their T-shirts or the model for their dream house; the selection process plays a role in forming their identity. Ten-year-old Daryan, for example, who comes from Turkey and is of a Muslim background, chose the Ka'aba as the motif for his T-shirt. It is the most sacred location in Islam, the cuboid building in the square adjacent to the Grand Mosque in Mecca, as he explained to the leader of the workshop: "That is the Ka'aba. Do you know how important it is for my family?" As a presentational symbol, the Ka'aba allows the ten-year-old to integrate himself into the religious context of the culture he comes from, to link his identity with this context and, at the same time, by pointing out the importance of the Ka'aba for his family, to connect his "I-identity" with a "we-identity".

We observed that Daryan interacted with the object which he designed on screen in a similar way to many of the other children. They all created an active relationship to the things that they produced; they told stories about the things, put on their T-shirts or played on the drawdio. In her visualization, eleven-year-old Safira represented her interactive relationship with her things as follows:

**Figure 5.** *Eleven-year-old Safira Reacts Interactively with the things she produced in the FabLab*



She is wearing the T-shirt that she designed; with one hand she's reaching for her computer mouse, in the other her drawdio is held up high; she has placed her dream house behind the screen. A smiling face is hovering over the scene; it looks like a bright sun. Safira is right at the heart of the things she produced; she presents herself as the proud creator. Alfred Lorenzer differentiates between forms of interaction which are linguistic-symbolic and those which are sensory-symbolic which subjects develop in relation to things as carriers of meaning. The sensory-symbolic forms of interaction are a



response to the presentational carriers of meaning which we observed in Daryan and Safira's activities in which emotional-sensory references dominated. The children's playful interaction with the Drawdio, the electronic musical instrument, was mainly an example of sensory-symbolic references as well. Some children were happy just to produce individual notes; some managed to play the nursery rhyme "Alle meine Entchen"; others imitated it and still others tried to make up their own tunes. Linguistic-symbolic forms of interaction are a response to the discursive significance of things and were revealed when computers were used or when holes were drilled in printed circuit boards while constructing the Drawdio. Linguistic-symbolic interaction is characterized by the fact that individual manual steps and thought processes follow on, one after the next. In other words, they are subordinate to the "if so - then" logic which is required when producing or using things.

#### *Gender Aspects in Interaction with Things*

The children's interaction with the drill turned out to be particularly intensive and while they were drilling, they spoke to each other a lot too. There were running commentaries on their own and others' interaction with the drill, with comments like "He's drilling fast!", "He's slow but he's also more accurate!" or "Whoops, missed it - I wonder whether that will have an effect on what I'm making?" Only one of the girls wanted to use a drill; the boys' reaction to that was to ask her whether she wanted to do it herself. Drilling holes didn't only result in a lot of questions, but also created a lot of uncertainty, which could be due to the fact that the children weren't used to using a drill. It could, however, also be due to the fact that drilling holes is an eruptive act which always involves the possibility of making mistakes or ruining something, as Barbara Rendtorff has pointed out<sup>1</sup>. As it was the boys who made such a fuss when interacting with the drill, that could confirm another of Rendtorff's assumptions, namely that in our cultural sphere, drilling holes is something that men do. Boys are encouraged to master the skill of drilling; it is even expected of them, which puts them under pressure. Girls, in contrast, tend to be prevented from drilling holes, which could be one reason for the skeptical comments from the boys when the one girl had a go at it.

**Figure 6.** *David (10) and Daniel (11) Drilling Holes*




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<sup>1</sup>Rendtorff 2011: 82

According to Lorenzer, things may approach subjects with specific meanings which are inherent in them, but these meanings do not establish themselves in the minds of the subjects without further ado. Our interaction with things turns into an interactive game in which the children assign their own meanings to the range of meanings which are already associated with the things. One example of this was their interaction with the 3D printer. This device in particular let their imaginations run riot in many ways, also with respect to the relationship between people and machines. One ten year old imaginatively asked whether he could reproduce himself (with the help of the 3D printer), adding optimistically "If I printed myself out several times, one of them could go to school instead of me".

Things give rise to fantasies, ideas and desires which go far beyond the meanings inherent in the things themselves, but they can also prove to be very resistant to this interactive game. This is surely something that Barthes wanted to point out when he described objects as being "ideosyncratic [ ] partly directed against humans"<sup>1</sup>. Ten-year-old Daryan was at the receiving end of the ideosyncrasy of objects when he didn't use the soldering iron "appropriately" and burnt his finger. "360 degrees almost got me", he cried in horror, and went to sit down to one side, his finger in a glass of water. Later on he had another go.

So freedom is not infinite in the interactive game with things. We experience the meanings inherent in them as resistance which we can learn from or by which we can fail<sup>2</sup>.

### **Subjectification and cCultivation**

As our observations in the Happylab in Vienna showed, the production of and interaction with things evoke feelings, thoughts, fantasies and memories; they show us our limits, trigger off learning processes and train certain skills. "In order to grasp the essence and becoming of humans, you have to understand the goings-on between people and things", according to Czikszentmihályi and Rochberg-Halton<sup>3</sup>.

#### *Interdependences between the Subject and Culture when Interacting with Things*

Subjectification, or the process whereby humans become subjects, is closely interwoven with our relationship to things, which already kicks off in the first few months of our lives. Donald W. Winnicott describes these things as "transitional objects"<sup>4</sup>. With the help of transitional objects like teddy bears, dummies and blankets, children gradually learn to distinguish between internal and external reality and to constitute their own self. Winnicott's assumption

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<sup>1</sup>Barthes 1988: 188

<sup>2</sup>Bosch 2011: 14

<sup>3</sup>Czikszentmihályi/ Rochberg-Halton 1989: 21

<sup>4</sup>Winnicott 1973: 62

that things are representations of external reality is also reflected in Lorenzer's characterization of things as sociocultural bearers of meaning, which I have already referred to. Subjectification is not an independent process, but happens within a cultural context which is, amongst others, conveyed by things. Within this context, becoming a subject can be described as cultivation, or as an occurrence in which individuals and culture mutually engender each other, stimulated by their interaction with things. I would like to look at this association more closely, based on our observations in the Happylab in Vienna.

As sociocultural carriers of meaning, things represent cultural norms and trends, as I already mentioned, and as such they trigger off stimuli to act. This was also evident in our study in the children's relation to the sociocultural significance of fashion, for example, which already played an important role in the interviews but even more so when the children were talking to each other during the workshops. Fashion brands like Burton, DC, Billabong, Vans, Quiksilver hats and Converse sneakers have a specific image for children which they generally described as being cool. Cool stands for everything that is trendy, everything that is associated with being admired and approved of, as a twelve year old explained to us. For this boy, cool brands are so important that he also uses his pocket money to buy brand-name clothing. Others explained that they always weighed up whether it was worth buying into the cool image, while yet others declined to buy branded products when the labels had Chinese characters on them as they associated that with child labour. Cool brand names representing fashion trends evoked emotionally intensive debates which result in different ways of acting, assuming that the remains were transformed into actions, which affect the children's self-image. As an increasingly important group of consumers, children and adolescents can influence cultural trends in fashion through their actions, thus helping to shape culture.

#### *Transcultural Experiences*

The things which children and adolescents are confronted with embody currents from various cultures, something which we also observed in the Happylab in Vienna. The activities of Daryan can serve as an example. He was the ten year old who chose the Ka'aba as the motif for his T-shirt and who took the Burj Khalifa, the highest building in the world at 828 metres, as a model for his dream house. His transposition of the Ka'aba and the Burj Khalifa in Dubai into the high-tech world of an Austrian FabLab can be seen as the young boy's attempt to create space for the culture he comes from within the western culture he lives in order to make his own identity more coherent. He pursued this attempt still further by criticizing the fact that there are so few mosques in Austria. But then one of the other boys contradicted him, saying "You're such a victim", in response to which Daryan threatened to beat up that boy. This one hit back, saying "I find that H.C. Strache's policies on foreigners are not that bad at all". H.C. Strache is a right-wing populist politician who has a discriminatory stance towards foreigners.

**Figure 7.** *The Visual Transposition of the Burj Khalifa into the High-tech World of an Austrian FabLab*



Culture is not a closed circle. Different cultural values and behavioural patterns intersected in the things which the children produced which demanded that positions were taken, selected or modified. The fact that this is not only experienced as an asset, but can also provoke attacks, defence mechanisms and aggression, is illustrated in the exchange between the two boys which probably had a bearing on their self-image.

## Outlook

If children only took over the cultural meanings inherent in things, culture would become a rigid system, no longer in a position to be a flexible casing for continued social development or for the subjectification of the individual. As already mentioned, the children's interaction with the things always turned into a game in which the sensory elements represented in the things can be interpreted, modified, rejected and re-combined against the background of the individual's questions. It is possible for individual perspectives to open up because things are accessible to different readings by the senses<sup>1</sup>. The game with things which is characterized by one's own sense as a subject makes it possible to actively shape culture. A ten-year-old boy from the FabLab described such a game in his interview which didn't have anything to do with digital things but with the things in his physical environment. We found out that he considered things which were worthless in the eyes of others, such as

<sup>1</sup>Barthes 1988: 190

loo paper rolls, kitchen paper rolls, empty tins and" all sorts of things which would otherwise end up in the waste paper bin" to be raw materials which he could use to create new things. He endows the individual parts with new meaning and creates his own world of things. For the time being, it is still only his own world but the idea of making new things out of worthless things could spread as a counter model to our present culture of standardized finished products. The boy's games with these things illustrate the possibility that culture isn't only internalized but is also moulded and re-shaped. They also focus on the boy's self-construction as a creative, inventive subject. Subjectification as part of the mode of cultivation does not only ensure the subject's place in society; it is also the promise that a society can continue to develop<sup>1</sup>.

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<sup>1</sup>Erdheim 1988: 197

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