

Group Report - INF5011

Project Re-coding: Light bulb

Radmila Kompová | Markus Grimsøen | Karolina Anna Matyja



1 Introduction

In the initial phase of the project we came up with some ideas that seemed fitting to the project description. Basically, we were supposed to take something, a technology, and recode it so that it would get a new meaning. This task wasn't easy because it was "too" open.

In the beginning we wanted to re-code the idea of books as something that we buy and then leave on the shelves at home to store dust. We found some inspiration on the internet and that led to us wanting to set up a cabinet at the subway station at Forskningsparken, where there would be a free and easy way to borrow books for a short period of time. The idea is that you borrow a book, read it, and when you are done with it, you put it back and take another one. As a result, more people could borrow books that they wish for - with greater ease. The idea is based on trust to others. We liked the idea, but after consulting our lecturer and finding some issues with the relevance of this idea in Norway where we have public libraries on every corner, we decided to rather focus on something more connected to technology.

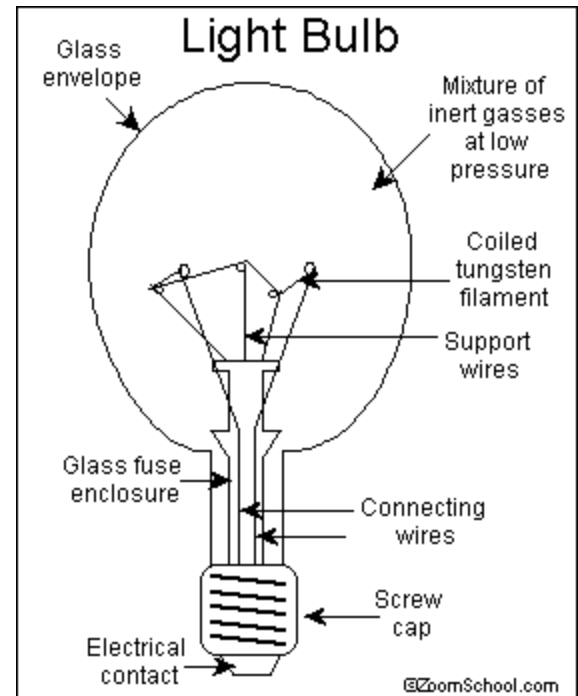
Through brainstorming we ended up with one artifact - the light bulb. What is interesting and relevant for this project, is how the living cycle of a light bulb usually looks like. The artifact is very popular in all countries that have a source of power, as it is giving us light. The artifact is mediating our daily activities, and is essential for our work - so we can actually see and do things. Through time the light bulb and the infrastructure has developed some standards, like e.g. duration of a light bulb. Based on our experiences with this artifact, we think that it is something that is difficult to not have in our houses; and when it's broken - we are forced to buy a new one. The old one, which has no value for us anymore, is thrown away. This is also called "designed for the dump", a concept mentioned in the short film "the Story of Electronics" by Annie Leonard (2010).

As we were inspired by our trip to the Nordmarka, and the articles from Peter Kahn (2009, 2011) about how nature is influencing our mental health; we wanted to re-code the light bulb into something that can enhance the environment in our daily lives. Based on that, the project was about reshaping the light bulb into a flower pot, or something that could contain green

sprouts. As a result of this project, we can create something that not only has a positive effect on our local environment; but also the global.

2 Technology - The light bulb

There are three types of light bulbs in use today, the incandescent, the fluorescent and LEDs(light-emitting diodes). The incandescent light bulbs are what we would call the original light bulbs. They were created in the middle of the 18. century and we know them well from Thomas Edison. The incandescent light bulbs turns electricity into light by sending the electric current through a thin wire called a filament. the filament is made up mostly of tungsten, a type of metal. The resistance of the filament heats the bulb up. Eventually the filament gets so hot that it glows, producing light.



The filament needs to be protected from oxygen in the air, so it is inside the bulb, and the air in the bulb is either removed (a vacuum) or more often, replaced with a gas that doesn't affect anything, like neon or argon. Only about 3% of the energy that goes into an incandescent light bulb actually makes light, the rest makes heat(Wikipedia). This is one of the reasons why they are thought of as neither effective or environmentally friendly, and had to be replaced by the fluorescent bulbs or the LEDs. In the early 2000, people started to realize that the fluorescent light bulbs are longer lasting, more environment friendly, and they use less energy while giving the same amount of light. This lead to a change in the market where it had become normal to use fluorescent light bulbs instead of the incandescent ones. Hence, there is now a lot of used incandescent light bulbs that have little to no use.

Recycling

In Norway, there is a lot of organizations and collaborations that work with recycling. One of these collaborations is LOOP, which is an organization that works with communication about resources and environment. On their web-pages, they list some of the benefits of recycling light bulbs and describes what that is done with them. According to LOOP, only 10%, 5

million, of the total amounts of light bulbs(50 millions)that are used, are recycled in Norway each year. LOOP say that most of the parts of the light bulbs that are sent to recycling are being sent to Sweden. In Sweden, the glass can be used for new glass products or be ground to sand to be used as fill. The metals are sent to a metal regains where they are sorted by type, melted down and reused. The plastic energy is utilized(LOOP).

3 Project realization

We decided to meet almost every Tuesday, at 10 o'clock in order to work with the project and with the article presentation. The first meetings were focused on the brainstorming, and the next one on the article by Irani et.al (2010). We wanted to use as much time as we could on the article, in order to understand as much as possible and teach other students something new. the last part of our schedule is concentrated on the making and writing phase.

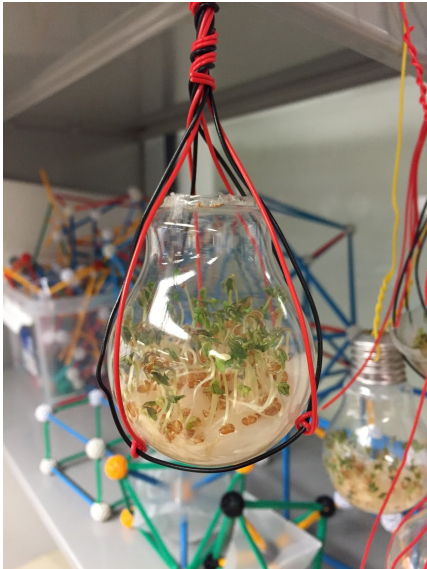
Date	Activity
16.09.2014	Brainstorming, choosing the right project. Bookshelf idea
23.09.2014	Consultation with Maja, reevaluation of the idea.
30.09.2014	After second brainstorming - ended with the light bulb project.
07.10.2014	Work with the article and presentation of project re-coding.
14.10.2014	Work with the article and presentation
21.10.2014	Presentation of the article in the class.
4.11.2014	Work with the project - painting light bulbs.

11.11.2014	Work with the project - seedling of the peppergrass. Every second day we watered the sprouts, and documented the progress.
18.11.2014	Assign roles for project report and presentation Markus: Technology - the light bulb Radmila: Project realization Karolina: Technology and environment (theory) All: Conclusion and finalization of the report
25.11.2014	Delivery day. Meet early to rehearse our presentation

We were inspired by the article by Peter Kahn (2011) and his thought about how nature positively influences people. At the same time we wanted to use old technology that can no longer be used for its original purpose. Because of this we came up with a new idea in one of our meetings - a light bulb project. More precisely, we decided to try to grow small plants inside of used light bulbs. To make the light bulbs even more good looking, we decided to paint some of them. We also decided to use old wires for hanging the light bulbs, and thereby re-using another type of technology.



We put cotton and seeds inside of each light bulb and watered it. We decided to use seeds of peppergrass as it grows very easily and quickly and it does not need soil to grow. After seeding the seeds, they needed to be watered approximately every two days. We have documented the progress of how are the sprouts growing with pictures.



4 Technology and society

In this section we will discuss how the light bulb as a technology intersects with society. We want to go through several phases of the living cycle of the artifact; starting with designers responsibility and the economical consequences of the innovation. Afterwords we are going to discuss the sustainability of the light bulb, continuing with how the non functioning bulbs can be used in different way. Finally we will talk about the challenges of our idea which are tied up to the remaining components.

4.1 Design

Based on the documentary “The light bulb conspiracy” (Dannoritzer, 2010), we can observe that the initial design of a light bulb was meant to last for 2 000 hours - that is a lot. One could assume that in the past, people wanted to buy things that lasted for a long time. This could be tied up to the economical situation in the given country. People didn't have large income - so if someone bought something - it should last for a long time since they have invested some money in that object. But after some time, the lifespan of the light bulb was decreased with 50% (Krajewski, 2014). This was caused by the legacy of the light bulb cartel, Phoebus, which

ended in the 1930's (ibid.). Even if cartel of the biggest light bulb companies was gone, the idea of shortening the living span, had influence on the economical market.

So, the main goal of the light bulb, was probably to give people more light in order to do more activities - even if it was dark outside. Life changed after the introduction of the light bulb, people were working more and the efficiency of the single worker was much bigger when the light wasn't a limitation anymore. On the other hand, the production of the light bulb itself also influenced the market. In the film "The light bulb conspiracy", the authors are mentioning that the main goal of the decreased duration of a bulb, was caused by the need of increasing consumption, ergo increasing production (ibid.). By shortening the lifespan, the consumer had to buy new bulbs more often, and as a result there was produced much more of light bulbs; giving more work to the people. This ends up, with better living conditions for the workers. So as said in the course book, "innovation is closely interwoven with economics" (Quan-Haase, 2013, p.215). And this is not only visible by the enhanced living conditions of a single worker, but it has in fact effect on the economy in general. Where big companies have increased income, and having a better position in the system.

Another important point in this short analysis, is the responsibility for the design and its impact on the environment and society. Could one assume that among different technologies, shorter life span of a single light bulb has contributed to global warming? Designer of a light bulb, Edison, does he have responsibility for the enormous e-waste? Or the heterogeneous network of different actors like different light bulb companies and economics? There isn't any clear answer to this, but one could discuss those different possibilities like Feng and Feenberg in their article (2008). They are discussing the process of design, at who have responsibility for the design and its results. They are arguing for the fact that the responsibility lays on the collection of heterogeneous actors, like end-user, designer, economics, social situation or culture. And at this point they are mentioning that the designer itself is constrained by the existence of the others factors during the design phase.

4.2 Design for last?

In the short movie of Annie Leonard (2010), she is mentioning a concept of *design for last*. Its about reevaluation of the design process in order to enhance the design itself and make it

more sustainable. The author of the movie (ibid.), is explaining that often it is cheaper to just buy a new device, than repair it. Through this approach we are ending up with a 25 million tons of e-waste each year (ibid.). Through creation of the light bulb cartel in the 1930's we have contributed with a generation of large amount of waste which often ends up in developing countries - where people without any equipment are trying to do something with it (ibid.). Unfortunately, a lot of the waste is burned and is finishing its way in our air - contributing to pollution, which have effect on the whole world.

In our project, we were not concerned about designing a new light bulb, but we were interested in which way we can extend the life cycle of the broken light bulb. By putting together some ideas; through brainstorming we wanted to re-code light bulb into something which had green-effect on the environment.

4.3 What next?

Our main inspiration for that project was the trip to the woods with class. Based on the literature for that time, we were interested in one fact that was presented by the Peter Kahn (2011). His article is referring to the influence of nature on our mental health and stress level. In his study, he is testing three conditions: a) a room with no window or screen b) a room with nature displayed on screen and c) a room with windows with nature outside (ibid.). Through this study, he found that people who are exposed to nature at some point experience enhanced well being (ibid.). He points out that nature on the screen is not so powerful as real, but still have better effect than a white wall.

Our project tries to address exactly this issue. We feel that this problem is even more interesting when we are applying it on the IT-students. From our experience, students at department of informatics spend a lot of time inside. This is not only caused by the fact the we have to study, but the fact that it is difficult to code in the sun with your laptop - because you don't see anything on your screen.

We want to create something that will enhance the environment inside the building, and make it more friendly. By introducing some green bulbs in different places, we can improve well being of the people who interacts with the building; and make it more interesting in general.

What is important to notice in this project, is that plants need some care from humans. In order to experience some fun and change in near community, one has to water sprouts or plants regularly. It's about care and understanding of the needs, in order to have something back - green sight. By applying this kind of perspective, we are considering the *feminist ethics* or *ethics of care* (Ess, 2010). This kind of thinking that we have presented is characterised by the *emotive dimensions* (ibid.p.201) of the problem. Where the emotions to the thing or person have influence on the way we are going to treating someone or something. Through this perspective one is also focusing on the relationship between the actors (ibid.). Once the connection between the plant is established - it will be harder for one to abandon it.

4.4 What about the rests?

While doing the project we ended up with a lot of waste, like aluminium, some kind of porcelain, glass etc. We didn't know what to do with that, and we are still not sure how they should be handled. In the documentary of Dannoritzer (2010), we can observe that there is a lot of waste which is shipped to the developing countries from western part of the world. The main thought, behind this, is that people there "can" reuse the old computers etc. In reality, a lot of the technology which is sent away is useless. What young people do, is to take apart components from each other; and if that is impossible - they burn it. Through this process they are not only creating a dangerous situation for their health; but also contributing to the global warming by burning toxic parts.

So the big challenge is to dispose the rests of the light bulb in the right way, which will not contribute to any of that. Where instead we are helping in some way developing countries and decreasing global warming. The big question which the project is raising is: what kind of precautions should we make in order to support a better world situation?

Another problem which emerged during the realization phase, was that not all light bulbs are easy to transform. Some of them, the fluorescent and others, have dangerous gasses inside, which makes it difficult to re-code for the new function. Based on their design inscriptions, it is impossible to reuse them in our project; but maybe on the other hand when they are energy saving from before - there isn't so much harm in throwing them away after some years of use?

5 Conclusion

There are two big factors in our project that we should debate. 1. how does our artefact affect us, and 2. is it more beneficial for us to recode the light bulbs, rather than recycling them? We have presented some ideas about how surrounding ourselves with nature affects us. Based on the research done by Kahn, we have made some prototypes/come up with a simple idea of how you can easily surround yourself with nature. This can be done using old materials and ruined technology that you have at home, as e.g. old light bulbs and some wires. We have discussed some of the challenges surrounding the technology and our prototype, e.g. how to dispose of a light bulb in a safe and environment friendly way.

In this project, we have learned that by taking apart the components of a technology, we can end up creating lots of waste, that contributes to pollution and that can be an environmental hazard. By not recycling the entire light bulb, do we make it harder to recycle the parts that are left? LOOP says that norwegians only recycle 10% of their light bulbs. Does our project make it easier or harder to increase this number? This project is showing that while working with technology you are meeting ethical dilemmas all the time, and that during this time one have to pick a side - unfortunately, often we chose the one which is most convenient instead of the one which is wise.

We wish to conclude, on the basis of the article of Kahn and our own experience, that this project can be a good and clean alternative as long as it follows a set of requirements. These requirements, or actually the only requirement, is that the waste, the metals, has to be recycled as to not lead to more pollution. If the waste is not recycled, the project will have a good side and a bad side, and that is not to be preferred. We think that if you do not recycle the parts that you do not use, then it would have been better to not do it at all.

6 Bibliography

Dannoritzer, Cosima, Claudia Sprinz, and Janos Tisovszky. "The Light Bulb Conspiracy." (2010).

Ess, Charles. "Digital media Ethics: Overview, Framework, Resources". In Charles Ess, *Digital Media Ethics*. Cambridge: Polity Press, 2010. 167-225.

Feng, Patrick, and Andrew Feenberg. "Thinking about design: Critical theory of technology and the design process." *Philosophy and Design*. Springer Netherlands, 2008. 105-118.

Irani, Lilly, et al. "Postcolonial computing: a lens on design and development." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, 2010.

Kahn, Peter. "Why Do We Destroy The Nature We Love, The problem of environmental generational amnesia". *Psychology Today*. 7.09.2009. Internet.
<<http://www.psychologytoday.com/blog/human-nature/200909/why-do-we-destroy-the-nature-we-love>> 18.11.2014

Kahn, Peter. "We Don't Know What We're Missing, Experiences with nature - so deep and beautiful - that we're losing". *Psychology Today*. 17.10.2009. Internet.
<<http://www.psychologytoday.com/blog/human-nature/200910/we-dont-know-what-were-missing>> 18.11.2014

Kahn, Peter. "Can Technology Replace Nature? We need actual nature for our physical and psychological well-being". *Psychology Today*. 12.06.2011. Internet.
<<http://www.psychologytoday.com/blog/human-nature/201106/can-technology-replace-nature>> 18.11.2014

Krajewski, Markus. "The great lightbulb conspiracy." *Spectrum, IEEE* 51.10 (2014): 56-61.

Leonard, Annie. "The Story of Electronics." *The Story of Stuff* (2010).
<<http://storyofstuff.org/movies/story-of-electronics/>> 17. november 2014.

"Gjenvinning av lysrør og lyspærer". *LOOP*. updated 11. mars 2013
<<http://loop.no/faktaartikler-posts/lysror/>> 22. november 2014

Quan-Haase, Anabel. *Technology and Society: Social Networks, Power, and Inequality*. Oxford University Press, 2013.