This project started as a collaboration with Electrolux and Fab Lab Barcelona to design a solution that could alleviate the e-waste exports to 3rd world countries. This report will cover the process and thoughts behind the final concept.

**Objectives**

The aim of this project was to come up with a system or product that would take advantage of e-waste to create something with it. The disposal of e-waste is becoming one of the growing problems that the planet is facing. Our consumption and disposal of electronic products is causing harm to the environment. The problem can’t be neglected. There is one main alternative to the end life of a product which is recycling. Is it possible to find more? Is it possible to repurpose e-waste?

**Used Methods**

To have a bigger picture of the end life of an electronic product, interviews, observations, shadowing were done. It was very important to firstly understand people’s habits towards obsolete electronics, and secondly grasp the e-waste end life cycle.

To improve the very first concept ideas, testing and role playing took part in the process. It was worth to test the concept with people to know I was going in the right direction.

**Conclusions**

Society wants to give a good second life to their electronics, but there are not many alternatives. Many appliances end up in a corner at home for a long period of time before being threw. The repair stores are disappearing.

At the same time, the recycling process is not energetically efficient. Involves a lot of parties that do small steps to recover materials. Those parties are far away from each other and together they generate a big carbon footprint.

In the other hand electronic producers
see obstacles on letting people manipulate their products, because any accident can affect their brand.

Hackers see beneficial the learning and joy in manipulating electronics.

**Final Concept**

The final concept tries to solve the key observations described before. The outcome is a service that aims to create a sustainable consumption culture based on giving the customers the option of increasing the life span of their electronics themselves by repurposing, repairing or reusing (the 3R’s).

The service has a physical space to do such activities, and an online platform. The space has the necessary means for the people to do the 3R’s: Expert staff whom will assist you, tools to perform the activities and equipment to protect you from any damage. The platform gives to its customers the possibility to access to knowledge through tutorials. It also emphasizes the social interaction of the customers by promoting knowledge sharing. It facilitates people to make tutorials and propose hacks that can become events.

The outcome concentrates in Repurposing because is the less explored alternative solution. Therefore I built a Fan made with a vacuum cleaner motor, and the instructions of how to build it, as a proof of concept.

More details about the service works and the decision making, are explained in the following pages.
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This report introduces the e-waste illegal exports to third world countries, as the main frame to explore sustainable alternatives at the end life of an electronic product.

This project aims to find practical solutions to avoid the disposal of obsolete, malfunctioning or broken electronic products.

The research is centered on understanding the stakeholders of the end life of the electronic product. It’s executed interviewing people, observing and shadowing the parties that intervene on the electronics end life cycle, electronic producers and Hackers/Makers.

The Development phase aims to get the information necessary to mature the concept. Instead of the traditional design approach, where the concept is built for long time and validated at the end of the project, the concept is a basic idea that is continuously shaped using testing methods, and role playing.

The Final Concept, explains the scope, the purpose and the reasons for the look and feel of the concept.
Before the degree kicked off, and using the brief as a reference, I contacted several companies, associations and non profit organizations in order to establish a possible partnership. Between those, were devices and appliances producers, associations supporting green initiatives, and DIY and Maker communities. The intention behind getting in touch three types of structures, was understanding their role and connection with the problem that e-waste generates. Fortunately, the sponsorship and collaboration became true, and Electrolux and Fab Lab Barcelona agreed to join forces with me.

2.1 Electrolux

Electrolux is a swedish multinational corporation founded in 1919 and present in 160 countries. Electrolux manufactures home and professional appliances. Among their appliances are refrigerators, vacuum cleanses, ovens, etc. The corporation sells under a wide variety of brand names like AEG, Corbero, Castor or Zanussi. Electrolux is known as one of the most environmental conscious companies. One outstanding environmental friendly product made by them is the vacuum cleaner produced with scrap plastic.

2.2 Fab Lab BCN

Fab Labs (Fabrication Laboratories) are places equipped with CNC machines where personal fabrication becomes reality. Fab Labs was born at MIT (Massachusetts Institute of Technology) in 1998, in the program Center of Bits and Atoms, in the course “How to Make (almost) Anything”. The purpose of the course was to teach students how to use CNC machines. The course became really popular at MIT when many students, even from majors not related with technology showed their interest on creating things for themselves with CNC machines. The dynamics of the course were progressively transformed to a working model. At some point that model expanded and was acquired in other countries (Norway, Ghana, Iran, etc), as we know it now, Fab Labs.
Nowadays the Fab Lab Barcelona, offers training on digital manufacturing (Fab Academy, Fab Kids), manufacturing consulting and manufacturing services. Their motto is the technological empowerment of the people.
In the initial phase of the project, I wanted to get a better understanding of the obsolescence of the electronics by getting inspire by people, services, trends, businesses, and platforms. Thus, the research phase focused on the electronic waste cycle, which starts from the last stage of the usage of an electronic product, until the recycling. The motto was, to recognize the parties that intervenes or modifies the e-cycle and its functions.

3.1 WHAT IS E-WASTE?

The e-waste or WEEE is other way of naming Electronic Waste. The e-waste is all the electric devices, appliances or artifacts that are outdated or not longer functional and had been disposed of. For instance, computers, vacuum cleaners or electrical toothbrushes.

The disposal of e-waste is becoming one of the biggest problems the world is facing nowadays. Only 15-20% out of 50 million tons of e-waste produced each year, is recycled according to the Environmental Protection Agency estimates. Europe and USA export their e-waste to other countries (China, India, Brasil, etc) to avoid the problem.

As a consequence Accra, the capital of Ghana, remains one of the biggest e-waste landfills in the world. Some local people, survive economically by burning the remains of the electronics (chips, boards, etc), and extracting the metals out of them. Most of what they burn is highly toxic. That affects their health and the environment causing diseases and polluted rivers. Although money is necessary for their survival, the impact suffered by the local people and the environment is not justified.

Sending the problem to other countries doesn’t solve the problem, but just postpone the obvious. That the problem will come back to us.
3.2 PEOPLE AND OBSOLETE ELECTRONICS

The first action I did was asking people about the problem. I randomly interviewed people in the Umeå University Campus, to know how they deal with a product when they consider it's obsolete. I firstly wrote questions considering two relevant periods of time: When the electronic product becomes obsolete, and when they have to decide what can be done with the old electronic product.

In between interviews I was pushed to adapt, reframe, erase and include new questions. The early answers of the interviewees where not completely answering what I was seeking. For instance, talking about e-waste in a generic way didn’t seem to work and needed to be exemplified. So I used a cell phone as an example.

This are the common threads I found
on the interviews:

1. Term obsolete is relative to the status of the product or the consumer mindset. Therefore I classified the obsolescence in three types:
   - Functional: When the function of the product is no longer needed. Like a radio-cassette.
   - Technologic: When technology advances to a new generation of products and replaces the old one. For instance the replacement of CRT TV’s for flat television displays.
   - Aesthetic: When the product doesn’t look like it use to or perform as it use to. For example, a scratched phone.

2. Some of the interviewees kept obsolete electronics for a period of time, because of the emotional attachment that tied them. They keep them for four reasons:
   - hoping to fix them
   - in case the new one breaks (happens mostly with personal devices)
   - because they don’t know where to give them a second life
   - because of the nostalgia.

4. There’s not clear information of what to do when an electronic product becomes obsolete. Even tough there are alternatives for old products, they are not implicit. The system puts hurdles to the consumers: People willing to recycle, doubt of where to place the e-waste since there are not a specific containers for electronics. They wonder if is necessary to separate the components. People willing to repair the old electronics, find repairing more expensive than replacing the old one for a new model. That if they find a place to repair. People willing to donate them, don’t have any reference of where are they supposed to go.

5. People with modest economies are more likely to find more alternatives to recover obsolete electronics. Among those alternative are: exchange the product to recovery companies for money, buy or sell second hand electronics, find a guy who can repair for a cheaper price or gain knowledge to repair electronics themselves.

Users seem to need a better support on the obsolescence process of the electronic produces. In general, there’s a lack of information, and companies that offer alternatives to embrace a better obsolescence.
3.3 E-WASTE RECYCLING PROCESS (UMEÅ CASE)

In this section, the disposed obsolete electronics dumped by Umeåns (Umeå citizens) are followed from the containers, to a recycling facility in Skellefteå. This section is divided in four different parts, corresponding to the places that I visited along the way from Umeå to Skellefteå. The main goal of this section was to get a general idea of how the electronic waste is processed and reintroduced to the manufacturing cycle, looking at the different parties that intervene on the process.

MILJÖHUS

The Miljöhus is the swedish name for garbage house, place where people can discard different kinds of waste in classified garbage bins. The garbage is divided in organic waste, cardboard-paper, metals, glass, plastics, batteries and lightbulbs. Each type of lightbulbs has different containers. Appliances and other electronics don’t have a specific area there to be collected. Although people still deposit them in between garbage bins. All the garbage is then transported to different landfills in the city. If e-waste ends up in the Miljöhus is sended to Gimonas Recycling Center.

GIMONAS E-WASTE RECYCLING CENTER

Gimonas is a Recycling Center in the outskirts of Umeå. The citizens can go there by car to throw e-waste. At Gimonas, the e-waste is separated to be sent to other recycling premises, where the e-waste is going to be treated. The staff assist people by indicating them where and how to put their e-waste on containers, classified by types of waste. The e-waste is classified in TV’s, major appliances (fridges, washing machines etc), small appliances (hair blower, juice maker, etc), incandescent light bulbs, fluorescent light bulbs, batteries and for Returbutiken (see next section).

Once all the e-waste is collected at Gimonas, can be sent to any city inside of Sweden, or even the world. But normally it is sold to Kuusakoski (after Returbutiken section).

RETURBUTIKEN

Returbutiken is a second hand store in Umeå, which is managed by the municipality. Returbutiken has a container at Gimonas Recycling
Center, where people can discard electronic products that they think still work or could be fixed. The staff from Returbutiken goes twice a day to pick up e-waste from their container. They check if the artifacts work, and if they do, they are cleaned and tagged with the price. Some of the functional components of defective electronics are also reintroduced into the market. The rest is sent back to Gimonas Recycling Center.

KUUSAKOSKI RECYCLING

Kuusakoski is a finnish Recycling Center with one center in Skellefteå. Most of the e-waste from Umeå is processed there. Kuusakoski’s job is to reduce and separate the materials of the e-waste and convert to raw material at the end of the process. The WEEE is shredded by an industrial shredder that diminishes the electronics to small pieces. At the end of the process you can find different piles classified by materials. Cooper is the most demanded material. The plastics and the fluff, are not normally recycled, but burnt for energy purposes. These materials are then send by boat to other countries in the world to be reintroduced to the manufacturing process. (see diagram)

During the tracking of the e-waste I saw that nowadays, recycling is not an efficient process because of the following:

- I realized that e-waste is a business. The e-waste destination depends on how much is paid for it.
- There are many parties involved in recycling materials. These parties are in different places and they are
responsible for one task each.
- As a consequence, the whole recycling process generates a substantial carbon footprint due to transportation.
- Almost 80% of the e-waste is still functional. Theoretically, it can be reused, but it’s not.
- Just 25% of the plastics are recycled. Most of them are burnt for energy purposes.
3.4 THE ELECTRONICS PRODUCTION INDUSTRY

The electronics production industry is directly linked with the problems that electronics is causing. Their role is key on finding a solution to palliate health and environmental problems caused by the WEEE in 3rd world countries.

I interviewed two people from the industry working in the environmental EU re-directives and legislation department, and the recycling and lifecycle aspects department.

When interviewing, I aimed to understand how the business model of electronics producers work to detect opportunity areas around the end life of electronics.

I firstly asked about the end life of electronics from their point of view. Secondly, if refurbishing or repurposing were contemplated as alternatives to recycling. And thirdly asking how do they establish contact with the customers.

The end life of a product

In Sweden, big electronics producers are affiliated to El-Kretsen. El-Kretsen is a recycling platform in charge of taking care of the WEEE that is collected in the municipalities, and delivered to specialized recycling facilities that El-Kretsen has a contract with. For instance, from Gimonas Recycling Center to Kuusakoski. They call this process “ElRetur”. Besides that, El-Kretsen supervises the WEEE treatment according to Swedish regulation. Thus El-Kretsen helps the producers by handling the insertion of recycled materials back to the production cycle. The producers are not involve on the process. But they economically support El-Kretsen to take care of their obsolete products.

Practical hurdles

During the interview I realize that many actions are difficult to be achieved by the producers due to re directives, legislations, brand values or internal believes.

One of the interviewees said: “Reuse and refurbish sounds nice, but we have all the parties against it, because there are practical hurdles”. Among the practical hurdles are, the reduction of energy consumption of new appliances. When the Europe Mandatory Energy Level came up, companies started competing to achieve the A level (the most energy efficient). Such
competition makes an appliance produced in 2000 less energy efficient than one produced this year. In consequence, refurbishing or reusing these appliances would be less energy efficient than buying a new appliance. However, according to the WRAP (Waste & Resources Action Program) report, Environmental life cycle assessment (LCA) study of replacement and refurbishment options for household washing machines refurbishing, has found that in half of the scenarios examined, machine refurbishment is the most environmentally beneficial option. In the report two main factors of the whole cycle of the washing machines are analyzed: Energy efficiency, and Carbon Footprint. But the impact of the solid waste, that replacing a washing machine could generate, is not measured. Therefore I could say that refurbishing or reusing is better than replacing; since we saw that recovering materials from e-waste, is not energy efficient.

In the other hand, modifying the original design of a producer appliance outside the producer’s control, can affect the brand image. If an appliance is badly modified and causes an accident, the responsibility can fall on the electronics producer. And producers care about creating an image of responsibility, liability and safety. Thus, many producers don’t involve in refurbishing, fixing or modifying activities since it can risk their brand image. In addition these activities require a huge investment on resources: making specifications, communicate the procedures to refurbishing companies, hire staff that can handle it, etc.

**Customer relationship**

Most of the electrical and electronics producers focus on producing home appliances, not being in the retail. That gives them an indirect way of communicating with their customers. The producers original message can diverge from the retailers message. But they believe that being on the retail is competing with their own retailers.

One of the interviewees told me “Nobody in the business is building the best performance possible, since would be really expensive to be sold”.

An industrial washing machine, for instance, have a life span of 20 to 25 years. The domestic version has 10 to 15 years. The main differences among them are price, quality, and the design of the components. Making a long lasting machines requires better components and design, which diverges with the capitalistic economic
model, based on generating revenue encouraging people to repetitively acquire and own goods.

That’s the reason why producers manufacture and retailers sell, a range of products from the lower spec (G), to the high spec (AAA). The lower the spec of the appliance, the cheaper and the shorter the life span. Therefore, the more often consumers will have to replace the appliance.
3.5 HACKING ELECTRONICS

To understand another perspective of what electrical and electronic equipment offers, I approached the Umeå Hacker Space. At this stage of the project, identifying the factors that drive somebody to manipulate electronics, was key. Umeå hacker space is a local association open to people with the motto of promoting knowledge and curiosity about technical systems. The association is held by young and curious hackers. I got the chance to interview two of them, the founder and co-founder.

During the interview, the goal was to know the reason why people likes to make things with electronics and why
other people don’t. In addition to get the picture of where does this interest come from. I can say that there are a few reasons to like these activities:

- People are curious about how things work.
- They get excited when they can make something using their hands.
- There’s pride and amusement in building something that works.
- There are so many possibilities with electronics that there’s always something to learn or explore. It becomes addictive.

Why is people reluctant to manipulate electronics? Here are the reasons:

- People believe that working with electrics is complicated and overwhelming.
- They consider manipulating electronics a risky/dangerous activity.
- They also think that you need technical skills to manipulate electronics.
- Or people doesn’t have time to tinker electronics

Video to the hole interview: https://vimeo.com/45217126

Learning with your hands is Therapeutic

Joy of making
3.6 INFLUENCES

While doing the research, I looked for sources of information (journals, articles, blogs, books, documentaries) in different fields, to form an idea on how to start building a concept. I intended to get inspired by e-waste related projects, social networks structures, business models, and entrepreneurship methods.

I watched the documentary The lightbulb conspiracy: The untold story of planned obsolescence. And I got shocked to see that some products in the market are programmed to last a determined amount of time, literally. And the fact that some companies and corporations promote the manufacturing of those products to generate more revenue. In the other hand, consumers are unprotected against this practice. Our ignorance about technical systems makes us fear what is inside those little machines. Just few people dare to try.

I read Cognitive Surplus, a book by Clay Sharky that exposes his vision on how social network platforms are build, looking on users motivations, behaviors, sharing and social structures. At the end of the book he identifies several keys to build an online community platform. The ones I considers the most important were: Start small, local and Default to social (make it social from the beginning).

I also browse Business Model Generation book by Alexander Ostelwalder & Yves Pigneur. The book guides you throughout the process of creation, understanding, evaluation, testing and implementation of a business model. I found that the business model canvas helps people to sketch business hypothesis with ease. Moreover, becomes a really suitable tool to explain how the structure of a business works.

The Lean startup by Eric Ries, proposes a way of building a startup product, (with product I mean the offering of the startup), based on trial an error. The motto of the Lean Startup Methodology is Build-Measure-Learn. I found that process interesting and I wanted to applied to the development phase.
In our society in general, there’s a lack of knowledge about technical systems. We fear to tear apart electronics for different reasons: warranty, electricity shocks, “I’m going to break it”, etc. That lack of knowledge turns into a disadvantage when the electronic products become obsolete, because just gives us a unique visible alternative to our old electronics, recycling.

We find engaging building things with our hands. By building things we establish an emotional connection with the object we made.

There’s a lack of alternatives for the end life of the product. The economical infrastructure is prepared to promote replacing instead of repairing. That’s one of the reasons why we keep electronics at home. We still see value on them but we are not sure of where to attend to give them a second life.

The fact that producers are tight to the current economic infrastructure makes difficult to change it.
4. SHAPING E-WASTE (DEVELOPMENT)

4.1 SELF BRAINSTORM

In this phase of the project, the goal was to define the concept using pragmatic knowledge by replicating the lean startup methodology in a minor scale. So firstly I brainstormed myself to have a concept to build upon. Later I evaluated the concepts asking myself several key questions. Secondly, I organized and participated on a brainstorm and a series of workshops with people to get a broader vision of
where the concept would lead. And thirdly I concentrated on building and testing different hypothesis, and improving the concept.

1. Lease appliances: Nowadays we own things. But more frequently we see mesh services like Zipcar were people share objects and artifacts that were conceived to be owned by one person. This concept also challenges the ownership of electronics by building a service provided by electronic producers where people can subscribe to it and lease electronics. The users sign a contract and pay a monthly fee which entitle them to use the electronic product as long as the contract goes. If any problem happens to the appliance or device, like a breakdown, it’s covered and solved by the electronic producer, including the replacement. The aim of this concept is that companies which implement the leasing procedure as their business model, consider producing long lasting electronics with higher quality than the ones are produced today. Wouldn’t be beneficial for them to manufacture products that last a shorter period of time, because replacement and reparation would become a loss in transportation and human resources. For instance, if the life expectancy of a device is two years, the company will be forced to use its resources to change or fix it every two years, while if it has longer live expectancy the resources would be less frequently demanded.

2. The workshop: I’ve been traveling to several cities and I found that there are no places open for people dedicated exclusively to built things with electronics. During my research I haven’t seen any spaces to rent tools needed or assistance to manipulate your own electronics. The existing similar concepts are hacker spaces or fab labs. But they are not that visible to the public and the assistance provided is not curated. The workshop is an open space with tools and experienced staff whose main purpose is helping people increasing the lifespan of an electronic product.
In the workshop, people can repair and repurpose assisted by the staff. Besides people can also donate their electronics. The general idea is making a service which can built a community inspired by the experience provided by apple genius bar, the familiarity of a hacker space, the machines used at the fab labs, and the shared knowledge of platforms like SkillShare or Quora.

Through the research I saw that to find solutions to the e-waste exports, is necessary to have an actionable solution. A type of solution that doesn’t require persuading the industry to change the whole system, but rather to be integrated by the society as culture that would lead to change. Persuading the industry would take time and a lot of bureaucratic processes.

That’s why I decided to continue with the workshop concept.
4.2 Questions Board

Even tough I had a concept, was still shallow in my mind why, how, and what this concept was going to be built. Then I started piling post its with relevant questions about the workshop concept.

What is the real problem?
- Planned Obsolescence: E-Products are made to last a shorter period of time and forces people to dump the old ones and buy new ones. The producers base their business models on this cycle because they think it keeps the economy flowing. The consequences are the e-waste exports, health problems, and a polluted environment.

Why I decided to solve the problem from the end part of the product cycle?
- Takes time to shift a big boat. The producers will carry on the business models based on selling more products. We will need them to shift their mentalities, and that takes time.
- We will still create waste: Until our manufacturing processes and materials can be entirely digested by the environment in a natural way, e-waste will be part of our lives.
- Serve as inspiration: By repurposing, repairing and donating electronic and electrical products, people will increase the lifespan of those products. Customers will gain knowledge on technical systems, gain technological independence and start suggesting new ways of manufacturing products.

What I’m I designing?
- A sustainable culture based on gathering knowledge through the manipulation of old electronic products. So an open source community online that also meets offline at the workshop.

How I’m I designing that?
- By blending together the concept of a Hacker Space, where there’s a culture of hacking electronics in cooperation with other people, a fab lab, where there are tools necessary to manufacture in medium scale and a service like Apple genius, where the staff is ready and willing to assist you.

What is this concept about?
- Behavioral change: This concept aims to erase the conception that e-waste is useless and push away the fear that society has about electronics. Besides promoting a sustainable way of consuming these kind of products.

What is the intention of this concept?
- Provide people with alternatives to extend the life of the electronic products.
Who am I designing for?
I’m not sure yet, but I contemplate four different market segments.

- Ordinary People: Is an influential mass of people able to decrease the export of the e-waste to other countries. People can easily identify with so you can feel you can do it too.

- Local people in the affected countries: People that need to find a better way to disassemble components to recover metals, who’s health is harmed overtime they burn pastiches and hazardous components in the chips.

- Children: They learn easily, they like to be creative and are engaged. They usually can adopt a habit easily if they learn it on regular basis.

- Niche market (makers, hackers): They are passionate about making and electronics. They can contribute to design new things out of e-waste, they can become staff of the workshop (teaching, attending customers finding new ways of solving problems).
4.3 How might we...?

This brainstorm aimed to understand motivations and incentives to increase the life span of a product in three ways: repairing, repurposing and donating. Six “how might we” questions were asked to 15 people, most of them interaction designers. In addition, the participants were also asked to give examples of services where there is a strong customer service, and others where co-creation is the key to success. Here are some findings that came into play during the brainstorm.

Instead of dumping they proposed: Donation, exchange for money, use for educational purposes, change of the functionality or attaching a story to the product.

To make repairing attractive: According to the participants, getting inform of what to do and giving incentives, was key. They mentioned that what would encourage people to repair would be, for instance, an easy way to diagnose problems, a repair cookbook with difficulty level, or get a badge after repairing.

To make aging attractive: the participants pointed to the product as an incentive in itself. In other words, the product should make the owner feel proud of having it. For example, celebrating the life of the product, or raising the value of the product as it gets older (antique).

To make repurposing mainstream: Is about how to advertise or promote this tendency and make it accessible to ordinary people. For instance, promoting that the products are designed to be repurposed, or having an infrastructure that facilitates finding places to repurpose electronics.

To transform burden of keeping an old electronic product into a benefit: Swopping, returning or using the electronic product in different ways were suggested; such as using a washing machine drum as a light shade.

Services with Strong customer service: Make things convenient, like matching the same staff, with the same client. They are transparent, and make the customer feel secure and protected. For instance the Fed-Ex post tracking system.

Services with co-creating as key: Are developed to generate communal value, like Groupon or open source communities. Or are based on customization, like Nike ID.
4.4 Workshops with obsolete electronics

After the first interview I arranged three workshop sessions at the Umeå Hacker Space, with the intention of experiencing myself donating, repairing and repurposing. Electrolux provided me with three vacuum cleaners that were malfunctioning, half disassembled or broken, to use in the workshops.

4.4.1 Separating a vacuum cleaner for donation

The first session of the workshop focused on how to disassemble the Electrolux's Ultra One vacuum cleaner. The session consisted on taking the vacuum cleaner apart and classifying the materials.

Aim: The aim of this exercise was to determine the complexity of disassembling a small appliance and getting a general understanding of the function of the internal electronic components.

Participants: 1 person

Materials and tools: To complete the exercise we used four plastic buckets, screw drivers and its tips, and bare hands. The four buckets were tagged with the most common materials: two buckets were used to contain plastic, another one for iron and steel and the last used for other materials. The electronic components, didn't have a bucket.

A stop watch was used to display the necessary amount of time to separate the components. A 1 m x 0.5 m block of paper was used to write the opinions of the participants during the separating process (good: green post-its, bad: red post-its, and comments: yellow post-its)

Methods: Observation, immersion and follow up inquiry

Duration: 1:30 hours

Separating: Separating is a process of guessing. Firstly, guessing which tools to use, secondly where and how to use them in the machine since there was not a clear evidence on where to start. And thirdly guessing what was the next step to keep disassembling.

Conclusions: It was time consuming to disassemble the vacuum cleaner without a clear guidance and the fear to break the parts. The plastic parts of the shell were tightly fastened to each
other, with torx screws, which is not a common section for a screw. That suggests that the vacuum cleaner was designed to protect the users from the internal components, but at the same time also complicates the access to internal components to repair or save. The electronic components inside the vacuum cleaner were surprisingly simpler than expected. It had a motor, a simple push button to turn on and off the appliance, a slider to control the velocity of motor and an electric board to connect the those components. Around 90% of the components were plastics. Most of them with just aesthetic functions.

Separating to donate doesn't seem to be a good option. There is no motivation behind, but getting money Video to the repairing workshop: for it.
4.4.2 Repairing a vacuum cleaner

The second session of the workshop focused on repairing a vacuum cleaner. This time a more advanced model of the Electrolux’s ultra-one vacuum cleaner was used.

Aim: Understanding what tools and support does a handyman need in the troubleshooting process.

Diagnose: After pressing the on button, the vacuum cleaner was turning on for a brief moment and then turning off. Trying to turn it on again didn’t give any response unless you unplugged and plugged the cord. Then, pressing the button again would go back to turning on for a brief moment.

Materials and tools: Screw drivers, bare hands, a cable stripper, a soldering machine, a voltmeter, and the spare electric components from the first session vacuum cleaner (push button, slider and electric board) were used. And again the 1 m x 0.5 m block of paper was used to write the opinions of the participants

Methods: Observation and follow up inquiry

Participants: 2 persons
Duration: 3 hours

Troubleshooting: The troubleshooting process consisted on five steps: observing the behavior of the machine, reading to find any evidence of failure on the electrical components, building a failure hypothesis based on the readings, think of a hypothetical solution and testing the solution hypothesis. If after testing, the hypothetical solution didn’t work, that solution would be discarded and the process would start all over.

Conclusions: “The more advanced the appliance, the most likely to have a problem and more complicated to find the problem.” Visual signs, such as burned components, facilitate the identification of problems. Not having specifications or a blueprint about the functions of the electronic components, made difficult to find a solution time wise. They had to reverse engineer and test components and for them became a tedious job. Fortunately replacing the circuit board and the button with the one from the vacuum cleaner used in the first session, helped them to fix the problem. As an amateur user in tinkering with electronics was difficult for me to contribute and sometimes engage with the activity.

Video to the repairing workshop: https://vimeo.com/45217123

4.4.3 Repurposing a vacuum cleaner

The third of the workshops consisted on modifying the function of some of the components of the vacuum cleaner.

Aim: Engage in the repurposing flow, looking at the needed tools to adapt parts of electronic products to other purposes. In addition to proof that repurposing is possible.

Materials and tools: paper and pen, a vacuum cleaner motor, a repurposed microwave acting like a point welder, a spare sheet of metal, a band saw, a screw driver, a wrench, a hammer, nails and screws, spare wood bars, a tester
and a Dremmel.

Methods: Observation, shadowing, follow up inquiry.

Duration: Two sessions of 6 hours and 4 hours. Total 10 hours.

Participants: 3 persons

Ideation: Together with two hacker space members, we thought of building an electric bike, a hovercraft or a windmill to store energy. But those ideas were too complicated to be built in a day. We decided to build something simple that people could relate to, a fan.
Execution: We cut the spare sheet metal, and welded in the shape of blades. Then we tested the optimal velocity with the blades in place for the motor to run. 12 volts was the optimal velocity. Above that could start to be dangerous. In the last step we attached a wooden support.

Conclusions: The ideation was time consuming. Seeking for alternatives to adapt the functionality of the motor was a bit overwhelming, when you don’t really have the knowledge. Some of the alternatives proposed, required sometimes extra material and extra time. We actually didn’t know if what we were making would really work, but that was the fun part. The hackers commented that sometimes it is better to get it done than plan and wait to make it perfect. I personally got really satisfied repurposing the motor, even tough the appearance was rough. So I decided to develop further the design of the hardware sketch like proof of concept.

Video to the repurposing workshop: https://vimeo.com/45217124
4.5 TESTING

I travelled to Barcelona to stay for a month in the Fab Lab premises to test parts of the concept. The purpose of this tests was building to learn. I wanted to develop the concept using a trial and error process, where the insights of the consumers come earlier and frequently in the process; instead of coming up with a concept and polish it and finally test it. This way, was faster to understand the consumer needs in the context, measure the benefits of the service, and change what didn’t work.

In the other hand I wanted to understand different hypothesis I had in mind. Such as, what type of assistance would the users like to have or why would they go to the workshop.

To test the hypothesis and parts of the concept I used Symbolic Games. A Symbolic Game is a mixture of different design methods that include Body-storming, Prototype to test, Wizard of Oz prototype and Feedback capture. Where there is an observer and testers whom interpret a particular situation of the user journey.

4.5.1 Structure of the tests

To understand the customer journey, cardboard objects (see the picture) were build to play Symbolic Games. A tangram cardboard pieces represented the parts inside the vacuum cleaner. Firstly, roles were assign to the participants of the tests in order play the specific parts of the service. Secondly, the participants where asked to act a specific situation or part of the service using the cardboard objects. I would observe the play, and note down the relevant parts of it. Afterwards, follow up questions regarding the play were asked to get feedback and ideas. Changes of the test structure or specific touch points of the service, were made on the fly.

4.5.2 Situations

The tests were made looking at three different situations: self service, service assisted and co-creation. The self service situation refers to get guidance through tutorials. Service assisted refers to the traditional way of delivering a service, the staff makes it for you. Co-creation is the middle point, the customer gets assistance to make it by their own, sort of like a class.
4.5.3 Hypothesis

I made a list of things I doubt about, and I came up with situations that the users would interpret during the role playing. For instance:

- The service is completely open source and entirely sponsored by Electrolux.
- The customers would lost the fear to manipulate electronics if they get assistance and the assistance.
- The customers would like to get see what level of knowledge about electronics they have before doing a tutorial.
- The customers would like to know what tools they need before doing the tutorial.
- People would value more the service if it’s social.
- The customers would pay for the service if its curated like apple genius.
- Incentives would encourage people to use the service more often.
- Customers would like to be rewarded after completing a whole task.
- The customers that would use the service are environmentally conscious people.

Test Results

I got a lot of feedback and ideas coming from the role playing sessions.

- The testers that act as clients during the service assisted situations, felt detached from the activity that the staff was performing. They complained because they got no explanation of what was happening with their vacuum cleaners. Co-creation and Self service were more convenient for the testers.
- The testers didn’t see the value of the service when the service was open source and the structure in terms of revenue streams.
- When I made people walk through the online access to do a tutorial at home, testers felt reluctant to introduce their personal data to sign up if they didn’t get enough information about the service or a sneak peek.
- Charging for an online tutorial was not accepted by most of the people that made the test. There’s a culture that most things should be free on the internet.
- The testers were willing to pay if the tutorial was really good or if they get assisted.
- References and suggestions, like level of knowledge about the topic or suggestions of what tools to pick, were things that they missed.
- Incentives worked to keep the testers engaged.

### 4.5.4 Conclusions

The test were intended to be carried everyday for almost a month, but due the lack of people willing to participate, I couldn’t carry all the test I wanted. I also wanted to try to repurpose real vacuum cleaners with people, but due times and peoples schedules didn’t happen. I learned the bad way that I needed more networks and a backup plan. Was difficult to come up with a scenario for the symbolic games to convey the message of repairing, repurposing and donating an appliance. And took me around three days to really grasp what situations where important to be tested. The role playing showed me a lot of ideas that I didn’t have in my concept at the beginning such as leasing tools, or building community through events.

Video the testing video:
https://vimeo.com/40998760
4.6 FAN PROTOTYPE

In Fab Lab Barcelona, the fan design was developed further from the first hardware sketch. For the prototype it was intended to change the blades material from sheet metal to warmer materials, designing a component to attach the blades to the motor, coming up with a structure to protect from the blades, a cover to protect the motor and also a support for the whole fan.

The overall goal of the design, was to create an easy to assemble set of components to build a fan, besides a guide to build it effortlessly, as a proof of concept.

From the brainstorms and sketches I did together with the Fab Lab staff, we prototyped simple solutions that could be easily manufactured in the CNC (Computer Numerical Control) machines.

To attach the blades to the motor we designed, and 3D modeled, a cylindrical part with three grooves 120 degrees from each other. We tested two possible ways of manufacturing it: 3D printing and milling in wood. We decided that milling wood worked better than 3D printing since it had a rough surface finishing.

The blades were laser cut in wood as well as the protective structure. The protective structure consist on different
ribs attached to a circular frame. Laser cutting the ribs in wood resulted on a flimsy and fragile structure. So we decided to change to acrylic or opal.

The motor cover consists of a cylindrical looking block of wood with grooves to insert the ribs and a hole in the middle to introduce the motor. The motor cover was built laser cutting different layers of wood and gluing them together.

The support was mimicking the hardware sketch I did together with the Hacker Space members. H shaped structure made out of wood bars that are inserted in the motor cover.

Many tests were made on shapes, sizes and assembling structures. Having the limitation of fabricating just with CNC machines, allowed me to simplify the overall design to the essence.

In this section, I talk about the features of the service and the reasons behind those features. The concept is illustrated in different formats, Business model, Brand Identity, Blueprint and User Journey. The Blueprint and the User Journey are concentrated in Repurposing since they are connected with the proof of concept.

Video to the fan development video: https://vimeo.com/45217122
5. Amplify. Final Concept

5.1 The Raise of Amplify. From Insights to Concept

The final concept is built on insights, gut feeling and some logic. What comes next in this section, are the most significant reasons for the concept to look like it does.

- Location: The illegal exports of e-waste, land in the countries around the golf of Africa. But the source of those exports is the first world. Placing the final concept in Africa, would prolong the problem. The exports would be done more often. The final concept is located in one of the problem sources, in Europe.

- The culture of doing is better than the culture of talking: Everybody seems to care about the environmental impact, but most of the initiatives to stop it, are campaigns to promote behavioral change to pollute less. The idea of this concept, is to change people’s behavior through actions, enabling people to participate, instead of getting one way communication.

- Alternatives: As we saw on the early research, we are lacking alternatives at the end of life of our electronics. And recycling is not as environmental friendly as it is sold to society. For that reason the concept sustains on Repurposing, Repairing and Reusing as “new” end life alternatives.

- Why Repurposing, Repairing, and Reusing? : We saw early on that the best of reducing the impact of electrical and electronic products is to keep them as much as possible. That way the carbon footprint caused by transporting the product is erased as well as the solid waste impact. Repairing, extends the life of the product, Repurposing changes the function of the electronic components and Reusing allows other people to use those components. It’s a cycle. If I repair and I’m missing one part I can look for one to reuse and if is not possible to repair I can repurpose the functional components.
- Space: Repurposing, Repairing and Reusing need a context to live. Amplify has a space where people can go and do such activities.

- Tools and equipment: Apart from the space, you also need the means to Repurpose, Repair and Reuse. Amplify provides you with the necessary tools.

- Assistance: As testers commented on the role play, tinker with electronics can generate reluctance. Therefore is necessary to employ experienced people in the electronics field to assist customers.

- Users: From the brainstorm I learned that to promote a sustainable culture is necessary to bring the people who believe in it, and can spread the idea. The early adopters are culture setters and in consequence the concept seeks to identify the right ones.

- Social: On the brainstorm we extracted that the services based on co-creation, generates a communal value. Therefore, the peers under Amplify wing, are encouraged to contribute by sharing their knowledge with other peers.

- Events: Repurposing was perceived by the testers as a group hobby. To stimulate the community involvement, events are made on regular basis. Those events try to answer questions asked by the community. The events are important building blocks of Amplify.

- Rewards: Most of the people I asked, told me that rewards are a way to incentive behaviors. For instance, repairing a utility could give the customer 30 min of free assistance. In the concept the rewards are taking into account in the overall system.
5.2 WHAT IS AMPHIFY?

Amplify is a curiosity driven community, that seeks for knowledge and satisfaction of manipulating things using old electrical or electronic products. The motto of Amplify is giving people the means to provoke a sustainable consumption culture. Amplify enables the users to bring back, malfunctioning, obsolete or broken products to life. It provides the space, the knowledge and the equipment to help customers to amplify their electronic items. Its name comes from the fact that the service, amplifies the life-span of electrical or electronic products.

Link to the concept video: https://vimeo.com/43105821
5.3 AMPLIFY BRAND IDENTITY

Amplify’s brand identity is defined by four brand values: Smart, Honest, Welcoming and Charismatic. Smart in a sense that delivers its service in a simple way. Amplify message is clear and Honest to its mission and to its origins: creating a sustainable culture and stopping the e-waste exports to Africa. It is open to people to learn and share technical knowledge. Besides that, delivers a cozy, warm, and Welcoming experience. Amplify is about the joy and fun of people making things with their hands that work.

The purpose of the branding is making Amplify the icon for sustainable consumer culture.

The name of the service needed to be easy to remember, to embody the whole idea that the service enables its customers to increase their appliances lifespan, and to a positive connotation in its meaning.

To find a name that could represent that lots of iterations were made. I found different techniques that many brands use to have a name that sticks to your mind. For instance Marvel, the famous american comics publisher, names its heroes using the same consonant in their name and surname like the Petter Parker (Spiderman), or Bruce Banner (Hulk).

I decided to use a simple name that started with the “a”, because the first letter of the alphabet is easy to remember, and was the first letter that they teach you to start reading. Is a strong icon in our mind.

Amplify’s logo reflects all the aspects cited before. Both color and shapes were picked thinking on the impact and recognition. The petal symbol
embodies the Charismatic and Welcoming aspects of the brand, while the word mark carries the Smart and Honest; together, become an easily recognizable logo.

The petal representing growth, is an analogy of what the service does: Extending the life span of electronics. The cozy red color was selected because it communicated the coziness, and character of Amplify. Most of the colors tend to red with exception of the complementary colors, blue, green and yellow.

The graphic style of the brand combines warm pictures with depth of field and plain rich illustrations, mixing again the idea of Welcoming and Charismatic.
5.4 BUSINESS MODEL

The business model canvas was used to visualize how the business could be built, and the relationships between elements.

- Value Proposition: Is the essence of what the service provides to the customer.
- Customer Segment: The type of market the service aims for.
- Channels: The ways the business can access to users and vice versa.
- Customer Relationship: Type of relationships generated between the service and the customers.
- Revenue Streams: Areas where the income comes from.
- Key Activities: The necessary activities to build the service.
- Key Resources: The necessary means and people to run the service.
- Key Partners: Other services or business that help the service to function.
- Cost Structure: Payments, that the service has to cover to continue running.
The Business Model Canvas

**Key Partners**
- Sponsors: Electrolux
- Open hardware/software: Arduino / processing, Raspberry Pi
- Social networks: Facebook, Twitter
- DIY/Manuals: iFixit, Dozuki
- Communication: Skype
- Material Providers
- Online Payment
- Mail Companies: FedEx, UPS

**Key Activities**
- Identify place to establish Amplify
- Hiring the right staff
- Build webpage
- Buy tools and machines
- Advertise at local level
- Create events
- Design kits/sets
- Establish partnerships

**Key Resources**
- **Human**
  - Staff (F shaped)
- **Physical**
  - Tools
  - Machines
  - Materials

**Value Proposition**
- **Newness, Status, Accessibility**
- Joy of making, satisfaction of fixing, pride of giving.
- Alternatives to decide what to do with the electronics when they are broken or "obsolete".
- Opportunity to stop illegal exports, change how business models work and be greener.
- Knowledge of how things work.
- Social Interaction by doing activities.
  - Brand image, reputation, recognition.
  - Information for improvement

**Customer Relationships**
- Co-creation (online, amplify space)
- Self Service (online)
- Personal assistance (online, amplify space)
- Community

**Customer Segments**
- Segmented
  - Beta Amplifiers: Pseudo hipsters, Open makers, Kids on Chips
  - Amplifiers: Mass Market
  - Industry: Electrolux

**Channels**
- Online platform
- Amplify Space
- Customers (Facebook, Twitter, Google+, etc...)
- Events (repair weekend, valentines repurpose pack for two)
- Co-creation (online, amplify space)
- Self Service (online)
- Personal assistance (online, amplify space)
- Community

**Revenue Streams**
- **Fixed pricing**
  - Assistance fee
  - Tools usage fee
  - Subscription fee
  - Tools Pack
  - Repurposing kit
  - Gift pack session
- **Dynamic Pricing**
  - Amplify Courses
  - Materials
  - Cafe income

**Cost Structure**
- Fixed costs:
  - Salaries
  - Machines Maintenance
  - Web Maintenance
  - Rent
  - Cafe utilities
  - Staff training
- Variable costs:
  - Domain name
  - Server
  - Stock materials
  - External Services (Post, Shipping)

[www.businessmodelgeneration.com](http://www.businessmodelgeneration.com)
5.5 Beta Amplifiers

For the beta version of the service, I selected the early users of Amplify that could embrace the right culture and also promote it. I based the criteria in observations at the Fab Lab, and the Umeå Hacker Space where most of the people that showed interest about the project had similar characteristics of the following personas.

Pseudo-hipsters: They are open people, cultured and proactive. On average they are politically, socially and environmentally conscious. Leisure is one of their priorities. Traveling, or doing DIY tutorials are activities written on their agenda. They like to get credit for their actions in a subtle way. The beta amplifiers are creative people whatever their job is. They are not tech addicts, but they are tech enthusiasts. You can find them fixing their bikes in the balcony, visiting a modern art museum, using Instagram or Pinterest in their smart phone, hanging out with friends in nice coffee areas, or drinking beer from a jam jar. They wear almost the last trend that’s why they don’t consider themselves hipsters.

The pseudo hipsters are the one of the early adopters of the service, the group that will attract the mass market.

Open Makers: This group of people is well informed about the latest trends in technology and open hardware. They are passionate about making things with electronics. For that reason making things has become one of their main hobbies. They sometimes refer to the satisfaction and joy of seeing what they build working. That’s why they have a logic way of problem solving. They feel proud of sharing their knowledge online with the community. You might see them working for an IT consultancy, communicating via IRC channels, talking about how dump are the features on the new phone it just came to the market, playing video-games in a video-game jam, or organizing arduino workshops for kids.

The open markers can easily be staff members of Amplify, assisting customers to find solutions to their problems; or being possibly the most active contributors of the service. Together with the pseudo-hipsters, they will build the culture that Amplify needs.

Kids on Chips: This kids are like sponges. They are curious and open. They are this kind of kids that you can give them a paper and they will start folding and painting them to build something out of it. They love
to see the objects unfold to see how mechanisms work. You can find them discussing about formula one cars, playing video games with friends, learning how to fix their bikes with their parents, or trying to drive a car.

I consider the kids on Chips the future amplifiers. They will see Amplify as part of their culture rather than a service.
5.6 SESSION DEVELOPMENT

Together with a friend of mine who is writing about game dynamics from the psychological point of view, we came up with a diagram that could represent the development of a session (Repurposing, Repairing, or Reusing) at Amplify Space. Apart from that, we talked about human factors that must be considered in the long term customer relationship to provide a humanized service. Those factors are expressed in negative since it was difficult to do it all the way around. For instance, talking about “elements that allow contact” we couldn’t really find an answer. So we rephrased to “elements that avoid contact”, in order to know what the “do nots” of the service. That way became easier to grasp how the service would be arranged.

### CUSTOMER RELATIONSHIP

<table>
<thead>
<tr>
<th>PRESENTATION</th>
<th>CONTACT</th>
<th>TRUST</th>
<th>COHESION</th>
<th>COLLECTIVE CREATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>What for is the company here?</td>
<td>Elements that avoid contact:</td>
<td>Elements that repeal trust:</td>
<td>Elements that avoid cohesion:</td>
<td>The purpose beyond the explicit that bring us to another level.</td>
</tr>
<tr>
<td>What for is the customer here?</td>
<td>Physical: counter, differentiated spaces.</td>
<td>From the company side: Manipulation, feel forced or lack of technical knowledge</td>
<td>From the customer side: Lack of meaning in the actions</td>
<td></td>
</tr>
<tr>
<td>What brings this relationship?</td>
<td>Psychological: skepticism, fear to the unknown.</td>
<td></td>
<td></td>
<td>From the company side: Overestimate the loyalty of the customers</td>
</tr>
</tbody>
</table>
5.7 Amplify Offerings

Amplify offers a variety of services to support the three main activities, Repurpose, Repair and Reuse. Either online or offline, Amplify makes sure that the service is delivered seamlessly.

5.7.1 Tutorials

There are two types of tutorials, Repurposing tutorials, and Repairing tutorials. The Repurposing tutorials have a red line underneath the picture, while the Repairing ones have a blue line.

The general information you can find on them is the number of views, the estimated time to do it, the difficulty level, the tools you need and, if you are repurposing, the price of the kit.

The tutorials made by the users, are for free, while the ones made by Amplify you need to buy.

Tutorials are the way that Amplify can give the knowledge to people.

5.7.2 Assistance

The expert amplifiers are responsible to take care of the amplifiers in both Amplify Space and the Web service. On average expert amplifiers have an F-shaped profile. That means that they have a strong skill in technical areas like Electrical Engineering, Design Engineering; a soft skill in other areas like Graphic Design, Medicine, Art, etc;
and finally the most important, passion for what they do at Amplify. The reason behind hiring passionate experts, is that passion is contagious and that would facilitate the installation of the culture. Expert amplifiers offer semi-personal assistance at Amplify Space. They can assist maximum 3 people at a time. In addition, they provide with post tutorial online assistance through Skype, if a repairing tutorial didn’t work, or amplifiers need a better troubleshooting. They also give crash courses to the rookie amplifiers about security and electricity.

5.7.3 Tools

The tools can be rented at Amplify space using the webpage. On the tutorials there is a section where the amplifiers can see what tools they need, and rent them for hours or days. Customers can also buy tool sets made by amplify. The tools are picked at amplify space.

5.7.4 Equipement

Gloves, boots, and other working clothes are provided to the user to avoid any accidents.

5.7.5 Repurposing kits

The repurposing kit is a set of components made to build on top of a particular electrical or electronic items, or any of their internal parts, to change their function. Amplify manufactures and sells those kits to the customers. The prices of the set varies depending of the number of parts, and the cost of the materials. Normally the repurposing kits come from tutorials made by people that had been a hit in the Amplify community. Then amplify collaborates with the creator of the
tutorial to develop further the tutorial. Finally the kits are sold by Amplify and the amplifier gets his percentage for the sells.

5.7.6 Reuse Stock

The donated electronics are classified and stored in a warehouse. Later they are displayed in the web platform as data base of components. Just the members of the service have access to the Reuse stock. They can use the donated components for free.

5.7.7 Cafeteria

The cafeteria is a causal location at Amplify used mostly by expert amplifiers and first time customers to chat about the knowledge level, the service principles, the learning style, and the security procedures, over a coffee. The Cafe is also open to non amplifiers as an onlooker, to get their interest on the service.

5.7.8 Membership

The membership plan offers different levels of involvement to the Amplify community. The Basic plan is for free. This plan just has free access to tutorials uploaded by other Amplifiers. In this membership the amplifiers have to pay the rest of the services. The Dynamic plan has a monthly fee of 60 Kr, free access to both tutorials uploaded by Amplifiers or from Amplify. The amplifiers with Dynamic plan have also discounts on renting tools or assistance. The Premium plan has a 120 SEk monthly fee, the same access than the Dynamic plan but larger discounts.

The early amplifiers can start with the basic plan, and as they get interest, they can change to Dynamic or Premium plans, so they save money.

All the members get a card which is used to upload the level status.
5.7.9 Levels

Every amplifier has a profile with a level badge that determines the accumulated experience. The amplifiers can check their progress as they do different activities at Amplify. The Level badge is divided radially in portions. Every portion, is a job done at Amplify (tutorial done, or created tutorial). The red portions, stand for repurposing jobs, the blue ones repairing jobs and green are reusing give aways. The reusing portions don’t give experience, but can unlock badges.

There are 3 levels: Rookie, Tinkerer and Pro. The level badge is divided in 3 sections. Each section represent one level. So, if a third of a circle is completed, means that you reached the tinkerer level. And if you reach two portions, means that you have reached the Pro level.

Rookie amplifiers have little knowledge about electronics, personal fabrication or production tools. The tinkerer Amplifiers have mid knowledge of electronics, they still have things to learn about fabrication, but contribute to the community with wishes and repurposing tutorials. The Pro amplifiers have a vast knowledge of electronics and fabrication, and had contribute actively in the community. They could become Expert Amplifiers.

5.7.10 Incentives and Rewards

With their activities, amplifiers can unlock different badges, like the Hit Hack badge, which is earned by users that had made a tutorial that has been really well accepted in the community. Amplifiers can unlock unique badges if they repurpose something that nobody did, or find a new way of repairing a device.

The badges together with the level badges elaborate a compulsion loop. For instance, I just finished a repurposing tutorial and my Level has been updated. I get a message that I have free access to the next event organized by Amplify. I know that if I go to that event, I can raise my level, and get an Event badge. And unlocking an event gives me another incentive to raise my level, and so on and so forth.
The intention of the compulsion loops is to create a system that keeps the amplifiers engaged and curious to come up with new ideas to repurpose and repair electronics.

5.7.11 Search/Wish

On the webpage, it is possible to search for any tutorial by typing the model of the electronic object you want to fix, and the problem you think it has. Or if you want to repurpose, you tell the name of the appliance and various options will appear. Then you can sort between the repairing and repurposing tutorials. Red line for the repurposing ones and blue line for the repairing ones.

You can also suggest to Amplify and the rest of the community writing what kind of tutorial you want to have, that doesn’t exist yet. The wishes are voted by the Amplify community and the most voted can become a weekend event. For example, a Repurposing 72 h. hackathon to come up with ideas of what to do with old Toasters.

5.7.12 Booking System

Amplifiers can book a time to do a tutorial assisted by expert amplifiers. When booking a time, assistance and tools are included in the price.

In the near future, Amplify plans to rent by time part of the workshop to experienced amplifiers, to give them a space to tinker with electronics freely.
5.8 SERVICE BLUEPRINT

In this section I looked at how a Repurposing session would start from a first time user. The blueprint starts in the online platform, passes to the Amplify Space and ends up in the platform again.

<table>
<thead>
<tr>
<th>Physical evidence</th>
<th>Amplify Web</th>
<th>Online Account</th>
<th>Search results</th>
<th>Tutorial catalog</th>
<th>Tutorial catalog</th>
<th>Tutorial Preview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken Electronic Object</td>
<td>Access Amplify online</td>
<td>Sign Up</td>
<td>Search to Repurpose</td>
<td>Sort by Type</td>
<td>Check Tutorial Level</td>
<td>Get tutorial Sneak Peek</td>
</tr>
</tbody>
</table>

### Customer Actions

<table>
<thead>
<tr>
<th>Assistance Level</th>
<th>Front Stage</th>
<th>Back Stage</th>
<th>Support Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support tools</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Front Stage

- Amplify web

### Back Stage

- Recommend database

### Support Staff

- Repurpose
- Repair Tutorial
- Database

Preparation
<table>
<thead>
<tr>
<th>Booking Page</th>
<th>Online Receipt</th>
<th>E-mail Booking Reference</th>
<th>Printed Booking Reference</th>
<th>Amplify Premises</th>
<th>Printed Customer List</th>
<th>Amplify Member Card</th>
<th>Appliance in Front desk</th>
<th>Coffe Hall Service Brochure Coffee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Do it at Amplify</td>
<td>Book a time</td>
<td>Payment</td>
<td>Booking Confirmation</td>
<td>Printing Confirmation</td>
<td>Go to Amplify</td>
<td>Check In</td>
<td>Get Member Card</td>
<td>Leave appliance front desk</td>
</tr>
<tr>
<td>Print customer list</td>
<td>Prepare tools and equipment</td>
<td>Prepare Guidance Structure</td>
<td>Introducing Asking Name and reference</td>
<td>Give Member Card</td>
<td>Bring Documents</td>
<td>Comenting the structure of the service</td>
<td>Let Front Staff amplifiers handle situation</td>
<td>Brining The Tutorial Booklet</td>
</tr>
<tr>
<td>Assembly Parts</td>
<td>Disassemble Electronic Object</td>
<td>Gather Selected Parts for Tutorial</td>
<td>Store remaining parts to &quot;materials&quot; to reuse.</td>
<td>Get Repurposing Kit</td>
<td>Repurposed Object power supply</td>
<td>Equipement - Dressing Room</td>
<td>Usher the Customer to the dressing room</td>
<td>Say Goodbye - Hand Feedback to Support Staff</td>
</tr>
<tr>
<td>Check Profile Level</td>
<td>Update</td>
<td>Give Instruction to service</td>
<td>Check Out</td>
<td>Go Home</td>
<td>Check Customer Size for necessary Equipment</td>
<td>Wait for Customer to be Ready</td>
<td>Help Customer Gather Tools</td>
<td>Assist, Intervene when necessary</td>
</tr>
<tr>
<td>Recomendation database</td>
<td>Booking System</td>
<td>Paypal Account Credit Card Account</td>
<td>e-mail service</td>
<td>- Receive Booking information, Send to back stage</td>
<td>Sent e-mail confirmation</td>
<td>Assign Staff for the customer. Sent to Back Stage.</td>
<td>- Preperation Experience Valoration Assimilation</td>
<td>Assistance Level</td>
</tr>
<tr>
<td>Questionaire</td>
<td>Amplify Security Rules</td>
<td>Security rules agreement</td>
<td>Questionaire</td>
<td></td>
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<tr>
<td>Answer Learning Style Questions</td>
<td>Answer Size Questions</td>
<td>Dressing up</td>
<td>Bringing Electronic Product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get Tutorial</td>
<td>Check tools location</td>
<td>Gather Tools</td>
<td>Dist. Elelctronic Kit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Customer Knowledge</td>
<td>Security Rules Demo</td>
<td>Give Security Rules agreement</td>
<td>Ask Learning style questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check client Size for necessary Equipment</td>
<td>Wait for Customer to be Ready</td>
<td>Helping Bring Electronic Product</td>
<td>Give Tutorial Booklet to Customer</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Show Tools Location</td>
<td>Help Customer Gather Tools</td>
<td>Answer Brief Questions</td>
<td>Check Out Go Home</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help Customer Gather Tools</td>
<td>Assist, Intervene when necessary</td>
<td>Help to check if the Repurposed Object works</td>
<td>Usher the Customer to the dressing room Say Goodbye</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assemble Parts</td>
<td>Disassemble Electronic Object</td>
<td>Gather Selected Parts for Tutorial</td>
<td>Store remaining parts to &quot;materials&quot;</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Get Equipement back and Classify</td>
<td>Give Something for the client to carry the Object</td>
<td>Ask about the experience</td>
<td>- Say Goodbye - Hand Feedback to Support Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Equipement - Dressing room</td>
<td>-Appliance -Workshop area</td>
<td>Tutorial Booklet</td>
<td>Tools Tool Compartment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools Working Table</td>
<td>Equipment in Front desk</td>
<td>Workshop area</td>
<td>Tutorial Booklet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffe Hall Service Brochure</td>
<td>Coffee</td>
<td>Questionaire</td>
<td>Get Introduction to service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leave appliance front desk</td>
<td>Get Member Card</td>
<td>Give Member Card Recommendation</td>
<td>-Appliance -Workshop area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Equipment - Dressing room</td>
<td>- Appliance - Workshop area</td>
<td>Tutorial Booklet</td>
<td>Tools Tool Compartment</td>
<td></td>
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</tr>
<tr>
<td>Tools Working Table</td>
<td>- Equipment - Workshop area</td>
<td>Tutorial Booklet</td>
<td>Tools Tool Compartment</td>
<td></td>
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</tr>
<tr>
<td>- Equipment - Workshop area</td>
<td>- Equipment - Workshop area</td>
<td>Tutorial Booklet</td>
<td>Tools Tool Compartment</td>
<td></td>
<td></td>
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</tbody>
</table>
5.9 SCENARIO

5.9.1 User Scenario

Adam Green got married not long ago. One of the wedding presents he and his wife received was a vacuum cleaner. The problem was that they already had a functional vacuum cleaner.

So Adam has the dilemma of what to do with the vacuum cleaner. Nobody in his network wants it. And trying to sell it is a burden, because the vacuum cleaner is quite old. For Adam, doesn’t look right to throw the vacuum cleaner away. Adam decides that he will browse the web to find any alternative that can help him doing something with the vacuum cleaner.

While searching on google he stumbles with Amplify’s homepage where he gets information of what the service provides.

Interested about the service, Adam clicks to the “Learn more” button. He can see why does the service exist, the three main activities, the offerings of the service, and how is to be an amplifier.

Adam decides to join the Amplify community choosing the basic membership type suits him the most.

He fills in the sign up form and adds his picture to the profile.

When he is set a window appears in his profile with an explanation of how to start using the service. He closes the

Now he can see different tutorials in his profile, and surprisingly one of the new tutorials is repurposing a vacuum cleaner to make a fan.

Adam checks the characteristics of the tutorial, like the difficulty level and the needed tools. He chooses to give a chance to the tutorial. The summer is close and they have to do

Now the can have a sneak peek of the tutorial and decide if he wants to do it at home or at the Amplify space. He clicks to the do it at Amplify, because he is still a novice, and want to get assisted by the expert amplifiers.

He books a time in the system, and he pays online. Later he receives an e-mail with the booking confirmation.

He prints the booking confirmation and he is ready to go to Amplify.

Adam arrives to amplify with the
booking confirmation and the vacuum cleaner.

In the front desk he receives the membership card. And he is taken to
the coffee area.

The expert amplifier introduces him to the service, shows Adam the spaces, and he gets a crash course on security on the workshop area.

Right after Adam put on the equipment and gathers the tools necessary to do the tutorial. The expert amplifier hands him the printed tutorial version and assist him when is necessary.

Adam assembles the fan. Is time to make a test run. The expert amplifier makes sure that all the components are in assembled correctly and there is nothing misplaced.

The fan works and Adam is very pleased with the result. He takes off the equipment and puts all the tools back.

The before Adam leaves Amplify Space the experts amplifiers ask him for feedback about the session activities and possible improvements.

Then Adam checks out using the card, and leaves the service with a new fan under his arm.

At home he checks his profile to see his level update.

Now Adam enjoys the breeze of the fan make with his own hands.
5.9.2 Web screenshots
We believe in empowering people by giving them the knowledge to provoke a sustainable change.

LETS BREAK THE CYCLE.

We consume, use, discard and consume again. That’s how the P.I.T.O (Product in and trash out) works. As a consequence, we are polluting our environment. Africa, to avoid a problem that can be solved if we start seeing opportunities in the obsolescence. If you are environmentally conscious and you like to build things we can diminish the problem. Keep reading.

THE 3R’S

We came up with three actionable ways of decreasing the environmental and health hazards impacts of obsoletism of electronics. Reusing, Rebuilding and letting other people Reuse electronics that you don’t want anymore. The 3R’s become a sustainable cycle when the community uses donated electronics as spare parts to repair or repurpose.
<table>
<thead>
<tr>
<th>Membership Plans</th>
<th>Basic</th>
<th>Dynamic</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Assistance</td>
<td>0.33 SEK/min</td>
<td>0.20 SEK/min</td>
<td>Free</td>
</tr>
<tr>
<td>Offline Assistance</td>
<td>60 SEK/hour</td>
<td>30 SEK/hour</td>
<td>15 SEK/hour</td>
</tr>
<tr>
<td>Tutorials Assistance</td>
<td>30 SEK</td>
<td>0 SEK</td>
<td>0 SEK</td>
</tr>
<tr>
<td>Tools Assistance</td>
<td>0 SEK</td>
<td>0 SEK</td>
<td>0 SEK</td>
</tr>
<tr>
<td>Discounts</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Monthly Fee</td>
<td>0 SEK</td>
<td>60 SEK</td>
<td>120 SEK</td>
</tr>
</tbody>
</table>

Choose Plan: Basic, Dynamic, Premium
Become an Amplifier

Name: Adams
Last name: Green
E-mail address: Your E-mail Address
Password: Your Password
Confirm password: Confirm Your Password

I agree with terms and conditions

Sign up with...

Facebook  Twitter  Google+  QZone

Join us
LEVELS

THE TINKERER

Tinkerer

LEVEL 1

METER

The equivalent to a Jedi in Star Wars. The tinkerers have experience enough about electronics that they understand the relationship of concept of voltage, current and resistance. They have contributed to Amplify with their first tutorials and ideas.

THE PRO

Pro

LEVEL 2

AMP. FER

The equivalent to a Master in Star Wars. They have extensive experience about electronics. They contribute actively in Amplify developing further reasoning about how to create instructions. They could become loosers amplifiers.

THE ROOKIE

Rookie

LEVEL 3

AMP. MUS

They are the equivalent to a Pedesman in Star Wars. They just got initiated in the area of electronics. They have a basic knowledge of DIY tutorials and how to tear up an appliance.
Create something new from old electronics.

Repurpose Catalog

SUGGEST NEW REPURPOSING CHALLENGES

New amplifiers

Tweets

@amplify we are planning a new event to make things with mobile phones.
Gain knowledge by self repairing your electronics.

### Repair Catalog

<table>
<thead>
<tr>
<th>Repair</th>
<th>Description</th>
<th>Sort by</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUILDING AN ELECTRIC BIKE</td>
<td>Repurpose a fan motor to make a low-cost electric bike</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUILDING AN ELECTRIC BIKE</td>
<td>Repurpose a fan motor to make an old bike an electric bike</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUILDING AN ELECTRIC BIKE</td>
<td>Repurpose a fan motor to make an old bike an electric bike</td>
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<td>Repurpose a fan motor to make an old bike an electric bike</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SUGGEST NEW REPURPOSING CHALLENGES

I wish I could build

I wish I could build

See more wishes

### New amplifiers

- Meet

### Tweets

- @amplify is killing it, great tutorial on how to build a fan out of a broken mixer by @isem.
- @amplify is planning a new event to make things with mobile phones.
Let others take advantage of what you don't want.

Reuse Stock

Sort by: Date, Type of artifact, Units, Popular

Ultra One | Vacuum Cleaner
- ref: RH8102 [5 units | year release: 2005
- Next item

Ultra One | Vacuum Cleaner
- ref: RH8103 [5 units | year release: 2005
- Next item

Suggest New Repurposing Challenges

I wish I could build
I wish I could build

See more wishes

New amplifiers

Meet

Tweets

new hack @amplify is killing it. Great tutorial on how to build a fan out of a broken mixer by @isam.

1 hour ago by isam

@amplify we are planning a new event to make things with mobile phones.
MATERIALS

You already have:

- Motor
- Washer and bolt

The repurposing kit should contain:

- Blades (x3)
- Screws (x12, x7)
- Ribs (x8)
- Rib Frame (x4)
- Connectors (x4)
- Central Part
- Battery Pack
- Switch
- Cable (1m)
- Motor Cover
- Vertical Support (x2)
- Horizontal Support (x2)

If any of these components is missing, please contact us at: www.ampify.com/contact
If you had any problem with the tutorial, please contact us. Or check the F.A.Q. of this tutorial.

Any problem with the equipment please contact us at: www.amplify.com/contact
Wishes

Lena Niva  www.amplify.com/profiles/lena
I wish I could make an electric toy plane with a medical juice squeezer.
1 likes | 1 comments
1 min ago

Emeratus Garcia  www.amplify.com/profiles/emerg
I wish I could build a hand drier with a sewing machine.
1 likes | 1 comments
1 min ago

Candia Bongo Man  www.amplify.com/profiles/candia
I wish I could build a hand drier with a sewing machine.
1 likes | 1 comments
1 min ago

Emeratus Garcia  www.amplify.com/profiles/emerg
I wish I could build a hand drier with a sewing machine.
1 likes | 1 comments
1 min ago

New amplifiers

Meet

Tweets

@amplify is killing it. Great tutorial on how to build a fan out of a broken mixer by @lasm.

@amplify we are planning a new event to make things with mobile phones.

Follow us on Twitter
5.10 Fan Final Proposal

When the project started I wanted to have a physical prototype that could prove the idea that repurposing is possible, feasible and can be commercialized. From the many options I had to build a prototype, I went for one that most people could relate to. An idea that looked simple and easy to be built. And I believe a fan is one of this objects that look simple.

The materials of the final proposal were picked based on appealing emotional attachment. Therefore most of the materials are natural. The whole structure except the protective structure is made in wood. That gives warmth sensation of hand crafted that Amplify stands for. The protective structure is made of white opal. The cable is a white textile cable.

Except the batteries and the white opal, the rest of the materials where repurposed.

In overall, the fan takes features of the scandinavian furniture design, and brings them to its design. The reason to emulate the scandinavian design, is the collaboration with Electrolux.

5.10.1 Instructions

The instructions have two formats, the booklet and online version. One for the people that prefer to do it at home, and other to people that wants to do it at Amplify Space. The instructions are divided in 5 sections:

- Before Starting: Explains what is needed to do before starting the instructions and what is coming next in the instructions.
- Structure: Shows the estimated time, the level of the instructions and the assembly group steps.
- Components: Indicates what components does the kit contain an what you already have.
- Tools: Needed tools to follow the instructions.
- Instructions: Necessary steps to put the components together.

When an Amplifier creates instructions that become popular in the community, Amplify recognizes and collaborates with the Amplifier, to commercialize the set. Amplifiers get a percentage of the benefits of the sets, apart of a Hit Hack badge.

Apart from the sections there’s a page with the name of the Amplifier who made the original instructions.
REPURPOSE:
MAKE A FAN WITH A VACUUM CLEANER

BEFORE STARTING

- This tutorial is made for Electrolux's vacuum cleaner Motors. For related tutorials check here: www.amplify.com/vacuumcleanerhacks.
- Check the manual fully and this suggests you to understand your level and accessibility risks. If you don’t know in what level you are, take a look at our level guide: www.amplify.com/levelguide.
- If you don’t have the necessary level but you still want to build the item, please contact us to book a slot at our premises.
- If you haven’t disassembled the vacuum cleaner yet, you can find the tear up tutorial at www.amplify.com/tearups/eleultra1.
- If you already disassembled the vacuum cleaner, the Motor inside should look approximately like in the diagram below.

ESTIMATED TIME

ROOKIE LEVEL

MIN.

30

Sequence of assembly:

1. PROTECTION
2. SUPPORT
3. BLADES
4. SWITCH

STRUCTURE
5.11 GROWTH STRATEGY

In order to see the possibilities that the service can offer in the future, I made a 3 phases growth strategy. The strategy is based on goals, set to understand possible paths to follow in order to see those goals being achieved.

Raise Curiosity

Goal: Encourage people to repurpose, repair or reuse. Build a solid community around Amplify activities. Create a catalog of repurposed products.

Addressed Users: Beta Amplifiers (Pseudo Hipsters, Open Makers, Kids on Chips).

Amplify Space: Workshop, Dressing room, Coffee area, Addressed to appliances and devices from the first sponsors.

Promotional Activities: Amplify Jam Weekends (3R), Tours for schools, Free repair hour, Posters, Blogs.

Staff: Hiring people passionate about problem solving, electronics and design. Used to work in group. F shaped people in this areas: Engineering, IT, IA, IxD, ID, Architecture, Data analysts, Physics,...)
**Build Community**

Goal: Raise the number of customers in the community. Let the community guide what amplify can become. Empower the customer to be tech independent.

Adressed Users: Amplifiers (Mass Market, special focus on kids and parents and couples).

Amplify Space: Classrooms, Cafe, Production of repurposing and tool kits, Adressed to a wider variety of electronic products.

Promotional Activities: 3R Course promotion, Free trial classes, Gift pack (Repurpose Valentines, Repurpose day).

Staff: Adding new professionals. Artists, Baristas, Psychologists, Physics.

**Create Philosophy**

Goal: Self maintenance of Amplify service through users contribution.

Users: Is adressed to especial needs in the location where Amplify will operate, according to user suggestions.

Amplify Space: Exported idea to other countries. Hosts electronics promotional activities.

Promotional Activities: Local Amplifiers stories. Products with stories.

Staff: Ex-Customers become new staff and brand enthusiasts.
6. REFLECTION

Illegal exports of e-waste land in the West coast land of Africa. In Europe we easily dump a mobile phone that we had for two years, because is old fashion. Before starting the degree I had many topics dancing in my head, all of them really broad. Deep in my mind I wanted to give something back to the continent that never saw me being born, Africa. My parents were born in Equatorial Guinea, and even tough is not one of the destinations of the e-waste I feel is an injustice dumping other continent that already has problems of poverty, war and disease with trash.

I decided to work with e-waste because I saw opportunity to bring together open hardware knowledge, with creativity at the end life of the product. When I saw the injustice happening in Ghana, Benin or Nigeria, I wanted to take that chance to do good.

Working in this project has showed me how the economic paradigm works. And being honest, I don’t like to see how dependent we are of that economic system that we can’t really see other possibilities around it. And I believe there are. I could blame the corporations for being so big and looking just for income. But we are part of those corporations, the same corporations that support planned obsolescence. Corporations don’t exist without its people.

I heard many times, “Yes, but we can’t do anything about it”, of course we can’t; it’s more comfortable to do nothing. Nobody is trashing our city, and our health is on average pretty good. Perhaps we would react the instant we see the solid waste coming directly after us.

My goal for this project was to try an empirical approach to the problem. And I had the chance to try myself how the service would look like. I couldn’t carry all the tests, role plays or workshops I intended to. I realized that after 4 years away from Barcelona, my networks had diminish quite a lot. And that affected my initial planning.

But, in the other hand I learn how to be a better facilitator. Even though most of the times I missed two people helping me with the camera, the questions or moving the paper mockups.
I noticed that there's another way of working, not user centered, but idea centered. You test your ideas with people not to validate your ideas, but to improve them. That way, gives room to concepts that would have been discarded in the very first test.

Looking at the overall structure of the project, my process in some stages, was inverted. I was ideating while researching, filming the concept idea without a solid concept. And it felt right, because I wanted to experiment with the process.

In my collaboration and sponsorship with Electrolux and Fab Lab Barcelona, I've been generally free to do whatever I wanted. My intention from the beginning was to follow my fate, and I had no hurdles to do it.

Generally the degree project is individual work, but I find interesting the idea that in the degree you could manage a team. Because in the real design environment, designers don't work alone.

In these last weeks I've been helped with the webpage and the video postproduction. It has been challenging and time consuming to give directions remotely, to the people who helped me. Besides keep them engaged in my project. Using e-mail is difficult to explain the whole experience, and Skype is sometimes not enough. Describing behaviors, discussing graphical style.

Umeå Institute of design has truly changed me. Almost four years ago I landed in Umeå knowing a bit about design, less about Sweden and having communication issues with my primitive english.

I used to be an engineer, and most of that mentality is gone. I worked 3 years doing 3D modeling and wishing that one day I could do something more creative than translating 2D sketches to digital volumes.

I didn't know what I was going to become. In fact I wanted to be in Advanced Product Design. But fate placed me in the interaction Design program. And looking back, it really makes sense. The boundaries within interaction design are way broader than other disciplines within design. That has allowed me to freely experiment ways of developing ideas that in other disciplines I wouldn't have been able to explore.

I believe I landed in this program because I wanted to change things in
the world that I don’t like. Learning user centered methods, visual communication, prototyping, service design thinking, and so forth, has really open my mind. Now I can see opportunities to tackle social problems that my engineering background would have never done.

It has also been four years to better know myself better. I’ve got to know my strengths and my weaknesses through, all-nighters, discussions, team work, etc. And I think is really important to understand what you are good at, because that will give you a clue of your role and what you bring in a design team.

What I missed during my MA in Interaction Design, has been bringing business and entrepreneurial methods to the program. Nowadays is naive to ignore that our works can become startups. And the trend indicates that business and design are blending together.

I’m very grateful that I became part of the UID family for 4 years. The education at UID is great. I’ve learn so much from my classmates, teachers and lecturers. I wish UID the best of lucks, and it would be a pleasure for me to keep in touch with the school.

Cheers
7. REFERENCES


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To all the people that have supported me along the during this project. To Electrolux for letting me do such a project with them, this project wouldn’t be possible without Thomas, Petter and Mall. I want to thank Fab Lab Barcelona for setting me there, especially Tomas, Anastasia, Jesus and Maria Antonia. To the members of the Umeå Hacker space for letting me in and giving me a piece of their time. To my beloved family to support me during this difficult times, and being there when needed, especially to my sibling sister Stella. To my brother from another mother Oscar, and Aida, you are always really helpful. Thank you. To Monty, for inverting his time in the postproduction. Thanks to Fosca, for your feedback and helping me to deliver the web. To Antonio for keeping me warm at his place. To my first year classmates, for the coffee I never had, and the good ambient you have brought, in particular to Siri, Shivanjali and Shelagh. To my second year peers. To Soramist, we are a really inspired team, I know we will work together in the future. Thank you to Lima for your leadership skills, to Ine and your sense of humor, to Yanghi for your peculiar perspective, to my dear enemy and Abji Khogele, Soltani. Also to Jenn and her feedback and the fisher. Big thanks to Camille and Camille, to Rickard the voice and to Tara Mullaney.

Finally thank you Niklas and Kent, and the 4 years I spent at Umeå Institute of Design.
WHAT DOES THE AMPLIFY BRAND STAND FOR?
AMPLIFY POSITIONING STATEMENT

**WHY**
We believe in providing customers with the means to provoke a sustainable change on how we consume electronic products.

**HOW**
Building a service that assists people to repurpose, repair and reuse their malfunctioning or obsolete, electronics.

**WHAT**
It will create a philosophy that brings technical knowledge to people, less exports to third world countries and diminish the planned obsolescence.
PROVIDING THE NECESSARY MEANS

Our customers seek for alternatives to extend the life span of their electronic products. The way the economic system is built nowadays, discourages this behavior. The products are made to last less and be replaced.

Amplify enables the users to bring back, malfunctioning, obsolete or broken products to life. Amplify provides the space, the knowledge and the equipment to help customers to amplify their electronic items.
## BRAND POSITIONING

**AMPLIFY PERSONALITY**

<table>
<thead>
<tr>
<th>PERSONALITY</th>
<th>we are more...</th>
<th>than we are...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMART</strong></td>
<td>Simple, Clean, Meaningful</td>
<td>Futuristic, Unclear, Simplistic</td>
</tr>
<tr>
<td><strong>HONEST</strong></td>
<td>Reliable, Frank, Concious</td>
<td>Elusive, Disrespectful, Not aware</td>
</tr>
<tr>
<td><strong>WELCOMING</strong></td>
<td>Open, Personal, Cozy</td>
<td>Generic, Company centered, Cold</td>
</tr>
<tr>
<td><strong>CHARISMATIC</strong></td>
<td>Bold, Engaging, Unfolded</td>
<td>Dull, Cheaply gamified</td>
</tr>
</tbody>
</table>
BRAND POSITIONING
AMPLIFY PERSONALITY
When creating experiences for Amplify keep in mind the following:

1. Make the purpose understandable within 1 min.
2. Provide a clear path to action.
3. Use action-oriented language.
4. Present products in context.
5. Look for opportunities to surprise and delight.
6. Allow for the newbie and provide for the expert.
The Amplify signature is the most fundamental part of our brand, and it represents our entire company, externally and internally. From product packaging and ads to data sheets and presentations, it functions as a personal sign-off on the ideas we’re presenting and sharing. The signature consists of two elements that work together as a whole.

**PETAL SYMBOL**

The petal shape represents growth or become bigger, as an analogy of the idea of extending the life of a electronic product. The “a” on the top of the petal embodies some features of the character of the brand: Welcoming and Charismatic.

**WORD MARK**

Our word mark is Gotham Black with two dashes. The word mark is strong, yet friendly, Smart and Honest.
A lot of thought and effort has gone into determining the perfect relationship between the elements that make up our signature; do not attempt to re-create these elements. Always use the approved artwork, and always follow these rules when using it.
Clear space is the area surrounding the signature that must be kept free of other graphic elements. The minimum required clear space is defined by the measurement “X,” as shown. This measurement is equal to the height of the lowercase letters in our wordmark.

We have established various minimum sizes for our signature to help it stand out as much as possible. While the minimum sizes shown here should accommodate most applications and reproduction techniques, make sure that our signature is never smaller than what can be clearly executed. Applications such as the Web, signage or merchandise may require larger sizes.
BRAND ELEMENTS
LOGO COLOR VARIATIONS

TWO COLORS

BLACK AND WHITE

THREE COLORS
### Brand Elements

#### Color Palette

**Primary Palette**

<table>
<thead>
<tr>
<th>RGB</th>
<th>CYMK</th>
<th>LAB</th>
<th>HEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>69</td>
<td>87</td>
<td>0</td>
</tr>
<tr>
<td>255</td>
<td>143</td>
<td>115</td>
<td>0</td>
</tr>
<tr>
<td>143</td>
<td>44</td>
<td>65</td>
<td>25</td>
</tr>
<tr>
<td>178</td>
<td>139</td>
<td>159</td>
<td>0</td>
</tr>
<tr>
<td>127</td>
<td>99</td>
<td>113</td>
<td>0</td>
</tr>
</tbody>
</table>

**Secondary Palette**

<table>
<thead>
<tr>
<th>RGB</th>
<th>CYMK</th>
<th>LAB</th>
<th>HEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>255</td>
<td>87</td>
<td>0</td>
</tr>
<tr>
<td>145</td>
<td>255</td>
<td>201</td>
<td>2</td>
</tr>
<tr>
<td>38</td>
<td>0</td>
<td>53</td>
<td>0</td>
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<tr>
<td>92</td>
<td>-42</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>43</td>
<td>0</td>
<td>21</td>
<td>0</td>
</tr>
</tbody>
</table>
BRAND ELEMENTS
PRIMARY TYPEFACE

GOTHAM
Thin
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Extralight
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Light
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Book
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Medium
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Thin Italic
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Extralight Italic
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Light Italic
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Book Italic
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?

Medium Italic
ABCDEFGHJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890!@#$%&?
BRAND ELEMENTS
PRIMARY TYPEFACE

Bold
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Black
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Ultra
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

LOBSTER TWO

Regular
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Italic
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Bold Italic
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Black Italic
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?

Ultra Italic
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$&*?
HELVETICA NEUE

Ultralight

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Light

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Medium

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Condensed Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Ultralight Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Light Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Bold Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?

Condensed Black

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#$%&*?
BRAND ELEMENTS
ALTERNATIVE TYPEFACE

OSTRICH SANS
Condensed light
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#%$&*?

Medium
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#%$&*?

Bold
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#%$&*?

Black
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890":!@#%$&*?
REPURPOSE:
MAKE A FAN WITH A VACUUM CLEANER
BEFORE STARTING

- This tutorial is made for Electrolux’s vacuum cleaner Motors. For related tutorials check here: www.amplify.com/vacuumcleanerhacks

- Check the manual difficulty level. We suggest you to understand your level to avoid any risks. If you don’t know in what level you are in, take a look at our level guide: www.amplify.com/levelguide.

- If you don’t have the necessary level but you still want to build the item, please, contact us to book a time in our premises.

- If you haven’t disassembled the vacuum cleaner yet. You can find the tear up tutorial on how to do it at: www.amplify.com/tutorials/tearups/eleultra1

- If you already disassembled the vacuum cleaner the Motor inside should look approximately like in the diagram below.
COMPONENTS

You already have:

- Motor
- Washer and Nut M6

The repurposing kit should contain:

- Blades x3
- Screws M3 x12 x7
- Rib Frame x4
- Connectors x4
- Central Part
- Middle Support
- Battery Pack
- Switch
- Cable 1 m
- Motor Cover
- Horizontal Support x2
- Vertical Support x2
- Blades Support x3
- Rib Frame x4
- Connectors x4
- Central Part
- Middle Support
- Battery Pack
- Switch
- Cable 1 m
- Motor Cover
- Horizontal Support x2
- Vertical Support x2

If any of this components is missing please contact us at: www.amplify.com/materials
TOOLS

Impact Glue

Screw Driver

Wrench

Cable Stripper

Clamp x2

quadrex

Plastic Gloves

Heavy Book x 4

Electric Screwdriver

Soldering Pen

Lead Wire

If you miss any of the tools above you can contact Amplify to rent them or buy a kit.
INSTRUCTIONS

1 PROTECTION

Connecting the Rib Frames
Add a drop of Impact Glue to the Rib frame and join them to the Connectors using the marks as reference.

Repeat 4 times
We will do this four times until we get a circular frame. Then put a heavy book on top of each connector and let the glue dry.
2 SUPPORT

T-shaped structure

Meanwhile, we take the vertical and Horizontal Support and bring it to the position showed in the picture.

Vertical Support

Horizontal Support

Screw them together with two long screws so they form a T-shape.

Do it again

Repeat the process on the other side, so you will get two T-shaped supports.

25 cm
Adding the Motor Cover

Bring the end of the Vertical Support (90°) to the groove on the Motor Cover and fix them together using two long screws.

Repeat in the other side

Do the same in the other side until get the same as in the figure.
Once we have the two T-shapes, we position the Middle Support at the same height as the holes in the Vertical Support. We use two large screws to attach the Middle Support to the Vertical Support. And we repeat the same action to the other side.

Cool!

Now we have the support almost complete. It should look like this.

We use two large screws to attach the Middle Support to the Vertical Support. And we repeat the same action to the other side.
3 BLADES

Inserting the blades

We take the Blades Support and insert a blade into the grooves.

Then reach the short screws and screw them perpendicularly to the Blade surface in the two holes on the blades.

Repeat the process 3 times

Until you get the right the same result as in the picture.
Attaching the blade group

Unscrew the Nut in the Motor and insert the blade support to the Motor like in the figure.

Hurray!

The blades are ready to be used.
Fasten the ribs

Once the 3 ribs are in position, we grab the Rib Frame and insert its grooves into the 3 ribs slots. Make sure that the Connectors of the Rib Frame, are facing the back of the Motor Cover.

Inserting ribs

We will bring the support group, and slide in the slots of the Motor Cover the ribs. We will insert 3 ribs first.
Inserting the Motor

Insert the Motor together with the blades inside the Motor Cover. Watch out the ribs. The blades should pass before the Motor body.

More ribs

Repeat the process of inserting the ribs in the grooves of the Motor Cover while matching the ones in the Rib Frame until you get the same result as the picture.

Do not insert the Motor completely. Leave some room for the ribs to be placed. When all are placed, push the Motor to the end.
Now that we have all the body assembled like in the diagram, it's time to start with the Switch installation.

Perfect!

Now we take the Central Part and slide it in the middle of the Ribs, connecting all the Ribs together.
4 SWITH

Cutting the Cable

Cut the cables hanging out of the Motor Cover, to approximately 5 cm each.

Strip the Cable to see the tip of the Cable core.

Inserting the Cables

We unscrew partially two of the screws at the Connection block. Then we bring the Cables of the Motor and insert them on the Connection block.
Unscrew the Switch and bring the Cables from The Battery and also from the Motor, and place them inside the switch. Once you have all inside, you will get a similar result as in the picture.

Cut the Cable
in the middle approximately at 50 cm and strip the wires the Cable at both end.

Joining the Cables in the Switch

Insert the wires
Introduce the wires of one the free cut Cable on the Battery Pack holes and solder them.

Once you have all inside, you will get a similar result as in the picture.
You made it! Now you have a Fan.

Congratulations!

Attach the Battery Pack

Position the Battery Pack 5 cm below the Middle Support in the back of the Vertical Support.

Then screw in the screw in the middle of the Battery Pack.

You made it! Now you have a Fan.
SUGGESTIONS

- The vacuum cleaner motor can reach 230 V. We recommend not to power it to that voltage. Can cause serious injuries to the people and its surroundings.

- Keep all the connections tight and protected.

- If any of the parts it's broken during the process, please contact us.
AMPLIFY
Opening opportunities on outdated electronics

IxD Master Degree Thesis | Brian Oko