MY FRIEND IS ALWAYS WITH ME

THE EMOTIONAL CONNECTION BETWEEN HUMAN AND PLANTS

Photo by Sanna Amajdian
Project owner: Sanna Amjadian
Supervisor: Michael B. Hardt
Partner company: Levande Filter
University: Mid Sweden University
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When I started to think about the subject of my thesis I knew that it is suppose to be a subject close to my heart. Plants are a big part of my daily life. I talk to them, pat them on their leaves and play music for them. When I am not at home I miss them, in fact I would like to have them everywhere with me but the question is how? I was looking for a solution to give me this possibility and all of the sudden the idea of the project emerged. I suppose the lack of a product is the result of this detachment. In short this project is a result of my concern for detachment of human bing from nature. The basic Idea started from my previous project on sustainability whereby I noticed that the importance of plants in human’s life has been ignored. Hence this project aims to strength this everyday bond by a design solution.
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Abstract

The vision of this project is to change people’s life style by improving their daily connection with plants. The goal of this project is to design a physical product that makes a strong everyday connection between human being and nature. A piece of nature is going to be carried in this product.
The user study will be designed as an online questionnaire for different group of society and observation in the lab and in an ordinary room. Primary models were made by acrylic and cartoon and tested by users in tow different stages. Participants were collected among different age, gender, with and without disabilities. Both plant lovers and non-plant lovers participated in this user study.
<table>
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| Week 4 | Define the current situation  
Define the problem and needs/ Project description/ Research |
| Week 5 | Research                                                               |
| Week 6 | Research/ Set the goal                                                  |
| Week 7 | Ideation                                                               |
| Week 8 | Ideation Evaluation                                                    |
| Week 9 | Prototype, User test                                                  |
| Week 10| Prototype/ talk to experts (about materials and feasibility)          |
| Week 11| Prototype/ talk to experts (about materials and feasibility)          |
| Week 12| Take in to accounts experts advises                                   |
| Week 13| Placing different models on the body                                   |
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| Week 15| Final model, Report, Presentation                                     |
| Week 16| Report, Presentation                                                   |
| Week 17| Report, Presentation                                                   |
| Week 18| Report, Presentation                                                   |
Detachment of human from nature
Living in artificial urban environments, surrounded by glass and steel is a result of transition from agricultural society to an industrial society. This huge transformation has enormous effects on our life style as well. One of these effects is detaching us from nature. According to many researches plants and being attached to them have many positive effects such as air purifying and mental and social position boost and reducing stress level. However they are not a part of our daily life in current modern lifestyle. Recently in a study it has been proved that linking human to the nature enhances environmental knowledge and will lead to more environmental friendly behaviour. (1) Another research shows that offices with indoor plants could improve occupants mood and could raise their efficiency. (2)

In this study participants were exposed to different plants with different colours and odours. The environments with green, slightly scented and small plants were reported as the most favourite conditions. The EEG and oxyhemoglobin saturation showed significant changes when plant conditions varied.
To some people emotional attachment is a bond between human-being
To some people emotional connection is between human-being and pets

Source of the photo: www.pixabay.com
Emotional connection

Emotional connection and Love
For many people love is about their children or their pet, They take care of their children and pets because in order for children and pet to survive they need to be concerned. Jonathan Chapman argues that “Today, most people are comfortable in the misguided belief that love is an emotion exclusive to the human species.“ (3)
For plant lovers love could mean their plants as well. Plants are such good friends of us not only because they are beautiful but also they produce clean air and good mood as it was mentioned before. The relationship between human and plants is a two way relationship, we take care of them and they take care of us.
These good friends should be closer to us. We do have them in our offices and apartments but why not have them closer and a part of our daily life. The problem which this project is going to solve is to strengthen this attachment between human and plants.
But flowers/plants are also good friends. They have so many benefits for us. People should reconcile with these good friends.

Photo by Sanna Amajdian
Lifestyle and human health

At the 2006 UK Public Health Association Conference, held in Telford in March, and the International HIA conference in Cardiff in the same month, there was much interest in a new model of health determinants applied to the planning of human settlements.\(^{(4)}\) The environment in which we live is a major determinant of health and well-being. Modern town planning originated in the nineteenth century in response to basic health problems, but in the intervening years has become largely divorced from health. We have been literally building unhealthy conditions into our local human habitat. Recent concerns about levels of physical activity, obesity, asthma and increasing environmental inequality have put planning back on the health agenda.

It is widely recognised that public health is being compromised by both the manner of human intervention in the natural world and the manner of development activity in our built environment (5). Our current lifestyle and technological gadgets are interlaced. Even tough dependency on technology is bringing us technostress (6) which is a stress psychosomatic illness caused by working with computer technology on a daily basis we still carry around our smart phones or digital gadgets. A transformation in people’s life style can increase their mental and physical health. This transformation is a reconciliation with nature.

6. https://www.google.se/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8&q=technostress+definition&
This chart shows lifestyle as a determinant of human well being

Source of the photo: http://eprints.uwe.ac.uk/7863/2/The_health_map_2006_JRSH_article_-_post_print.pdf
You might wonder why you have to carry around your plant. It might seem an odd idea but not as weird as the story of Tamagotchi. It was a Japanese handheld digital pet in 1996 made by Akihiro Yokoi. It became a huge trend all over the world around 1999-2000. 76 million Tamagotchi has been sold all over the world. (7)

The key issue underpinning the Tamagotchi was that it could die, and to keep this digital pet alive and happy one had to look after it by answering its needs just as it answers yours. (8)

If we look at this piece of plastic that we carried around and take care of it every day and every where then may be we can replace it with something else, something which has more mental and physical benefits for us. Maybe it is time to have our natural Tamagotchi. Tamagotchi in itself had good pedagogical aspect which is taking care and responsibility for children.

7. wikipedia.com
As Marlene Targ Brill in ‘Raising Smart Kids For Dummies’ states giving responsibility and chores to children helps growing smarter children. She claimed middle school kids are able to handle chores such as planting flowers and grass, walking the dog and so forth. (9) So why not making a better Tamagotchi which can clean the air, teach children to take responsibility and in a nut shell something that benefits every one.
A Tamagotchi was a digital handheld pet

The source of the photo: eBay.com
Plants as portable pleasures
To many people plants are known as stationary elements, they might wonder why to carry a stationary element but stationary elements do not always need to stay stationary. Before emerging of Walkman in late 70’s music also was considered as a stationary element. Then Walkman introduced a new way of listening to music which was a change in life style. It was invented to give people the possibility of carrying their pleasure. Pleasure on the move became commonly accepted and valued practices only during the last two decades. In particular Walkman and the wider changes of society in the 80s did prepare the ground for the fast reception of the cell phone one decade later. The previous negotiations around “music to take along”, “portable pleasures” and “leisure on the move” gave way to today’s fun concept in which portables serve for private fun anytime, anywhere.
In its first report on pocket stereos, the leading German news magazine Der Spiegel pictured youngsters eating and shopping together while individually listening to their Walkmans. The underline read: "Will the remainder of interpersonal communication dies out?" Already one decade later, this strong cultural criticism of non-users had lost its influential voice, and on its twentieth birthday, the conservative German newspaper F.A.Z. unanimously called the Walkman a sign of “freedom”, “individualism”, and “pleasure always at call”, all of which were described as positive values.
“Walkman doesn`t isolate people – it makes them happier”, the head of Sony, Akio Morita, Said in an interview.
Walkman usage led to a new perception of both the music heard and the environment seen while moving around. (10)Hence carrying around your plant is not a burden on you, it is a new life style which brings you happiness and health. Stories of Tamagotchi and Walkman shows that carrying around a piece of nature that has an emotional bond to you apart from positive affect on your health is not a strange idea.

Walkman made music portable

The source of the photo wikipedia.com

10. Manufacturing leisure. Innovations in happiness, well-being and fun, Mika Pantzar & Elizabeth Shove (eds.) page 149
Plants clean the air

Nature has an amazing way of keeping itself clean. There are many powerful air-cleaning plants that naturally remove pollutants from the air. In a 185 square meter house, bring in 15 to 20 plants in 15 centimetre pots or larger. (11) IN 1989 Nasa made a study on 32 species of plants and the result shows how they perfectly clean the air. (12) For example peace lily absorbs all the toxic particles from the air and English Ivy absorbs all particles except Ammonia.

12. wikipedia.com
<table>
<thead>
<tr>
<th>Plant</th>
<th>Benzene</th>
<th>Formalde</th>
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NASA clean air study 1989
Plants and anti-asthmatic potential

Asthma is a common disease that is rising in prevalence worldwide with the highest prevalence in industrialised countries. Asthma affects about 300 million people worldwide and it has been estimated that a further 100 million will be affected by 2025. Since the ancient times, plants have been exemplary sources of medicine. Current asthma therapy lack satisfactory success due to adverse effect, hence patients are seeking complementary and alternative medicine to treat their asthma. Ayurveda and other Indian literature mention the use of plants in various human ailments. India has about 45 000 plant species and among them several thousand are claimed to possess medicinal properties. Researches conducted in the last few decades on the plants mentioned in ancient literature or used traditionally for asthma have shown anti-asthmatic, antihistaminic and antiallergic activity. This review reveals that some plants and their extract have anti-asthmatic, antihistaminic, anticholinergic and antiallergic activity. (14)

Plants are not only beautiful, they can boost our efficiency and they clean the air.

The source of the photo: www.pixabay.com
Conclusion

We are aware of this fact that plants are beautiful, therefore we put them in the basket of our bicycle or in the jars on the desk, at our offices and our home. But considering their positive affects such as absorbing toxic particles from the air, anti-asthmatic ability, boost our mood they deserve to be more involved and accessible in our daily life. We should have the possibility of having them whenever we want and wherever we wish, at our offices, in the car, beside our bed, beside our laptop. A carrier for plants will benefit everyone, and our planet. This will make a huge change in our lifestyle just as Tamagotchi and walkman did.
So in order to continue the project I should have found a company working with plants. Levande Filter as a company producing air purifier based on natural function of plants is a good alternative. Their products are making a bridge between human being and nature this urban life style. They do not produce any portable product. Their products are huge stationary boxes of plants. Air will be vacuumed inside the product and then plant will naturally clean it and a fan will send out the clean air from the the other side of the product.

Current product of Levande Filter

The source of the photo: levandefilter.se
This illustration shows the function of a Levande Filter.

Air and all pollutants and particles are vacuumed inside

The LED lamp works as an artificial sun light

Plants absorb dust and particles which will be washed off into the soil

Water will wash and clean the leaves and control humidity of air

Clean air and oxygen will spread out buy the fan
Market analyse

Since a carrier for plant which works as an air purifier will fall in portable air purifiers category I am suppose to search for some existing products as examples in the market and analysing them to be able to make a comparison.

Exteriör Färg. Vit
Produktlinje. Fellowes AeraMax
Modell. DX5
Färg. Vit
Maximum area coverage . 10 m²
Garanti. 3 år
ENERGY STAR - godkänd. Ja

Motor. Kapacitet max. 153 m³/t
Ljudnivå max. 43,5 dB(A)
Mått och vikt.
Djup 23,00 mm
Djup max. 23,00 mm
Brutto dimensioner
Bruttovikt 6,20 kg

Användning. Filtrering
Effekt. 1.5 W
Egenskap. USB
Färg. Vit
Material. Plastic
Räckvidd. 60 m²
Price. 480 kr

(15) www.gulakatten.se
(16) www.whiteaway.se
(17) http://cdon.se/
Target group

A carrier for plants is a need for everyone. For anyone who wants to be close to a piece of nature to benefit from its amazing properties such as air purifying, mood booster and anti-asthmatic.
Sketch, creativity

“Art should take nature as its model”
Aristotle
Form selection

In the sketch part I was quite playful and I did not really pay attention to the function. After playing with different shapes which all are inspired by nature now it is time to select and evaluate the appropriate shape by considering the space they will have inside them and whether they are appropriate to be placed on body. Simple models of plaster were made to be placed on the body. Three of them were chosen by the reasons which is described in front of each shape.
Not chosen because in stationary position will occupy so much space around.

✓ Chosen in the first round of selection because the shape is inspired by a leaf which symbolises Levande Filter logo. As a backpack it locates at the right place.
Not chosen because in stationary position will occupy so much space around.

✓ Chosen in the first round of selection because it sits good on shoulder and back the shape has a high possibility to be stationed without occupying so much space.
Not chosen because it is only suitable as a backpack.

✅ Chosen in the first round of selection because you can embrace it like a baby carrier.
Not chosen because in stationary position will occupy so much space around.

Not chosen in the first round of selection because of occupying so much space.
Methodology

Online questionnaire, and user study have been conducted to gain the final conclusion. As Donald Norman argues Everything we do, everything we think is tinged with emotion, much of it subconscious (18) Products affect on three different levels which are visceral, behavioural and reflective and a good design will affect on all levels.

Visceral design concerns itself with appearances.

Behavioural design has to do with the pleasure and effectiveness of use. Finally, reflective design considers the rationalisation and intellectualisation of a product. (19)
On-line questionnaire
A short questionnaire was conducted to assess plants’ effect on visceral level in comparison with other portable air purifiers. A photo containing three portable air purifiers and a box with plants was shown to participants and it was asked them which one they would choose if they knew the function is same in all products?
The result of the online questionnaire

- Number 1: 4%
- Number 2: 10%
- Number 3: 4%
- Number 4: 8%
- Maybe no 2: 4%

- 74% of the respondents chose the number 2.
Fifty six persons participated from different age and different genders. 74% of answers was number two. Most participants did not even ask about the function. When the reason of choosing the box with plants was asked the answers were:
1. “It is natural.”
2. “It creates connection between me and nature.”
3. “It is naturally beautiful.”
4. “It has something alive inside it.”
5. “It spreads energy around and makes a cosy and lovely space.”
6. “I love plants.”
7. “It is simple.”

Four percent of participants answered they would choose number 2 in case it is not going to take so much space. So size for participants matters.
The result of questionnaire shows that participants are talking about visceral and behavioural. Donald Norman in Emotional Design discusses that at the visceral level, people are pretty much the same all over the world. The behavioural and reflective levels, however, are very sensitive to experiences, training, and education. Cultural views have huge impact here; what one culture finds appealing, another may not. Indeed, teenage culture seems to dislike things solely because adult culture likes them. (20) In doing so if a product has an emotional bond to the user it will be much more desirable and sustainable than if it does not. As an example Norman claims that the sight of the classic tools is attractive, but the memory of their use is negative. Because the power of emotion fades with time, the negative affect generated by our memories doesn't overcome the positive affect generated by the sight of the instruments themselves. (21)
First user test

For the first user study two shapes out of final three selected shapes were chosen. The reason was to understand whether participants prefer to have a backpack or like a baby carrier in front of them. The weight that everyone feels comfortable was supposed to be measured. It was measured by adding weight to an ordinary bag and then it was asked them to carry it. Also the approximate size of the final product was cleared. Two pre-model of acrylic were made. Five persons participated in this user study. It was held in the lab. Three persons without disability and one paraplegic and one with arthritis participated. The environment of city and wood was simulated by photo and sound in order to remind the participants our detachment from nature in this urban life. A colour chart was made to understand the importance of colour choice for the user.
The result of first user test

According to the guideline provided by the American Chiropractic Association (ACA) specific to a person’s weight and the ideal maximum backpack weight a person with 60kg weight can carry is 5kg. When the models were tested by users the maximum weight that everyone except person with arthritis was comfortable with was estimated 2.5 kg. The weight that person with arthritis felt comfortable was as heavy as her bag which was 1.3 kg. All of them were agreed on the point that they would like to have different alternative of colour since this product is going to be a part of your outfit. They stated that the final product should not be on your back because they would like to see the plant. The bag that the person with arthritis had was on her shoulder. No one wanted to embrace it. They stated hanging on the shoulder is the best position to carry this product.
### ACA chart

<table>
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<th>Person’s weight</th>
<th>Maximum backpack weight</th>
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<tr>
<td>60</td>
<td>5</td>
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<tr>
<td>60-75</td>
<td>10</td>
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<tr>
<td>100</td>
<td>15</td>
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<td>125</td>
<td>18</td>
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<td>150</td>
<td>20</td>
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<tr>
<td>200 or more</td>
<td>25</td>
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This chart shows the maximum weight a person can carry

source: https://ergonomicedge.wordpress.com/2010/02/10/keeping-kids-safe-5-ideas-for-improving-your-childs-ergonomic-health/
Talking to experts

After user test the models should be demonstrated for the experts to find out which one is feasible to make in reality. The place of implanting fan and LED lamp and plants were also discussed in this stage. The materials which Levande Filter is using are wood and glass. So their suggestion was to use materials close to their agenda which is environmental friendly material. The shapes which were made for the first user study were not appropriate to implant all the equipment according to experts comment.

The plant will be in a wrong position when embracing it

The plant will be in a wrong position when placing on the ground
As the conclusion of the first user study and experts advises the final product’s weight should not exceed 2.5kg. Lighter product will include users with low power in body. A product which can be stationed and hanged vertically on the shoulder is preferred because the plant position will not be changed. There should be different choice of colour for the final product. The approximate size that everyone felt comfortable with was a bag with 34cm height, 30cm width and 15cm depth.
Second user test

According to the result of first user study third shape which is appropriate for hanging on the shoulder and then placing on a flat surface is the shape bellow

Another pre model with cartoon was made, the plant was placed inside it, the size and depth was measured to make sure there is enough space for all equipment as well. Then it was placed on the body. Three persons without disability participated and they stated it is a comfortable shape for hanging on the shoulder.
Conclusion

The shape is comfortable for hanging, the size is appropriate size. The weight of plant and other equipments inside should be divided in a way that it dose not let the product tilt backward or forward. The soil inside the plant should be restricted hence it will not spread inside the product. The strap should be adjustable. This shape will be chosen for the final design.
Woods and products made of wood have an amazing capacity to sequester carbon. Through the process of photosynthesis, trees grow and soak up carbon dioxide out of the atmosphere. They convert this into carbon and give off oxygen for us to breathe.

In order to produce one kg of timber, a tree consumes 1.47 kg of CO$_2$ and returns just over a kilo of oxygen into the atmosphere. When a tree dies and falls to the forest floor it gives back that carbon dioxide to the atmosphere or to the ground. If it burns it will give back the carbon dioxide to the atmosphere as well but if it becomes a toy or a piece of wooden furniture, the carbon will be sequestered in the wood for the life of the product. 50% of the dry weight of wood is carbon.
It is far more preferable to have the carbon stored in trees and in wood products on the surface of the Earth than in the atmosphere where it contributes to climate change. (22) So wood is a sustainable alternative for this product and it is also compatible with Levande Filter agenda. The wood which is used should be compatible with the nature of the country in which it is going to be produced, for example bamboo in the countries in which bamboo is accessible enough or timber and birch for Sweden and so forth.

Wood
For producing 1 kg of Timber 1.47 kg of CO₂ is consumed and 1 kg oxygen is produced by the tree.

ABS
Tough, light, recyclable

Source of photo: pixabay.com
The products that Levande Filter is producing are made of glass and wood. In the previous page wood was discussed and analysed as a possible alternative and now it is time for analysing glass. Glass as a sustainable material is a potential option. However when it comes to portable products problems such as security and weight will emerge. Although security glass could be noticed as an option due to the heavy weight it is not wise to carry it. A 50*70 cm sheet of security glass with minimum thickness will have at least 2.5 kgs weight and this weight is quite high considering that other equipments and the main body also have weight. Hence another alternative such as ABS could be considered.
Acrylonitrile butadiene styrene (ABS) (chemical formula \((\text{C}_8\text{H}_8)_x \cdot (\text{C}_4\text{H}_6)_y \cdot (\text{C}_3\text{H}_3\text{N})_z\)) is a common thermoplastic polymer. Its glass transition temperature is approximately 105 °C (221 °F).\(^2\) ABS is amorphous and therefore has no true melting point. The most important mechanical properties of ABS are impact resistance and toughness. A variety of modifications can be made to improve impact resistance, toughness, and heat resistance.\(^{23}\) Since it is recyclable it seems that ABS could be a good alternative instead of glass which is heavy and breakable.
Final design

The lid was made in 3 stages, first a mould of plaster was made in 3d printer. Then it was filled with clay to make it ready for placing inside the vacuum former and finally a two millimetre PET plastic was chosen as the lid to be formed by vacuum former. The body also was made in 3d printer with a combination of 30% wood and 70% plastic. It was made in five pieces and all parts were glued together in the end. The weight of final product is 1 kilogram. Final Product will be available in different colours.
The LED lamp is a solar one, so when needed it could be charged by sun. It can be turned on by pushing its button. The battery which runs the fan is charged in two way; either by pulling the strap which is around the winder pulley many times or when you do not have time you can just connect it with a usb cable to a energy source like your laptop. When the product is placed in a stationary position the strap is not a trouble it will go inside the product since it is connected to the winder. The lid is connected to the body by a hinge joint and a small magnet will hold it in the correct place. Air goes inside the product from the holes implanted on the top of the product and after being cleaned by plant the clean air will be sent out by the fan from the holes on the other side.
Small holes from which air goes inside
LED lamp provides day light if needed, you can turn it on by pushing its button

Small holes from which clean air goes outside

Small handle which helps to open the lid, a small magnet inside it holds the lid in its place when the lid is closed

Tiny layer of metal will hold the magnetic joint

Fan will send out the clean air towards the holes

Winder

Battery

The strap

Small holes from which clean air goes outside
There are two ways to produce energy for the fan and LED lamp, either by pulling the strap or connecting it to your laptop or energy source outlet by a USB cable.
The battery is being charged by the usb cable.
Turn on the light by pushing the button of it and enjoy this beautiful peace of nature next to your bed.
Light and beautiful
Your natural filter is always with you
Reflection on the final design

When final model was made it was taken to the city centrum and it was asked people to try it. The product and its function was described to people. People stated that the idea is so innovative. One stated that it would have been better if the product could have a small place for accessories like keys or mobil phone. They were satisfied by the shape and one stated that it could be used in a fashion show as a fashion item. They also stated that it is not heavy. A functional model could give a better understanding of the idea and all small details.
Further development

This product will not change all problems of air pollution and carbon sequestration. But we live in an era in which green buildings and using plants is becoming more trendy. In fact the lifestyle of people is changing gradually, it takes time and effort of designers but it is absolutely feasible. All these small steps will help us to have a healthier and greener environment. To involve plants in different aspect of life no matter whether at offices or homes, on the roof of buildings or in the balcony or a small carrier on your shoulder will help. This project will not end here the next step is to implant plants in the cars which will produce beauty and clean air in the cars and will change current car facet and street’s face.

A huge green revolution will happen by implanting plants in the cars

The source of the illustration: www.vectizi.com
Special thanks

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Take more advantage of plants by keeping them close to you