Appetite for technology

Investigating the role of the designer in shaping consumer's interaction with technology.

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Submitted in partial fulfillment of the **Masters** level program in interaction design at **Interaction Design Institute Ivrea**. Italy, June 2004.

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Abstract

Products impact on how we think, influencing and even shaping people's behaviors. In interaction design this influence is even more apparent, due to its intrinsic focus on how people use objects or services and in defining how technology will merge with people's lives.

This thesis project tries to understand better the designer responsibility implied in this influence. This was done by looking at different points of view about the social role of the interactive designer, and by investigating the influence of design on people.

As an output from these explorations, two inter-related projects were done. First, a project called Bakedbits, which expresses the concept of "Appetite for Technology" by looking at the consumer's relation to electronic objects and at issues of waste, banalization and superficial seductive features. Second, the Mobile.Seed project, a communication of a future scenario where objects could motivate users to engage in an ecological ideology without need to renounce to the consumer's society acquired benefits. It is a redesign of the end-of-life of a mobile phone and an exploration on the possible changes in the relationship between the consumer and the device.

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1. Introduction

Consumption is one of life's great pleasures -- as even World Watch[1] afirms: "Buying things we crave, traveling to beautiful places, eating delectable food, owning every Stevie Wonder album: icing on the cake of life."

At the same time, consumption by the wealthy elite, and increasingly among the middle class, has gone beyond satisfying needs to become an end in its own right. Statistics demonstrate that increasing wealth and consumption don't help people have satisfying lives.[2]

We are witnessing the effects of an inconsequent consumption in our body, in our social lives and in the environment. The World Watch 2004 report says consumption is not in itself bad. But it says: "Higher levels of obesity and personal debt, chronic time shortages, and a degraded environment are all signs that excessive consumption is diminishing the quality of life for many people.

However, preoccupation with the consequences rather than the processes of consumption has led to a particularly restricted view of what is involved. If we want to find solutions, we must also consider the economical, political and social context that built this situation.[3] Differently from many solutions mainly based in the consequences of consumption, new design solutions should consider that people would not accept return in time and loose the acquired benefits, and also consider that is not effective to make people feel guilty or just provide information.

The understanding of the influence that design performs nowadays, and more specifically in this thesis, interaction design, makes of great relevance a reflection on the question:

What is the role of the interaction designer in our society? Assuming that design decisions have impact in people's behavior, what are the current ethical responsibilities of this profession?

The objects presented in this thesis are explorations about the social role of the interaction designer, a controversial and difficult theme. Some ideas investigate in an ironic way the influence of design on consumers. Other project explore a design possibility that try to equilibrate human quality of life and diversity, technological development, business profit, and the preservation of the environment.

1.1. Overview

This thesis paper is organized in 6 chapters, more Notes, Appendix and References.

Chapter 2, **Background**, is divided in three parts. The first one discusses general issues of design that motivated the questions and explorations of this thesis. The second part will introduce some information about consumption, environment, biopolymers and waste that are key references for the ideas proposed. Finally, the third part talks briefly about some designers or design movements which concepts aim to rethink or to question the way we design and use objects, which is the same aim of this thesis.

Chapter 3, **Conceptual Development**, gives an overview about the initial questions and the development and maturing of thinking through the process. The second part of this chapter presents user researches, results from a qualitative questionnaire and exhibition feedbacks.

Chapter 4, **Design and Implementation**, represents the main body of the thesis, divided in three stages. The first stage were the initial ideas, later abandoned but that helped in shaping the ideological positioning that followed all the process. The second stage is the Bakedbits, an investigation. They are objects that are expression of conceptual thoughts about the relationship between the consumer and electronic objects. The third stage is the Mobile.Seed project, a proposal. In this project, after the experience and insights with the Bakedbits, there was a need to try something beyond a investigation. It is a creation of a future scenario where the designer uses his influence in people's behaviors to stimulate consumers engage in a common wellbeing ideology.

Chapter 5, **Discussion and Analysis**, look at the thesis with a more clean eye, after one month of its conclusion, and describe what succeed, what didn't succeed and the key findings.

Chapter 6, **Conclusion**, is a more open talk, where some personal opinions are exposed and open more questions for further studies.

After Chapter 6 follows the **Notes**, where the comments and detailing of parts of the text can be found. Three appendices close this paper. One with an exercise of launching a product in the market, called **"A New Company"**, and another two with sketches and ideas not developed for the Bakedbits and for the Mobile.Seed.

1.2. Theoretical motivation

"There are few professions more harmful than industrial design, but only a very few... by creating whole new species of permanent garbage to clutter up the landscape, and by choosing materials and processes that pollute the air we breath, designers have become a dangerous breed... In this age of mass production when everything must be planned and designed, design has become the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself). This demands high social and moral responsibility from the designer." *Victor Papanek* [4]

The increasing number of parameters that contemporary designers need to coordinate and synchronize is reflected in a greater complexity in the design profession. It also implies in a greater responsibility in the decisions designers make.

Design decisions often specify how our culture is manifested in the material world. But this 'selection process', that takes place in the background influences culture. Products do influence and even shape people's behaviors. Products provide symbols of identity to their users and the people around them. They carry meaning and are constant reminders of who we are, where we are, our activities, our history and our future. [5]

In interaction design, this influence is even more apparent, due to its intrinsic focus on how people use objects or services and in defining how technology will merge with people's lives. The artifacts people interact with have enormous impact on how we think,[6] in the same way that the language vocabulary used to describe our experiences is a very powerful factor in shaping how we understand the world.[7]

Today, we live and breathe design. Few of the experiences we value at home, at leisure, in the city or the mall are free of its alchemical touch. We have absorbed design so deeply into ourselves that we no longer recognize the myriad ways in which it prompts, cajoles, disturbs, and excites us. (...) We imagine that we engage directly with the "content" of the magazine, the TV commercial, the pasta sauce, or perfume, but the content is always mediated by design and it's design that helps direct how we perceive it and how it makes us feel. *Rick Poynor* [8]

We could compare the designer's power and responsibility with the one that of a journalist. This power increases with the penetration of the design

company or the newspaper in society.

Design is always ideological in the same way that the news is a partial version of reality. This leads to another statement: there is no neutral design.

(...) design is always ideological. User-friendliness helps conceal this fact. The values and ideas about life embodied in designed objects are not natural, objective or fixed, but man-made, artificial and mutable. *Anthony Dunne* [9]

This statement is particularly important because it claims for an explicit positioning: being neutral is to neglect one's responsibility.

The ones that qualify their own design as ideological neutral do that or because they ignore the existing bonds between their creations and the cultural, historical, economical and social context or because, despite knowing these relations, try to negate it for diverse reasons, like economical, political, etc. In both cases, the personal responsibility, inherent in all creations, is implicitly denied. This thesis project tries to understand better what this responsibility would mean in practical terms. This was done by looking at different points of view about the social role of the interactive designer, and by investigating the influence of design in people's appetite for technology. As an output from these explorations, a conceptual proposal was done based in a personal positioning. This positioning is inserted in a broader ideology that aims to equilibrate human quality of life and diversity, technological development, business profit, and the preservation of the environment.

The proposal is not just the creation of another alternative product, but a possible new way to think about the consumer's relationship with products.

2. Background research

This chapter is divided in three parts. The first one discusses general issues of design that motivated the questions and explorations of this thesis. The second part will introduce some information about consumption, environment, biopolymers and waste that are key references for the ideas proposed. Finally, the third part talks briefly on some designers or design movements which concepts that aim to rethink or to question the way we design and use objects, which is the same aim of this thesis.

2.1. General issues of design

2.1.1. Modernism and Post-modernism

In order to understand the current role of the designer in society, it is essential to look at it through the development of modernism and post-modernism. In both theoretical areas we find a strong ideological positioning and a different use of the design as a media, even if sometimes not explicit. And as a consequence of that, the approach to consumption changes as well. This discussion is very complex and controversial, and here will be exposed briefly just to frame the project.

Modernism

Modernist designers believed that the aesthetic of a product should be derived from its structural integrity rather than applied decoration or references to the past. Instead of artifacts helping to differentiate between the taste and identity of individual consumers, they were seen as holding possibilities as a general, unifying presence.[10]

They had an ideological stand about how would be a better world and their design decisions were coherent with it. As Jackson[11] explains, "Modernist designers sought ideal forms for the products and architecture they created – forms that would have a universal appeal, and that would transcend individual differences in taste, regardless of the user's social position. In this way design was envisaged as a unifying force, helping to create a fairer, socially just world, and producing timeless objects unaffected by the vagaries of fashion."

They defined design as a process, with objective methods, that we still use today with few changes. And they used design as a media as well, with the physical object being a media for a function. A way to it reaches people: "The functionalist orientation of modernism, by definition reduced artifacts to their function. In this vision it is not the object that counts, but the function it fulfils. Of course it cannot do without matter for its embodiment, but this materiality in the end is of secondary importance. The physical characteristics of the product are only seen in the light of the product's function. Form follows function: matter is necessary but derivative. Indeed, Rietveld designed chairs as 'objects for sitting in' and Le Corbusier saw a house as 'a machine for living in'." [12]

For modernist designers, the meaning in the objects is confined to an expression of the zeitgeist. "Modernist design methods assumed that objects (...) could have a predetermined meaning that is

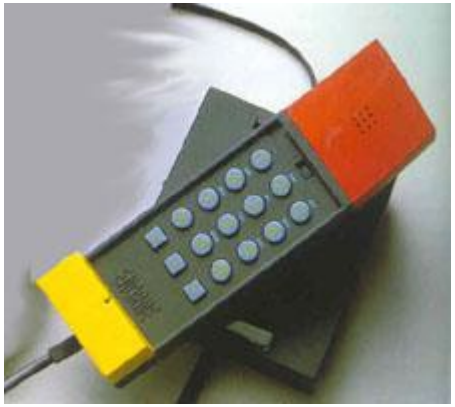


Fig. 2.1 Enorme Telephone
Ettore Sotsass Design, 1984

in existence prior to the user experiencing the object. This implies that the meaning of the object is constant, predetermined, and independent of its situation. This position allows for the possibility of an absolute and universal meaning to be attached to an artifact, with the act of consumption being a passive reception of given meaning."[13]

Post-modernism

After Second World War the context changed and the ideas of Modernism began to be questioned. Many lines of thought were derived from this questioning. Although they are varied and often contradictory, they have tended to be grouped under the title Postmodernism.

Here the role of the designer has altered. "The designers needed to infuse products with the aesthetic codes required to appeal to a particular section of the market. Most consumer products are now reliable enough, and cheap enough, to satisfy the requirements of even the most demanding user. Now, the challenge for the consumer is navigating the myriad of products available in order to find a purchase that is for 'them' – that fits their lifestyle and says the right things about them. The challenge for the designer is through the understanding and manipulation of aesthetic codes, to ensure that their client's products will appeal to a targeted section of the market. Consequently, designers are increasingly required to work with trend forecasters and brand development consultants who have an intimate understanding of what motivates consumption." [14]

This approach takes the object as a media for abstract ideas. As Verbeek and Kockelkoren explains in Eternally Yours [15]: "Products are not reduced to their function but to their meaning. Products become icons, symbols or signs. They do not even need to be durable anymore, as they did for modernists. This indicates, that to post-modernism matter is even less important. Objects are seen as embodiments of meaning, and it is from this perspective that they have to be designed. Post-modern designers are no primarily concerned with things, but with ideas."

The development of Postmodernism was part of a general shift in design away from a focus on problem solving and improvement, towards a wider engagement with the world of imagination, with ideas, humour and visual excitement. (...) Design is no longer seen just as a way to make objects function, but to encompass ideas, culture and social concerns. The inspiration of the designer and the idea of communication through

the object is becoming at times more important than the object itself. Quentin M. Roper [16]

For the thesis, beside providing a historical context for the current design ideologies, these two lines of thought are excellent examples that to have a clear and defined ideology is essential for change.

2.1.2. Aesthetics of the interaction and user-friendliness

Go straight to the point. Be efficient. Be faster. Increase the productivity. Do more with less. These are some of the 'lemmas' of our western lifestyle. Should they be applied to all situations? It sounds reasonable that not. But, focusing in interaction design, often they are extended to other realms of our life other than the economical activity. And it seems that we loose something in this process. The concern with the 'inefficient' activities.

People do not just pursue tasks and solve problems, they also explore, wonder, love, worship, and waste time. These activities, captured by the notion of 'Homo Ludens', or people defined as playful creatures, are meaningful and valuable, but difficult to handle from traditional perspectives on Human Computer Interaction. Thus we are developing design-driven techniques to explore people's lives, create evocative design proposals, and develop prototypes of new systems that focus on the emotional and sociocultural effects.[17]

The aesthetic of the interaction with objects is often relegated to a second level of importance due the predominance of functional 'user-friendly' designed products. When we establish the rules of user-friendliness in interaction design, and enact that this is the best way that people will get benefits from that technology, we quiet other versions of interaction that contains richness and values that does not match with its criteria.

"Without our senses, there is no beauty. Beauty has long been kept out of interaction design research. Most research has focused on usability, trying to give interaction research respectability through measurability. Beauty has been considered a subjective aspect restricted to product appearance, a kind of sauce that can be poured over a design once the real work concerning functionality and usability has been finished. This separation of beauty and interaction has led to a situation in which we have tempting looking products with which the interaction is at best efficient and mundane, but more typically ugly and frustrating. Designing

Fig. 2.2 Aesthetics of the interaction. Prototype of alarm clock. When sliders are slid from the starting situation towards the central display, the alarm time changes.

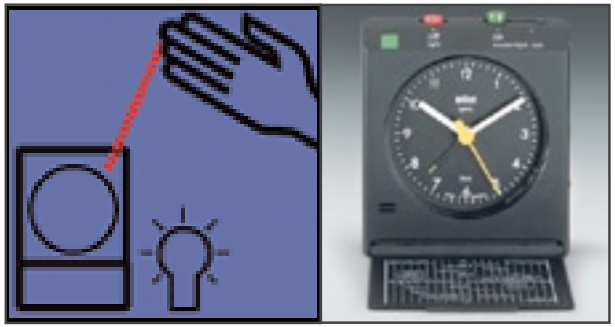


Fig. 2.3 Braun reflex alarm clock
Not so sensual appearance, but an example of aesthetic in the interaction. To snooze the alarm, you wave your arm/hand over the object, respecting in that way the lethargic state of the user.

Fig. 2.4 Donald Norman uses different teapots according to his mood.

products to fit man's perceptual-motor skills may not only be a means to improve the usability of IT-products but also a new way of approaching aesthetics. No longer do we see aesthetics as restricted to appearance, but instead we strive for objects that are beautiful in use: aesthetics of interaction becomes an incentive for use and thus aesthetics and usability become interwoven". [18]

In post-modern industrial design the values associated with the object are determined by the circumstance within which the object is consumed. A good illustration of the relative aesthetic value of objects and its relative usefulness is Donald Norman's description of his teapots (fig. 2.4):

(I use) three different teapots, one emphasizing usability (or to be more precise, its absence), one emphasizing aesthetics, and one practicality. But which one do I usually use? All of the above. I do drink tea every morning, but at that early hour, even though I am not willing to compromise on taste, efficiency comes first. So, upon awakening I plod into my kitchen, push the button on my Japanese hot pot (...). Fast, efficient, easy to clean.

But sometimes, when I have more leisure, or when with guests or family, I use one of the others. The Nanna teapot for its elegance, or the tilting pot for its practicality. Design matters, but which design is preferable depends upon the occasion, the context, and above all, upon my mood.

Why do I own several teapots? Because I like them. I proudly exhibit them on the ledge above the kitchen sink. In addition to their function for brewing tea, they are sculptural artwork, giving satisfaction in their appearance. I enjoy standing in front of the window, idly comparing the contrasting shapes, watching the play of light upon the varied surfaces. When I do make tea, I choose the pot that matches my mood, and when I do, the tea tastes superb. Donald Normal [19]

Aesthetics, wherever in the appearance or in the interaction, should not be considered a decorative resource added in at the end of the design process, sometimes just to mask problems. It must be part of the design aims and should be seen as part of the affordances[20] of the object/service, contributing to its usefulness.

I believe strongly in the potential of industrial design as applied art, or industrial art, to improve the quality of our relationship to the artificial environment, and in industrial designer's potential, at the heart of consumer culture, to be subverted for more socially beneficial ends. In order to achieve

this, research is needed into an expanded notion of design aesthetics that includes more poetic and metaphysical relationships with the artificial environment of technological artifacts. Anthony Dunne[21]
In this thesis, the aesthetic of interaction was the main theme of the first phase, looking at natural ritualistic actions as an interface for technology. The Candle Dimmer is an example, using a real candle as an interface for adjusts the light mood of the house. This subject was retaken in the third phase, with the Mobile.Seed project, that uses the beauty in the action of planting as the end of a relationship with an electronic object. In both cases the aesthetic experience is coherent with the use or the message intended.

2.1.3. Slow Technology

Slow technology can be technology where slowness of appearance and presence simply is inherent in the design for various reasons beyond pure aesthetics of functionality, design where time is a central and explicit notion. This is technology with focus on time presence. Slow Technology is a design agenda for technology aimed at reflection and moments of mental rest rather than efficiency in performance. It is an investigation of the expressiveness of computational technology as design material with focus on time as a central design variable. We aim to work with basic issues in interaction design where the focus is on expressions and aesthetics rather than pure functionality. [22]

Slow Technology proposes a 'temporal design' of objects-- design that gives time for reflection and mental rest. Hallnäs et al. define "presence" as the existence of things in our everyday life based on an act of acceptance.[23] Slow technology can also be technology where the aesthetics of functionality is in focus, rather than its final objectives.

It is design concerned with how we relate to the expression of technology itself as we use it to do certain things. Slowness then comes as a consequence of a techno-aesthetical design philosophy that focuses on reflective and conscious use of the technology as such.

A good example of this concept:

Imagine an electronic doorbell that plays short fragments of a very long melody each time we press the doorbell button. To fully grasp the doorbell through its behaviour, we have to stop and reflect for a moment each time it rings and only over time can we grasp the whole melody. It is technology that claims time. Is this "slow"

Fig. 2.5 Slow Technology. From left to right: WebAware, and two abstract clocks.

Fig. 2.6 The 'Compass Table' from the Placebo Project, by Anthony Dunne and Fiona Raby.

doorbell a better doorbell than the ordinary one playing the same two or three tones over and over again? The difference in aesthetics between the two doorbells is a difference in philosophy of design; the "slow" doorbell is not designed to be "just" an efficient signaling mechanism for nonreflective use, but rather an artifact that through its expression and slow appearance puts reflective "use" in focus. [24]

This thesis has many conceptual affinities with the slow technology philosophy, especially the last prototype, the Mobile.seed, a mobile phone that contains a seed that waits to be planted and need prolonged care to grow. As said before, planting can be seen as a ritualistic and aesthetic interaction, and introduces unpredictability into the interaction.

2.1.4. Critical Design

Objects that critically explore ideas about society and the practice of design have been usually related to art or architecture. Experimental design often explores these subjects, but usually unofficially and outside of the market. Critical design brings this approach, in a declared and open way, closer to the design practice itself. It calls for a development of a parallel design activity that questions and challenges the commercial agenda. Some people find this positioning controversial, but whether this is an accepted role in the design field or not is not the matter here. The point is that it exposed this discussion and became a reference in this moment that electronic technology development is demanding a redefinition of the design profession.

Anthony Dunne, in Hertzian Tales, tries to set the scene for relocating the electronic product beyond a culture of relentless innovation for its own sake, based simply on what is technologically possible and semiologically consumable, to a broader context of critical thinking about its aesthetic role in everyday life. He comments about the ideological nature of design as a view of industrial design serving the narrow commercial interests of industry as opposed to a more general social role for design: developing tools for living. This is a view that started to be questioned in post-modernism:

I don't design things in any style, even less so in any fashion style, I design things for life states. *Ettore Sottsass* [25]

Post-optimal objects are another important

concept that justifies why we can consider some of the critical design proposals as possible market products:

In a world where practicality and functionality can be taken for granted, the aesthetics of the post-optimal object could provide new experiences of everyday life, new poetic dimensions. *Anthony Dunne, Hertzian Tales, p. 29*

People do not always interact with objects just to achieve a goal. Maybe they hope for a surprise that never happens, something that breaks the predictable functionality and triggers a forgotten synapse in the right side of the brain. We may never find out if we, as designers, don't provide options for these people. And it is important to clarify that 'options' here does not mean creating a seemingly endless stream of 'alternatives', like variations on a theme. It rather means rethinking the paradigms and analyze the object as a medium.

Looking beyond the quality of our relationship with objects themselves to the aesthetic of the social, psychological and cultural experiences they mediate. *Anthony Dunne, Hertzian Tales*

The mobile.seed project is more than a fictional union of two apparently unrelated 'objects': it mediates an ideology. It is an idea in which the message is experienced in the everyday use of the object and which becomes concrete in the act of planting. In the Bakedbits objects, the medium characteristic is even more explicit, once some of the questions investigated are materialized in the body or shell made of a specific food. They also point a different perspective on interface design: your interface with electronic objects becomes food, by definition a very sensual experience.

2.1.5. Ambiguity in design

Ambiguity is a stimulus for diversity. Ambiguity comes from our interpretation of things, and not the things themselves. Different interpretations of the world and of its inter-relations, associated with creativity, helped to generate the diversity of solutions human problems.

As is put in the paper "Ambiguity as a Resource for Design" (Gaver, Beaver and Benford), ambiguity is seldom embraced within traditional Human Computer Interaction. If "usefulness and usability are the twin goals of HCI research and development, then ambiguity would seem their nemesis. It is difficult to see how an interface can be usable if the information it conveys is unclear, or useful if its very purpose is uncertain." [26]

In the continuation: “ambiguity can be frustrating, to be sure. But it can also be intriguing, mysterious, and delightful. By impelling people to interpret situations for themselves, it encourages them to start grappling conceptually with systems and their contexts, and thus to establish deeper and more personal relations with the meanings offered by those systems.”

Design can influence the ambiguity in the interpretation of an object: “Interfaces that are imprecise or contradictory are more likely to lead to multiple interpretations than ones that are clear and consistent”. This sounds obvious in a way, but the difference between an inconsistent design and an interesting ambiguous object is mainly that in the later case the imprecision and contradictions are in the design intensions, and not just an unpredicted result.

The project Bakedbits intentionally uses ambiguity in the context of use of the objects. Using food as the materialization of the electronic devices (body, shell, buttons), it intends to create a tension in our stereotyped assumptions of the properties of an electronic object (use of plastic, water resistant, toxic, very defined shape, throwaway), and in how food should be presented (hygienic, packaged, ephemeral validate, organic). The ambiguity stimulates thinking about these stereotypes, by means of skepticism or belief, without constraining it with a specific answer. At the same time, it makes more evident some aspects of the relationship between the user and the object that didn’t become contradictory despite the different context.

2.1.6. Object Hacking

Beta-testers have learnt how to derive enjoyment from electronic materiality, from rejecting the material realities on offer and constructing their own. They display a level of pleasure in customisation currently limited to home DIY and custom car hobbyists. Many specialist magazines and books are already available that show readers how to modify or tweak everyday electronic products. An ever-growing number of home improvement magazines and TV programmes thrive on the pleasure people get from modifying their environments themselves—of customising reality. Fiona Raby - Design Noir

Many objects allow hacking in some way or another. But I see objects that are intensionally hackable in their constitution as a good example of designs that enable alternative paths of use in

relation to its standard function. By interacting more elaborately with an object that has a determined function (hacking) you create an alternative path to achieve the function you really desired in the beginning (that was constrained in the original object), with your personal specifications and properties.

Hacking, not considering illegal aims, can point out desirable features and what people expect from a product. The hacking is also is a challenging interaction with the man trying to overcome the machine. It is a playful interaction.

The domestic objects of the game The Sims, from Electronic Arts, are a phenomenon in this sense. There are numerous pieces of software and tutorials to hack the game and its gadgets, and thousands of sites with customized and hacked (changing the behavior) objects available for download.

The game allows also a vairtual 'hacking' in our real social behavior, being a space where players can act accordingly to not acceptable social conducts or release constrained desires. This kind of freedom creates a stimulating environment for questioning some cultural assumptions.

Most players read the all-out endorsement of consumption in The Sims as irony – that ultimately, the game encourages players to question whether their characters would be happier with bigger, better items and houses. While goods and services are valued in gameplay, human interaction and compassion are also valued. The richer the characters become, the more they must work, and the less time they have -- thus, the more effective their items must be at delivering pleasure. *Mary Flanagan* [27]

Below and at the side of this page, some examples from Stone Age Sims:

Fig. 2.7 Meditation Tree
"For quiet, contemplative Sims, the meditation tree offers a way to build body points without the stress of exercise!" http://www.cheapfrills.org/

Fig. 2.8 These objects are made for vampire inhabitants. http://www.grimsims.com/

2.1.7. Digressive Design

- Hi. I am here at 23 de Maio,
how do I get to your home from here?
- It's quite simple. Take the Ayrton Senna tunnel, and you will come out at Juscelino. Head on straight till the second traffic light, then turn right from there. You will come onto the street Joao Cachoeira. Head on to number 120, apartment 51. And you are there.
It should take you ten minutes.
- Ok!
- Ah! But if you want, I think it will really be worth your while if you take the way through the park Ibirapuera, by the Republica do Libano. They have setup some huge statues of Orixas[28] *floating in the lake, which are illuminated at night. It is really worth a see. I am in no hurry, so it is no problem if you get here a little later. So from Republica do Libano street you take Juscelino, turning right from the signal there.*
- Cool! I will get by there. See ya!

In common interaction design practice there is a very limited diversity in the possible ways we could interact with objects or services, especially in the domestic environment. The current vocabulary of possible interactions available comes mainly from the workplace, where evaluation criteria are based on efficiency, productivity, clarity and problem solving. When we apply the same criteria to the home environment, it leaves no room for ambiguity, imprecision, flexibility, unpredictability, beauty and emotional attachment that are native to our houses.

The state of technology has made it feasible to include of computer technology into the domestic environment. In this new paradigm, the interaction designer should seek to introduce meaningful and enriching benefits for this introduction. Technology must not constrain men expression. I believe it is a role of the designer to preserve the diversity.

Designing objects to better respect and stimulate these human characteristics is being explored in the movements I've mentioned elsewhere in this chapter. Here, I humbly propose another approach that intersects with concepts like slow technology and critical design without negating the functional path. It focuses mainly on the meaning of the actions during the interaction.

I am calling this approach "digressive design". The term is borrowed from literature, where it means the use of material seemingly unrelated to the subject of a work, but later linked to the plot or theme 29. Digression also makes the reader aware of the

structure of the text. For the purpose of interaction design, its goal is to make people realize that the functional use of a product is just one possible approach, but not the only one.

(Digression frustrates) the reader's expectations regarding the story (since that story flow is constantly interrupted) and thus proving that the story is controlled, that it does not happen of itself and secondly, by its inherent non-linearity (since digression prevents the narrative from making a simple A to B progression), the digressive device mirrors the non-linearity of communication between interlocutors.

F. Miyamasu [30]

It is important to make clear that this parallel between digression in literature and digression in the interaction with objects, as defined here, just applies when we consider dissertative texts as referential. A dissertative text, by its argumentative flow and concise structure relates to a functional choice in the interaction. And usually it states in the first paragraph the intention of the text, so we know since the beginning where the text is leading us. The narrative text, in general, seldom has a 'known ending' since the beginning of the story. The 'known ending' is the equivalent to the initial desired goal in the interaction. Curiously, digression in a dissertation can be used as way to make it closer to a narrative story.

The alternative path itself must bring a benefit to the user. Benefit means beauty, reflection, surprise, socialization and/or entertainment. The digression is also a way to stimulate the wandering of thought, as well as imagination and creativity.

The digressions themselves have to be interesting, in order to justify being there. So hopefully the very reason you're digressing is because you are creating anecdotal dimensions that the story wouldn't have if you did not. But there are a lot of other aspects. I think anytime you depart from a narrative line you're taking a risk, but you're also opening up the possibility of point/ counterpoint, different kinds of pacing. *F. Miyamasu*

The digression is misused if it is just a drift in the text (which is outside focus of this concept). To avoid this misuse, I set some rules that will constrain digressive design.

2.1.7.1. Rules for Digressive Design

Digression is just a digression if there is a linear path as reference. It shares the starting point, the intention, and arrives in a common point with the referential linear path.

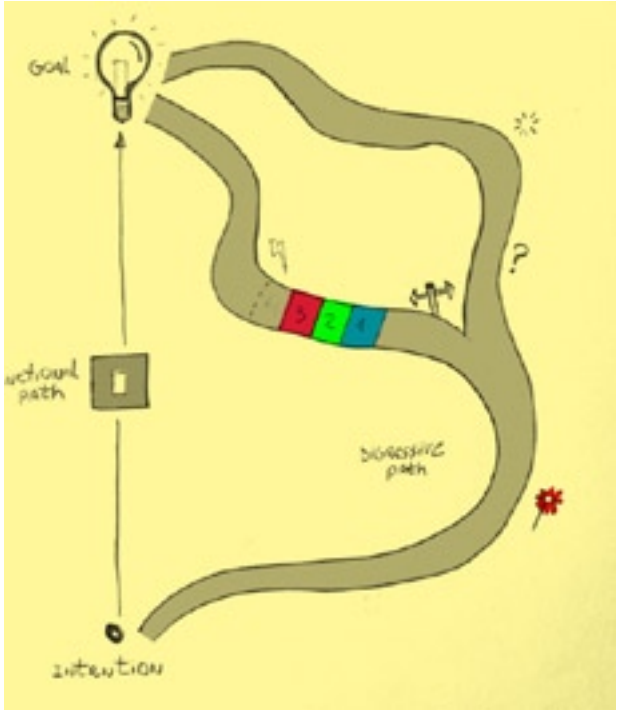


Fig. 2.9 In the alternative path you can get beauty, surprise, socialization, reflection, and/or entertainment as benefits.

Digression in the novel Snow Crash is not meandering, or meaningless. (...) It is not always a priority when reading literature like Snow Crash to understand and absorb the plot, because this novel is not about a compelling plot. In fact, prioritize plot/narrative, and you miss so much of what makes any reading entertaining and important. What is that? Literature can be a platform, a launch pad toward subversive and radical reading practices. John Crews [31]

Below are some rules that keep the richness and strength of this approach holding it faithful to the analogy with its use in literature.

. Does not replace the linear, functional way.
The functional approach is the linear path that is used as reference. If we lose the reference, usually we get lost or drift without aim. It can juxtapose, accumulate or harmonize. Accepting the functional approach respects its positive characteristics.

. The alternative path must require or stimulate an active action from the user.
People might like to just contemplate the object or see it working alone, but this does not suit the digressive design approach. It is not enough to be a reactive object. If digressive design wants to question the functional way for its simplistic relation with men, using automation and alienating solutions makes no sense. The use of digression intends to stimulate a more engaged interaction with objects, in a physical or emotional way.

. The alternative path by itself must bring benefit for the user.
Digression does not interrupt the story and introduce something else in a pointless way. It can be subtle, ironic or naive, but must have a proposal, the intention of aggregate something valuable for the user. The benefit should be understood as a designed affordance, which may or may not be perceived according to the user's own frame of reference and culture.

It is well documented that other cultures have different conventions that value digressiveness (e.g. Clyne & Kreutz, 1987; Golebiowski, 1998; Hinds, 1990), and that readers in those cultures expect to be led on a journey whose line and purpose is not always predictable. Digressions may serve the purpose to display knowledge, present something interesting, but of marginal 'relevance', or display elegance or mastery of genre.[32]

. It is highly desired that the alternative path admit user decisions among the different options available, the possibility of alternative

uses or even the object hacking.

The alternative path can be just another linear path with different properties, but it can become more interesting for long-term use if some unpredictability is designed in the way the interactions proceed. Offering 'bifurcations' and crossroads multiply the possible paths in the digression to achieve the same goal. Object hacking is also an instance of digressive design.

. The interaction must not repeat or be redundant with the interaction of the main functional path.

It is of no help to be another button... The digressive path can be understood as redundant if you look just at the achievement of the final goal, but the focus here is in elaborate interesting interactive alternative paths to achieve the goal. But many people confuse an alternative option with just doing cosmetic changes, not really rethinking the existing paradigm.

An example of this 'method' applied in an object is the Candle Dimmer project[33], which is a proposal for a domestic product that controls the brightness of domestic lamps in harmony with the states of a candle. Instead of the user adjusting the lamps individually, he 'expresses' his mood using a real candle (the interface), and the goal is achieved in an indirect and subtle way.

In a certain way, this approach to achieve a goal using an indirect but often more interesting path, and at the same time not eliminating the functional one, is present in the mobile.seed project. The goal there is to stimulate a behavior or just a concern on people. Instead of provide a direct and strong message about e-waste problem and consumption side implications, that proved to not really motivate people, it tries to communicate the message in a more poetic, indirect and subtle way.

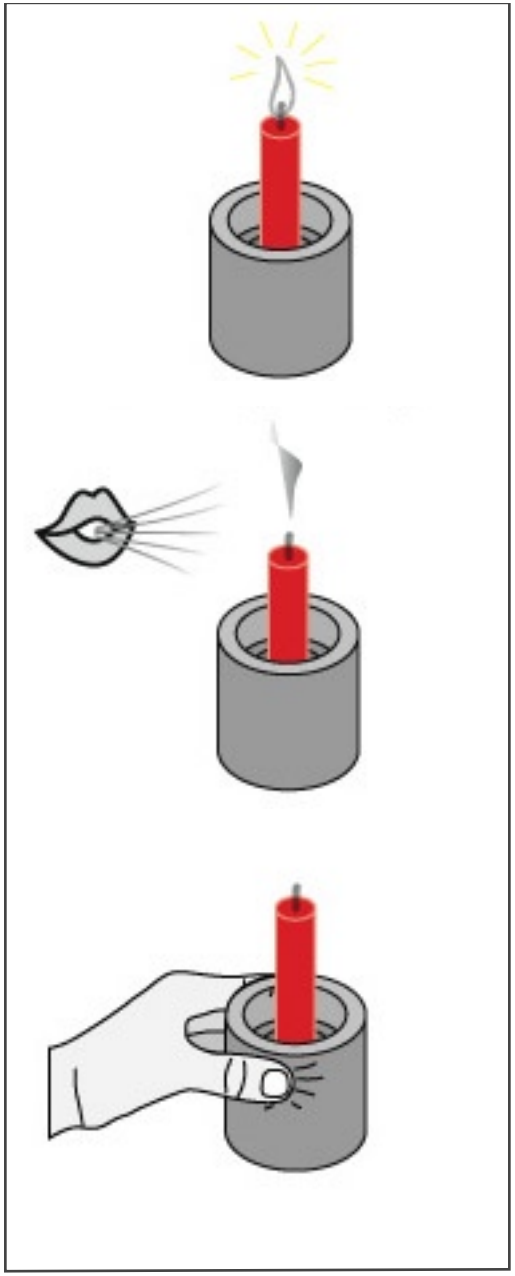


Fig. 2.10 Candle Dimmer interactions

2.2. Environmentalism, Consumers and Sustainable Development

2.2.1. Environmentalism, Consumers and Sustainable Development

The economies of mass consumption that produced a world of abundance for many in the twentieth century face a different challenge in the twenty-first: to focus not on the indefinite accumulation of goods but instead on a better quality of life for all, with minimal environmental harm.[34] *World Watch*

Some of the questions explored in this thesis refer to subjects long discussed by environmentalists, and NGOs, with designers and research institutes arriving in the table later. The ideal of a balance among industry profit, society welfare and environment preservation is one of these.

As McDonough and Braungart state in Cradle to Cradle[35], "We are accustomed to thinking of industry and the environment as being at odds with each other, because conventional methods of extraction, manufacture, and disposal are destructive to the natural world. Environmentalists often characterize business as bad and industry itself (and the growth it demands) as inevitably destructive. On the other hand, industrialists often view environmentalists as an obstacle to production and growth. For the environment to be healthy, the conventional attitude goes, industries must be regulated and restrained. For industries to fatten, nature cannot take precedence. It appears that these two systems cannot thrive in the same world."

Usually the relationship between these apparently antagonistic ideologies is mediated by governmental laws[36], and by consumer buying decisions, the focus here.

But how to motivate consumer's commitment if, as McDonough explains[37], the environmental message that "consumers" take from all this can be strident and depressing: "Stop being so bad, so materialistic, so greedy. Do whatever you can, no matter how inconvenient, to limit your "consumption". Buy less, spend less, drive less, have fewer children – or none. Aren't the major environmental problems today – global warming, deforestation, pollution, waste – products of our decadent Western way of life? If we are going to save the planet, you will have to make some sacrifices, share some resources, perhaps even go without. And fairly soon you must face a world of limits. There is only

so much the Earth can take."

Before questioning the role of the designer in this motivational issue, it is important to understand better what are the factors involved in the consumer's decisions. The governmental research Why Consumers Buy Green; Why They Don't[38] reports the factors that are seen to contribute to consumers' willingness to buy green. These include perceived consumer effectiveness and knowledge, as well as concern for the environment.

Another point is the emergence of Sustainable Development (SD) as a development paradigm, which shifted the terms of the debate away from environmental protection to a more explicit process of trade-offs between social, economic and environmental priorities.[39]

"Despite its surface simplicity and appeal, SD is a complex and contested concept. The most widely used definition is one articulated in the Brundtland Report: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED; 1987, p. 43). This definition highlights fundamental principles of intra-generation and inter-generational equity and includes the key concepts of needs and limits. The concept of needs prioritizes the basic needs of the world's poor, while the concept of limits acknowledges that levels of technology and social organization place limits on the ability of the environment to meet present and future needs."[40]

Designers have an important role in the achievement or not of this paradigm. We have the potential to determine what goods people consume and how. Designers have some control over consumers and have direct control over how products are manufactured, assembled, distributed, used and disposed of. It is the responsibility of the designer to specify the product's characteristics, and the time has come to start specifying sustainable qualities as central aspects of successful design.[41]

Which would be these sustainable qualities that Abbot mentioned above?

In Cradle to Cradle, McDonough and Braungart suggest taking nature itself as our model. "A tree produces thousands of blossoms in order to create another tree, yet we do not consider its abundance wasteful but safe, beautiful, and highly effective; hence, "waste equals food" is the first principle the book sets forth. Products might be designed so that, after their useful life, they provide nourishment for

Fig. 2.11 Capri Battery by Joseph Beuys, 1985. The lemon is the energy source for the attached yellow light bulb. The instructions with Capri Battery read "Change battery every thousand hours". The energizing and degeneration of the artwork reflect the natural cycle of life. Image from Harward University Art Museum Exhibition.

Fig. 2.12 Nothing™ anti-advertising campaign in New Zealand[43]

something new-either as "biological nutrients" that safely re-enter the environment or as "technical nutrients" that circulate within closed-loop industrial cycles, without being "downcycled" into low-grade uses (as most "recyclables" now are)."

In the other side, in an article in the Capitalism Magazine, Glenn Woiceshyn reinforces the point of view that it is the right and duty of human beings to shape nature to better ends:

Ironically, it was the Industrial Revolution that gave us the luxury of enjoying nature. We are no longer at its mercy, no longer living a life that is, in the words of Thomas Hobbes, "solitary, nasty, brutish and short." We can now safely enjoy nature with our wealth and hi-tech equipment.

"Environmentalism and Eco-Terrorism" by Glenn Woiceshyn (September 30, 1998) - Capitalism Magazine.

This ideology influences our current design choices and our relation to the world. It is well put by Stuart Walker in Eternally Yours: "Our material culture is an accurate reflection of how far we have wandered from ways of living where nature and perennial human values are inculcated in our understandings and embodied in our actions and our interventions. Environmental degradation and the widening gap between rich and poor are, perhaps, evidence that ethical understandings have not been given sufficient priority in developing our current practices."[42]

It introduces well an open question from Niels Peter Flint: "Design makes intention visible. We must continually ask ourselves: What are our intentions for our lives (as well as for our planet's life), as technology gives us ever-increasing power to decide - in fact, to design - the future?" [44]

It is difficult to talk about sustainability and the responsibility of the profession without refers to the thoughts of Ezio Manzini.

What is, in more general terms, the designer's responsibility once the demiurgic[45] myth has been played out and the complexity of the world with its subjective choices has been discovered?

Ezio Manzini [46]

Manzini's works are based on strategic design and design for sustainability, with a focus on scenario building and solution development. He acknowledges the influential role design can play in changing our ways of thinking and living.

Design, according to Manzini, cannot change the world, but is capable of giving form to a sustainable society. By give form he means to visibly amplify new types of demand and behaviour, together with proposing sustainable criteria for quality.

Scenarios, and specifically, Design-Orienting

Scenarios (DOS), could play an important role in sharing these ideas in society, thus enabling more favorable conditions for long-term sustainable solutions.

The suggestion for new environmental scenarios corresponding to new lifestyles requires the highest level of social acceptance. Moreover it can only emerge from complex socio-cultural innovation dynamics within which designers may play an outstanding but limited role (collection, interpretation, reformulation and stimulation of socially produced ideas).

In this case it is not so much a question of putting new specific technological or production possibilities into practice, but the production of new principles of quality that the environment may sustain, whilst being socially acceptable and culturally attractive at the same time.[47]

The mobile.seed project is a communication of a simple scenario that the gadget is designed to return to nature in curious ways by the hand of the consumer. One of the aims of this project is to steer current decision makers toward the concept of personal recycling where people themselves perform the act of recycling in his home, making an otherwise hidden process delightful and present and perhaps a valued cultural and social phenomena.

The mobile.seed is not the design of another mobile phone, but a critique on the current relationship that we have with objects that are part, as Manzini stress in "The Garden of Objects"[48], in a world of objects of rapid consumption. Objects which perform their service requiring minimum effort and minimum attention, but also objects which pass us by without leaving any lasting impression in our memory. He does an interesting comparison between this context and the relationship that one has with a garden:

Imagine a garden with some flowers and some fruit trees. Think of the attention, time and energy that are required and think of its products. Those flowers and those fruits, and the person who made them grow, do not have a measurable value in banally economic terms. Certainly the garden must produce flowers and fruits, but the person dedicated to this, does it for a more general reason: he/she does it because he/she loves plants. Try now to imagine an analogous relationship with objects. Think of some objects that are as beautiful and useful as a tree in a garden: objects that would last and would have a life of their own. Objects that, as a tree, would be loved for how they are and what they do. Objects

Fig. 2.13 Bottle made of corn.

Fig. 2.14 Flatware made of starch.

that would render a service and would require tending. Ezio Manzini

2.2.2. Biopolymers

Polymers are a type of molecule that takes the form of a long chain. They are the base for any plastic. Some polymers are synthetically produced, such as nylon and polyester, while others can be found in nature like silk, hair, natural rubber and starch. Some of these natural polymers are the main ingredients for biopolymers, plastics that are biodegradable.

A list of the most commonly used biopolymers[49]:

- cellulose is the most plentiful carbohydrate in the world; 40 percent of all organic matter is cellulose!
- starch is found in corn (maize), potatoes, wheat, tapioca (cassava), and some other plants (fig. 2.12). Annual world production of starch is well over 70 billion pounds, with much of it being used for non-food purposes, like making paper, cardboard, textile sizing, and adhesives.
- collagen is the most abundant protein found in mammals. Gelatin is denatured collagen, and is used in sausage casings, capsules for drugs and vitamin preparations, and other miscellaneous industrial applications including photography.
- casein, commercially produced mainly from cow's skimmed milk, is used in adhesives, binders, protective coatings, and other products.
- soy protein and zein (from corn) are abundant plant proteins. They are used for making adhesives and coatings for paper and cardboard.
- polyesters are produced by bacteria, and can be made commercially on large scales through fermentation processes. They are now being used in biomedical applications.

There are at least three factors[50] that affect how environment-friendly a material is:

- **renewability:** how quickly are the ingredients that go into making the plastic created in the environment? (A material that is made from soybeans, for example, is more environmentally friendly than one made from wood, because nature can produce soybeans faster than it can produce trees.
- **degradability:** how quickly can the plastic be re-integrated into the environment after it is no longer being used?
- **production:** how much pollution or waste is created during the process of actually making the plastic?

"For bioplastics to become practical, they must

have properties that allow them to compete with the current plastics on the market: bioplastics must be able to be strong, resiliant, flexible, elastic, and above all, durable. However, it is exactly this durability that now has people increasingly worried. Now that we wrap our sandwiches in bags that will still be around when the sandwich, and even the person who ate it, are long gone, many people are wondering: have we gone too far?" *E.S. Stevens - Green Plastics*

For the prototypes of the mobile.seed and Cd-lini were used biopolymers Mater-bi™ from the Italian company Novamont[52], from Novara. Special thanks to the New Business Development Engineer Roberto Marangon, that provided many information about the process of producing the plastics, made from corn starch, and some samples of different materials feasible to be used in a domestic oven.

2.2.3. Obsolescence and e-waste

Most of the projects of this thesis relate, in an indirect or direct way, with the problem of objects that become obsolete and then are discarded. For better understand the proposals some information is provided here.

First, an overview on why people loose interest in objects. The different reasons for a product reaching its end-of-life are[53]:

a. Technical obsolescence - the product itself is worn out and no longer function properly

b. Economic obsolescence -new products in the market are more economic in terms of cost, they have a lower cost of ownership.

c. Feature obsolescence - new products have come onto the market that offer more or better features

d. Ecological obsolescence - new products have less harmful impact on the environment

e. Aesthetic obsolescence - new products in the market have a nicer look or more fashionable design from the point of view of the consumer

f. Psychological obsolescence - a new product has greater emotional value or the present product has a negative emotional value.

Second, an overview on e-waste, that is how is called customer electronic equipment that are no longer wanted. These include electronic appliances such as televisions, washing machines, radios, computers, cellular phones, and refrigerators, among many others. Advances in technology, decreasing product prices, and product designs that discourage upgrading and repair has increased

Fig. 2.15 Sanyo Corn CD[51]

Fig.2.16 Waste Statistics in the DataTown[56]

the demand for new products and the disposal of old ones.

The main concerns when electronic wastes are worn-out and discarded are the hazardous materials that they contain- CFC's (chlorofluorocarbons), PCB's (polychlorinated biphenyls), lead, mercury, hexavalent chromium in circuit boards, plastics, brominated flame retardant and the volume or space in landfill that they will occupy.[54]

Numerous government and commercial agencies are engaging in efforts to reduce electronic and electrical waste, and improve its recovery and recycling. In Europe, these include the Waste Electrical and Electronic Equipment (WEEE) directive and the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment (ROHS).

The Bakedbits project investigates, with a touch of humor, our appetite in the acquiring of an electronic product and at the same time stimulate thinking about their throwaway property.

Think about it: You may be referred to as a consumer, but there is very little that you actually consume – some food, some liquids. Everything else is designed for you to throw away when you are finished with it. But where is "away"? Of course, "away" does not really exist. "Away" has gone away.[55]

In the Mobile.seed project, the focus is on the mobile phone e-waste. For that purpose, here is a collection of statistics:

- Mobile phones are typically used for only 18 months before being replaced, and by 2005 about 130 million of these devices, weighing approximately 65,000 tons, will be discarded annually in the US, according to the environmental research organization Inform.[57]

- According to Accenture's recent study only 10% of used mobile phones are returned for recycling in Europe. Still more than half (65%) of them are kept at home in drawers, and 18% of them are given to someone else for their use.

- A UK company which accepts discarded telephones for reprocessing estimates that more than 80 percent of the phones they receive are in perfect working order.

- Most of these phones will be stored away in closets and drawers, creating a stockpile of

about 500 million used phones weighing over 250,000 tons – material that will enter the waste stream at a later date.[58]

- Approximately 77% of the UK population has at least one mobile phone. There are an estimated 45 million mobile phones in circulation at present in the country, with an estimated 15 million mobile phones replaced every year.[59]

- 15 million phones equates to some 1500 metric tonnes of potential landfill, which is the equivalent to burying a World War 2 Naval Destroyer or 6 Mir Space stations.[60]

- Within 3 years, enough phones will have been discarded in the UK to cover the length of the Great Wall of China from one end to the other. Within 6 years there will be enough surplus phones to lie end-to-end to cover the 13,871 kilometers from London to Darwin in Australia.[61]

- While containers are usually made from a single type and color of plastic, making them relatively easy to sort out, a consumer toy like a cellular phone may many small parts consisting of over a dozen different types and colors of plastics. As the value of the material is low, recycling plastics is unprofitable.

- According to one recent report, 50 to 80 percent of the electronic waste collected for recycling in the US is exported to Asia, where investigators at some disposal and recycling facilities found unrestricted dumping and workers exposed to high levels of toxic chemicals.[62]

Fig. 2.17 Pile of trash made of mobile phones.

Fig. 2.18 Lamp 'do scratch', by Martí Guixé.

Fig. 2.19 Bench 's(h)it on it', by Richard Hutten.

2.3. Design that rethink how design influence people

A respectable number of young designers, architects and artists are distancing themselves from simply creating beautiful forms and objects. They take their inspiration from what is meaningless, anonymous, everyday, neutral. (...) They copy and quote. They capture quality in the inferior. They leave room for decay, for improvising, for chance, for the familiar, the archetypical. Products are allowed to wear out and fade away. Renny Ramakers [63]

In this third section will be listed briefly some of the design references of this thesis. Some are works that look at the design as an author, a choreographer of an open experience, other are proposals that stimulate reflection on how the message in the objects influence our behaviors.

The lamp 'do scratch', by Martí Guixé (fig. 2.17), from the Droog project called 'do create'. It only shines when one scratches its surface. "Whoever buy a 'do create' product has to set to work, has to spend time on it. These days products sell at a furious pace and we consumers are encouraged to keep buying new ones. We no longer follow processes. Our patience does not extent to 'slow' and 'difficult'. Things must be easy and complete, to be taken in a glance. They are ditched so quickly that there is no time to establish a bound with them"[64]

The bench 's(h)it on it', by Richard Hutten[65] (fig. 2.18). This bench, together with the bench 'the cross' was made for the Salone di Mobile 1994 to comment on the political situation in that country. This is a literal, although ironic, example of the object as an expression of an ideology.

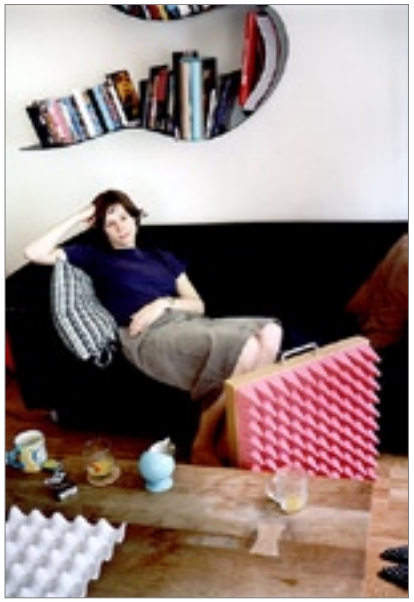


Fig. 2.20 'Electro-draught Excluder' by Dunne and Raby.

The 'Compass Table' and the 'Electro-draught Excluder' (fig. 2.19), from the Placebo Project, by Anthony Dunne and Fiona Raby. "Although we cannot change reality, we can change people's perception of it. Like a medical placebo, the objects

in this project do not actually remove or counteract the cause for concern, but they can provide psychological comfort."[66]

Fig. 2.21 HiBYE pills by Martí Guixé, 2001.

HiBYE pills by Martí Guixé (fig. 2.20). Pills for the hectic work environment. "The effect of the HiBye pills is largely determined by their design. 'Concentration is Everywhere', for example, is an inedible, hard, irregularly shaped pill that needs to be rolled in the mouth the way one chews a pencil or a pen.[67]

The Australian engineer and designer Natalie Jeremijenko reclaims technology from the abstract realm of cyberspace and applies it to the messy real world. In the project called 'Atree', she created a tree that grows on your computer desktop (fig. 2.21). "Unlike other popularized forms of a-life (self replicating growth algorithms) the rate of growth is controlled by realtime CO2 meter, which converts a screen saver into a political engagement with the effects and actuality of global warming."[68]

Fig. 2.22 'Atree', by Natalie Jeremijenko.

This virtual representation was connected with another project, 'OneTrees' (fig. 2.22), in which one thousand cloned trees were planted in public spaces in San Francisco. Her intention was provide the opportunity to see the similarities and differences between the clones after some time. These projects are part of an initiative called 'Eco Informatics', where she states: "while Ecodesign is often systematically accepted by contemporary product designers entered product design but focuses on manufacturing and performance issues. Few projects and product design has looked at changing feedback systems, such that the consumer and end user is getting real time informa-

Fig. 2.23 'OneTrees', by Natalie Jeremijenko.

Fig. 2.24 Plantarium™, by Globus.

Fig. 2.25 'Bolle box' by Andreas Möller, 1994.

tion on the consequences of their own choices".[69]

The Plantarium™, by Globus (fig. 2.23). "A media for seeds". A gift that contains a seed that grows inside of a bottle. Together with other products of the same company, like Biosphere, they bring a sense of the fragility and subtle equilibrium that we find in nature ecosystems.

The 'Bolle box' by Andreas Möller (fig. 2.24). A cubic box made of smelly dry manure that is a flower bulb packaging that can be planted together and nourish the flower. Despite that his initial intention was not to do a realistic solution for the manure surplus, it was interpreted as so by many people and stimulated thinking about the regular packaging used.

Fig. 2.26 Teletangram, by Nicole van Nes, 1996.

Teletangram, a modular telecommunication device, by Nicole van Nes, 1996 (fig. 2.25). It is an example of how product design can influence the product lifetime. The modular structure of the product enables repairability and upgradability through easy replacement and addition of modules. The part that looses interest is replaced, and one doesn't need to discard it as a whole.

Fig. 2.27 'Terra!' arm chair, by Nucleo.

'Terra!' arm chair, by Nucleo[70] (fig. 2.26). "Objects arrive in the homes as alien spaceships, in which we do not know anything of, and what we are able to learn about them is what they want us to learn. (...) Which is the best way to learn about an object, to feel it? Surely to construct it. There is no greater form of intimacy for an object than to be created."

Like the 'do create' objects, 'Terra!' is not a finished product. They provide the cardboard frame and the seeds, and the dirt can be found everywhere.

The Oranienbaum candy, by Martí Guixé (fig. 2.27). "One eats the candy, plants the seed and puts the stick next to it as a warning that in 20 years' time it will have grown into a tree."[71]

Fig. 2.28 Oranienbaum candy, by Martí Guixé, 1999.

3. Concept development

This thesis should not be seen just by its outputs, but also by the process that generated its learnings. The development path passes through misconceptions, wrong approaches and mistakes, but also through findings, structured thinking, prototyping practice, reevaluation of beliefs and questioning about given truths.

3.1. Motivation

"Is it at all possible to design for a different morality than the ruling one in order to change behaviour? Even more pressing is the question who decides what kind of behaviour a certain product should enforce. It would take hours and hours of discussions just to determine responsibilities." *Ed Van Hinte* [72]

The interest in exploring the role of the designer in stimulating people behaviors, a broad and in some extent dangerous theme, came mainly from a personal perception that something was missing to myself really feel as a designer. It was missing some kind of ideological positioning, which would guide my design decisions, based on a belief of being following a bigger aim. The common practice in the design process of looking at very specific and narrow problems was not providing to myself this kind of stimulus. I am not saying that I am against this method, but that I understand that is very important to have a clear and broad view of the picture before diving in the detail.

Another issue was my attraction for the naïve and poetic approach. In a very personal level, after working for 5 years in very aggressive, cynical and competitive advertising agencies, I felt a need for authenticity. I chose the innocence existing in the simple metaphors, using food and seeds, or in simple actions, like eating and planting, as a possible way. Bringing the qualities of innocence and fragility to our relation to technology was an inspiring challenge. I was aware how this could be misunderstood, with people possibly associating the innocence in the choices with an innocent designer, but at the same time keeping the conviction was a kind of test for my beliefs.

3.2. Overview

If thinking individuals have a responsibility to withstand the proliferating technologies of persuasion, then the designer, as a skilled professional manipulator of those technologies, carries a double responsibility. *Rick Poynor* [73]

Fig. 3.1 The artist Joanneke Meester has used a flap of her own skin to make a replica pistol, 2004.

When I decided to explore the theme of this thesis, it was clear that it would be difficult, controversial, and that I would not arrive in any simple and unique answer. And it was also clear that it was the subject that I would like to understand better, despite the risks. I was interested in using my practical skills to comment, criticize and suggest new possibilities in this theoretical ground.

But the things were not that clear since the beginning of the process. I started with a more mild approach, looking at the ritual as interface and at the aesthetic of interaction. At this stage, technology possibilities were the main source for the creation of ideas. Nothing wrong with that, despite that some of the ideas seemed contrived and that one of the most important characteristics of the ritual, the intrinsic meaning of the actions, was lost by arbitrary connections with an electronic equivalent.

A parallel project marked the breakthrough in this process. It is called PoliticoMobil, and was developed at the workshop Applied Dreams at IDII, called "Community Cars Dreams - New interactions in the context of mobility." [74], in collaboration with Fiat Auto Advanced Design. I worked with Karmen Franinovic, with coordination of Simona Maschi, Dave Slocombe and Laura Polazzi, all from IDII, and Noam Toran, from RCA. In this project we transformed a "community car" into a theatre to explore political systems of power. Through the development of PoliticoMobil became clearer that design is always ideological, and that looking at technology as a system, more than just at the specific solutions, brings a complete different (and complementary) understanding of the consequences of design on people.

At this stage, most of the current ideas of the thesis became meaningless to me. I felt that I was just helping to push technological solutions into people lives without adding anything meaningful. Even if my intentions at that moment were to add value for diversity and meaning in the interactions with technology, the view of the broader picture made me aware that I was just feeding the status quo with this kind of process.

My background in marketing and advertising reinforced this perception of maintenance of the status quo. If advertising is blamed for adding meaning to things that are meaningless, we should blame also design for creating this word of meaningless alternates.

"Droog does not believe that design means the whittling down of the 'solution' or object so that

Fig. 3.2 No Shop - the shop that promises everything but sells nothing. The No Shop , an installation by designers Thomas/Matthews in collaboration with Friends of the Earth's Art and Nature Programme and the RCA.

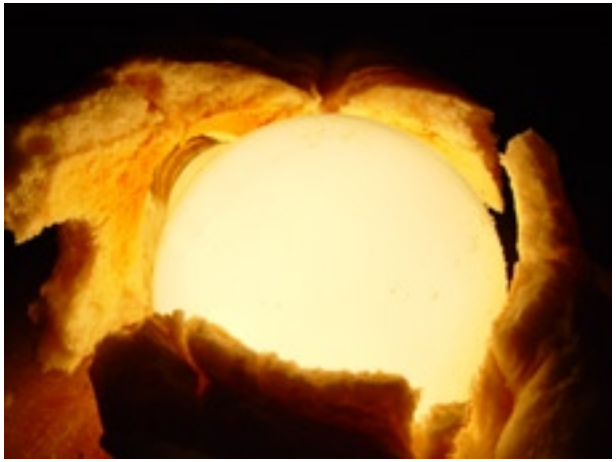


Fig. 3.3 One of the first Paneluce prototypes.

it is the most minimal response to the 'problem'. (...) After the product is made, after all, it has to be sold and consumed. This is done by reducing the object, image or space (again) to the most minimal state, but in this case that is, as it is popular to say, a 'meme': a catchphrase, image or icon that is so inescapable and seductive that it embeds itself into an operating system, whether human or not, and becomes an inalienable part of that host. This is the way in which all productions and systems of production present themselves in our Western culture. Branding is god, or perhaps the other way around." Aaron Betsky [75]

The first reaction to this was mainly emotional. And it was expressed with the creation of the Paneluce. It was characterized by mixed feelings, trying to keep the background research about aesthetic of interaction, ritual as interface and digressive design, but also adding an acid play between our metabolism in consuming food and our patterns in consuming and owning electronic goods. It was an expression of a speculative reflection about our appetite in consuming, despite the awareness of the strong and structural differences between the two processes of consumption of food and electronic goods. I was very interested in the possible analogies that could emerge.

After doing some prototypes and testing with people, the output was clear: what I was intending to express was not clear in the object. Every person had a different reaction, most positive, but for different reasons. At the same time I realized that I was trying to create something that, if effective, would make people feel guilty or ruled. And that would be a very naïve and superficial approach to the problem.

After a deeper post-reflection about the Paneluce, two more ideas were created to express the conceptual thoughts, the Dolceradio and the CD-lini, generating the project Bakedbits. At this time, I decided to let the interpretation more open, and focus on the investigation of the design influence on our interest in consume.

The emotional reaction settled down and the outcomes form the Bakedbits stimulated the creation of a proposal, trying to think how designers could use their influence on our appetite for technology to stimulate behaviors in a 'positive' way. "Positive" here means a strategy that would motivate users by desirable stimulus, not by constrains or punishments. "Positive" here also means an envision of a future where the current problems related to the consumer society would be better managed. The social role of the designer in stimu-

lating consumer's behaviors became the focus.

This proposal was the Mobile.seed project. One of the most important processes at this stage was the consolidation of a personal ideological positioning, supported by further book readings, desktop research and discussions with friends and professionals. With clearer statements about what would be desirable for a better future for all, the decisions about the design of the project became easier and more coherent.

Despite the Mobile.seed project be a communication of a fictional electronic product, it is a possible new way to think about the consumer's relationship with products. And if it is not feasible currently, its ideas and suggestions can start to be applied now.

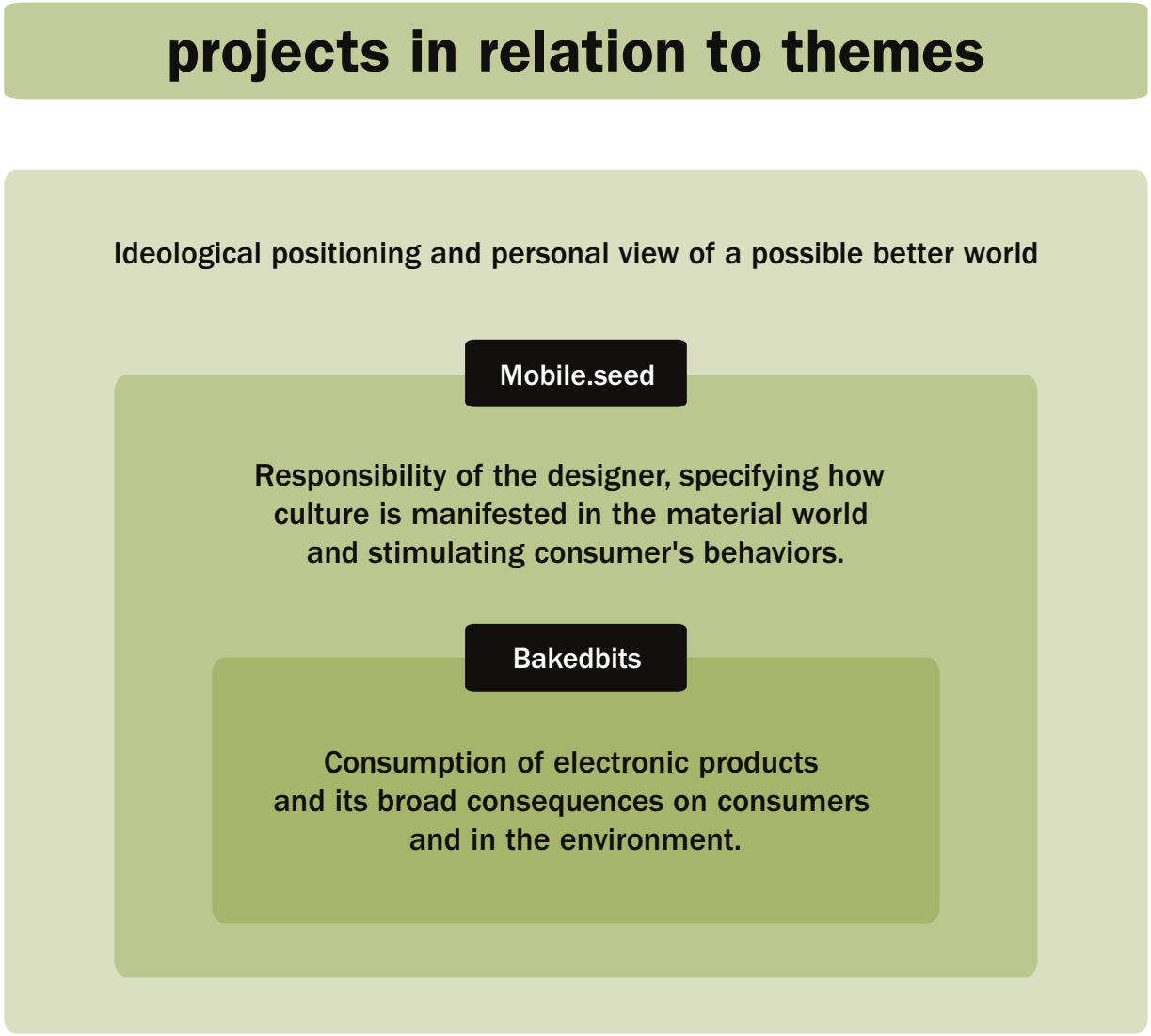


Fig. 3.4 Diagram showing the diverse accumulative layers of themes studied through the thesis process and the projects positioned in the transitions between the layers.

Fig. 3.5 Internal critique at february 2004.

Fig. 3.6 Bakedbits at the italian Disney Channel, 2004.

3.3. User research and other feedbacks

A very important part in the process was the feedback from colleagues, professors and from people outside the design area.

In addition to these feedbacks, the Institute critiques with external guests were fundamental, often providing some "slaps in the face" to wake up again and revaluate assumptions.

For this paper, we can consider two categories of feedback, one related to the abstract thesis theme and another one about the actual prototypes and scenarios. First, the abstract concept.

The subject about the social responsibility of the designer in stimulating consumer's behaviors is very controversial, and opinions highly differ. And at the same time that this created certain confusion in my mind, it was a stimulus to go further. A frequent situation was to receive a political correct positioning, with the idealized designer in mind. Even if would be completely incoherent with one's work. Other group were really concerned with this responsibility and tried to apply/adapt the personal beliefs in their work, like choosing specific materials, respecting diversity and avoiding the use of technology by an end in itself. A third group avoided position themselves on the theme, saying that they were more concerned in keep "doing things" than stop a while for debate something that will change nothing at the end. But, often these people come to be the ones that keep recycling the past and generating the superficial sameness of alternate solutions. Or better known as keep the status quo.

These answers and informal talks about the subject added to my personal experience in studying and working several years with advertising and marketing. I worked dealing directly with consumer's motivations and developing seductive messages for selling. Readings about consumption behavior, sustainability, laws, materials and design related with these subjects completed the sources for build the theoretical ground.

For a more qualitative data about the consumers, an online questionnaire was elaborated, and 132 answers were received. It can be found in the appendix. About 50% of the answers were from metropolitan regions of Brazil and the other half from European countries, mainly Sweden and UK. People received e-mails or messages from friends asking to answer the questionnaire and to forward the link to other friends.

In the sequence, some interesting outcomes, some predictable, but necessary to have some background for the process:

It was asked to people answer when does an electronic object become outdated for them. The most frequent answer were "When the object couldn't handle the task as efficient as it was designed for" or "I would say when I feel I loose time; when others are doing something faster because they have better access to technology".

Another question was "Do you ever think about what happens to it after it's gone?", and most of the answer could be exemplified by "No, I have no idea. I suspect it gets recycled?..".

For the question "How do you see your relation with technology?" many pointed a kind of dependency, mainly as a work tool and information hub (internet). One interesting answer: "I don't let myself grow outdated enough to feel rejection, and I don't let myself buy too much objects or spend too much time with them". When asked about the emotional relation, people answered: "I do have emotional attachment to camera and computer. I guess a lot of personal experience associated with them". The objects that people got more attached are portable computers, mobile phones and mp3 players, individual and portable goods.

And for the last question "Do you think that you feed technology in someway?", common answers were "Yes, in the amount of hours spent. Precious time that you could have used socializing with friends", or "yes, buying products".

About the prototypes, the feedbacks can be divided in three moments, like the overall process. More detailed information about the ideas or objects can be found in the next session.

At the first moment, was presented just ideas of products, focusing in the ritual as interface and thinking in interactions that would be a digression in relation to the functional path. The feedback was good, and made me realize that I was leading the thesis towards a premature dead end. The ideas were not giving much space for further development and were too much practical. Another point was that they were using difficult metaphors. People need to learn a new language to use the object, being not so neatly closed as the Candle Dimmer idea.

At the second moment, there were ideas about electronic products that should be cooked to work

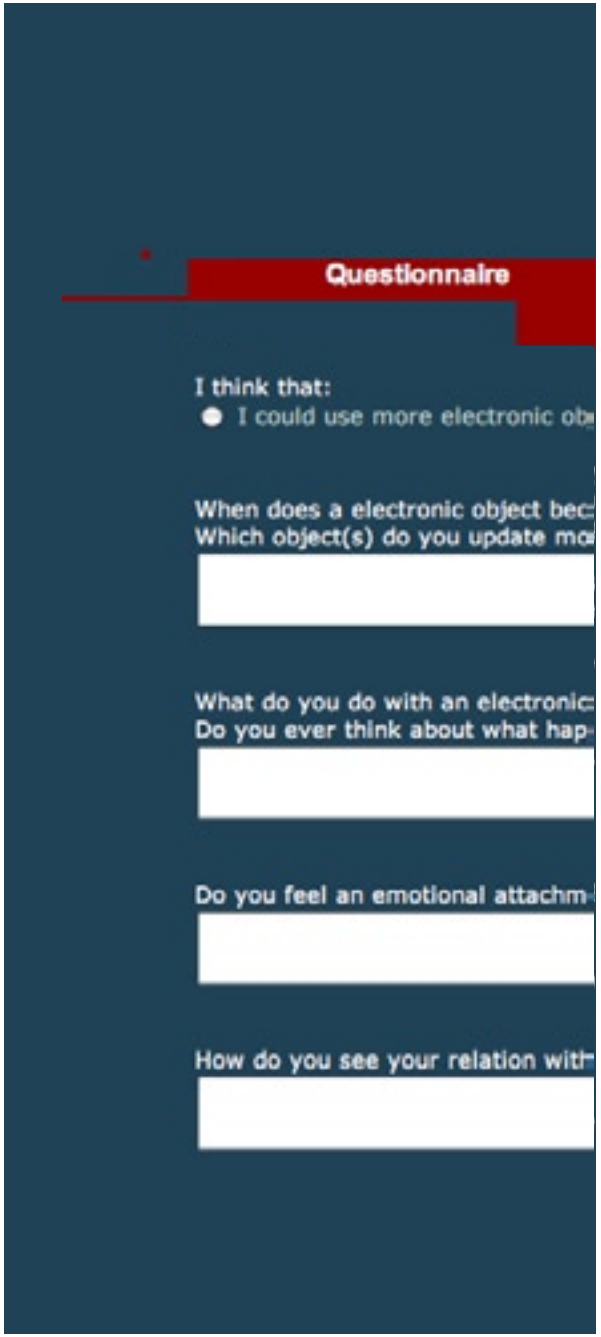


Fig. 3.7 Screenshot of the questionnaire.

Fig. 3.8 Exhibition at IBRIT - Milan, May 2004.

Fig. 3.9 Exhibition at IDII, June 2004.

– the digression – and about criticize the excessive consumption of goods. The Paneluce was created at this stage. The feedback revealed the closeness of the project with art and that people didn't get the intended messages through the prototypes. After a while, became clear that the messages were too complex, and should be restricted to the creation process, not relying in the consumer interpretation, which should be let open. Another important feedback at this moment was that the objects should not be expected to become real market products, that they are expressions of conceptual thoughts, and the real audience would be designers or artists.

These feedbacks and reevaluations matured the concepts, and two more ideas were generated in this process, the DolceRadio and the CD-lini, that are less ambiguous and with few connotations than the Paneluce. This new positioning, about letting the objects more open to interpretation and trying to take out the heaviness of my intentions, worked out. The following exhibitions were much more successful and people enjoyed the object for different reasons, for different interpretations, and I understood that what seemed to be a problem become one of the most important features, a richness in meanings. Some examples: one girl that saw the radio made of chocolate said "Oh! This radio is great for a girl that need to do a diet and must control herself!"; or a guy that said "The Paneluce would be perfect as a luminary for that super cool bakeries in Milan".

The third moment was about the Mobile.Seed idea. At this stage, a continuation of the second one, the ideas were focused in proposing a product that would put in practice concerns about social responsibility and at the same time work on the influence of the designer in stimulating people consumption behaviors. The prototyping were mainly based on video scenarios and in objects to represent the look and feel, not the functionality. Many biodegradable materials were tested, but with secondary relevance. The objects themselves were not self-explanatory, and the videos were not didactic, but focused in the mood of use. But when presented all this material together, the reaction of the public was very positive, understanding the potential and the contrast with other more traditional ideas. The practice of explaining the project and receiving feedback several times were essential to understand what were more relevant for each kind of public and to improve the explanation of the idea, being more concise and effective.

The importance to demonstrate that the idea is feasible, even if just in the future, and that the

materials can develop in that direction, showed to be crucial for the credit of the whole idea. Another important feedback was about the need to think about what would happen if the product become real, what would change in society and who would use it. Think how the product would be launched and the possible scenarios.

3.4. Scenarios

Scenarios are very useful tools for design, used usually for creating contexts or situations in which one solution can be developed, applied, tested. Future scenarios help to foresee what the decisions made today can lead tomorrow.

To think about how the Mobile.Seed would be developed or accepted in a fictional market, it was necessary to create future scenarios according to different trends.

For that purpose, stakeholders were defined and a quadrant scheme with axes that represent main uncertainties was created to position the possible scenarios according to speculations over the trends. Reflecting on the four scenarios positioned in the quadrants, it became easier to understand that the scenario that I classify as ideal would be exactly in the middle, and is called the Balanced Scenario. It exemplifies a vision where technological development is not seen as a bad thing, but as a way to achieve a truly ecological equilibrated society.

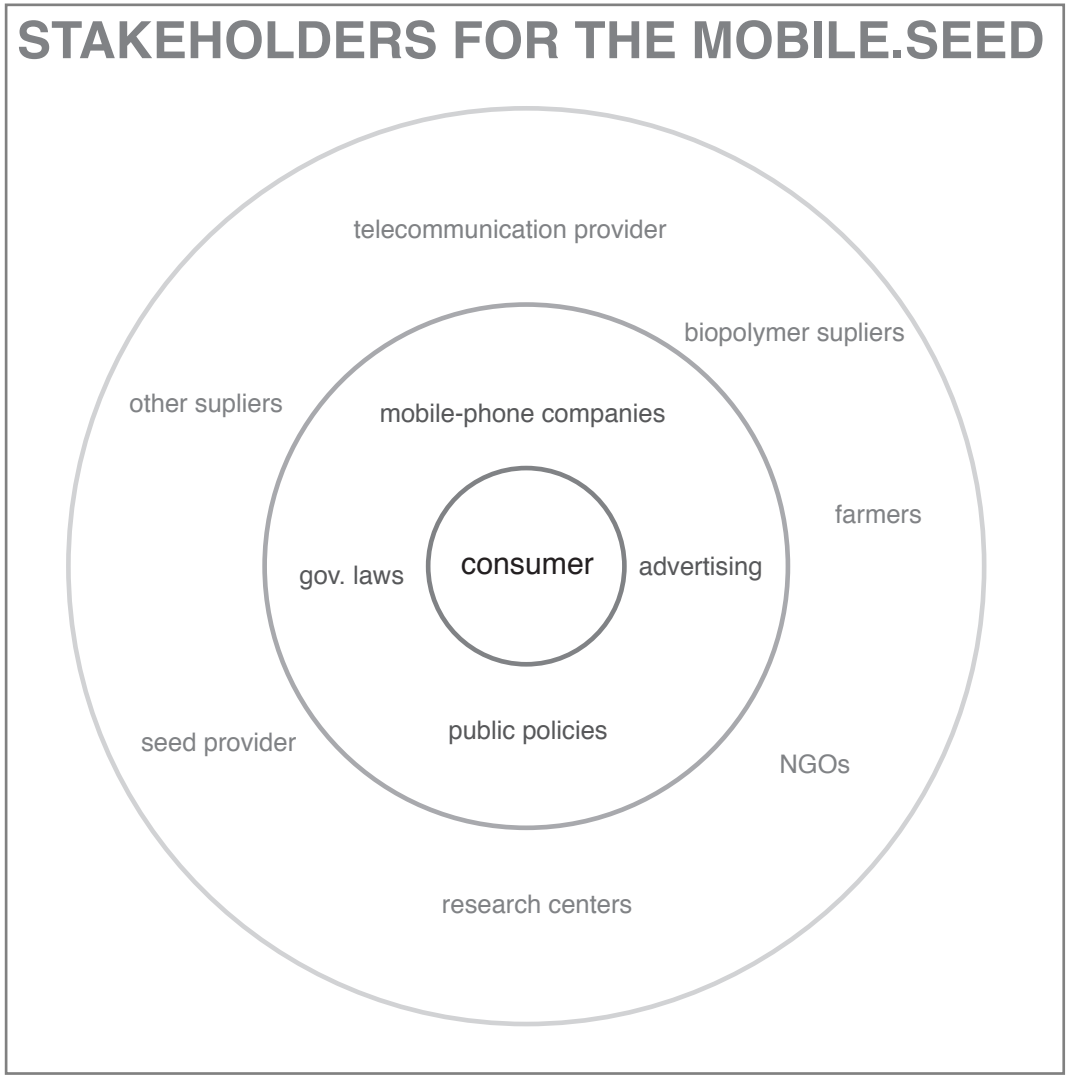


Fig. 3.10 Levels of influence of the stakeholders for the fictional Mobile.Seed product.

3.4.1. Uncertainties

For defining a scenario is essential to select some uncertainties that are relevant for the subject of study and try to speculate on them, based in current information, what are the different possibilities, trends and alternative developments.

For the Mobile.Seed, political, economical and social behaviors are essential issues that influence how the object would be accepted or even if it would become real.

Political Uncertainties

- How political and economical laws will evolve? (which lobby will be strong?)
- Would the state be a unifying factor, caring for a commonwealth and imposing a collective order or it will be more fragmented, with many different agents ruling, consequence of the strength of economical liberalism and increasing social plurality?
- Which ideology/policy will prevail: European, Asian or American?
- What will be the role of the developing countries in this world? Will misery increase or developed countries will help to increase global wealth distribution?
- How will be state-of-art of solutions for the problem the disposal of toxic products?

Economical Uncertainties

- Will green products become competitive?
- How many new people in developing/poor countries will have access to the consumer society?
- Will be design subordinated to technology and biz or to consumer's common welfare?
- Will be business and companies predatory or social concerned (is it needed laws for that?).

Social Uncertainties

- Will be contemplative and idle time something that people care about or they will be looking for saturate every moment with something to do, doing activities at the same time or faster in way to have the possibility (or the illusion) to do more?
- Will Access Wellbeing Society provide happiness to people?
- Will people engage in personal recycling/ ecological wellbeing ideology?
- What are the rebound effects? What are the new problems?
- How Mobile.Seed would be accepted in

these scenarios? What consequences it can have?

- How will be the vision of the common goods by the society? (insignificant, their deterioration is inevitable, must preserve, marketization, partner)
- Will consumes will prefer remedial goods or restorative goods?
- Will the individualization, the "I", or will the communitarian values, a nation, a tribe, the "WE", be the prevailing influence in our culture? Which one will be the base of our social organization and self-definition?

Other uncertainties

- How climate will change?

The seed alone would be better positioned in the top half of the graphic at right, and the mobile phone alone in the bottom half. When the Mobile. Seed is used as a phone, it is mainly an individual device. When it is planted, it acquires a community property and at the same time stimulates a contemplative
relationship.

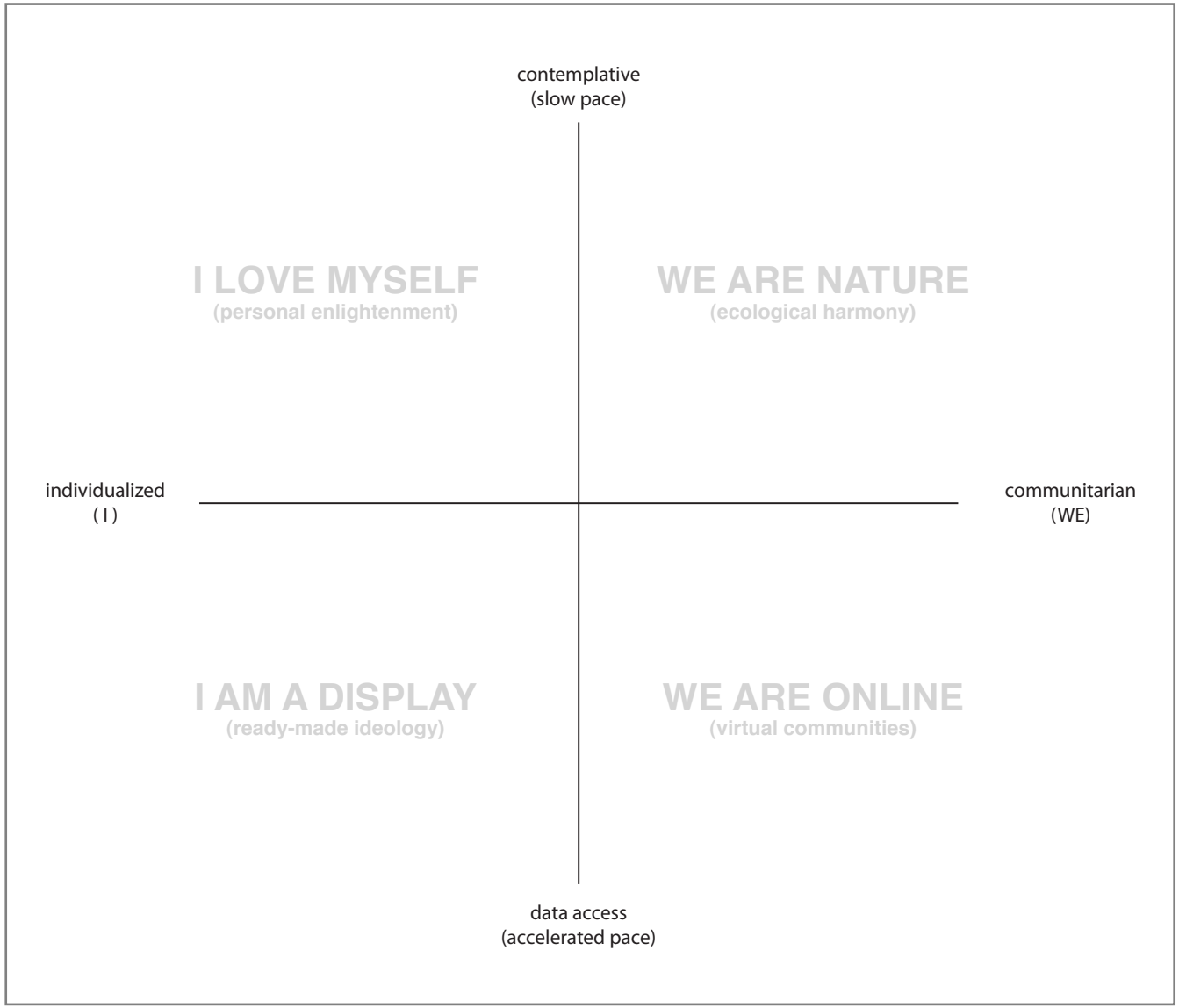


Fig. 3.11 Scenario axis, based in four main uncertainties. A more *individualized* or a more *communitarian* society? A more *contemplative* culture or a culture based on fast *data access*?

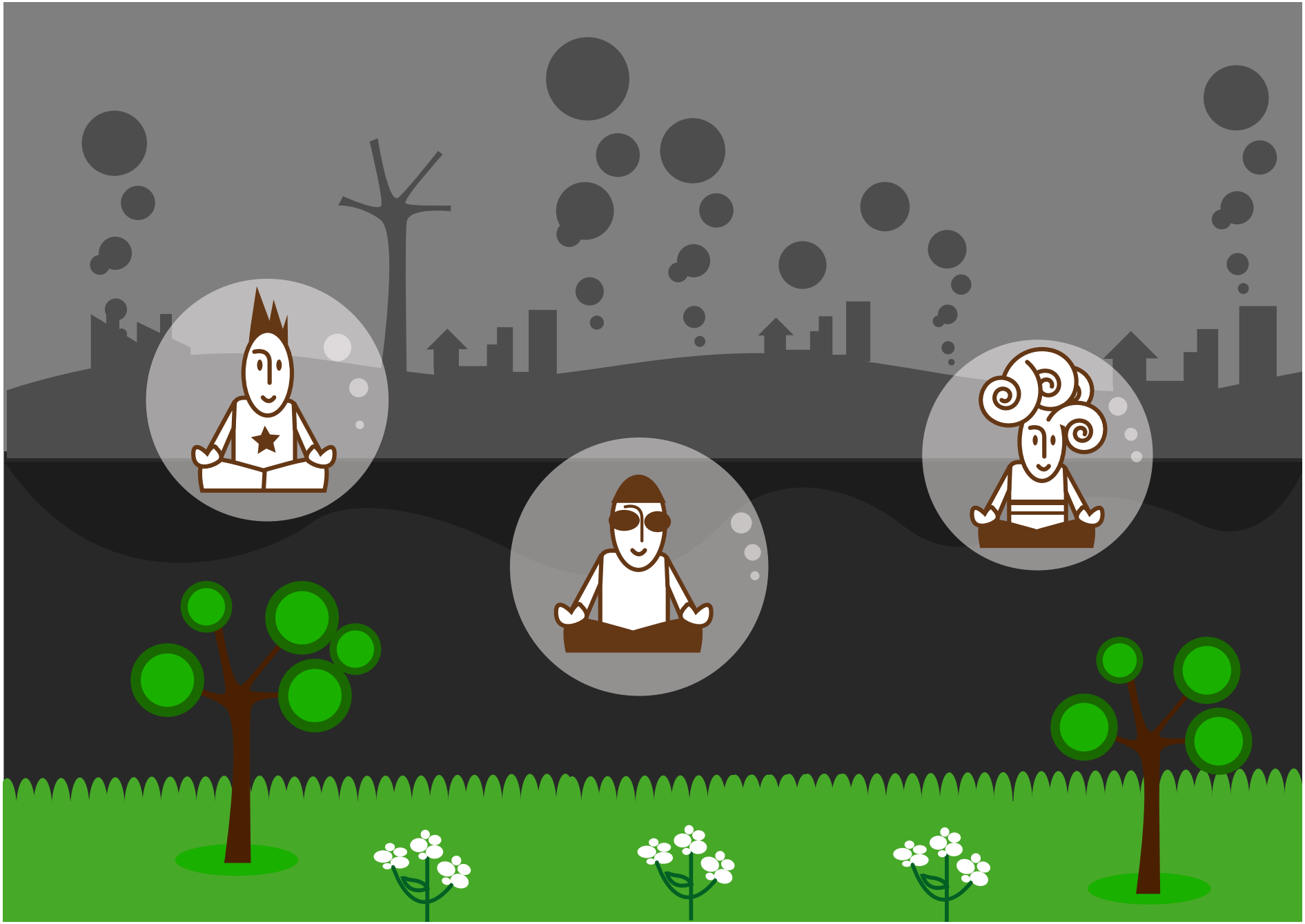


Fig. 3.12 Illustration of the "I LOVE MYSELF" scenario.

3.4.2. Contemplative e Individualized quadrant - I LOVE MYSELF

- **Laws:** New ones needed to assure the individual free time and freedom to do nothing. Workers have weekly hour time reduced.
- **Consumer's behavior:** Hedonist with slow pace. Simple pleasures, slow entertainment and free safe sex.
- **Companies and Business:** tourism and entertainment are the main industries. Found a way to make profit over the consumer's idle time by making they pay more for slower products, justifying by the bigger amount of time that they keep consuming resources.
- **Developing countries:** calm and beautiful places or virgin areas become touristy Meccas. The rest are resource providers for the consumer society. Pollution and social gap increases dramatically.
- **Design role:** develop products that respect the human timing and free the man from a stressful and multitasking life. Long life products.
- **Happiness:** people feel happy, as long they keep alienated about what is happening around or if everything seems beautiful.
- **People's eco concern:** it is important because people have the right to contemplate the beautiful nature. (marketization of common goods)
- **Climate:** Pollution decreased in developed countries but increased highly in poorer countries that are not considered eco-Meccas. Global weather changed, with hotter summers and winters, drought and floods become frequent.
- **Mobile.seed:** was a success because it was marketed as a personal attitude that would make the world more beautiful and pleasant. After its introduction many other mass products followed this idea of personal connection with the nature and some even tried to associate themselves as a kind of 'purification' from the super saturated and accelerated world. Flowers and other plants become disputed brand icons. But companies don't embrace so much the idea of biodegradable products and they are still toxic and high demanding of not renewable resources.
- **New problems:** Several hedonist religions appear and become very relevant. The accumulated knowledge of traditional spiritual teachings is dangerously redefined in way to justify the self-oriented and selfish spiritual philosophy. Society become too fragmented and personal achieved enlightenment is usually superficial or a marketized feeling.

Fig. 3.13 A dweller meditating in his perfection bubble.

Fig. 3.14 Illustration of the "WE ARE NATURE" scenario.

3.4.3. Contemplative and Communitarian quadrant - WE ARE NATURE

- **Laws:** Subsidies for green products and Carbon Tax are reality. USA and Russia sign Kyoto Protocol. Bio products are competitive.
- **Consumer's behavior:** Altruist and see the common welfare as a pleasure. Consumption is always concerned about requirements and consequences of products.
- **Companies and Business:** They are social concerned and the profit are proportional to the trust and benefits offered by the products to the collective. Increased the demand for shared products and services. Biodegradable products became almost a standard, especially for mass production objects.
- **Developing countries:** Europe, Japan and USA provide strong money incentives for education and quality of life in Asia, Africa and South America. Carbon tax system works and natural resources are explored in an eco-sustainable way.
- **Design role:** develop products that preserve or increase the quality of life and the global welfare, working in an ethic framework and accordingly to consumer's criteria and specified needs.
- **Happiness:** People say that are happy, but they feel often very bored. Individual identity is secondary in relation to the community identity. Entertainment is usually associated with prohibited or perverse things, but always in secrecy.
- **People's eco concern:** Ecology become so important that is almost a religion.
- **Climate:** Pollution decrease to levels pre-industrialization. Weather is normally unstable, but more predictable and manageable.
- **Mobile.seed:** was a big success and became a milestone in the introduction of products as partners in the building of an environmental and economical sustainable society. Flowers become disputed brand icons, and some new business models appeared, mixing technology and gardening for example. After its introduction many companies started to incorporate this mindset in their mass products, using biodegradable products as long possible and providing to the consumer the motivation (or gratification) to engage in the process of closing products' life-cycle.
- **New problems:** The pace of technological discoveries decrease due the low stimulus to individual competition. Competition shifted to communities dispute, bringing less but more consistent innovations. A spread out crisis in the people identity generates an increased taste for the illegal and for extreme pleasures that are dissimulated and disguised for the community view.

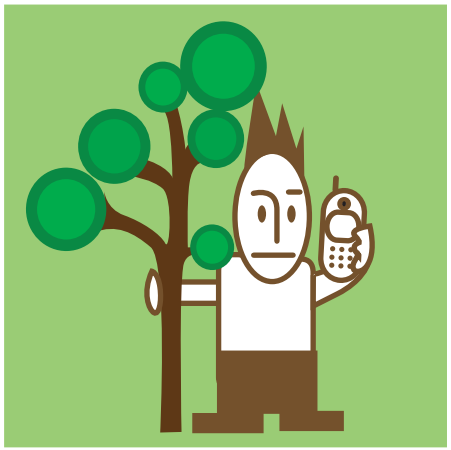


Fig. 3.15 Nature, people and technology as partners.

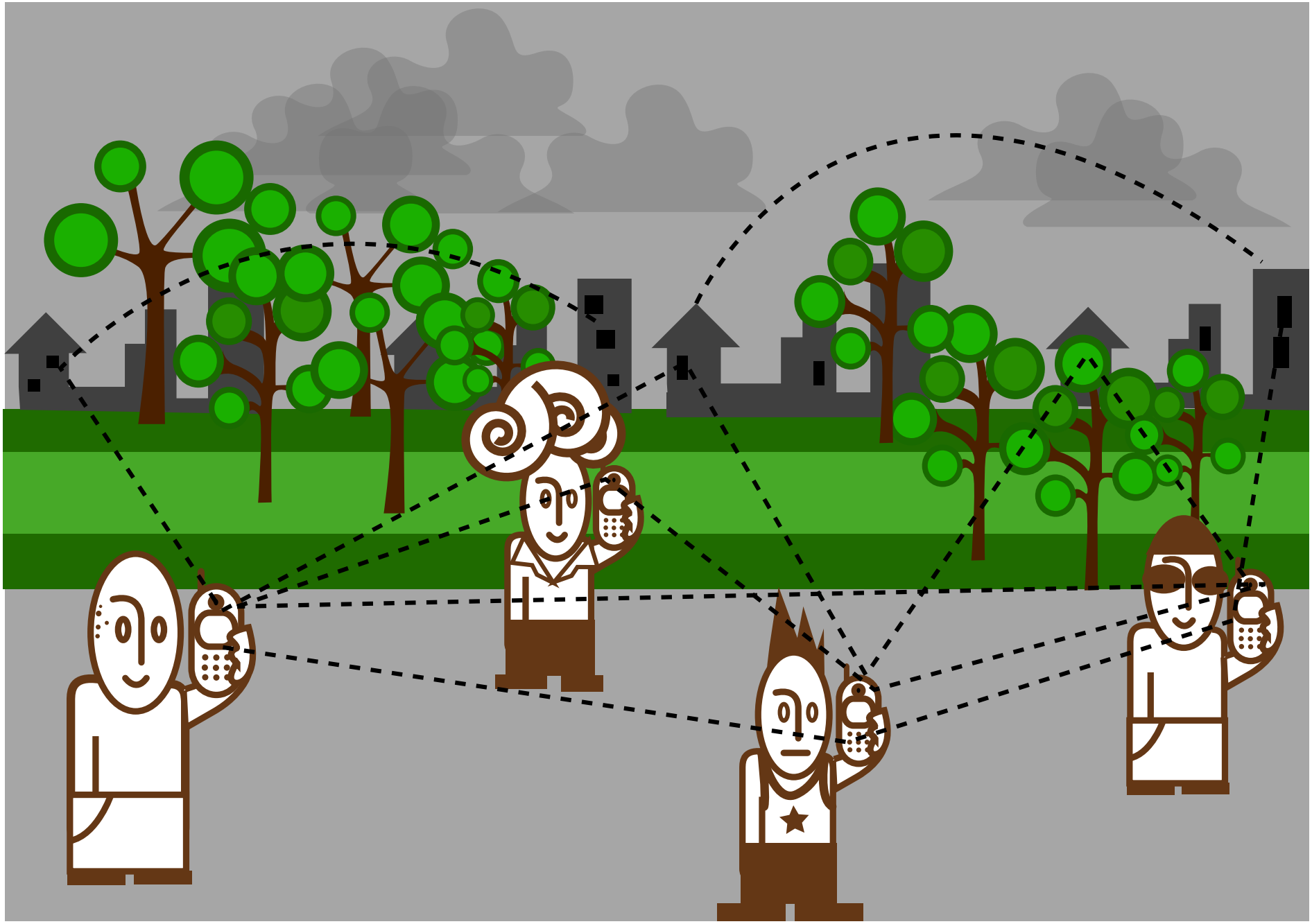


Fig. 3.16 Illustration of the "WE ARE ONLINE" scenario.

3.4.4. Data Access and Communitarian quadrant - WE ARE ONLINE

- **Laws:** Cyber paranoia and over control about online information.
- **Consumer's behavior:** Society is organized in communities that are always online and communicating between them. Communities influence people consumption.
- **Companies and Business:** Products have a short life, but companies are responsible for its recycling and take-back.
- **Developing countries:** Some economic help from rich countries, but without long term consistency. More people as consumers is an aim.
- **Design role:** Develop products that introduce new technologies in the market to increase overall security, communication, education, entertainment and health accordingly to community discussion output.
- **Happiness:** People don't know anymore for sure how people really are. Everybody is an image constructed by digital means that can be manipulated before transmitted. Even live video is not trustful anymore. This reality produces a feeling of fakeness, of missing authenticity.
- **People's eco concern:** They don't worry so much as long it cannot be perceived in a short time spam.
- **Climate:** The weather is very chaotic, but the information that people receive is filtered in way to 'preserve' the harmony. People that try to show what is really happening become diluted in the ocean of versions of the reality.
- **Mobile.seed:** was a short fashion product for few niches beyond the obvious green consumers. Even with a good advertising effort, the idea of wait a plant to sprout and grow was too much time demanding and many people got frustrated because their plants died due no watering. Even the collective benefits were difficult to grab due to not immediate feedback.
- **New problems:** Life become too complex. Simple things are exception in the daily life, and many times are just disregarded. People must deal daily with a huge amount of data and try to get meaning from that. Beside the personal problems they must provide attention to the several communities that one is part off. What for most people results in poor attention to all. High stress levels and high intensity lives decrease life expectation. All the online messages are controlled by some governmental filter and the cities are full of cameras and sensors. Serious control over privacy generates a new kind of puritanism, where an ethic and moral code established by a minority is applied to all, for "benefit of all".

Fig. 3.17 Dwellers are always connected virtually.

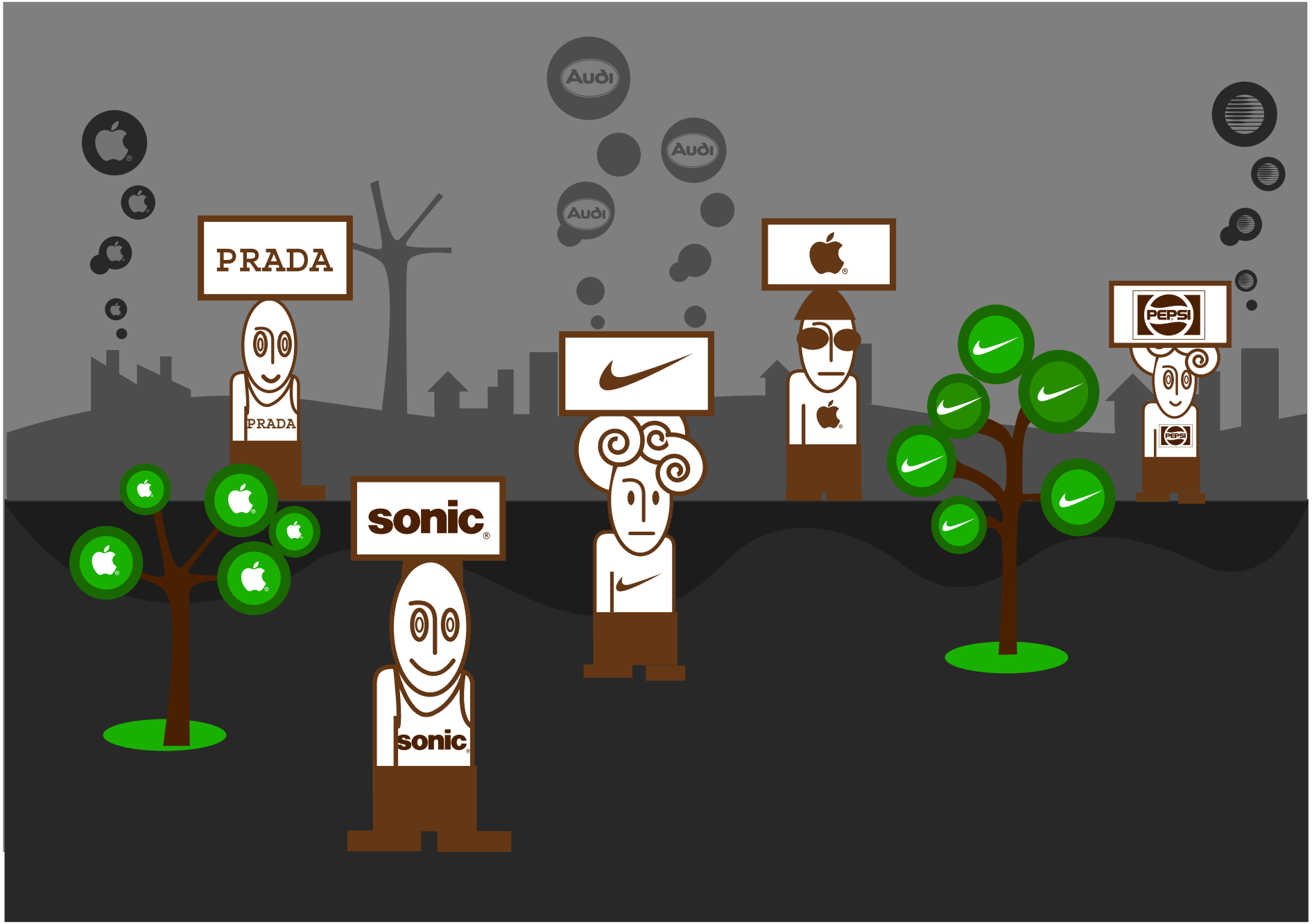


Fig. 3.18 Illustration of the "I AM A DISPLAY" scenario.

3.4.5. Data Access and Individualized quadrant - I AM A DISPLAY

- **Laws:** Big companies lobby keep bio-products not commercially competitive.
- **Consumer's behavior:** Hedonist and individualist. People get bored very fast, and everyday they need stronger stimulus. Moral and ethic boundaries were far crossed. In reaction to this uncertainty, people try to look for the familiar and the predictable. So they use brands as references and interpret other people's use of brands to establish their status. People that try to get out of thais loop have their identity rapidly marketized by the cool-hunters and annulled.
- **Companies and Business:** Most products use planned obsolence as a 'solution' to not bore people. Discard culture. People want to feel good about what they are buying, so corporations respond by cultivating the "meaningfulness" of their brands. Brand represents certainty in an uncertain world.
- **Developing countries:** Natural resources are almost completely destroyed. Misery increased in the world and rich countries spend billions a year just to control immigration. They have access to an idealized way of life through products or other media, but have no access to its real benefits.
- **Design role:** Develop products that create uses or needs for the technologies developed. Create products that could be associated with known brands. Short life products.
- **Happiness:** People keep themselves happy with psychiatric drugs like Prozac. Drugs for not sleeping, memory and sexual performance are broadly accepted and used. Happiness is about people perceive you as happy.
- **People's eco concern:** Don't care. It is the price for development. But some green brands are 'cool'.
- **Climate:** Crazy weather, very hot summers, season's shifting, flood and drought are frequent. Scandinavian countries are having stronger and longer winters due the golf stream extenuation.
- **Mobile.seed:** never was released in the market. Research about biopolymers couldn't reach an enough level of development due to small investment. Products that would require a kind of process or with not immediate feedback would never succeed in the mass market, even if they would show off in public.
- **New problems:** Brands are no longer simply about the qualities of the product or service they sell. They are promoted as a set of values, a philosophy, even an ideology. Brands and its different market positioning explain the human idiosyncrasies. They are used to understand personal and social behaviors and predict solutions to daily problems, like mythology was used in the past. The problem is that they are too much stereotyped and idealized and, unlike mythological gods, they don't fail or do silly mistakes, generating a hive of people frustrated and with an emptiness feeling. People that can't match with what they identify themselves. And the solution is a self-destructing loop of consuming more branded 'remedial goods'.

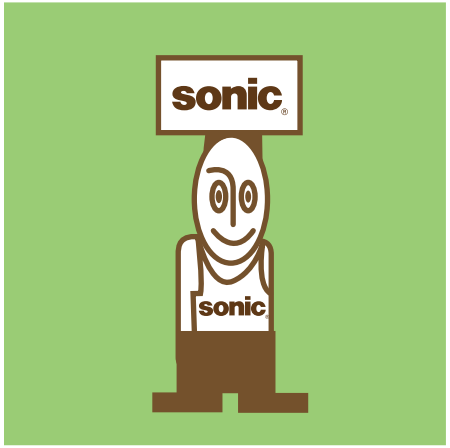


Fig. 3.19 Dwellers are brand displays.

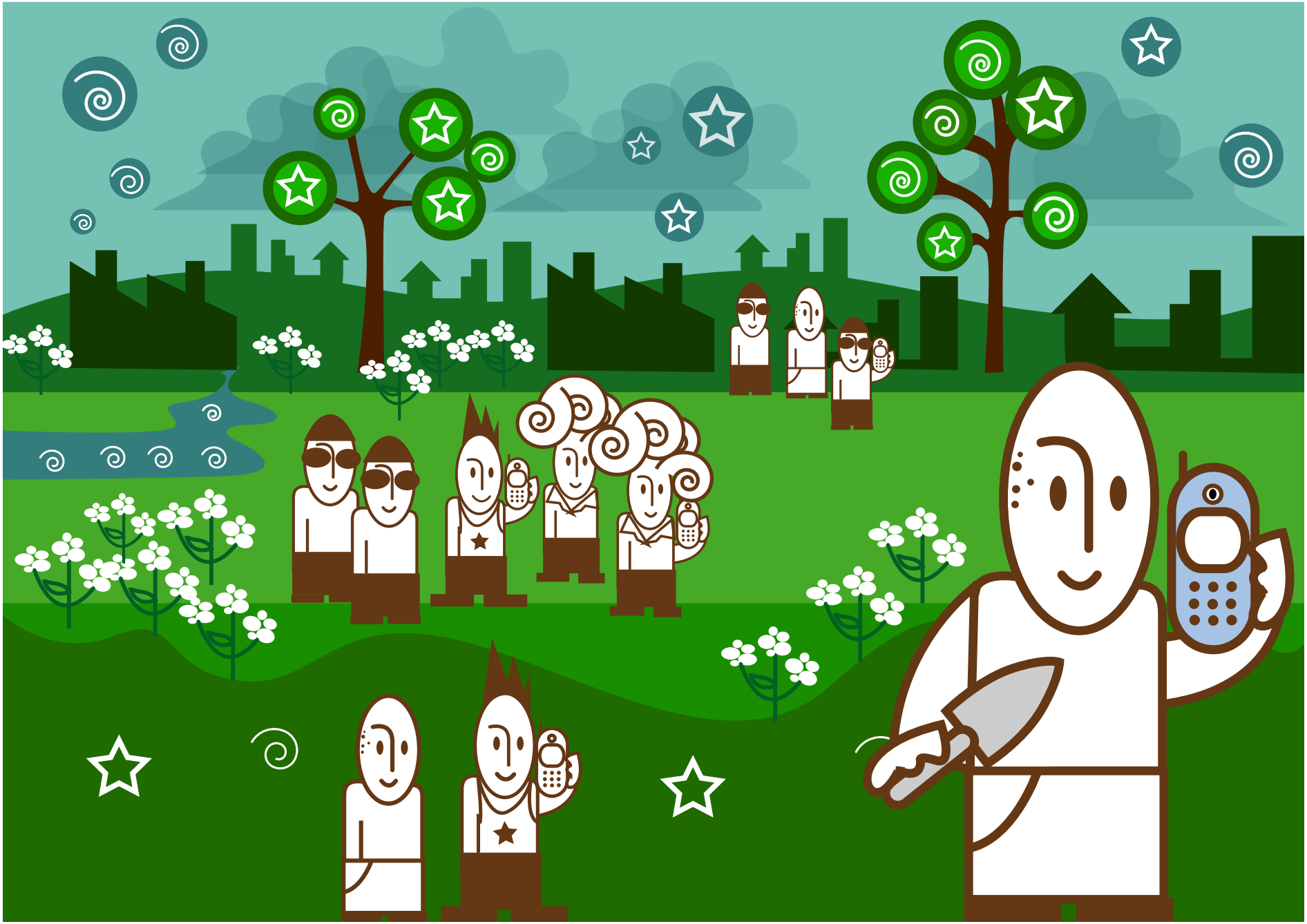


Fig. 3.20 Illustration of the "BALANCED WORLD" scenario.

3.4.6. Ideal Scenario
THE BALANCED WORLD

Introduction

Not surprisingly, none of the previous scenarios is the scenario that this thesis project would like to see become true, mainly because they represent a way of development pushed to an extreme positioning.

A human being has all the sides, the good and the bad, the serious and the playful, the stupid and the smart, the individualist and the social, the peaceful and the violent, etc., and to respect men and also nature is about to respect how the things are, without negating these characteristics, and learn how to deal with them. This way of understanding the world is not new. Polytheist religions like Greek mythology or some African religions have understood well that we need to give attention as well to our good and bad side, represented by different divinities. Ancient Oriental philosophies pray for the equilibrium, for harmony with the surrounding environment and as well internal. I am not interested in consider any specific religion as a solution for the world, what would be incredible intolerant, but to keep this very old and experienced output that equilibrium is the key. And, as some could think, equilibrium does not mean passivity or lethargy. It can even mean moving faster and with precision.

I see the mobile.seed as an example of how could be this equilibrium, based in our present context, or at least a product that is in an intermediate stage between now and towards this state.

Equilibrated design would merge functionality and purposeless play. Modernism and Post-Modernism. Merge beauty and strangeness, fast and slow, erudite and vernacular, complete and incomplete, the familiar and the alien, freedom and ethic. Off course, not necessarily all at once.

People would not accept return in time and loose the acquired benefits. And this makes a lot of sense. And it is also not effective to make people feel guilty or just provide information. We must look forward and find ways to equilibrate human quality of life and diversity, technology development, business profit and preservation of environment. Achieve this aim depends on many factors happening simultaneously to become true. Design has a role in this path, and responsible designers must be aware of this influence. This view should be embodied in the products and services paradigm.

-Laws: Subsidies for green products and Carbon Tax are reality. USA and Russia sign Kyoto Protocol. Bio products are competitive. Individual privacy is

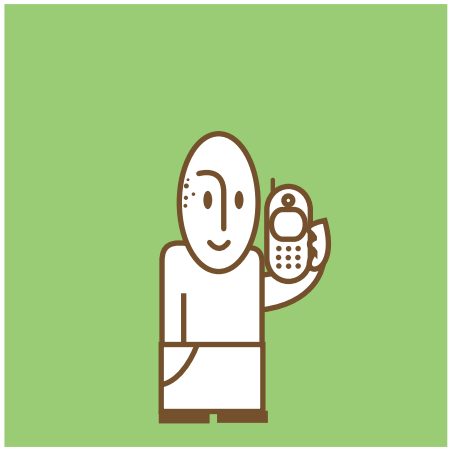


Fig., 3.21 Individuality and communitarian values together.

protected.

- **Consumer's behavior:** Give strong value to the personal identity, to the differentiation and to the plurality of options for different kind of people. See fashion and products choices as part of this identity. Reject ready-made ideologies, which are associated with lack of personality. At the same time, see consumption as a good thing that has consequences that are not immediate and not desirable. And understand that this small consequence become a big problem when multiplied in big scale. But beyond just understanding, the consumer is engaged in responsible product's choice and disposal.

- **Companies and Business:** Valuable brand image is not anymore achieved just by associating it with other's attitude. This kind of approach is not effective anymore. Brand image is built on real attitude and public decisions that are related with the product that the company sells. In this context and due to consumer demand, companies and brands become publicly associated with the consequences of their products on the environment or on people. The profits are still high, but are not coming so easily as before. Many biodegradable products are in the market. Services and shared products are strong on the community market.

- **Developing countries:** Europe, Japan and USA provide money incentives for education and quality of life in Asia, Africa and South America, but associated with corruption control. Carbon tax system works and natural resources are explored in an eco-sustainable way. Poverty is still an issue, but misery is strongly reduced.

- **Design role:** An interface between the new developments and business' needs and the consumer's desires and concerns. Designers and companies are legally responsible for the solutions created and its consequences through the product life cycle, like an architect and an engineer are responsible for a bridge. Most designers are active in helping to build a balanced world, knowing how to balance personal ego and collective concern. Products that valorize the individuality, the critical understanding, the social integration and the welfare. Products that build the value of a brand or company, accordingly to the new context of value.

- **Happiness:** People detached happiness from the amount of goods that one own or display. This remains just as criteria for wealth possess, as always it has been. Besides happiness usually be a feeling relative to a previous state, people are conscious of the current achieved common well-being and personal space in the society brings a joyful satisfaction. People are more concerned in keep or improve this state than have a fast and unsustainable "progress".

- **People's eco concern:** Ecology is not seen with

radicalism. Human beings are not a parasite neither a virus in the planet. And neither just passengers in a spaceship. They (we) are an important integrating part of the planet that has power to influence the overall equilibrium. To the good or to the bad. And it is our role to bias this influence.

- **Climate:** Pollution decrease to levels pre-industrialization. Weather is normally unstable, but more predictable and manageable.

- **Mobile.seed:** was a big success and became a milestone in the introduction of products as partners in the building of an environmental and economical sustainable society. It brought concretely to people the perception of the waste consequences of mobile phones, and promoted the concept of 'personal recycling', where consumers are not passive anymore. Mobile companies sponsored public gardens as an option to mobile.seed consumers plant their phones. Flowers become disputed brand icons, and some new business models appeared, mixing technology and gardening for example. After its introduction many companies started to incorporate this mindset in their mass products, using biodegradable products as long possible and providing to the consumer the motivation (or gratification) to engage in the process of closing products' life-cycle. These companies built the first valuable brands of the new brand model, and now are the ones that make more profit in the market.

- **New problems:** equilibrium is just pleasant if we are equilibrated inside ourselves as well. Even if opposite sides are pleased, the radical and the peaceful, the expansive and the restrictive, the straight forward and the crazy, etc, this plural view should be inside everybody to make this system really work. A specific behavior would be seen just as a personal choice, not as THE right choice. Tolerance to difference is, again, the key. And in our current historical moment it seems too far from this reality...

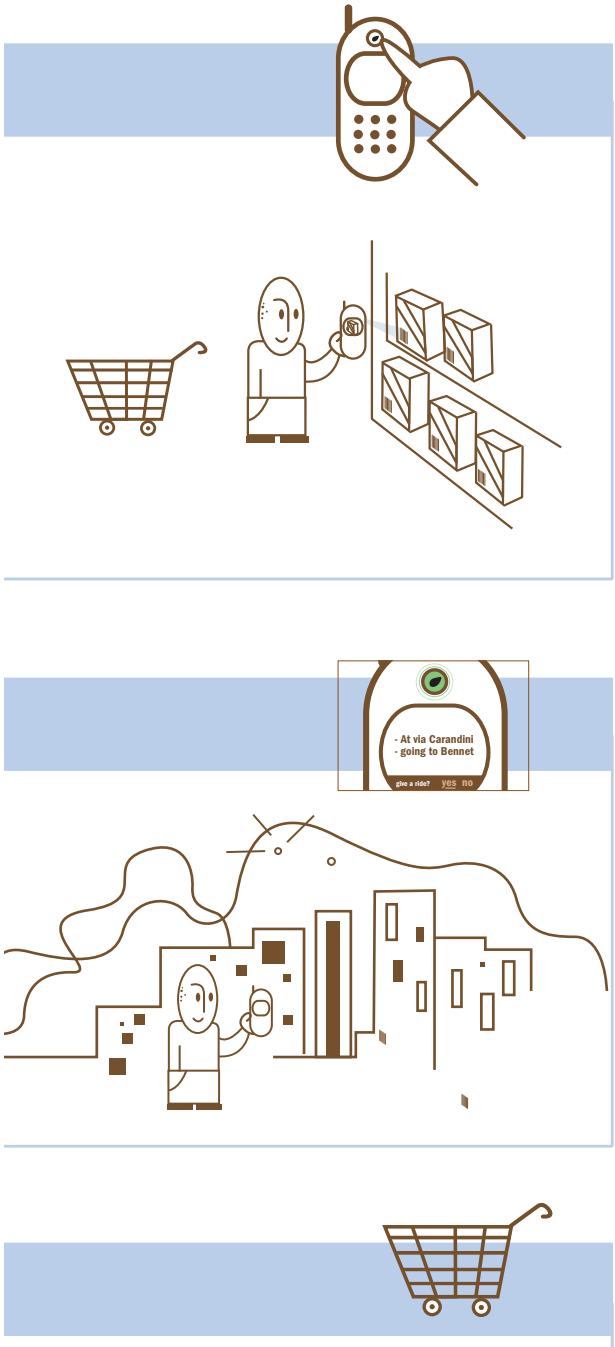


Fig. 3.22 The Mobile.Seed in different situations.

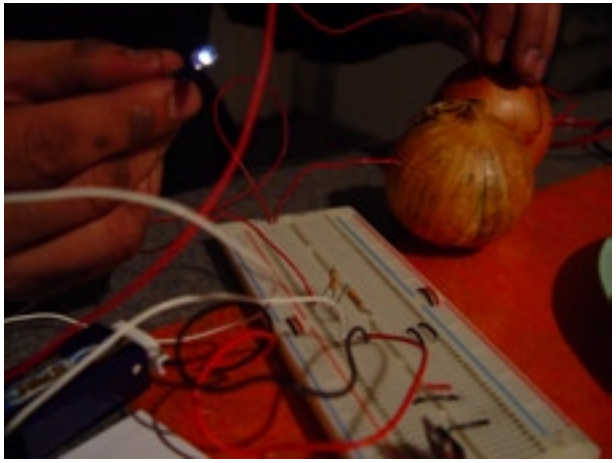


Fig. 4.1 Experiment with two onions in an electric circuit.

4. Design and implementation

4.1. Overview

This thesis could be divided in three stages, one initial trial and consequent reevaluation of goals, a second part that was an investigation of objects, and a third part, with a scenario and fictional product proposal.

The first part was an exploration focused in looking for ideas for objects that are aesthetically pleasant in the interaction and that constitute an alternative path to the goal-oriented functional one. The context was the home environment and the method to achieve this goal was what I called digressive design (outlined in the Background chapter).

The second part of this thesis project was an investigation about the design influence in our interest for technology. This project is called Bakedbits and explored the concept of "Appetite for Technology" by looking at specific issues in the consumer's relation to electronic objects. For that purpose three objects were designed:
- **CD-lini:** a fictional optical compact disc that can be consumed as pasta.
- **DolceRadio:** a radio with edible shell and buttons made of chocolate.
- **Paneluce:** a lamp than can be consumed as bread.

Mobile.Seed is a continuation in the thesis process, stimulated by insights that originated from the Bakedbits investigation. Mobile.Seed is at the same time a project in which the social responsibility of the designer is practiced, and a marketing strategy to sell a product that would be ecologically sustainable, but uses the motivation present in the consumer society as the main stimulus. Behind an innocent façade (a flower) conceals an elaborated manipulation mechanics (spread out an ideology).

A fictional product (mobile phone + seed) was designed as part of a communication of a future scenario and as a positive way to influence people, based in data from current material research and laws. Situations, videos, posters and schemes were also designed to communicate this project.

4.2. Initial Stage
Positioning myself

This initial part of the thesis started looking at a perceived lack of diversity in the possible ways we could interact with objects or services, especially in the domestic environment. I called this approach Digressive Design. The term is borrowed from literature, where it means the use of material seemingly unrelated to the subject of a work, but later linked to the plot or theme[76]. More info about this approach is in the Background Chapter.

Fig. 4.2 Digression in a story.

At the same time I was very interested in the aesthetics of the interaction. How would be possible to interact with technology in a poetic or ritualistic way? How can the beauty that we find in simple actions like lighting a candle, watering a plant, changing flowers in a vase or cooking a sophisticated meal be applied to our interactions with technology?

Things are pretty, graceful, rich, elegant, handsome, but, until they speak to the imagination, not yet beautiful. Ralph Waldo Emerson

4.2.1. Objects, prototypes and ideas

The interest in this subject started with a prototype that uses a candle as an interface (Candle Dimmer) to regulate the illumination in a house, and was created in the Control Mania course (2003) taught by the Reed Kram. In this object the experience of using the candle are not spoiled, but kept intact. Its interaction relates with the house's mood control. Pictures and prototypes can be accessed at: http://people.interactionivrea.it/b.negrillo/controlmania/.

An excerpt from this website:

"(...) The candle as a device for control has interesting properties, too. Firstly, as said before, you don't need to teach one how to use it. It is simple and already rooted in almost all cultures. Secondly, it has a special slow flame catching behavior that acts as a switch. When the candle is lighted, it takes a while until the wick burns in maximum strength. The same happens when you "turn off" the switch, by blowing it, until the smoke stops rising and the wick gets extinguish.

Fig. 4.3 Cardboard models of the CandleDimmer. The dimmer is attached to already existent lamp plugs of the house. The shape allows freedom in the choice of the candle.

Another important property is the perishing nature of the material (the wax or the oil). This fire consumption gives time and life cycle perception. (...) The Candle Dimmer is a proposal for a domestic product that controls the brightness of lamps in harmony with the states of a candle. (...) you just put a candle in the candleholder and light it. As the wick becomes brighter, the lamps match this mood and dim. You blow the candle, everything becomes dark. (....)"

This project had a good feedback from people and other designers. It stimulated the creation of more ideas that would have the same general properties. The first step was to map the qualities of the CandleDimmer, like interacting with perishable and natural matter, using a real, common and ritualistic interaction as interface, instead of a metaphor of it, and being an interactive alternative to the strictly functional approach. Reflecting on these properties led to the concept of digressive design.

I have produced many ideas and sketches at this stage, but just two will be discussed here. One is the **Weather Bowl** and the other is the **Message in a Bottle**. Each idea is explained in reference to a functional and 'efficient' way to achieve the same goal, here called the "linear path".

Fig. 4.4 One pours water in the bowl. The amount of water sets the day forecast (tomorrow, in 2 or 3 days). Dip the finger to receive the message.

Weather Bowl

A way to get the weather forecast.

Linear path: access a website or turn on the TV, or listen to the radio, or read the paper to check the weather forecast for today and for the following days.

Digressive path: pour water in a bowl and interpret the signs for the weather.

To communicate weather status we just need five independent signs that can be combined to provide most of the possible status:

- forecast day
- temperature
- clouds
- sun

The weather forecast could be reduced to interpretation of water, air and light conditions. Possible outputs that would be uniquely associated with a weather independent sign and that can be made inside the bowl:

- color of the light
- brightness intensity
- bubbles
- vibration
- flash of light
- temperature of water
- focus light (blur/sharp)
- mini tornado
- drops in the glass
- fog

Fig. 4.5 Most of the weather situations can be represented with only few different symbols combined, like heavy clouds, light clouds, sun, frost, snow and rain.

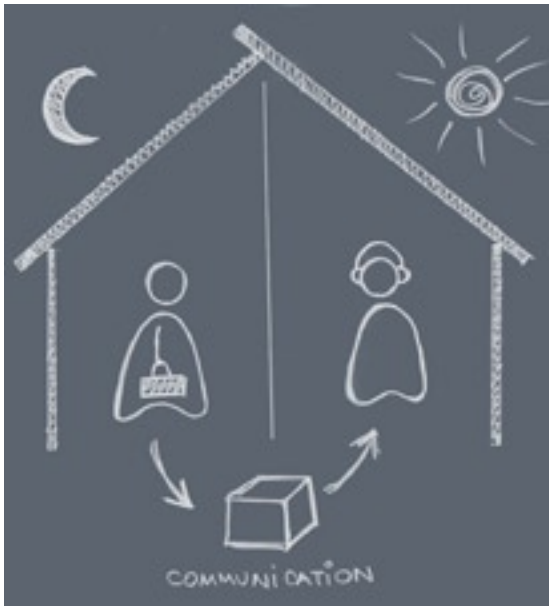


Fig. 4.6 The idea "Message in a Bottle" tried to address the problem of communication between people that live in the same house but seldom meet each other.

Fig. 4.7 One can let a message just talking to an open bottle or/and dropping a paper inside.

Message in a Bottle

A communication tool for people that live in the same house but does not meet often and need to exchange messages through the home.

Linear path: Put Post-Its in visible places, send e-mail or SMS.
Digressive path: open a bottle, throw a message inside it or talk to it, and put back the cork in the bottle.

One opens the bottle and can let a paper and/or a sound message. It glows slowly to show that a message is available. When somebody opens the bottle, it plays the sound. To delete a message just shake it upside down.

One interesting possibility of this idea playing with physical (paper) and immaterial (voice) messages. For example, the sound message can be contradictory or a teaser of the object inside. Another property is that the paper or object-message can be saved 'forever', but not the sound message.

4.2.2. Evaluation and critical view on this initial part

After explaining to several people the new ideas, it was clear that they were not so neatly closed as the CandleDimmer one. They were using difficult metaphors and people would have to learn a new language to use the objects.

Besides that, they didn't leave so much space for further development. The thesis would be developing towards a dead end.

An important outcome from the reflection over these ideas was the perception that I had been too much practical, not developing enough the conceptual side. I decided that I should profit from the academic moment and look for more explorative approaches. My opinion was that technological learning is ephemeral and that learning to think is not.

I started to feel that I was just using new technologies for its own sake. Pushing arbitrary new products to people's domestic lives. This feeling influenced the following project at IDII, which was a breakthrough moment in the thesis process.

In the Applied Dreams workshop, december 2003, I realized that there is no such thing as a neutral design decision. Every decision carries an ideology that can be personal, commercial, or even political and cultural. And we as designers must be aware of our responsibility in how our design decisions shapes the users behaviors, beyond the benefits of solving the proposed problem.

In our case here, as interaction designers, it is also necessary to consider what the use of technology to solve a problem changes before, during and after the consumer experiences our design solutions.

For this workshop, Karmen Franinovic and I developed the project PoliticoMobil, which explored systems of power expressed through social interactions inside the car. Using extreme examples of political systems, PoliticoMobil questions control, decision-making, and issues of property inside the collective car community, as well as the concept of the community car itself.

Trust, access and communication are important aspects of every community. In the car these are expressed through actions such as the designation of a single driver, control of the sound or heat system, the logic of the cars doors. How do we make collective decisions in the car about these systems (where to go, what to listen...)? What possibili-

ties does the implicit car system give us to make personal decisions?Invisible relations inside of the community (is the driver the king or the slave?..) can be expressed through the design of the car.

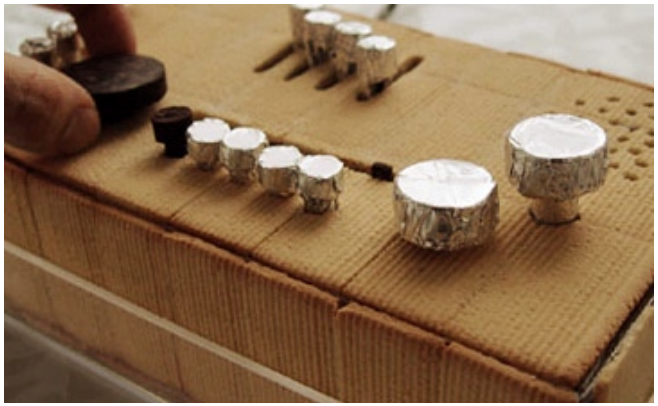
For better understanding of the range of systems that may be expressed inside the car we designed extreme expressions of political systems that would stimulate certain behaviours.

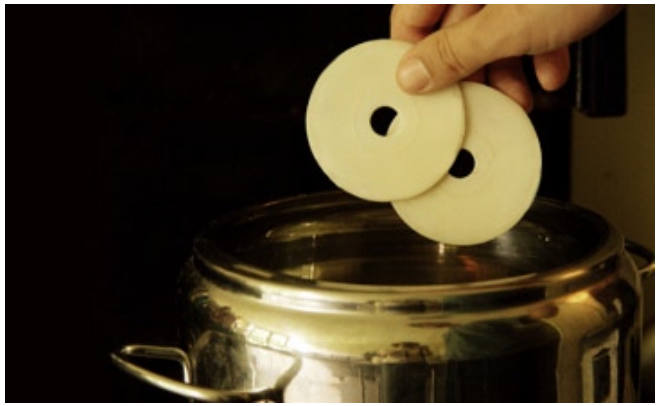
After a conceptual development of four possible political systems in the car, we entered into a stage of physical prototyping and production of video scenarios for two of them (incorporating, however, aspects of all four) in order to represent the possible interactions.

Fig. 4.8 Below, some screenshots from the video scenario "Libertarian Democracy - Bush".




4.3. Second Stage
Bakedbits, an investigation





4.3.1. Intro

(...) objects, acquired and used, increasingly turn into signs, mere communication supports, contributing to semiotic pollution. And on the other hand, once their "useful life" is concluded, once they have lost their possible communicative significance, they go back to mere materialness (the materialness of the support providing information), thus contributing to the planet's physical pollution. (...) When things arouse our interest and we perceive their physical presence and "materialness" they stop involving us and become trash. [77] *Ezio Manzini*

The second part of this thesis was an investigation about the design influence in our "Appetite for Technology", by looking at specific issues in the consumer's relation to electronic objects. This project is called Bakedbits, and explores the boundary of how electronic objects can be consumed and discarded.

This project looked at two phenomena that we can find in current consumer society:

1. Several electronic objects are replaced and discarded at high rates because they are programmed to reach their end-of-life very fast.
2. A considerable part of the consumers don't think about the environmental implications of throwing away their electronic objects.

Fig. 4.9 Logo Bakedbits. Above, Paneluce, DolceRadio and CD-lini, from left to right.

Bakedbits is positioned as a comment on these behaviors of the current consumer society. They are hypothetical electronic objects whose main function is to express and communicate conceptual ideas, and not necessarily to be made real and put on the market.

The Bakedbits objects are intentionally ambiguous. Using food as the design material for the electronic devices (body, shell, buttons), they intend to create a tension in our stereotyped assumptions of the properties of an electronic object (use of plastic, water resistant, toxic, very defined shape, throwaway), and in how food should be presented (hygienic, packaged, ephemeral validate, organic). This ambiguity stimulates thinking about these assumptions by offering the possibility of skepticism or belief in the object without constraining it to a specific answer. At the same time, it makes more evident some aspects of the relationship between the user and the object that didn't become contradictory despite the different contexts.

In the following pages are the descriptions and images of the three objects designed.

Fig. 4.10 Image used in the DolceRadio poster. A play between the seduction of chocolate and the seduction of the radio functions.

Fig. 4.11 Two prototypes of the Dolceradio. One made of chocolate and another made of biscuit.

4.3.2. DolceRadio

A radio with edible shell and buttons made of chocolate. “Dolce” in italian means “dessert”.

The radio is an example of a technological object that in its original functionality is not as desirable anymore when compared to other, more advanced devices.

The DolceRadio tries to regain its attractiveness not by innovation, but by adding seductive qualities using chocolate and adding extra functions. It aims to stimulate questions about the presence of additional characteristics and how they influence desirability.

The radio is made of biscuits or chocolate (two different prototypes). It has basic radio functions, like tuning, volume, on/off, etc, and some with more specific use like 100Hz, 1kHz and 100KHz equalizer, memory, alarm, gain and even some that just work in combination.

The control knobs are made of chocolate and can be covered with aluminum foil, like a bonbon. If a control knob is pulled out and not replaced, the function is removed from the radio. Hence, the appearance and functions of the radio can be dramatically affected by consuming its control knobs as food.

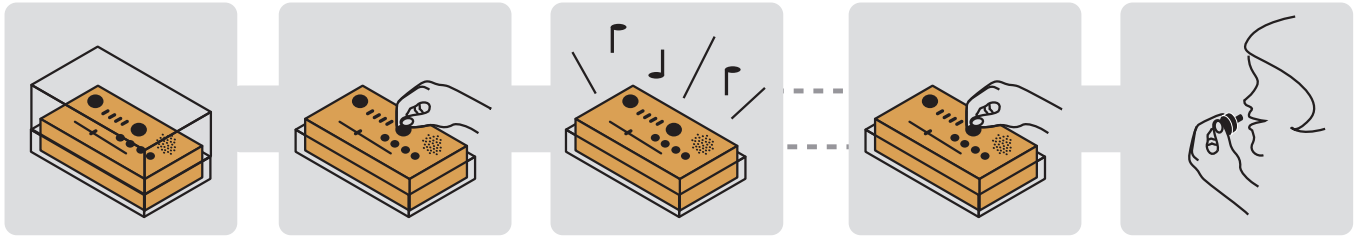


Fig. 4.12 The three first steps are the usual use of a radio. The consumer can choose to go beyond and pull out knobs and bite the shell of the object.

Prototyping details

The electronic part is a real alarm-radio re-assembled in way to have an equalizer and fit in the internal biscuit/chocolate box space. The control knobs were redesigned to have enough volume to be desirable as food and to have enough resistance.

For the chocolate shell, it was made a mold based in a positive radio made of plaster. The manufacture process was very similar to the process of homemade Easter eggs.

More references in the Appendix.

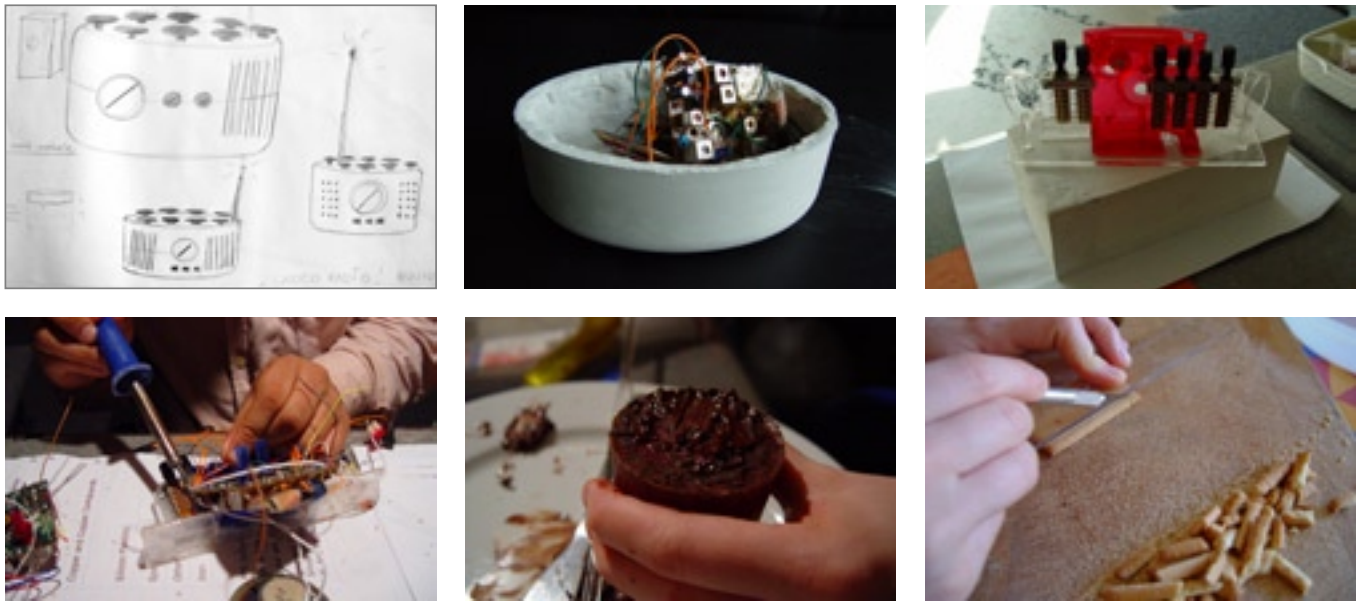


Fig. 4.13 Some images of the DolceRadio prototyping process.

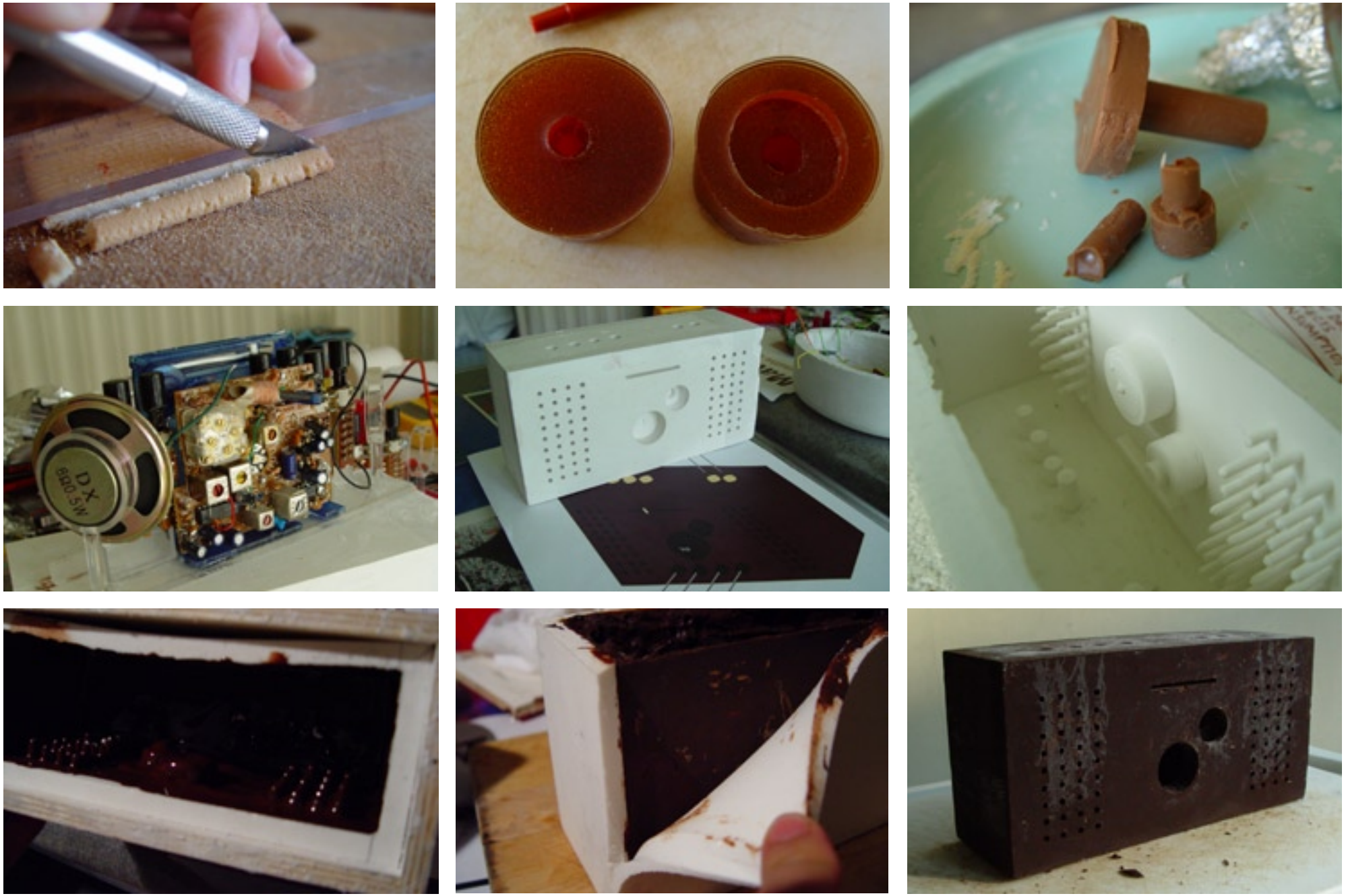


Fig. 4.14 More images of the DolceRadio prototyping process.

Fig. 4.15 Image used in the Cd-lini poster. A post-use for a good that has a very transitory interest.

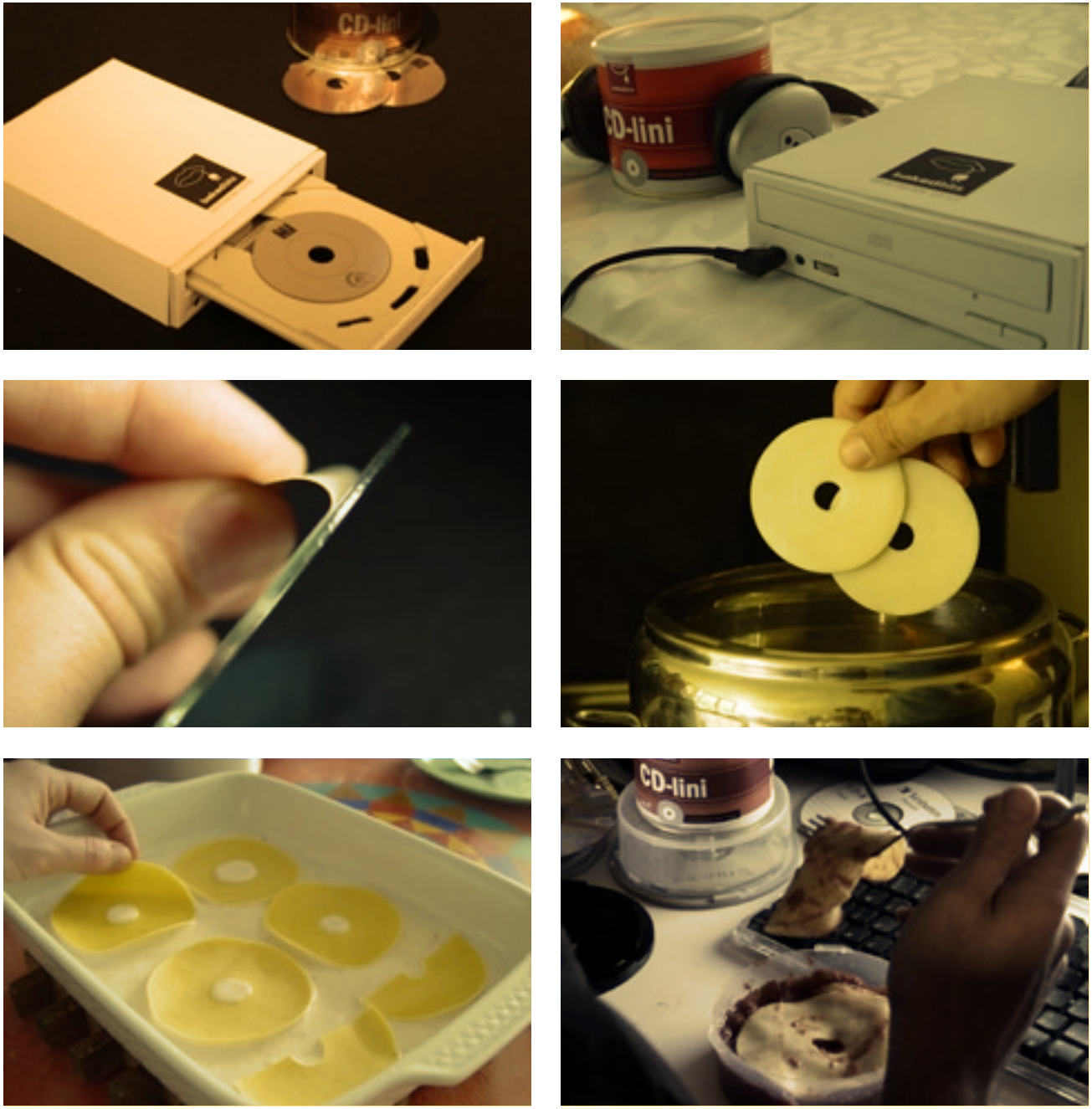


Fig. 4.16 Two suggested ways to consume the CD-lini. One as digital media, another as circular pasta.

4.3.3. CD-lini

The CD-lini is a compact disc that can be consumed as pasta. The name refers to usual pasta names like tagliarini, cappelini or tortellini.

CDs and digital music are banalized goods in the sense that they are easy to acquire (buy, copy or download), are cheap and have a high availability. In the CD-lini, transforming CDs into circular pasta exposes the transitory interest (appetite) in this object and stimulates questions about the appropriate discard for this kind of object.

CD-lini comes in cans with different flavors. The flavors refer to music labels compilations (ex: Virgin Rock mix) or to specific bands (ex: Spicy Girls special). The package contains 25 audio CD singles (8 cm diameter), each one with a different music accordingly to the flavor. CD-lini can be used for cooking just peeling off the metallic label. One can use the peeled discs as lasagna tiles or simply as pasta.

The CD-lini does not admit intervention while consumed as electronic object (one can't record or delete files), like a regular commercial CD. The information is not stored in the label, so when one eats the CD-lini the information is also eaten. If

one has problems with hygiene, after some use, it can be thrown away without further consequences or used as compost.

Prototyping details

For understanding of some of the inspiring references, read following description:

CD singles, or CD-3, are small (8 cm) and allow for about 22 minutes of music. As any current recordable compact disk, it has a reflective surface (the metallic label), a photosensitive dye that stores the information and a body made of polymer.

The dye and the polymer are made of biopolymers. As reference, Sanyo and Cargill are releasing this year the first bio-plastic (polylactic acid) vegetable derived optical disc.[78] They can make 10 discs made from one ear of corn, but this material is not yet edible by humans. CD-lini are made from a hypothetical biopolymer that has the required optical properties and at the same time can be eaten by humans without problem.

Another reference of how optical discs are developing is the paper DVD. Sony and another Japanese company have developed a disc with 51% of its weight made of paper, that can hold up to five times more data than current DVDs. According to Sony, researchers were able to make a paper disc as Blu-ray technology does not require laser light to travel through a key layer of a disc called the substrate.[79]

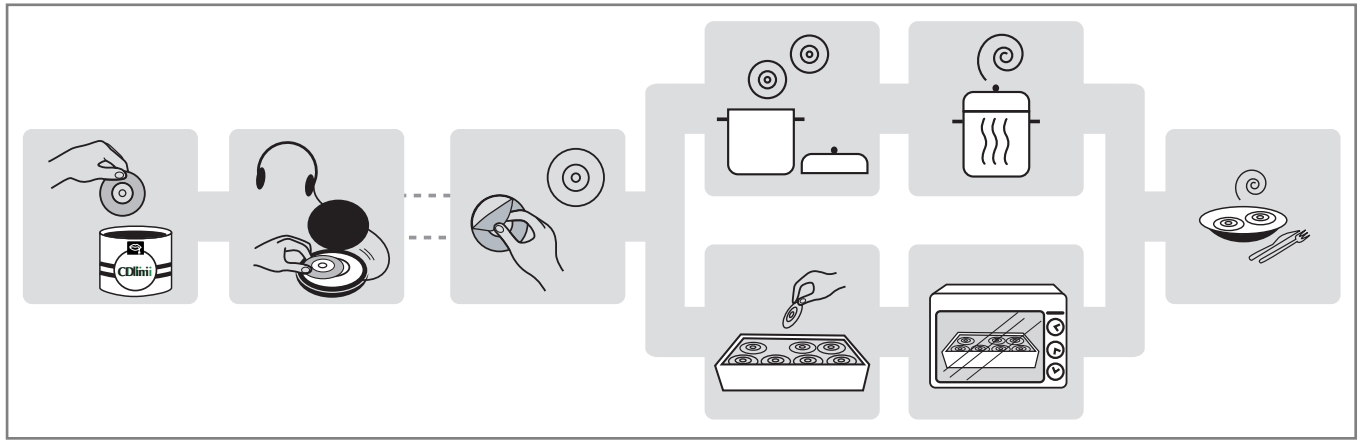


Fig. 4.17 One opens the can and pick up a disc with digital music for listening. If one looses interest for the new acquisition, there is the option to peel the metalic label out and cook it as a lasagna or as regular pasta.

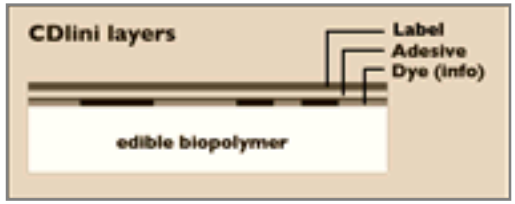


Fig. 4.18
The layers of a CD-lini.

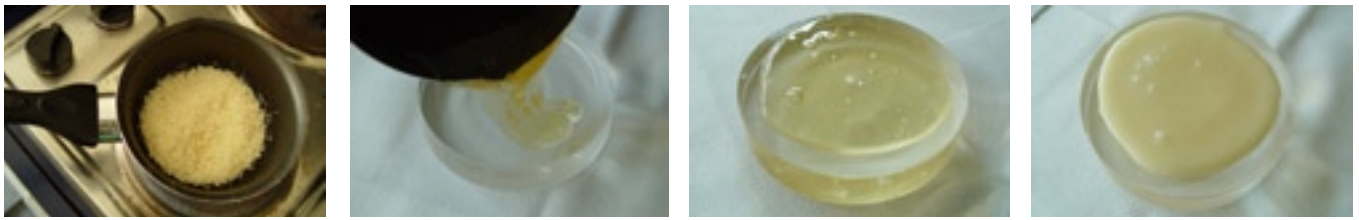


Fig. 4.19 Prototyping process of a version of the CD-lini made with biopolymer Mater-bi.

Fig. 4.20 More images of the CD-lini prototyping process.

Fig. 4.21 Image of Paneluce poster. It is a commentary about the electronic object made for almost daily consumption but not completely consumable.

Fig. 4.22 Some of the different Paneluce prototypes.

4.3.4. Paneluce

A lamp than can be consumed as bread.

Paneluce is related to the Appetite for Technology concept, but it is too ambiguous to be positioned clearly. It is better to consider it as a conceptual model, not as a project.

The intention was to make an electronic object that would put together a very common representation of electronic object (a lamp) and of food (bread). This union aimed to investigate the electronic object that is made for ephemeral – even daily – consumption, but still is not completely consumed. If one chooses to consume the object, the entire loaf of bread cannot be eaten because it is the shell and body of the lamp. If the food is consumed, there will be a light bulb and a socket remaining. In this latter case, the light bulb can still be used for other purposes.

An extreme example of the difference between the products of labour and work is the distinction between a loaf of bread that is eaten in about one day and a table, which may easily survive generations.[80] *(...) When producers and designers*

look at products mainly as things that must be made fit for consumption, it is extremely hard to give them an independent and durable life of their own.

Hans Achterhuis, in Eternally Yours

The bread of Paneluce is cooked partially (precooked). It is baked in a very hot oven, baking the external crust faster than the bread's interior. The heat of the lamp finishes the baking from the inside.

One must plug the bread in the wall, turn on the light and wait 20 minutes to have the bread fully cooked, tasty and smelling good. At this moment, if one bakes it too much the bread becomes too hard and dry to be eaten. In fact, it becomes so hard that becomes an inedible object with a pleasant warm glow.

This object has an intermediate mode of use, with the possibility of eating just some bits of the bread and put it to use as a personalized lamp. If one decides to keep the lamp and doesn't use it often, there is a high possibility of it being prone to fungus, because the heat of the lamp makes sure it remains dry.

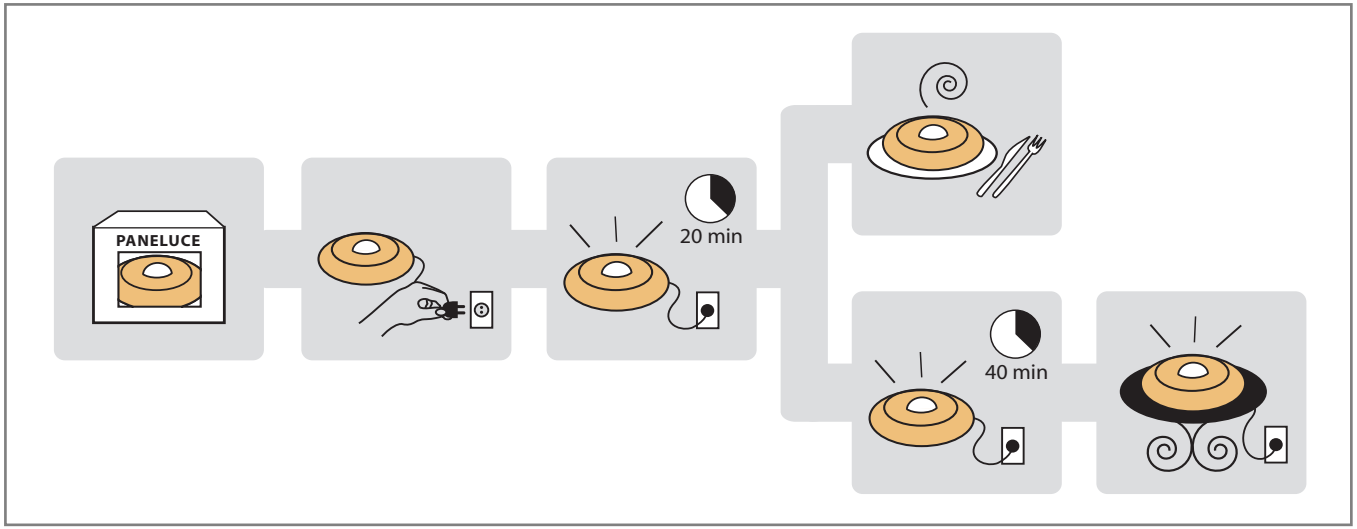


Fig. 4.23 One buys the pre-cooked bread and plug it in the wall. After 20 min. the consumer needs to do a decision: or he chooses to eat the warm and cooked bread at that moment or chooses to keep the light lit and wait to the bread become dry and hard as an object, a lamp.

Prototyping details

The bread is made with flour, yeast, water, oil, a light bulb G80 60 Watts, a ceramic electrical socket and salt. The external white wire is the one used for sound systems. It is cooked in a oven hotter than usual to make it cook much faster outside than inside, providing a nice external crust color and resistance. But it is taken out of the oven before it is completed cooked inside. All internal electrical parts are insulated previously with hard flour batter cooked separately.

Fig. 4.24 Ingredients of a Paneluce. In this picture is missing the insulated socket and the wire.

Fig. 4.25 Paneluce prototyping process.

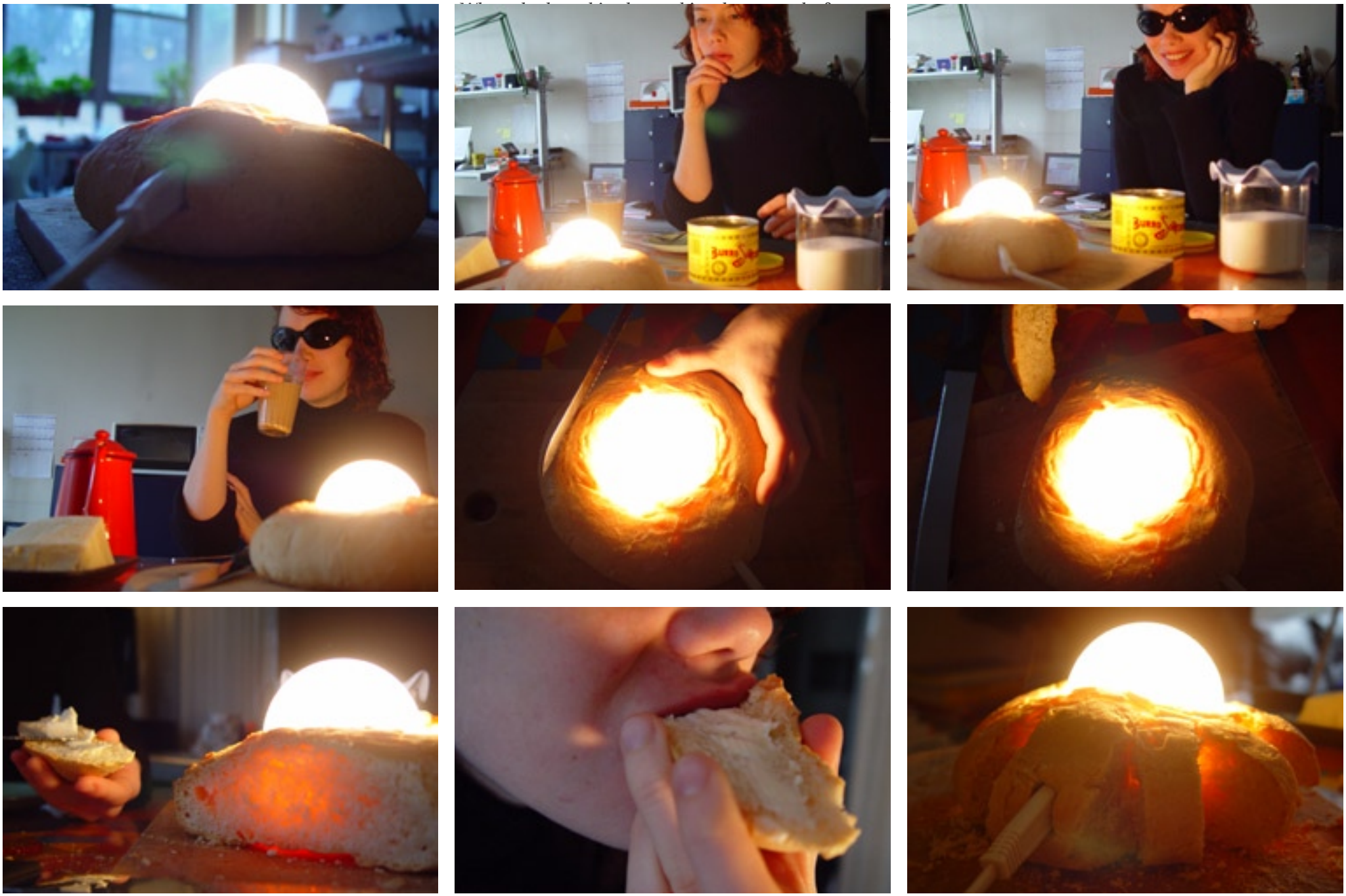


Fig. 4.26 What about a Paneluce for breakfast?

4.3.5. Bakedbits in Exhibitions

Fig. 4.27 Exhibitions at IDII and at IBRIT (Milan). Last image from the Italian Disney Channel program "Eta Beta".

4.4. Third Stage
Mobile.Seed, a proposal

4.4.1. Intro

If the more general role of design is to make the world more habitable, a way of doing it is, in my opinion, that of proposing a new criteria of quality, which would have the garden, and the care which it requires, as a metaphor of reference. A new criteria of quality which would bring to a system of objects variety, complexity, life, garden, and that, at the same time, would be a product of the current world: a world so extensively and intensively artificialised. It seems simple. In reality, following this proposal implies an overturning of the way design has traditionally oriented itself towards its products. It implies an inversion of tendencies in the relationship between subjects and objects. It implies a new ecological sensibility: taking care of objects can be a way of taking care of that much larger "object" which is our planet.[81] *Ezio Manzini*

Fig. 4.28 The Mobile.Seed nourishing a flower.

Fig. 4.29 In the Mobile.Seed project, the act of discard is re-designed in way to change the relation between the consumer and the electronic object.

This third phase of the thesis was stimulated by insights that originated from the Bakedbits investigation. The investigation helped me to have a better understanding of the influence of design in our appetite for technology and to look differently at waste and at the moment that things are thrown away.

Everybody understands that mobile phones are changing our lives, but few people are aware of how technological devices change our environment. This project is a communication of a scenario of 'personal recycling' of technological objects. In this future scenario the gadget is designed to return to nature in curious ways by the hand of the consumer, creating a positive approach to direct the user's behavior. Recycling of technological objects today is a remote and thus abstract concept to most people. But this vision is not a daydream. It is based on research of the current available materials, the materials that are under development and in the laws that manage e-waste.

Communicating this scenario effectively can steer current decision-makers toward the concept of personal recycling where people themselves perform the act of recycling in his home, making an otherwise hidden process delightful and present and perhaps valued as a cultural and social phenomenon. It is not about being politically correct; it is about showing an understanding that wellbeing and respect to nature are really important issues for us and for future generations.

Mobile.Seed is at the same time a project in which the social responsibility of the designer is practiced, and a marketing strategy to sell a product that would be ecologically sustainable, but uses the motivations present in the consumer society as the main stimulus. Behind an innocent façade (a flower) conceals an elaborated manipulation mechanics (spread out an ideology).

There are mainly three different types of influence over decisions in this area. The first is the increase of consumer demand for technological objects that respect environmental concerns. The second are the companies, which by their own initiative or external pressure develop new solutions that rethink products paradigms as a whole, or reduce usage of materials, reusability of devices and recyclability of waste. The third is governmental laws. Bringing the responsibility of recycling to daily life as a pleasant action can raise the consumer demand for this kind of solutions and the awareness of the consequences of one's own consumption. Also, changes in the consumer criteria can reflect in the companies' research and in the governmental regulation.

Why a mobile phone and a seed?

The mobile phone, despite its small size but due to its huge scale of production, represents a very relevant e-waste problem. It is very toxic when in landfills and it is difficult to recycle due the amount of different materials integrated. Few people return mobile phones for recycling (only 10%), and some even throw it in the trash. More than half are kept at home in drawers. I want to take advantage of the fact that the mobile phone is a very personal device and of the identity that people acquire with the product to experiment and communicate a possible change in the relationship between the user and the electronic device.

The seed and the act of planting were chosen to signify this change in the relationship, taking a positive approach that could join fun, the acquired benefits of the consumer society -- like diversity of options and freedom of choice -- and an active engagement in the ecological well being ideology. Maybe this view is too romantic, but planting brings back people closer to nature, getting in touch with the soil humidity and the frailty of it systems, something quite disregarded in the high tech urban societies.

The Mobile.Seed project is a communication of a possible future that unites the acquired technological benefits of digital connection with the old benefits of staying connected with nature.

There are three main issues that motivated this project:

1. A personal criticism on the radical approach of many environmentalists that simply blame politics, industries, products and consumers for the consequences on our world, but often disregard the interconnected economical, motivational and social reasons that constitute our current scenario.

Environmentalists hardly pay any attention to what the enormous industrial effort is originally meant to provide: cameras, cars, lamps, solar panels, dishwashers, telephones, chairs, Prozac, computer games, bread, anything that brings comfort to our lives, and far more clocks than we can possibly watch. They only consider products from the viewpoint of environmental impact by exploitation: energy consumption and waste emissions. *Laurie Anderson*[82]

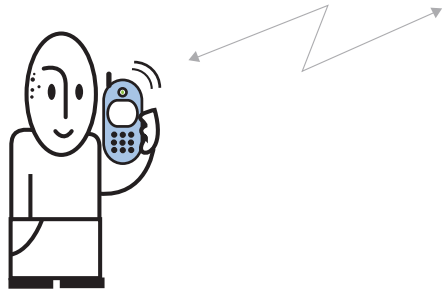
2. Overall low interest in getting people to engage in the ideology of common well-being. I see this in part as a consequence of a poor communication strategy, not really working on the motivational reasons of the process.

Fig. 4.30 More than half (65%) of the discarded mobile phones are kept at home in drawers.

Fig. 4.31 Image from the "Buy Nothing Day" campaign by Adbusters.org.

For thirty years scientists, think-tanks and global summits have produced a stream of such ghastly projections that many people have been de-motivated by deep eco-gloom. As a business or social issue, the environment seems to be all pain and no gain. The 'eco problem' leaves us with guilt, denial, despair - or a combination of all three. John Thackara [83]

3. Real facts and concrete problems related to e-waste that we face nowadays. This project will constrain it focus on the mobile phone, which have a very toxic waste and high material requirements for the manufacture (fig. 4.32).



75,50 Kg/phone

Material Input for the phone	
Source	**MI (Kg)**
Material	30,40
Assembling	15,50
Air Shipping	0,30
Ocean Shipping	0,01
Roads	1,09
Operation (1 year)	28,20
Total	**75,50**

Fig. 4.32 MIPS of the Italian Mobile Telephone Network, 2001, Ing. Antonio Federico, Dr. Fabio Musmeci, Dr. Daniela Proietti Mancini, ENEA.

4.4.2 Mobile.seed

In the following pages the Mobile.Seed idea is explained in detail. The first part of the content is organized in key questions and direct answers, grouped in:

- **What is the idea?**
- **Why this solution?**
- **How do you think this product could become true?**

Then, in the second part, there are graphics and illustrations.

4.4.2.1. What is the idea?

It is a fully biodegradable mobile phone that contains a visible seed inside. One can plant it as a different disposal mode, and after a while a flower sprouts from it.

How does it work?
The seed germinates as soon it comes into contact with water. This takes a while because the biodegradable protection capsule needs to degenerate a bit and allow the water to enter.

How do I plant it?
Just plant your mobile phone upright, covered with soil, no more than 2 cm deep. Keep it well-watered for four weeks until it sprouts. Then care for it as you would with any plant.

Fig. 4.33 The Mobile.Seed has a visible seed inside.

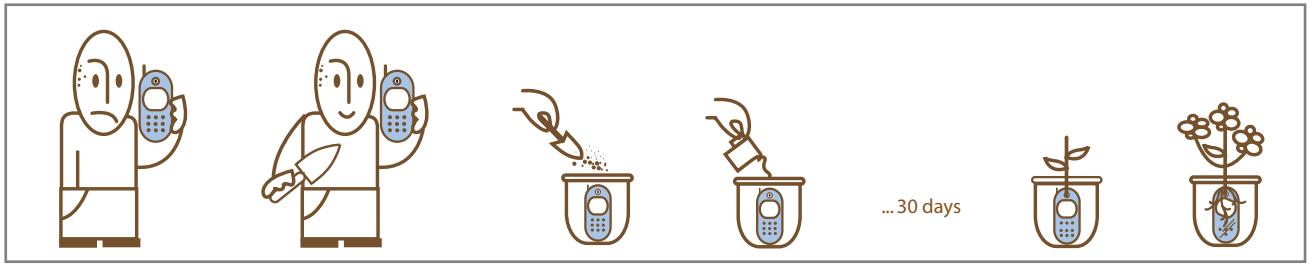


Fig. 4.34 As an alternative discard mode, one can plant the phone. After few weeks, a flower sprouts from it.

Fig. 4.35 VERTU mobile phone, positioned as a Luxury Personal Communication instrument. It is crafted using precious metals and exclusive parts. www.vertu.com

Why a mobile phone?

This thesis works on the theme of Appetite for Technology and approaches it by exploring how the designer influences and shapes people's behaviors and their relationships with electronic objects. The mobile phone is a personal device and a modern technological fetish. It is an icon of the modern technologies in our daily life. Hence, it is an excellent product to use as a channel for experimentations for this kind of influence of design in consumer's behaviors.

Why a seed?

A seed or a plant is one of the most obvious examples of how to take advantage of biodegradable materials, nourishing from them and processing them into new forms. At the same time, seeds are full of connotations and associated meanings. They are more then just a possibility for a beautiful flower in a vase. A seed symbolizes the carrier of a new life, a chance for change. In the case of Mobile.seed, the seed symbolizes the mobile phone returning to nature, closing a biological cycle, and the chance to raise interest in develop technological objects as partners in the process of looking for social and environmental well being.

4.4.2.2. Why this solution?

This idea is a result of a rumination on the very different subjects raised by the Bakedbits investigation and subsequent readings on subjects like edible biopolymers, eco-feedback, consumerism, cooking procedures, ecological sustainability, e-waste, cradle-to-cradle approach, phytoremediation of soil, and benefits of an idle mind.

This idea sprung from a personal naïve thought: "What if I could discard my phone simply by planting it? What would this change?" I decided to take this question seriously.

What is the connection mobile phone + seed?

There are two kinds of connections. One is more poetic and another one is more practical.

The poetic one is how I see the phone, the seed and the user together in a metaphoric way. The metaphor is related to how some plants (angio-

sperms) ingeniously developed a way to spread out their species. They provide attractive fruits to animals that eat them but, at the same time, these animals transport the internal seed(s) to farther places, increasing the planted area and the chances of new genetic combinations. The mobile phone represents the fruit, the enticement of the technology. The fruit seduces the user who in turn buys it. But inside this phone there is a seed that contains an ideology, which can spread with the help of the user. Hopefully it can increase the amount of people that engage in this ideology and also stimulate new solutions.

The practical one is more related with social implications. A mobile phone is a connection device. The added seed is just an extension in this connection property. The mobile phone is associated with be connected with the rest of the world in an instantaneous way. Distance and time don't matter, you are free to move and still keep in touch whoever you want. But in reality, you are in touch but mediated by a device. Our connections with people and sometimes with a remote place reach us by digital means. Everybody understands that this is part of a revolution, most for good. But, ironically, information and communication technologies are 'disconnecting' us from the same things that they connect.

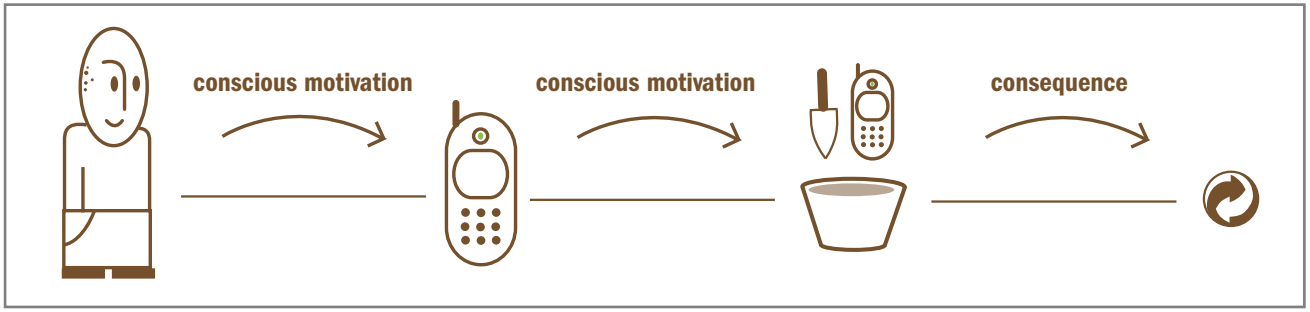


Fig. 4.36 The concept was inspired in a common mechanics used by nature to spread out a seed. The consumer is seduced by a good and consciously decide to buy it. Later on, to plant the phone or not is another conscious decision. But, as consequence of the planting, intentionally or not, the consumer does a benefit for the collective and helps to spread out another kind of seed.

Within the development of culture under an exchange economy, the search for authentic experience and, correlatively, the search for the authentic object become critical. As experience is increasingly mediated and abstracted, the lived relation of the body to the phenomenological world is replaced by a nostalgic myth of contact and presence. "Authentic" experience becomes both elusive and allusive as it is placed beyond the horizon of present lived experience, the beyond in which the antique, the pastoral, the exotic, and other fictive domains are articulated. In the process of distancing, the memory of the body is replaced by the memory of the object, a memory standing outside the self and thus presenting both a surplus and lack of significance.

From "Objects of Desire" in "On Longing" by Susan Stewart. Baltimore: The Johns Hopkins University Press, 1984, pp. 132-136.

Fig. 4.37 A prototype made with biodegradable biopolymer made from starch. The roots of the flower nourishes from the decomposition of the material.

This detachment in experiencing concrete people and real places makes it more difficult for people to respect the world that surrounds us, including the people that live in it, because the change in our perception of significance.

In addition, we see people demanding faster access to information and demanding stimulus at an increasing rate and intensity. This could reflect in immediatism[84] and in exaggerated individualism, stimulated behaviors that are of no help for the collective. The seed is, by its own nature, a counter balance in these behaviors. Someone who plants a seed knows that its results are not immediate. It is not enough to pour water and watch what happens next. One must to some extent re-connect to nature to succeed. The care and attention for a certain period is inherent to this process. And the reward is not glamorous, but beautifully real and still frail.

This approach is better than alarming and scaring people about the possible detriments of consumer society. It is better to encourage people to see with their own eyes these slow and small changes. And, like any old farmer knows, one just needs to re-connect to nature to 'see'. The mobile-seed is a communication of a possible future that unites the acquired technological benefits of digital connection with the old benefits of staying connected with nature.

Why biodegradable?

A biodegradable material returns to nature as nourishment to plants and microorganisms, decomposed in simpler and non-toxic substances. For Mobile.seed, there would not exist a direct flow from these decomposed substances to the production cycle of a new product. But in a broader view, the flow of minerals, gases and organic matter would happen on a global scale.

More important than thinking about the details of the ecological cycle of the Mobile.seed is understanding its aims in the project communication.

The purpose of a fully biodegradable phone is also about bringing the abstract concept behind the seed and the planting to a physical expression, embodied in the object. Biopolymers and other biodegradable materials have inherently different aesthetics that can be used in a positive way to motivate consumers. It must have an appealing design. In order to use such a device, people must feel socially secure or even 'cool' using the device. Different colors, textures, transparency and flexibility differ slightly from common plastics. To use biodegradable materials and a real seed in

the Mobile.seed is about accessing the meaning anchored in a material object.

In summary, the industrial design of the product must be as good as that of the high-quality mobile phones we find on the market today. However, this is not the focus of this project communication. I am not an industrial designer and decided to use a common and neutral mobile phone design as physical representation, and focus on the communication of the interaction and of the relationship with the object.

Isn't this idea innocent?

No. But the intention is to make it seems like yes. The apparent innocence was a desired quality for a counterpoint to the current way that we relate with electronic objects. The flower care and the simple mechanics of discard/recycling aim to evidence the contrasting values with the usual view of technology. And instead of put them as incompatible, the project tries to propose how a merge could happen. I believe that innocence can be a desirable state in which the eye can see beauty in an uncensored way.

There is a tendency to dismiss something that looks naïve. The naïve is considered to not have an understanding of the complexity of the relations or of the contexts in its manifestation. It is considered to have a lack of sophistication and critical judgment. It can be said that our western culture praises the fast pace, the individual pleasure, the ephemeral consumption and the artificial perfection. The naïve does not fit well in this environment, often competitive, cynical and very manipulated. The natural imperfections and the pace of a plant are in somehow annoying to this kind of culture.

Beyond the innocent façade, there is an elaborated manipulation mechanics. A marketing strategy to sell a product that would be ecologically sustainable but uses the motivation present in the consumer society as the main stimulus. To look like naïve in this context helps to make this method more efficient and at the same time contains an implicit critical judgment. But it is important to make clear that it is not an abuse of the quality of innocence in the way advertising does, as an appropriation used to add value to something meaningless. It is about understanding the current context and play on the rules. In addition, if the familiar contains the seed of change, it is easier to be accepted and become reality, smoother.

Fig. 4.38 This project gives a great value to innocence, but as a mind state, not as a limited condition. Innocence is seen as a state in which the eye can see beauty in an uncensored way.

Is it the best solution for the mobile phone e-waste?

No. I believe that products as service would be a better solution for this problem of e-waste. It makes recycling a responsibility of the companies that offer the services and makes easier the return of materials for reuse, even if in another product.

But the Mobile.Seed is not just a possible solution for this problem. It also deals with the motivation of the users to engage and support the sustainable approach for the economical development, what is not so emotional in the product as a service solution.

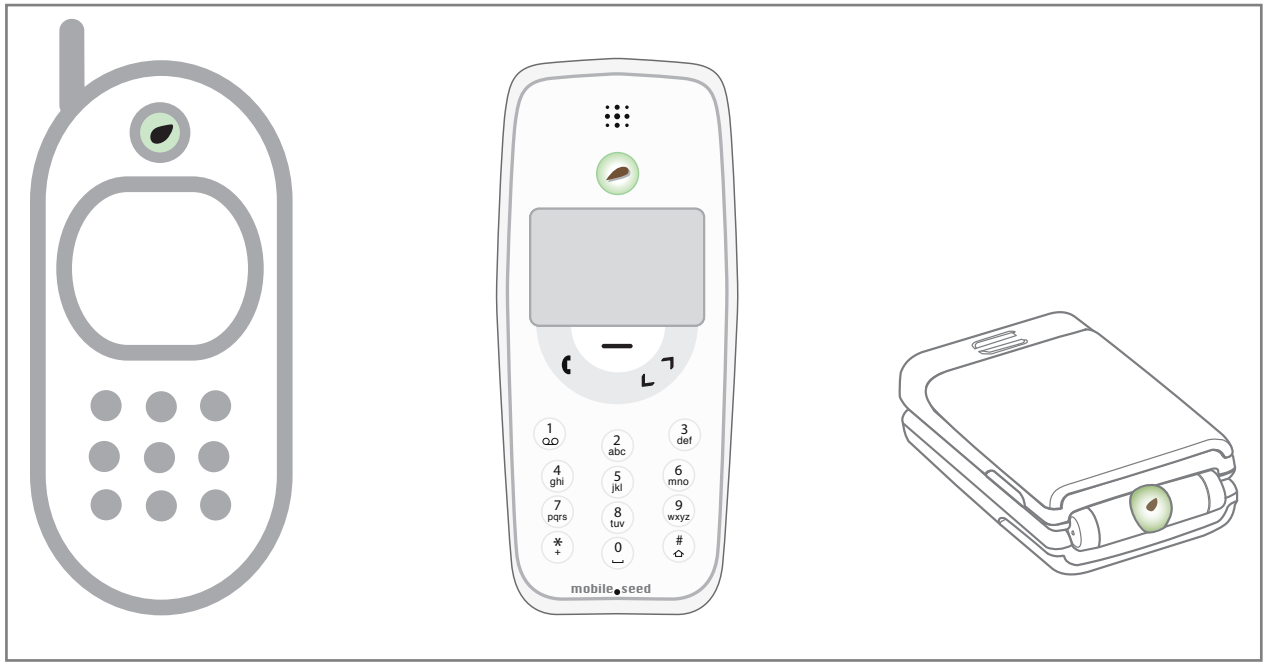


Fig. 4.39 Different illustrations for representing the Mobile.Seed and the visible seed.

4.4.2.3. How could this product become true?

Feasibility of the idea

The first question to be answered in order to know if this scenario could become true or not is the feasibility of a fully biodegradable mobile phone. For this purpose, a research on the current materials used in the mobile phone was done. These materials were categorized accordingly to their toxicity to the environment. Then, possible materials, already available or under research, that could substitute the toxic ones were listed. The resume of this stage can be seen in the table of the **Fig. 4.40.**

With this information and stipulating a reasonable time for the commercial availability of these materials, intermediate stages before the launch of the fully biodegradable mobile phone were planned. This table can be seen in the **Fig. 4.41.**

In the **Fig. 4.42** we can see a comparison between the current life-cycle of a mobile phone and the proposed life-cycle of the Mobile.Seed. It is important to underline that the 'use' stage is kept the same in both cycles.

Materials today and in development

Alternative materials towards a fully biodegradable mobile phone.

Components of a mobile phone:

. Printed Circuit Board
. Antenna
. LCD or plasma display
. Keyboard
. Microphone
. Speaker
. Camera
. Battery
. Body case

+ Accessories

Sources/ References:

. Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS) Directive (2002/95/EC).
. Leena Oiva, "Case Study on the Environmental Impacts of a Mobile phone", Electronics Goes Green 2000+, Berlin, Sept 11-13 2000.
. "MIPS of the Italian Mobile Telephone Network", 2001, Ing. Antonio Federico, Dr. Fabio Musmeci, Dr. Daniela Proietti Mancini, ENEA.
. Diverse news and publications about material research and results found in the web.
. "Metal hyperaccumulation in plants - Biodiversity prospecting for phytoremediation technology", 2003, Helena Freitas, Majeti Prasad, Electronic Journal of Biotechnology.

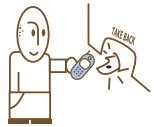
material used today	% in total weigh	need to replace?	properties / use	possible alternatives under development
ABS-PC (acrylonitrile-butadiene-styrene)	29%	Yes	Stiff, impact strength, dimensional stability flame-retardant & cover	Biopolymers based on polylactic acid or starch
Ceramics	16%	Some	capacitors, resonators, etc	ROHS Law at 1/07/2006
Copper and Copper Compounds	15%	Some	electrical conductor	. Semiconductor of nanostructured porous silicon PPy/PDLLA . Phytoremediation
Silicon Plastics	10%	Some	chips/ display	. nanocircuits made of aminoacids (Virginia Tech) . Biodegradable OLED display
Epoxy	9%	Yes	PCB, chips and adhesives	. protein adhesives, . biopolymers, nanocircuits
Other Plastics	8%	Yes		Biopolymers (?)
Iron	3%	No		
PPS (polyphenylene sulfide)	2%	Yes	thermoplastic electrical connector	Polyhydroxybutyrate (PHB) SPLA70 - but not so high temperatures
Flame Retardant	1%	Yes		ROHS Law at 1/07/2006
Nickel and Nickel Compounds	1%	Yes		Phytoremediation
Zinc and Zinc Compounds	1%	Yes		ROHS Law at 1/07/2006
Silver and Silver Compounds	1%	No		
Al, Sn, Pb, Au, Pd, Mn, etc	< 1%	Some		ROHS Law at 1/07/2006

Fig. 4.40 Table with the current materials used for a mobile phone and the possible alternatives towards a fully biodegradable device.

Scenarios for personal recycling

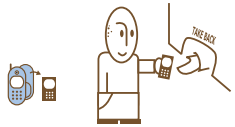
How the mobile phone could develop towards a fully biodegradable mobile.seed

2005



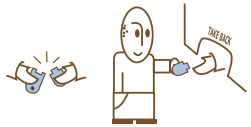
Phone is very toxic to the environment and you receive a seed when you give it back for recycling.

2008



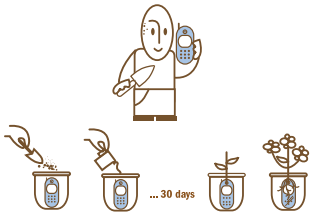
Biopolymers achieve necessary properties for external protection. The seed comes in the front cover.

2015



New biopolymers and protein adhesives substitute epoxy in the PCB. Semi-conductors made of nanostructured porous silicon. OLED Displays are fully organic. Half of the phone is biodegradable.

2025



Chips use nanocircuits made of aminoacids. Metal usage reduced to a level that can be processed by domestic phytoremediation of the soil. The plant nourishes itself from the phone and closes the cycle.

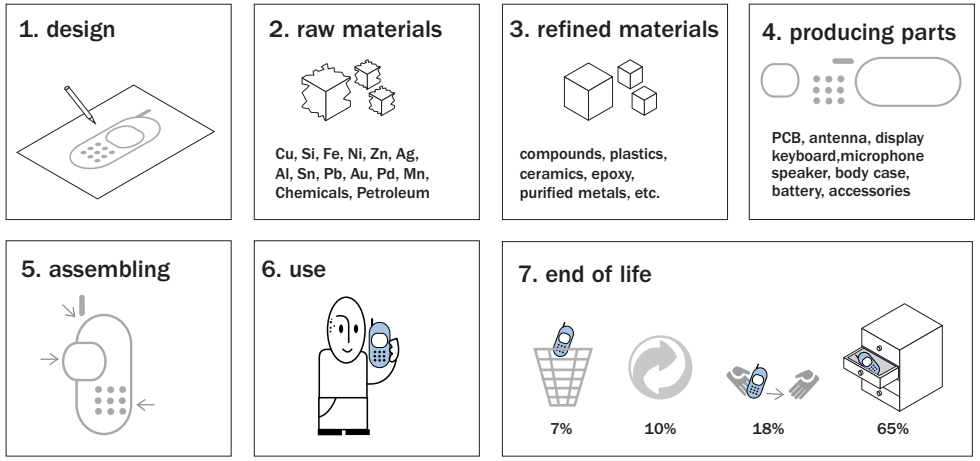
Fig. 4.41 Possible intermediate stages related to new materials availability before the launch of a fully biodegradable mobile phone.

Life cycle

mobile,seed

A comparison between the current life cycles of the mobile phone and of the Mobile.Seed.

Mobile phone current life cycle



Mobile.Seed life cycle

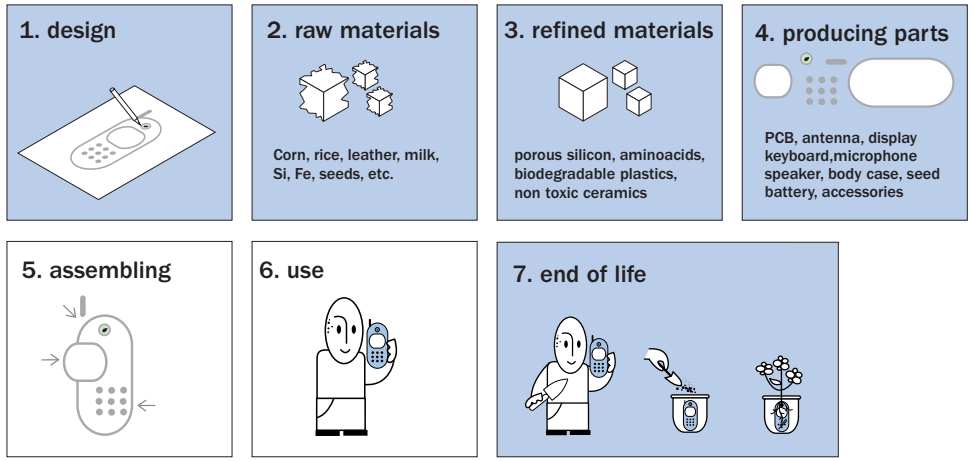


Fig. 4.42 Differences in the product life cycle between the current mobile phone and the Mobile.Seed.

How would be the product launched in the market?

It would become true in small steps. As an exercise for this launching process, I created a company called Ecotech, and looked at the development of this product from now, starting with simple achievements and keeping the ideology until the final goal, a fully biodegradable phone.

The full story can be found in the appendix in **"A New Company"**. The hypothetical company is a syndicated company of the MetaSystems Group, which had a strong tradition in high end communication and network systems, and the Matogrosso Group, which had ties with the chemistry and agro-industrial sector. The company's objective was to develop communication devices that had a low environmental impact, using raw materials of agricultural origin. The process passes through scientific developments, patents, joint ventures and diverse communication strategies, until November of 2025, when the Mobile.Seed is launched in the market.

Changes in the relationship between the consumer and the device

Besides the necessary marketing strategy and advertising campaigns, it is valuable to speculate how the consumers would react to the product and how they would abuse of its original functioning.

For this purpose, a short illustration video was done, called "New eyes". The story is used to visualize possible new interactions with the mobile phone due the re-design of its end-of-life and also to show a possible situation in which a skeptical observer could become motivated to engage in the idea. The narrative starts with a Mobile.Seed spot in the TV and then continues with the protagonist walking through the city, going to visit some friends. By his way, he see people planting a mobile phone in public squares, teenagers with the new cool model and a guy giving the old phone to his dog to bury it. He has a very skeptical behaviour in the beginning, but after the experiences that he witnesses by the path and the visits to his friends, he starts to change his perception of the situation. The first friend does a kind of mystical ritual with the personal phone. With the second friend, at the end, he joins a little girl in an innocent and playful discard of the Mobile.Seed, and attends to the spreading out process of the idea.

This movie can be seen online in the link below: http://people.interaction-ivrea.it/b.negrillo/thesis/mobileseed/movies/. In the next page there are some frames from the movie.

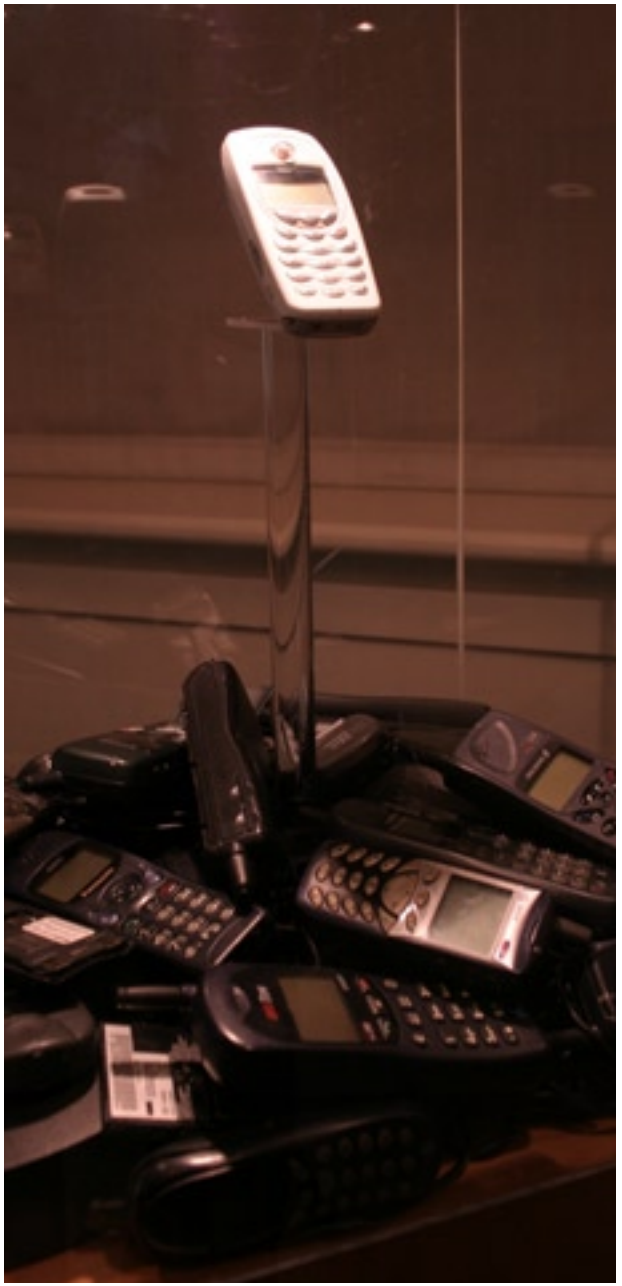


Fig. 4.43 Mobile.Seed stand made for the IDII exhibition in June 2004.

Fig. 4.44 Frames from the video "New eyes", made to explore possible new interactions with the mobile phone due the re-design of its end-of-life.

4.4.2.4. Prototypes and tests

Fig. 4.45 Images from prototypes and tests made for the communication of the Mobile.Seed project, using plaster, silicon, rubber and ice.

Fig. 4.46 More images from prototypes and tests made for the communication of the Mobile.Seed project.

5. Discussion and analysis

I wrote this part of the thesis one month after finishing the exhibition. This meantime was essential to evaluate what was done with a more cold view and understand better the value of the process.

Personally, it was an interesting experience to start with a mild interest, working in a theme that I was interested but that didn't raise any strong feelings to myself and then change to one which I am passionate and was risky and controversial. In this sense, the thesis was a very tough and enriching process, in which I merged my ethical beliefs and values, my background and built a perspective for what I want to my professional future, despite any other easier paths that appeared in the way.

As expected, I changed a lot through the process. The passionate feeling of the beginning, which implied in inflexibility, innocence in the assumptions, and emotional guidance, become a rational, open minded and mature approach to the problem, but still keeping the ideals that started all over. And the innocence was transformed from a weakness to an intentional language, to a poetic approach.

The projects themselves, independent of the process, had successes and failures, which will be described in the following items. The two projects deal differently with the main theme, with the Bakedbits being an investigation, not really bringing any solution for the problem, and the second one being an proposal, a possible future scenario where both the designer responsibility and a ideological positioning in favor of the common wellbeing are practiced. It implies in different evaluations for success or fail.

5.1 Where the projects succeed

The Bakedbits worked well in generating curiosity, admiration and often some questioning about how these objects would be consumed. But, at the same time, this feedback was not predictable or constant, and each observer had different interpretations. Taking in account that they are intentionally ambiguous, this can be considered a success.

Some people said that I should have a clear stand in the objects; that they would be stronger with a unique message; that they should be more polemic to stimulate debate. I agreed partially with these suggestions, but at the same time I saw a big value in this plural interpretation and in the intentional

subtleness of the messages.

Despite the plurality, most of the interpretations came from the tension between the food characteristics and electronic properties and from the possible choices of use. That's good if we consider that making people not be passive to these contrasts and to stimulate a parallel with the consumption of market products were my aim with these objects. There were very diverse opinions, some about the desire to have a lamp that is made with bread, just for aesthetic reasons, some about the disturbances that one of these objects would generate in one's mind if brought to a domestic environment, and so on. The message is not unique but at the same time there is a focus, and that's why it is rich as an investigation.

The Mobile.Seed project is more difficult to evaluate. The real and clear success would come if the communication of the idea could interfere in decision makers as a reference of possible futures from now. I couldn't test the project at this level yet, mainly because it was not presented to any relevant decision maker. The second criteria for success would be if the project could influence designers to consider more their responsibility in the creation of new products. So far, there was any designer that said: "Yes, now I see better what my profession implies!" among the audience that saw the project. And, as we know, it is an unexpected behavior in this area... What I can say, at least, is that it influenced a lot my formation as a designer, and that many colleagues at least stopped for a while to understand the message. But if they considered the point or not, just the time will say.

About the mechanics of motivating people to plant a mobile phone as a different discard method, it was well accepted, despite the strangeness of the act and the initial disbelief that it would be possible (before showing the materials research). People had fun doing that, and the feeling of doing an ecological good action was a very important motivational aspect. If the product could keep the functionality of a contemporary communication/personal device and at the same time have the benefit of become a flower at its end of life, most people said they would prefer a Mobile.Seed than a regular and toxic equivalent. If we consider that the technological functionality will remain close to a commodity for this kind of product, the flower benefit and the ecological approach can be a very good differential.

The Bakedbits and the Mobile.Seed were successful as a trial to detach the thinking of interaction design from technology. With them, technology

came as a tool, not as the main reason to be.

In a personal level, these projects made me understand better the complexity of the relation among companies, products, consumers, environment, government and design. I could see how interwoven are these areas, and have a better idea of how to position design in this game. Bakedbits made me deal with the border between design and art, and, as consequence, explore the current definitions for these areas.

Another interesting consequence of these projects on me was the development of physical prototyping skills, something new due my graphic design background. I succeed in learning alternative ways to prototype in relation to electronics: cooking, molding, scenarios, staging, movies, etc.

5.2 Where the projects didn't succeed

The Bakedbits just started to be accepted as an interesting design object when it was reduced the conceptual heaviness that was being putted on them. The personal values and emotional motivations had to be constrained to the inspirational level, and the interpretation be left free. So, we can consider that Bakedbits failed to communicate through the objects the whole concept I was interested to explore. Their ambiguity was like a knife with two sides. At one side, as commented in the previous item, it was a source of richness and diversity. At the other side, made the communication less effective.

In the Mobile.Seed project, the main difficulty was to communicate the idea effectively. The prototypes were not working prototypes, and, in addition, to make real test with the planting mechanics would take much more time than the one available for the thesis. The idea just could be fully understood when all the fragments of the different communication tools were put together. The scenario movie, the vases with roots coming from the biodegradable mobile phone, the posters with the material research, the phone with the visible seed, the explanation of the marketing strategy behind the innocent flower, all these parts were weak alone. So, several times, a failure in the communication generated misunderstandings about the project.

Beside that, at the time of the conclusion of this thesis, it was missing a deeper study about the possible consequences of this product in social behaviors and in the economical cycle. These consequences were so far based in desktop research and

elaborated with speculations over that data.

5.3 Key findings

- Designers should not be ideologically passive in the process of introducing technology in people's lives. The design choices of the products do influence people's lives and neglect this is to avoid facing the responsibility of the profession.
- Responsibility has nothing to do with be boring or rule people.
- Believe that a better world is possible is essential for 'good design', even if the current reality is not favorable. Great design movements of the past had a clear vision of what would be a better future, and this vision and their ideology guided their design decisions.
- Be aware that the concept of a better world basically didn't change through history, but the path to achieve it yes, what basically changes the definition of what is 'good design'.
- Innocence has a great value that is dismissed nowadays. Innocence is a state in which the eye can see beauty in an uncensored way.

6. Final Conclusions

The projects of this thesis are very relevant in an area like interaction design, which are still understanding itself and its place in the world. At the same time that it develops products, sometimes as traditional design disciplines do, interaction design adds a layer of concern during the development process. It looks at technology, and design how people or communities will be affected by the product and how they will relate and interact to it.

The investigation Bakedbits is relevant in exploring a boundary in how electronic objects can be consumed and discarded, and in commenting the responsibility and consequences of design decisions in this process.

The Mobile.Seed project hopefully brings to discussion a new approach in how to see objects as partners in stimulating people to actively engage in a common well-being future. It also aims to break with the paradigm that opposes technological objects with simple and concrete connection with nature.

In an implicit sense, the investigation that underlies these works is 'What is the broader function of design, beyond the superficial and immediate function of the product? What makes a designer a designer?' Through the process of the thesis became clearer that the answer lies beyond producing products or services, beyond doing beautiful and functional solutions. It lies in one's values, in one's vision of the world.

In my opinion, concern about this values should be an important part of the academic curriculum of any design institution. The formation of professional values and the stimulus to one criticize and actively develop the own vision of a better world. It is about to develop individuals, not individualists.

The Bakedbits were closer to become real products than the Mobile.Seed, but, ironically, from diverse reasons than the ones that created them. Paneluce and the DolceRadio could have become a commercial product for events or a personal decadent design luxury item, contradictorily a consumption fetish. This exemplifies the existence of a vicious circle in this process, that is worthy of study in another thesis by itself.

7. Notes

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[5] Ed Van Hinte in Eternally Yours, page 222.

[6] "Paradoxically, user-centeredness is not just figuring out how people map things, it absolutely requires recognizing that the artifacts people interact with have enormous impact on how we think." R. Robinson, IN Design Issues 10 – 1994.

[7] There are many controversial theories about this relation. One very accepted says that the influence of language isn't so much on what we can think about, or even what we do think about, but rather on how we break up reality into categories and label them. And in this, our language and our thoughts are probably both greatly influenced by our culture. Pullum, Geoffrey. 1991. The Great Eskimo Vocabulary Hoax and Other Irreverent Essays on the Study of Language. Chicago: University of Chicago Press.

[8] First Things First Revisited - Rick Poinor - article published in Emigre magazine issue 51, 1999.

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[10] Andrew Jackson - From Solving Problems to Selling Product - Designing Britain Project. www.brighton.ac.uk/designingbritain/

[11] Ibid.

[12] Peter-Paul Verbeek & Petran Kockelkoren – in Eternally Yours, page 103.

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[21] Anthony Dunne - Hertzian Tales.

[22] Slow Technology – Designing for Reflection – L.Hallnäs and J. Redström - PLAY Research Studio, Interactive Institute, Gothenburg, Sweden.

[23] Expressions: Towards a Design Practice of Slow Technology – L. Hallnäs, P. Jaksetic, P. Ljungstrand, J. Redström and T. Skog

[24] Slow Technology – Designing for Reflection – L.Hallnäs and J. Redström - PLAY Research Studio, Interactive Institute, Gothenburg, Sweden.

[25] Ettore Sottsass Interview at designboom magazine online: www.designboom.com/eng/interview/sottsass.html

[26] Nickerson, R. & Landauer, T. Human-computer interaction: Background and issues.

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[29] A Writers' Lexicon / Tameri Publications.

[30] Coming Full Circle: the Use of Digression in Diderot's Jacques le fataliste and Proust's "Combray"- F. Miyamasu.

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[32] "How do we define and teach 'relevance' in academic writing?" Rosalind Lawe Davies - Graduate School of Education The University of Western Australia.

[33] Belmer Negrillo, 2003. http://people.interactionivrea.it/b.negrillo/controlmania/.

[34] World Watch. State of the World 2004 - Special Focus: The Consumer Society, 2004.

[35] Cradle to Cradle: Remaking the Way We Make Things by William McDonough and Michael Braungart, p. 6.

[36] like the European Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS) Directive, or the american's Clean Air Acts and Water Quality Act.

[37] Ibid, page 6.

[38] Brooke Nash, of the Massachusetts Department of Environmental Protection.

[39] Sarina Prabasi, in 'Baby and the Bathwater', 2003

[40] Sarina Prabasi, in 'Baby and the Bathwater', 2003

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[58] Eric Most, Calling All Cell Phones: Collection, Reuse, and Recycling Programs in the US, INFORM, Inc., 2003.

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Environment - Design within the limits of possibilities and the possibilities of limits. Unpublished manuscript, available at http://www.edf.edu.au/Resources/Manzini/ManziniMenuMain.htm.

[78] http://www.sanyo.co.jp/koho/hypertext4-eng/0309news-e/0924-e.html.

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[80] This excerpt refers to the study 'The Human Condition' by Hannah Arendt. She makes a difference between three aspects of our Vita Activa, our active life: labour, work and action.

[81] Ezio Manzini, The Garden of objects - Designing for a world to take care of. Unpublished manuscript, available at http://www.edf.edu.au/Resources/Manzini/ManziniMenuMain.htm.

[82] in Eternally Yours, Visions on product Endurance, Ed van Hinte, page 14.

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[84] Used here in the sense of quickness of action or occurrence, instancy.

8. Appendix

Appendix A.
A New Company

Intro

This text is an exercise for the launching process of the Mobile.Seed project. I created a company called Ecotech, and looked at the development of this product from now until 2025, starting with simple achievements and keeping the ideology until the final goal, a fully biodegradable phone.

This kind of exercise is very useful as a communication tool. It helps to make people understand the graduality of the process and to speculate over possible decisions that must be done now if we want a similar future.

Company Name

ECOTECH (provisory)

Date of this Report

December 2025

History

January of 2001

Ecotech was founded. Ecotech is a syndicated company of the MetaSystems Group, which had a strong tradition in high end communication and network systems, and the Matogrosso Group, which had ties with the chemistry and agro-industrial sector.

The company's objective was to develop communication devices that had a low environmental impact, using raw materials of agricultural origin.

This interest for the investment started based on consumer's research demonstrating the development of the 'Cultural Creatives', a parcel of the population that began to emerge and grow in the 1970s[1]. It now includes about 44 million Americans, 24% of the adult population. The Ray study reports: "The Cultural Creatives believe society faces significant problems and needs to reinvent its culture, institutions and practices to solve them and provide a future for our children.

Cultural Creatives are seeking to reintegrate their values into their everyday lives and are ready to take action on a wide range of social, environmental and spiritual concerns."

It was seen as a huge marketing opportunity, due the fact that with 24% of the population and growing rapidly, the Cultural Creatives are beginning to define the new mainstream. And clearly the market could be expanded to Europe, Japan and developing countries.

March of 2002

The project 'Bio-chip' was launched. It aimed to develop the first logical processor that is fully biodegradable. The research started on nanocircuits made of aminoacids and semiconductors of nanostructured porous silicon.

June 2003

First fully biodegradable electrical circuit worked in lab environment, using the molecular properties of the aminoacids to conduct electricity. Prototype still had problems with oxidation when exposed to air. Research on insulation materials started in parallel.

September 2004

The interactive designer Belmer Negrillo, together with the corporate strategy expert Sanjay Khanna presented the project "Mobile.seed" to Ecotech. The project was a vision of a communication device that would stimulate regular consumer's to engage in the ecological ideology, and consequently buying related products, dissociating it from the usual message of guilty or perception of inferior product.

At the beginning, the poetic proposal of putting a seed in a mobile phone that would sprout as a flower when the device is planted, as an alternative discard solution, was seen as naïve. But after a while, this was perceived as one of the main strong points. The new proposal was in line with a consumer's research[2] that pointed: "Cultural Creatives think they represent a tiny, minority worldview -- maybe as small as themselves and their ten best friends. This happens for two reasons. First, because it is an emerging worldview and people have come to it from many pathways, the worldview is still highly fragmented. People within it don't yet share a common language or recognize people who come to this worldview from different pathways as allies."

The fact of having an physical output from the 'personal recycling' of the phone and that this output, a selected flower, is as strong as a public

display saying that “I belong to this group” could become a catalyzer of the ideology.

December 2004

Ecotech decided to patent the idea and set the mobile.seed as a special project, an aim to be pursued within 15 years. As the future development of the mobile phone itself as device is hardly predictable, the vision was translated to create a fully biodegradable personal communication device that contains a seed.

March 2005

The Ecotech Marketing Board, due pressure from investors, decided to change slightly the strategy and launch intermediate products that would not be completely biodegradable or organic. The products will use the already available materials and technology from the mother companies. The Mobile.seed project would become a market brand and be used to communicate the Ecotech ideology. Each new technological development would be presented as a step further towards the Mobile.seed.

July 2006

The Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS) entered in vigor in the European Union. New electrical and electronic equipment would not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers.

November 2006

The launch campaign started. One of the promotion campaigns delivered a pack of flower seeds for each mobile phone returned for recycling. Ecotech took a bestseller phone from Metasystems and changed all the external plastics (ABS-PC) for green plastics with equivalent properties developed internally. The biodegradable cover was removable and contained a seed embedded. Communication at this stage was focused in the green consumer.

January 2007

Evaluation of the campaign. The green consumer didn’t get really convinced about how much difference a case would do in all the process and the sales didn’t launch. At the same time, a marketing survey detected that the Mobile.seed goal was very well accepted and that they would like to own a fully biodegradable phone now.

March 2007

Repositioning of the marketing campaign. The main selling argument was wrong. The biodegradable removable cover should be communicated by

its own current aesthetic qualities, and not for a future promise. A new advertising campaign was created, using the sensual properties of the materials as argument, but still letting in the background the Mobile.seed goal.

April 2007
The special textures and glow of the materials developed by Ecotech were a sales success. The buyers were not just green consumers, but also consumers form other niches. The fact that one can plant the cover and get a flower was also a success, as a complementary aspect of the sensual benefit of the product.

May 2007
Investors were very satisfied with the results of the campaign and decide to put more money in the Bio-chip project.

December 2007
The yellow flower that grows from the seed in the covers became the logo of Ecotech.

January 2008
Ecotech launched in the marked a series of biodegradable accessories for mobile phones. One third of the profit goes directly for research.

June 2009
Ecotech developed the first fully biodegradable Printed Circuit Board. It was non-inflammable and conducted electricity using nanocircuits of amino-acids.

August 2010
Ecotech launched minor biodegradable electronic devices within another brand name, called Cycle.

December 2011
Complex logic circuits using semiconductors of nanostructured porous silicon worked in lab environment.

March 2015
Half of the personal communication device was already possible to be made using biodegradable materials. Ecotech prototyped a ‘phone’ that is half biodegradable. They redesign the device in way that the biodegradable half could be detached from the half that is still toxic and planted.

December 2015
Launched the half biodegradable ‘phone’ in the market. Returning the toxic half the user receives manure for the flower. The advertising campaign focused in communicating the half biodegradable part as a memento of that very personal object.

The place (GPS) and date of planting was saved in the personal data card.

May 2018

Ecotech launched the first fully biodegradable battery, which chemicals are not harmful to animals or plants.

May 2021

A fully biodegradable communication device is possible. But the price is still prohibitive.

November 2025

Mobile.seed is finally launched in the market. At this time, many other products are already biodegradable and economically competitive, due the increase in the price of fossil fuel in the last decade.

Notes

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[2] Ray, Paul H. The Integral Culture Survey: A Study of the Emergence of Transformational Values in America. Institute of Noetic Sciences, Sausalito, CA and Fetzer Institute, Kalamazoo, MI. 1996.

Appendix B. Sketches and diagrams for the Bakedbits

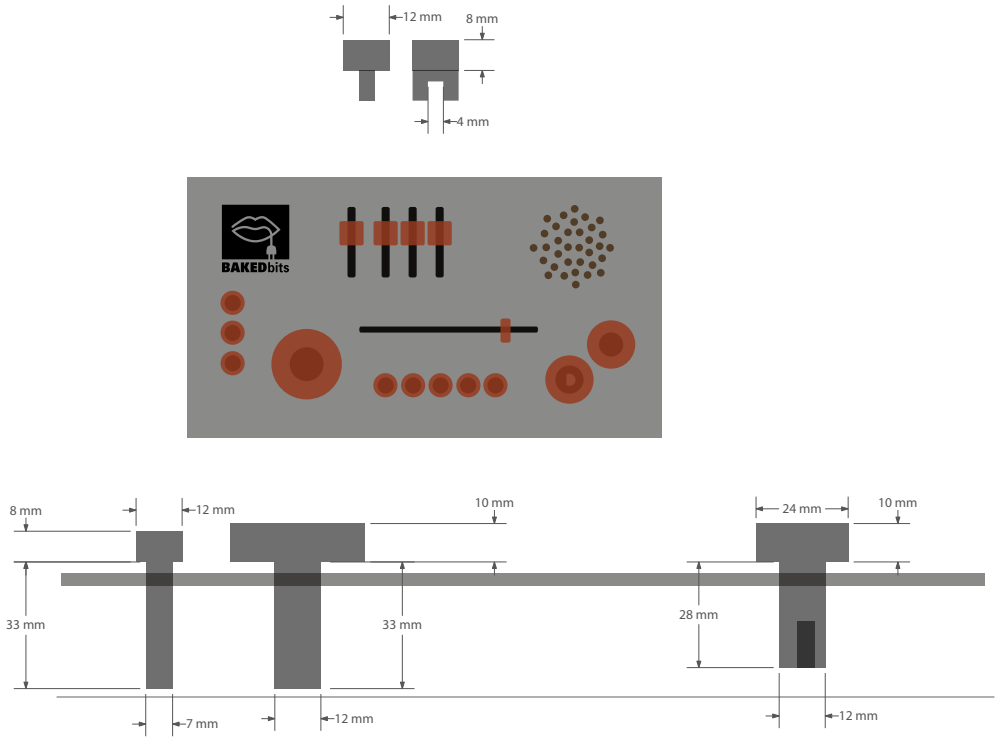


Fig. 8.B.1 Diagrams for the first prototype of the DolceRadio. Body made with biscuit and buttons with chocolate. Here we see the size and placing of the buttons, made accordingly to the existing electronic circuit below.

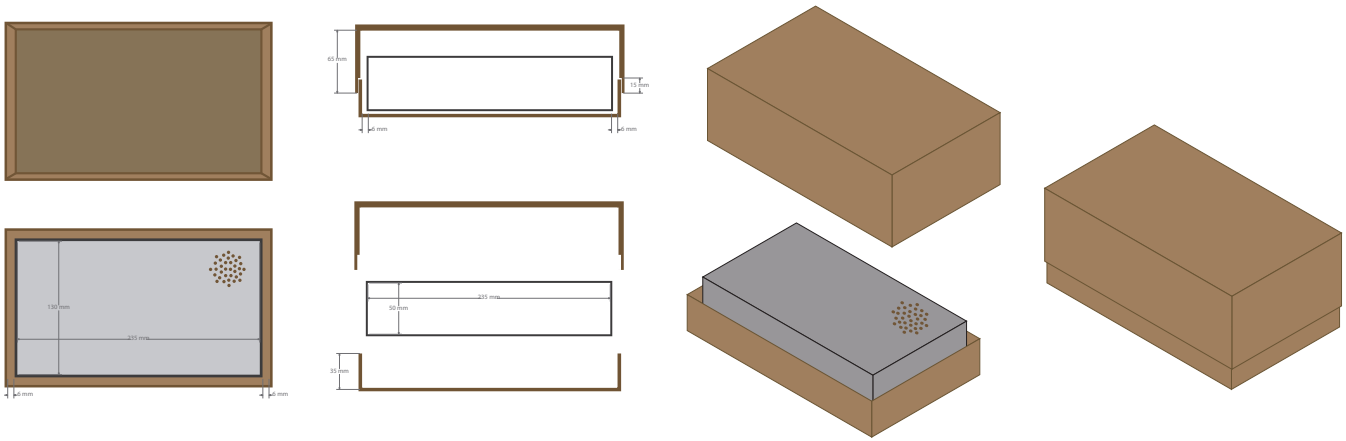


Fig. 8.B.2 Diagrams for the first prototype of the DolceRadio. The body would be contained inside a protective box, as a bonbon box, and the buttons would be the candy.

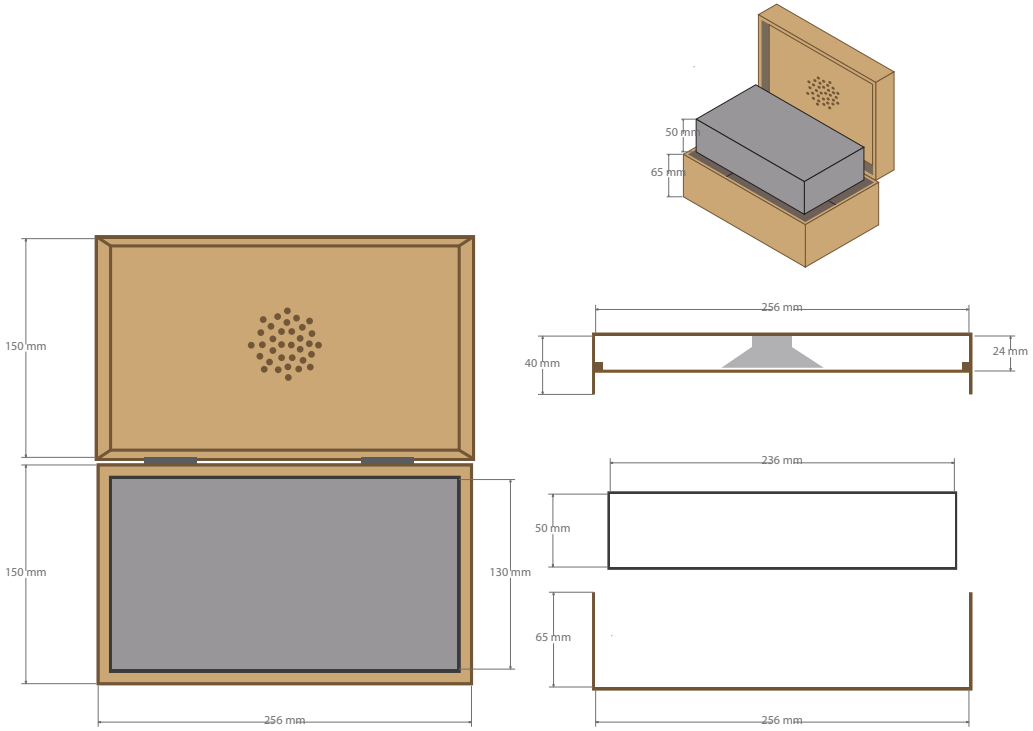


Fig. 8.B.3 Another diagrams for the first prototype of the DolceRadio. In this version the bonbon box opens differently.

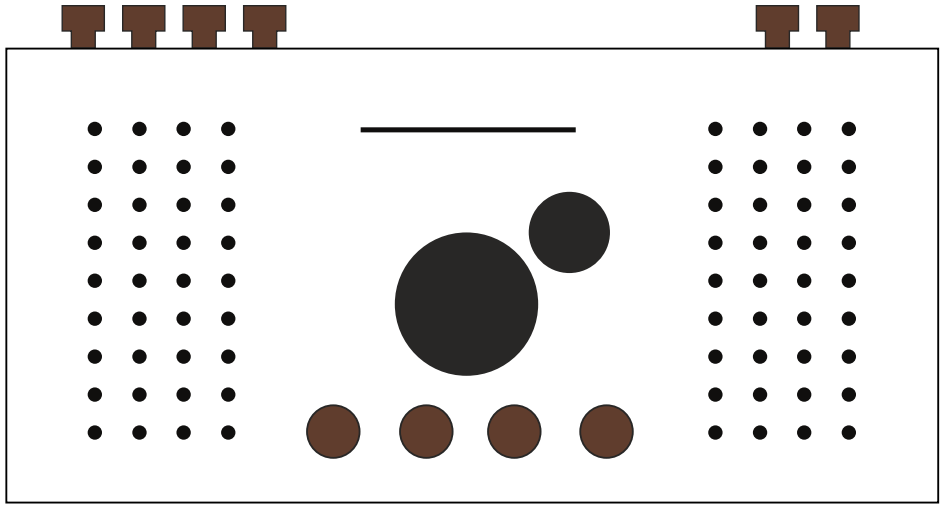


Fig. 8.B.4 Front view of the second prototype of the DolceRadio. In this version, the body would be made of chocolate also.

Fig. 8.B.5 Diagrams for the electric buttons behavior of the second prototype of the DolceRadio.

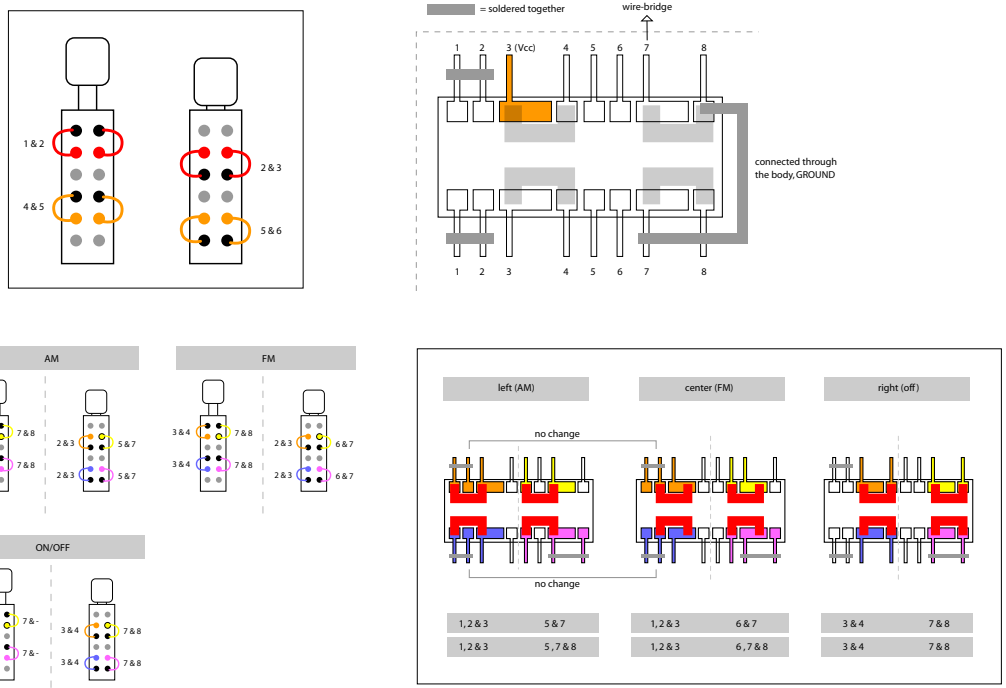
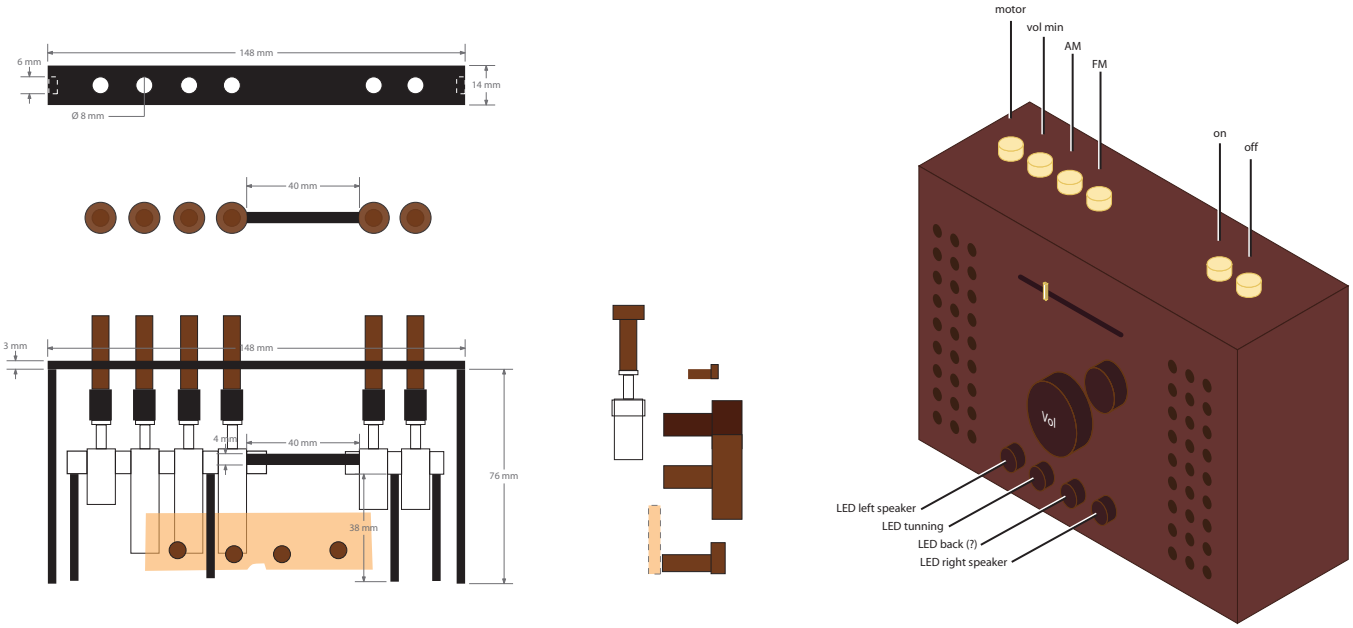


Fig. 8.B.6 More diagrams for the second prototype of the DolceRadio. Assignment of functions and internal positioning.



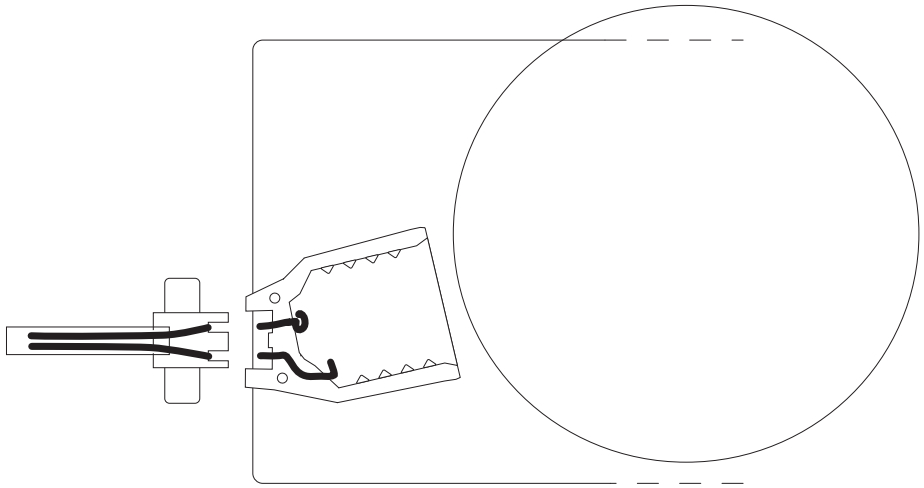


Fig. 8.B.7 Diagram of the electric socket for the first prototype of the Paneluce. The bread was squared and the socket would be insulated with hard baked flour.

Paneluce

baked**bits**

Fig. 8.B.8 Paneluce logo and the Bakedbits logo.

Fig. 8.B.9 Package for the CD-lini can.

Fig. 8.B.10 Design of the removable metalic labels of the CD-lini.

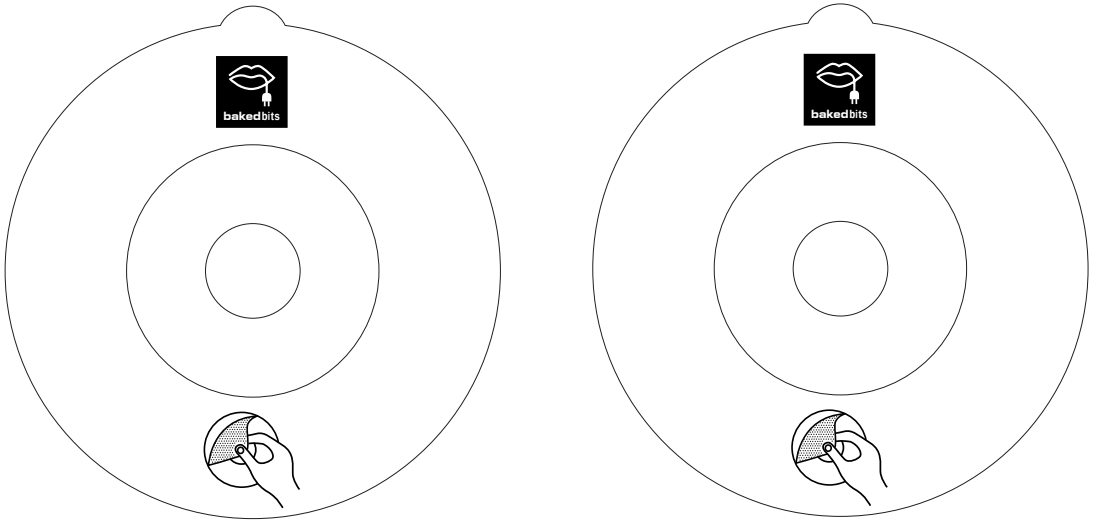


Fig. 8.B.11 Packaging for the Paneluce. There would be a plastic window in the front to see the product. This idea of packaging was abandoned later on because a regular bakery paper pack would communicate better the daily consumption property.

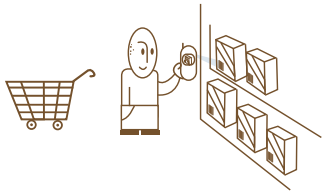
Fig. 8.C.1 Some ideas not further developed of services and accessories that could be associated with the Mobile.Seed.

Services and accessories

A list of ideas for the mobile.seed consumer

Services using the seed as a button

- Record position and date of planting a seed
- Scan products barcode to get info from GCC (Green Consumer Clain)
- Drop a seed
- Send a SMS to the remote watering device at home
- Ask for hitch a ride from people in the area with the mobile.seed
- Toggle photo camera to pollution detection mode
- Access SMS chatroom channel



Services using the seed as a light

- Shines if someone with a mobile.seed is in a close range
- Shines when eco-news available
- Blinks when somebody in the area is asking for hitching a ride
- Lights when somebody sends a 'seed message'
- Green accessorie asking for attention

Accessories

- Biodegradable covers with different materials / textures
- Plant additives
- SMS triggered remote watering device
- Seed charger / packs (different flowers, foliage, etc)
- Vases / tools with matching design

Planting.memories

mobile,seed

What if significant messages could be planted in the city, creating an alive path of memory clues?

More details

Everybody that has a mobile.seed carries a container with different seeds, for flowers, foliages, fruits bushes and trees.

These seeds represent two things:
- each seed will be associated with a special message, like love and a seed for fruits...
- All the seeds together represents the amount of natural resources used to manufacture the mobile.seed.

Mobile.seed users have no access to the seeds inside the container. The only way to release a seed is to receive a 'seed message' from someone else.

The sender chooses the kind of seed.

User records position and date of planting pressing the 'seed button'. The message is not stored in this operation. The seed is the physical memory clue.

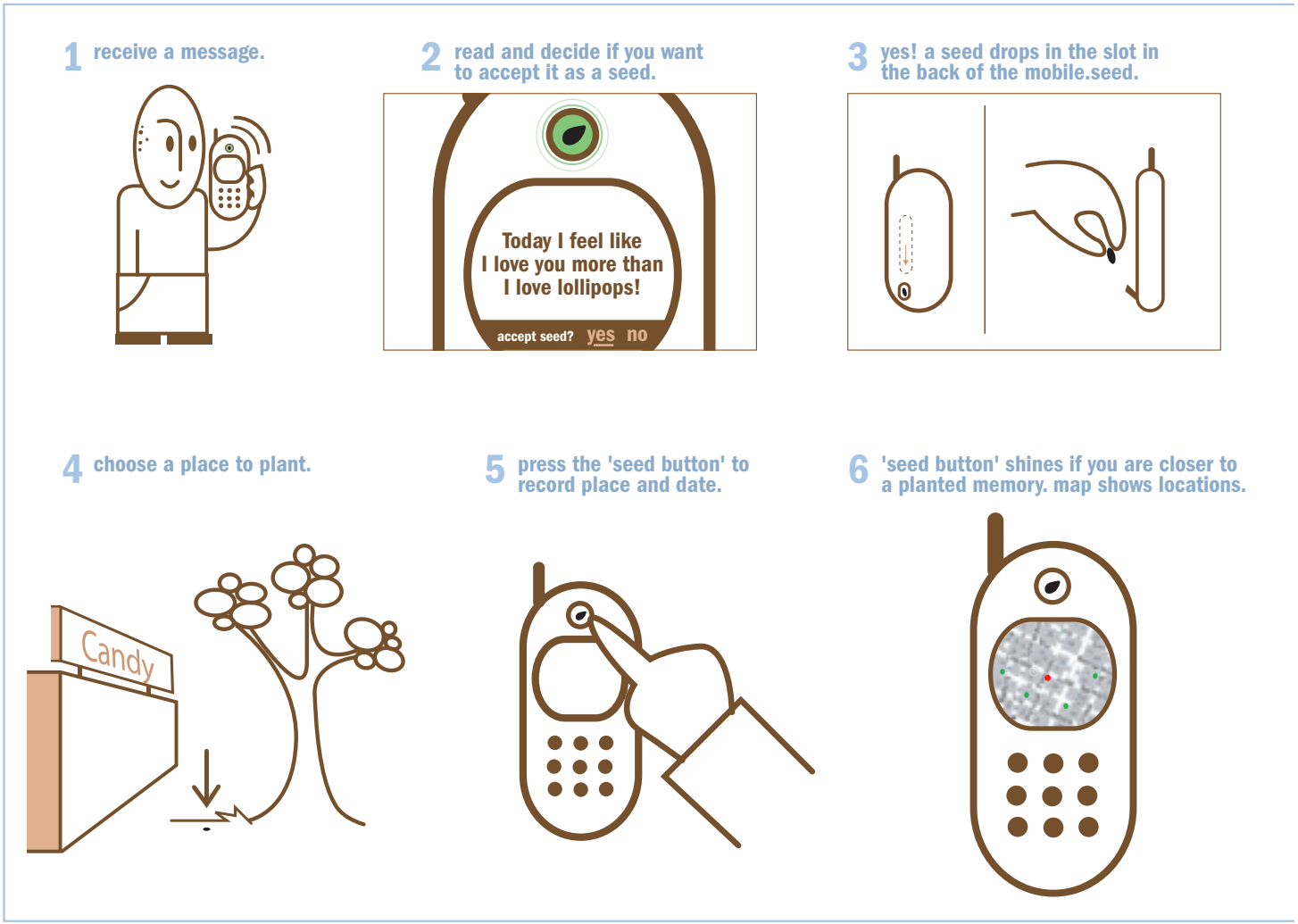


Fig. 8.C.2 An idea that was abandoned in the process. One could receive a seed-message and plant it to make a memento of a moment.

Material Input for the Italian network

Material request as a proxy for estimating the human pressure on the environment

Extra Info

. MI: Material Input
sum of all material requested for a giving service

. MIF: Materia Input Factor
account for the ecological rucksack of each material

. MS: Mobile Station
the mobile phone

. BTS: Base Transceiver Station
controls the radio connections with MS and covers the area of one or more cells.

. BSC: Base Station Center
control one or more BTS and manages the radio channel settings.

. MSC: Mobile Switching Center
engaged with the connections between the MS users and the other networks (fixed or mobile).

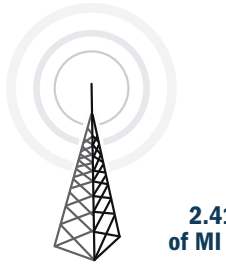
. HLR: Home Location Register
data base that stores static and dynamic information on users.

Source:
. MIPS of the Italian Mobile Telephone Network, 2001, Ing. Antonio Federico, Dr. Fabio Musmeci, Dr. Daniela Proietti Mancini, ENEA
. The phone used in this study was the Ericsson T28

Average MI for minute of service: 0,196 Kg/minute (call + SMS)

75,50 Kg/phone

Material Input for the phone	
Source	**MI (Kg)**
Material	30,40
Assembling	15,50
Air Shipping	0,30
Ocean Shipping	0,01
Roads	1,09
Operation (1 year)	28,20
Total	**75,50**



2.416 Millions tons/year
of MI required by the network

BTS

BTS

Base Station Center

Mobile Switching Center

Home Locatin Register

≈ 246 tons/year per node

Nodes in the network	
Item	**Quantity**
BTS	7675
BSC	1919
MSC	192
HLR	35
Total Nodes	**9821**

Fig. 8.C.3 A diagram about the Material Input for the manufacture and use of a mobile phone.
This information seemed too dramatic and calculated in a too loose way to be kept in the communication of the project.

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http://adbusters.org/

Anti-apathy
http://www.antiapathy.org/

ENOUGH, Anti-Consumerism Campaign
http://www.enough.org.uk/

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