ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

User Experience Design part I

Fabio Vitali

Two user-oriented process models

A task-oriented model

- *ISO 9241-210 (2010)*
  - *Official international standard, originally from UK*
  - *Aim: usabilty design*
  - *Five phases: Feasibility study, User Requirements, Implementation, Evaluation, Deploy*

A goal-oriented model

- Jesse James Garrett (2011)
  - Well-known professional, USA, word-of-mouth (passaparola)
  - Aim: User Experience Design
  - Five planes: Strategy, Purpose, Structure, Skeleton, Surface

The Elements of the User Experience

By Jesse James Garrett

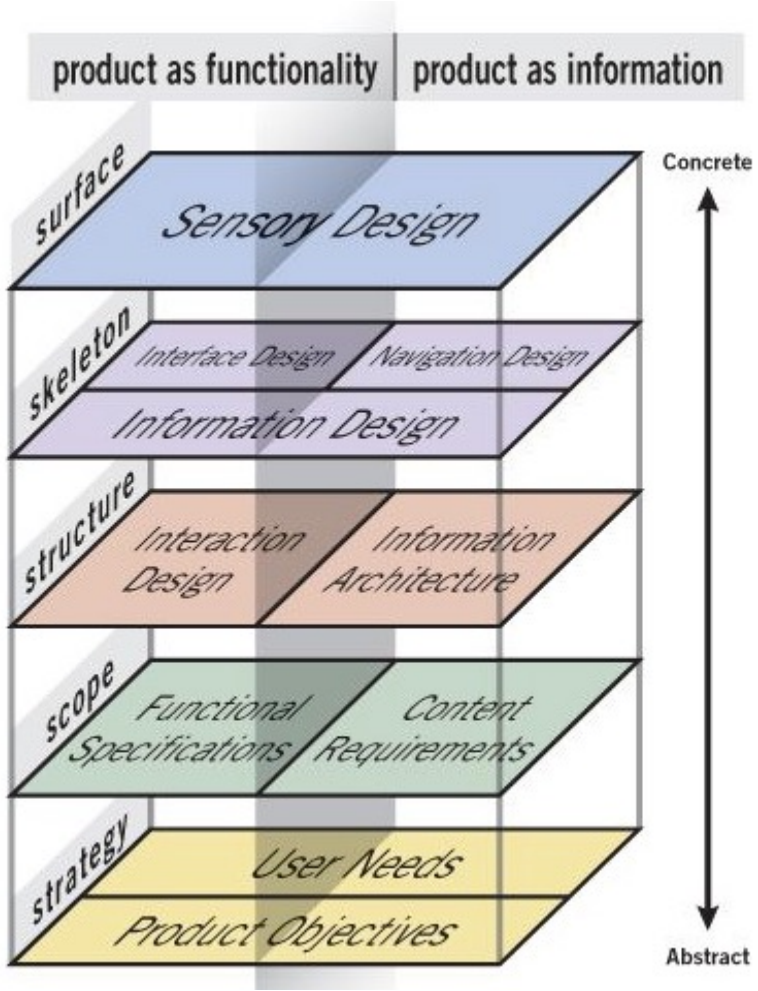
First a crudely drawn schema passed around by word of mouth by web designers.

Later a web page, finally a book (2006 and then 2010) providing a conceptual model and a series of implementable steps for managing a User Experience Design Process.

Jesse James Garrett invented the term AJAX in 2005.

Here I am extending Garrett's model including a number of other compatible ideas and approaches.

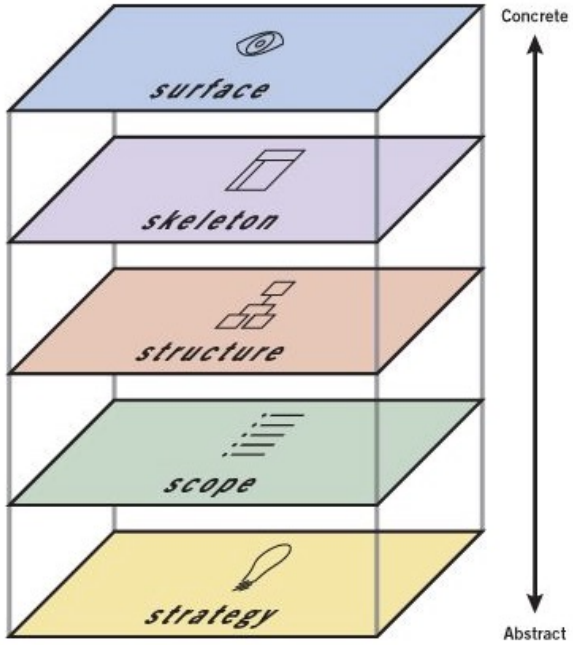
Garrett's schema



A linear process

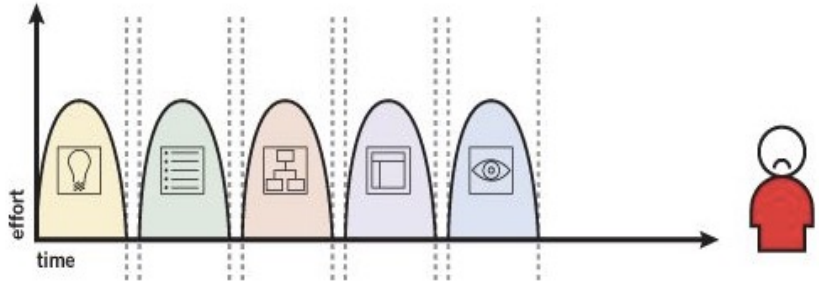
- from abstract to concrete
- mainly Web
- Parallelism between application sites and information sites
- It involves roles from management, architects, implementers, graphics, and sales.

The five planes



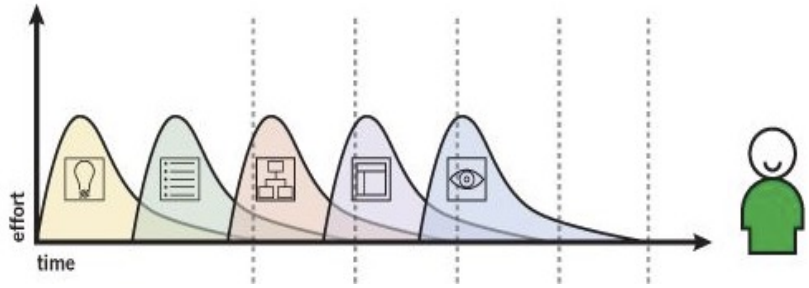
- *The surface:* actual web pages with text, sophisticated graphics, images, clickable links, forms, etc.
- *The skeleton:* these elements are placed in specific locations, to help recognition, memorizability, site branding, etc.
- *The structure:* the organizational choices about pages, groups of pages, hierarchies and navigation paths on the content of the site
- *The purpose:* what are the features and services offered by the site
- *The strategy:* what the site owners expect to offer and to obtain from the site itself.

Overlapping!



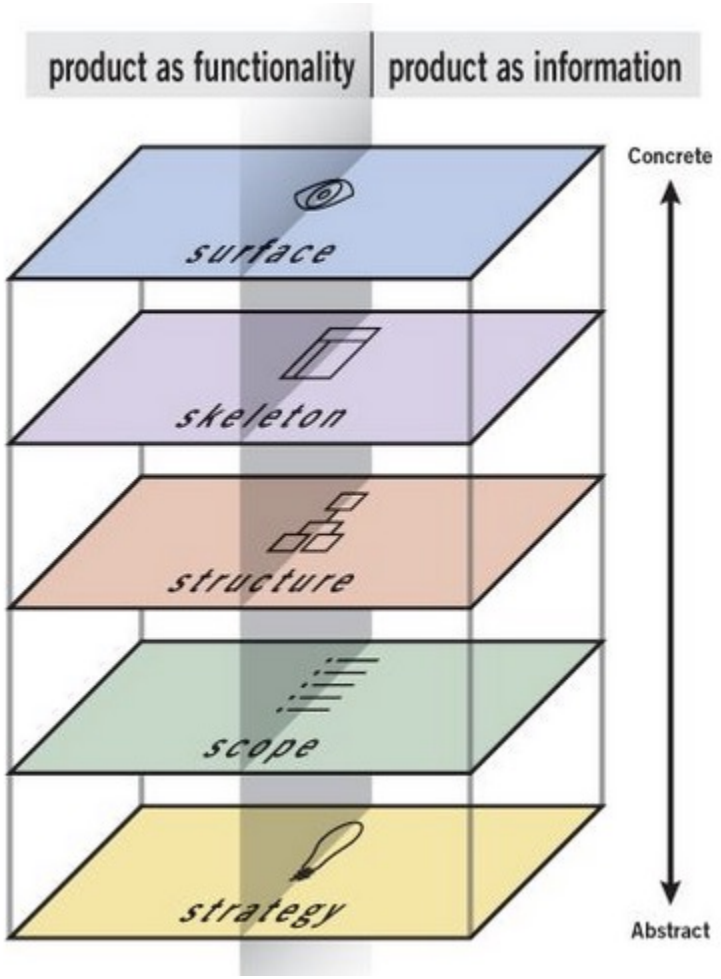
The decisions in the lower planes affect the higher ones, but in some cases the influence goes downward as well.

For example, the birth of new technologies, new services from the competition, or even just a management request for a change in the color scheme may require redesign.



In these cases it is expected that the "previous" phases are not closed until the "subsequent" phases are already started.

The duality of the web



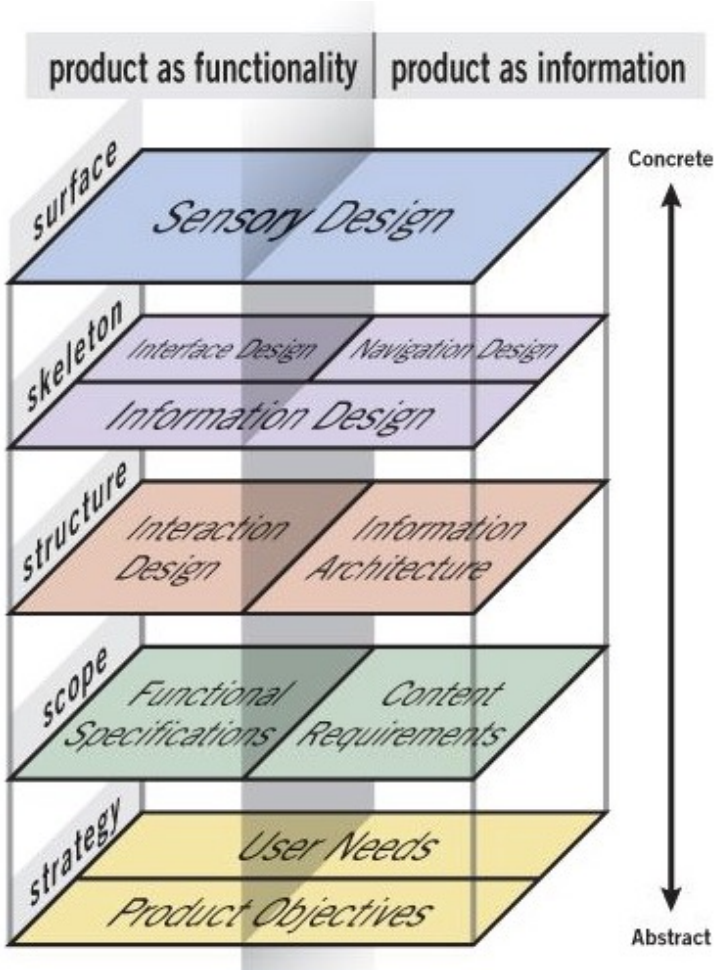
The web has always had a fundamental duality:

- Information: a medium for disseminating content: text, images, multimedia, etc.
- Application: a distributed interface to remote services of various kinds, both on the Internet and Intranet

This duality exists

- From site to site,
- From section to section of one site
- From an area to another of a web page

The full schema



Each level corresponds to one, two, or three specific activities to be carried out to complete the corresponding phase.

Many of these phases find a direct correspondence in the traditional process of ISO 9241-210.

Yet, goals assume a much wider importance here.

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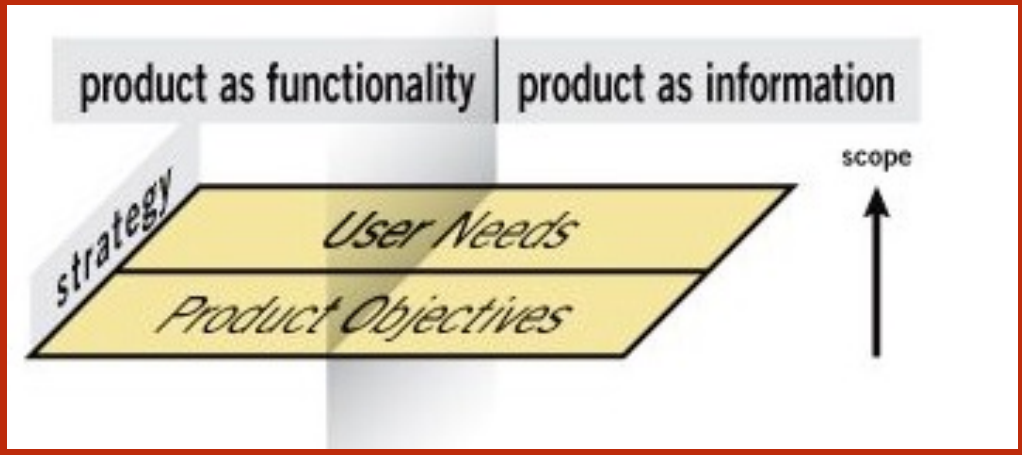
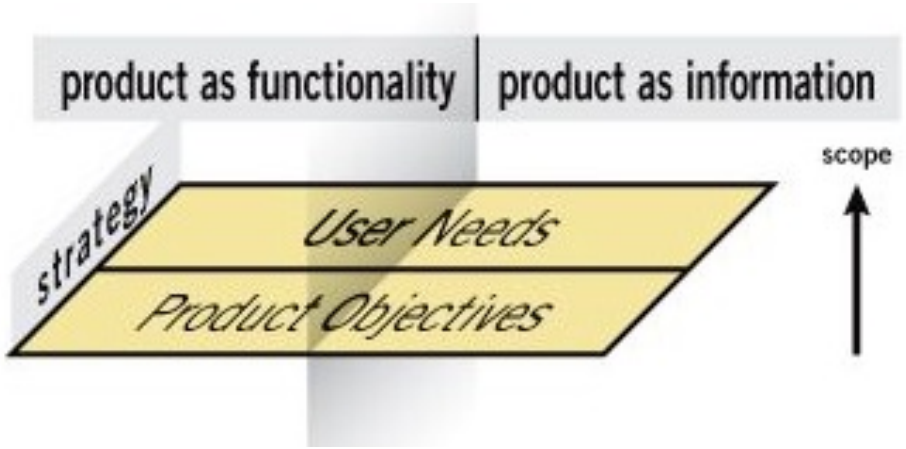
The Strategy plane



The strategy plane (1)

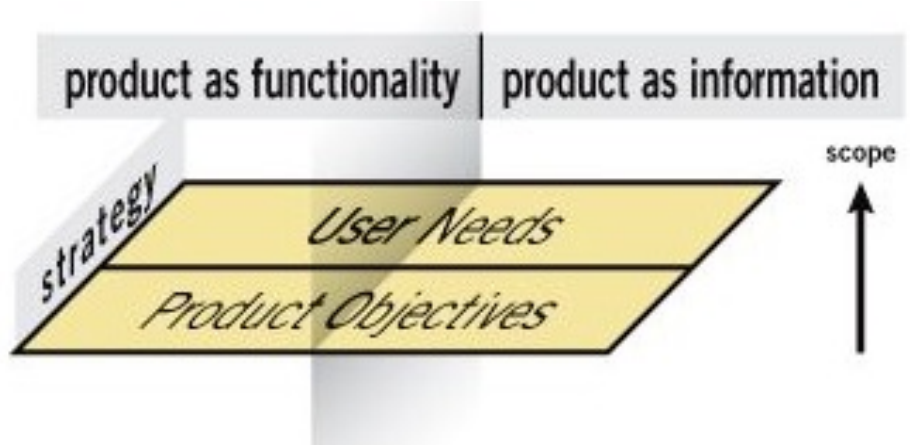


- What do ***we*** want to get from this product?
- What do we want ***users*** to get from this product?

Product Objectives: **what do *we* want to get from this product?**

- Business Goals: How does this specific product integrate with overall business goals?
- Brand identity: How does this specific product promote a brand identity and make it more appreciated?
- Success metrics: When and how do we know that the project is completed and it went well?

The strategy plane (2)



User needs and goals

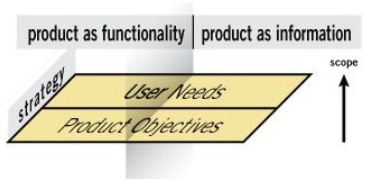
What do we want the ***user*** to get from the product?

Maslow's hierarchy applied to the user needs

Norman's cognitive processing levels

Goal-oriented design techniques

- Segmentation of users (demographic and psychological approach)
- User research (market research, contextual inquiry, task analysis)
- Personas (and the dramaturgical approach)

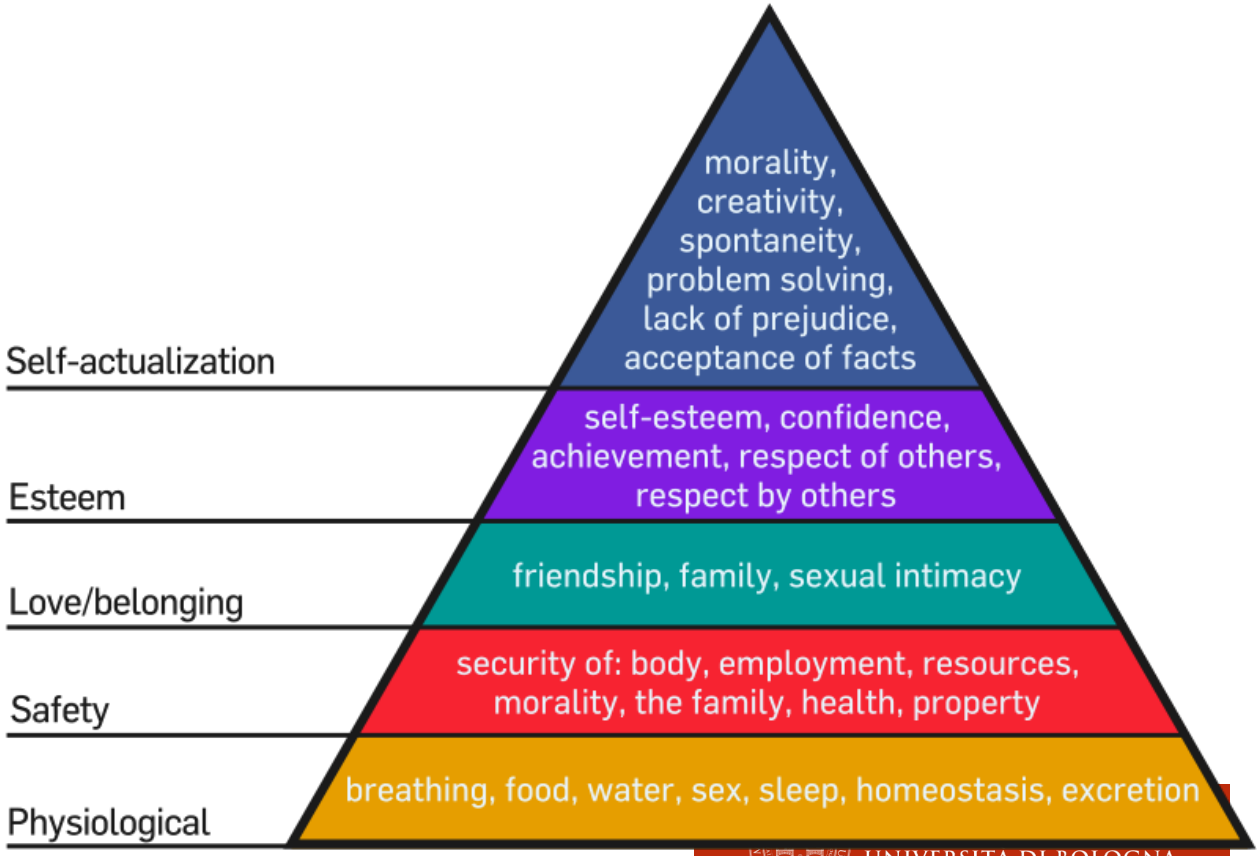


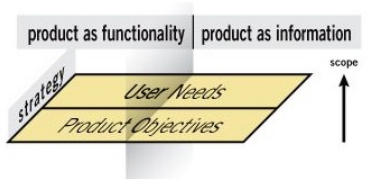
Maslow's hierarchy of needs

Theory of human motivations by psychologist Abraham Maslow (1954)

A psychological study of healthy minds rather than sick ones (he studied the richest 1% university students)

At the basis of everything there is physical survival, then economic and social security, the feeling of belonging to a group, the esteem of the group and others, and finally one's own actualization as a person





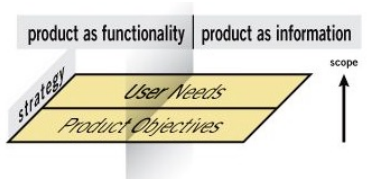
Maslow's hierarchy and user experience

Every interesting and positive object we choose addresses at least one of the Maslow needs

Therefore, does your product:

- respond to the fundamental needs of survival and security?
- protect the user from threats or other issues?
- provide to the needs of an individual, or of a larger social unit, such as a family or a group?
- promote a sense of belonging?
- promote self-esteem or a sense of personal accomplishment?

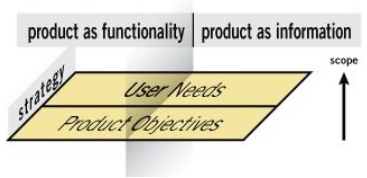
And if your product doesn't physically, what about its functions? Or the way in which your product provides these functions?



Norman's levels

Donald Norman lists three levels of cognitive processing, each of which has precise design impacts.

- *Visceral level*:
  - the way we react istinctively to visual and sensory aspects of products. It provides quick decisions about what is good bad, or dangerous.
  - Designing beautiful things, desirable, regardless of a conscious evaluation.
- Behavioral Level:
  - the way we perform simple and daily tasks, i.e., most of our activities.
  - Design product behaviors that adapt to your mental patterns, expectations, and behaviors.
- Reflective level:
  - the way in which conscious reflections and the memory of past experiences affect our behavior.
  - Designing for long-term relationships where the product changes us and improves us and makes us learn, evolve, improve, and approach our goals.



Goals

According to Alan Cooper these are not true user goals:

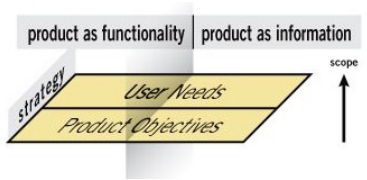
- Completely file a document archive
- Quickly paginate a book
- Verify the correctness of a business hypothesis
- ... any other business goal

These are true user goals:

- Do not look stupid
- Do not make big mistakes
- Carry out a reasonable amount of work
- Have fun (or at least not get too bored)

Even in work-related activities, goals are personal, not work-related.

A software designed for business goals will fail, a software designed for personal goals will be successful and will also succeed for your business goals.



Goals: Experience goals

Simple, universal, private, hard to share with others.

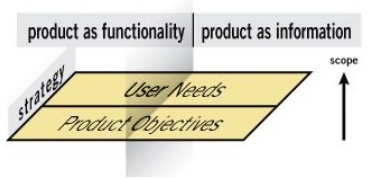
Shyness and reticence and poor attitude to introspection make us ignore them most of the times.

Theses goals are pre-conscious, and are determined by how our visceral processing level applies to ourselves:

- Feeling smart, stimulated
- Have fun
- Feeling cool, fashionable, popular
- Be in control, interested, not bored

In brief: how I expect to feel like when I use the artefact

Parallelism with the visceral cognitive level



Goals: end goals

The motivations of the user when carrying out the tasks at hand with the artefact.

They justify the success/insuccess of our interaction with the artefact and are based on a good connection between our behavior and the artefact:

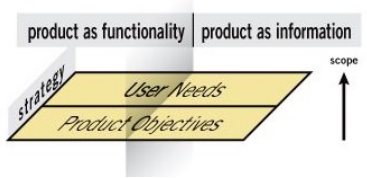
- Complete all day activitieswithin office hours
- Be informed promptly about problems
- Keep track of the progress of my activities

Also personal:

- Find some music I like
- Let me keep in touch with my friends
- Find a bargain at the lowest price

In brief: how I want to use the product

Parallel to the behavioral level



Goals: life goals

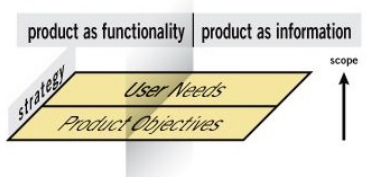
The set of global aspirations and ambitions we have. They are independent of the artefacts, but they can be influenced (positively or negatively) by it.

The time-frame of these goals is long-term, and the ability of the artefact to change the user or his life to approach the goals is important.

- Live a full and fun life
- Become X (finding a job, career advancements, etc.)
- Be an expert in Y (recognized as such by my peers)
- Have time for non-work activities (family, hobbies, etc.)
- Be attractive and liked by my peers

In brief: how I want to think about myself

Parallel with the reflective level



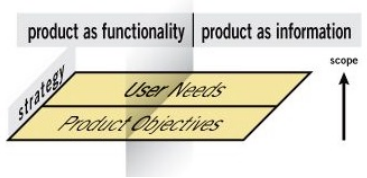
Non-user goals

Client / Buyer Goals

- *Organizational*: make our internal processes more effective, control internal processes, automate internal processes and reduce expenses and human resources, etc.
- *Individual* (eg. parents) be educational, improve school performance, help socialization, foster physical and mental development of the user (the kid). Make him/her happy, spend a reasonable amount of money, etc.

Goals of the organization building the product

- *Commercial:* increase profits, increase market share, beat the competition, win new customers, retain old customers, broaden the product line, focus the product line, etc.
- *Public administration:* provide a service, educate the public, reduce the use of physical branches and call centers, optimize the use of limited financial resources.
- *Technical goals:* Work on all browsers, guarantee data integrity, ensure performance, maintain compatibility with previous versions, ensure functionality and consistency across platforms, and so on.



Other issues connected to goals

Fear

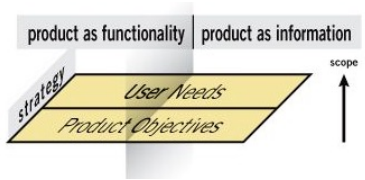
- The fear of the new and the unknown
- Fear based on past experiences

Empathy

- The designer's ability to put him/herself in the shoes of the user

Frustration

- "What makes sw usable is the absence of frustration when using it" (Rubin Chisnell)



Techniques for goal-oriented design

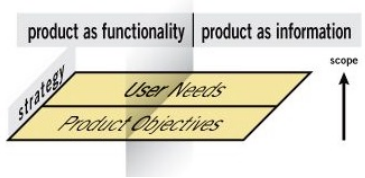
User segmentation

- Demographic approach
- Psychological Approach

User research

- Market research,
- Contextual inquiry,
- Task analysis

Personas



User segmentation

Often the number and variety of target users makes it difficult to create a homogeneous characterization

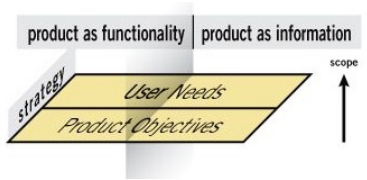
Segmentation lets you group users into subgroups that are homogeneous with regard to some feature

Demographic Segmentation:

- Age, schooling, marital status, income, residence, etc.
- Very generic (18-59 years old men) or very specific (women 25-35 of South Italy, graduated and unemployed, unmarried, income <20,000 euros per year)

Psychological Segmentation:

- Personality, values, attitudes, interests, lifestyle, etc.
- E.g., single blue-collar biker



User research

Market research methods

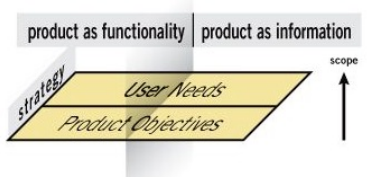
- Indirect sources of data
- Survey, focus group, etc.

Contextual inquiry

- Direct sources of data obtained by interacting with users
- Interviews, direct observations, passive presence

Task analysis

- Identify the context of tasks where the user uses, would like to use, or you would like them to use the product.
- Examine the sequence of steps and interactions between the activities covered by the product and all other tools / events / activities outside the product used to carry out the tasks of the user.

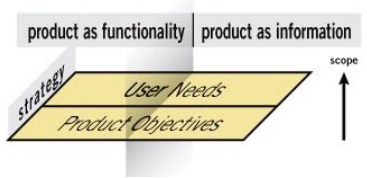


Personas

A dramaturgical and narrative approach to the design.

Handling the design of a product is like telling a story, and can be evaluated for the interest and credibility of the overall narrative, just like would you evaluate the screenplay of a movie

- Characters (personas)
- Setting (context)
- Plot (use cases)



Characters vs. personas

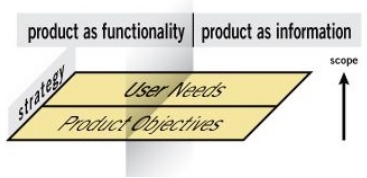
What is the easiest way to do something that's good for our user? Definitely ask him.

But:

- Differences between the sample and the representation class
- Relationships between the state of suffering on a problem and the ability to solve it
- Differences between use during test and during normal use

Idea: inventing synthetic users who embody the features we want to support and serve in this project.

Personas are therefore abstract archetypes of intentions, purposes, and habits



Data to provide for each persona

Goals (end goals):

- What is he/she trying to achieve, and what tasks does he/she want to accomplish with the system

Motivations (Experience and life goals):

- Why does he/she want to achieve these goals

Behavior:

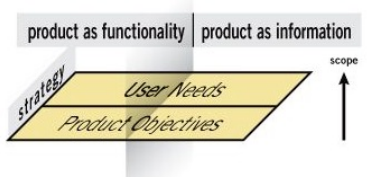
- Patterns of online and offline behavior in relation to goals

Attitude:

- How does he/she approaches the goals and in general his/her life

System objectives:

- How can the system help him/her achieve his/her goals by agreeing with his/her attitude and facilitating his/her behaviour



Bad personas

The elastic user (John Smith / Mario Rossi)

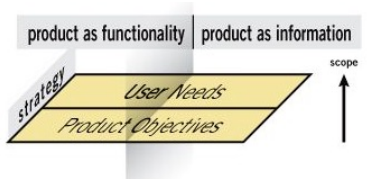
- A blurred, vague description allows all members of the team to use him to support their own opinions and ideas.
- Every time, when discussing a new design choice, a new characteristic of the user needs to be invented and was not previously planned, the user is becoming elastic and is used to support the designer's preconceptions rather than vice-versa

The self-referential user (Me)

- A user who is to a great extent an idealization and abstraction of the designer him/herself, with his/her habits, ideas, skills, goals.

The extreme user (The problem case)

- A blind old man, paralyzed, foreigner, without schooling, no technical competencies and in a hurry
- Although extreme situations in target behaviors and target users exist, it is not for them that the product needs to be designed, if this goes at the expense of a more distinctive range of behaviors.

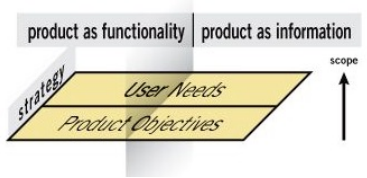


Another bad persona: the average user

No one writes stories about average people, which never undergo anything interesting, without a meaningful history, without a character that can be really felt and described.

A story has an interesting person as protagonist: typical but not average, even better a borderline character, whose peculiarities make him/her stand out of the others and can make him/her a lively, memorable person with a credible personality.

Otherwise, it is too easy to get either an indistinct character or (worse) the alter ego of the writer / designer.



Specificity in personas

The important bit when designing a persona is the level of detail of its description before the specification of tasks

We do not write:

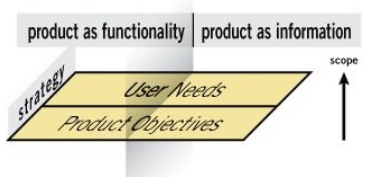
- The user already knows how to use word processing software

We write:

- Emily is 53 year old woman from the countryside, has a husband and two children (17 and 13), a high school degree, has been working at Global Airways for 12 years receiving request from new customers. She works in a 3 x 4 mt. room with two colleagues she goes along well with, and uses MS Word 2011, of which she knows 15% of the functionalities, perfectly enough for her.

Important:

- Give names
- Give life characteristics
- Give plausible stories
- Prevent the designer from identify heim/herself in the character
- Maybe give it a face (eg a photo from the web)



Synthetic and likely personas

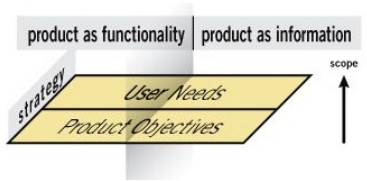
Real users are not good ones

- A real user has peculiarities and idiosyncrasies that a virtual user does not have.
- A real user may, for instance, hate trackpads, or the green color, but a persona can skip irrelevant details such as these.

It is more important that the user is precisely drawn, i.e., provided with details that make it easier to build stories.

Details allow you to focus on design. Reducing detail may increase the segmentation class, but it also makes the user vague and elastic. ***Evil***.

We must avoid the *average* personas and focus on one with specific and unique characteristics. The user whose peculiarities make the resulting project unique and relevant.



Cards for personas

Janet

…ort through a lot of
…ick answers."

…g in a corporate environment
…ounting practice.

…rly comfortable with technology; Dell
…r old) running Windows; 5 Mbit
…15-20 hours/week online
…home; news and information.

Travelocity.com

Frank

"This stuff is all new to me. I want a site that will explain everything."

Frank is interested in learning how he can turn his hobby of making furniture into a business.

Age: 37
Occupation: School bus driver
Family: Married, one child
Household income: $60,000/year

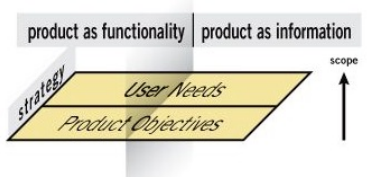
Technical profile: Somewhat uncomfortable with technology; Apple iMac (about two years old); DSL Internet connection; 8-10 hours/week online
Internet use: 100% at home; entertainment, shopping

Favorite sites:

ESPN.com

moviefone.com

eBay.com



Types of personas

Protagonist

The one for whom the project is realized. There's one protagonist for *every role,* and it is the user whose satisfaction covers the satisfaction of most of the other characters. Not an extreme case, not an average case, but a *peculiar* case.

Secondary personas

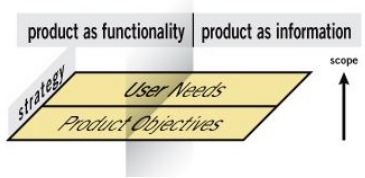
The one who is more or less satisfied with the choices made for the protagonist, but has special and additional needs whose satisfaction does not require a complete reworking of the project, nor reduce the satisfaction of the protagonist.

Additional personas

All other users who are neither primary nor secondary and who are satisfied with the design made.

Negative or non-user personas

Users for which the product is NOT designed. This does not mean that it is designed to hurt them, but the peculiarities of these personas do not have any impact on the project.



The cast

Every project has a cast of personas, somewhere between 3 and 12. You should start with a very rich collection (even 50-60), which are then progessively discarded because the impact of their dramaturgical role is already covered by other personas.

Personas are drawn from the user segmentatio profiles, mainly.

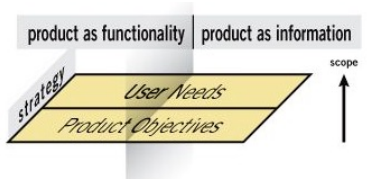
Most of the characters are users, but a few are *non-users* (i.e., people whose needs and whose goals are not ***relevant*** for the project).

Each cast contains a main persona, the protagonist, who must be absolutely 100% satisfied.

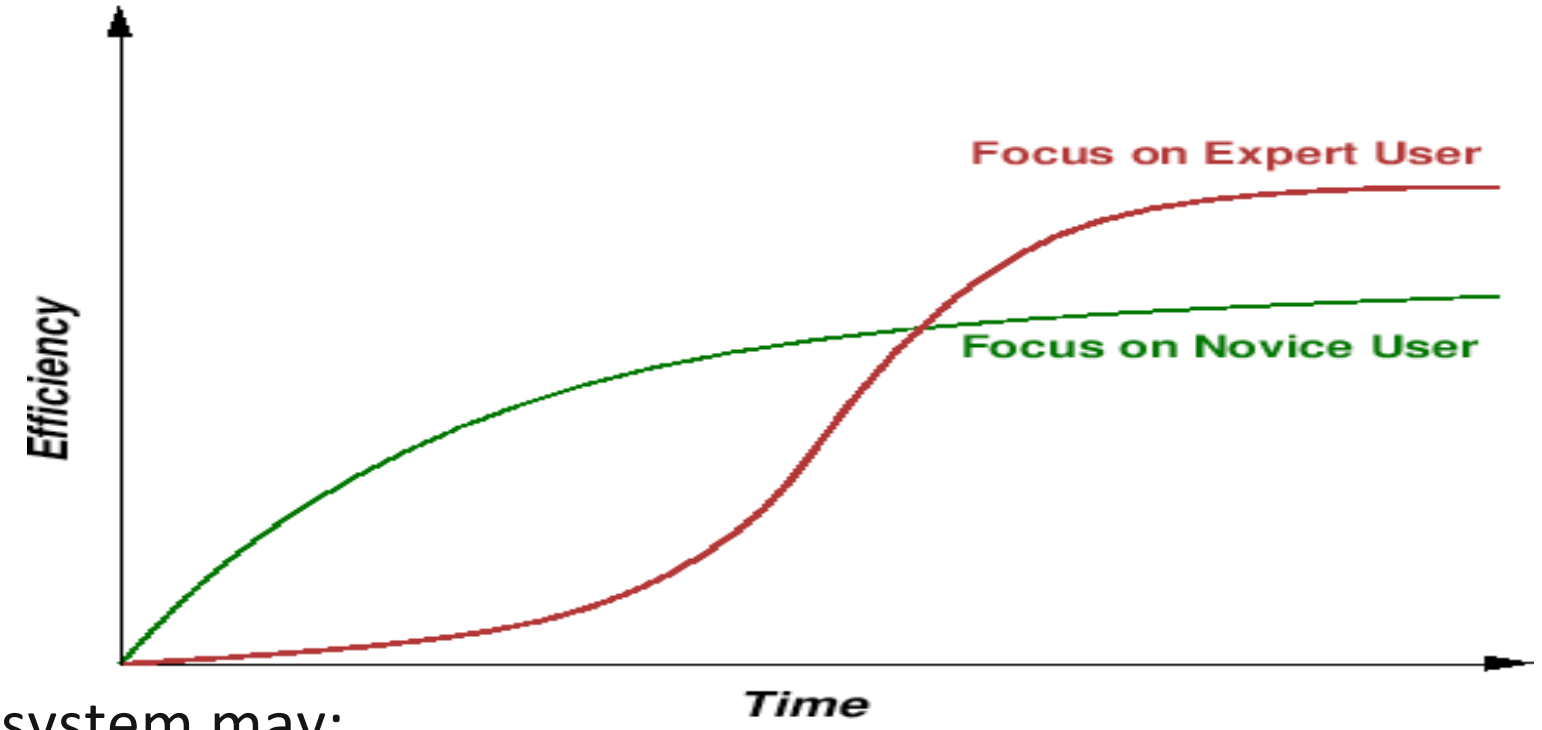
- The choice of the protagonist is difficult but fundamental: it is the protagonist of all the main stories of simulations and tests.

Secondary characters perform contour and counter-story use cases, and are used to detail aspects of the interface that are not relevant to the protagonist.

The protagonist needs to emerge as the persona who can not be satisfied by interfaces designed for the others, but vice versa it works. He becomes the nodal point of the project.

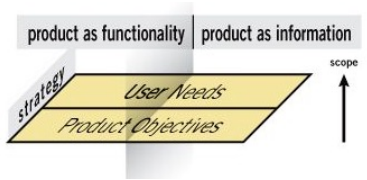


Learning curves



A system may:

- Focus on ease of learning, helping *novice users*.
- Focus on the efficiency of use, helping *experienced users*.
- Planning both a mode for novices and a mode for experts (for example, rich menus and a custmization tools). In this case we navigate above both learning curves and we can call it a "usable system".

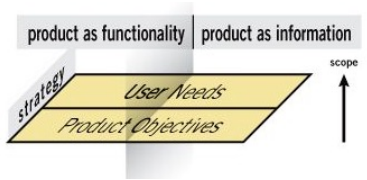


User, users (1)

Inexpert, beginner or novice

- Emphasis on learning

In usability manuals of the 80s (e.g., Macintosh User Interface Guidelines) attention was mainly for novice users.



User, users (2)

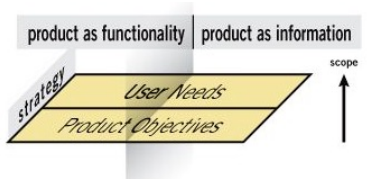
Inexpert, beginner or novice

- Emphasis on learning

Expert

- Emphasis on efficiency

Nielsen e Molich usability decalogue (1989) first introduced the need to respect the hurry and impatience of expert users.



User, users (3)

Inexpert, beginner or novice

- Emphasis on learning

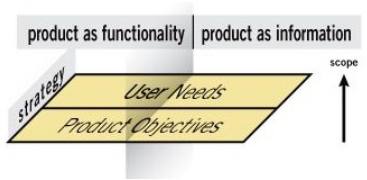
Expert

- Emphasis on efficiency

Casual or intermittent or sporadic

- Emphasis on memorability

In Nielsen's list of the components of usability (1994), memorability can be found, including the expert user who does not use the tool continuously.



User, users (4)

Inexpert, beginner or novice

- Emphasis on learning

Expert

- Emphasis on efficiency

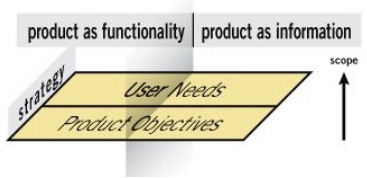
Casual or intermittent or sporadic

- Emphasis on memorability

Perpetual Intermediate

- Emphasis on the right ratio between effort and competence

Alan Cooper in 1995 (About Face) says that each of us reaches the level of computing competencies proportioned to the effort we plan to invest and nothing more



Competence, competencies

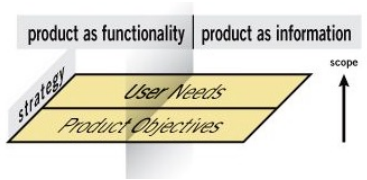
The user is not necessarily a computer scientist, but there is more to expertise than just computing expertise.

Other relevant expertises:

- Domain competence
  - Especially if the domain is very technical (e.g. finance or medical)
- Linguistic competence
  - Linked to school level
  - Important in the case of foreigners

Computer skills are also a complex concept

- Knowing how to use the tablet but not a PC
- Knowing how to surf the Internet but not how to use desktop applications
- Knowing how to use but not how to manage a PC



Physical fitness

Obviously we need to consider extremes

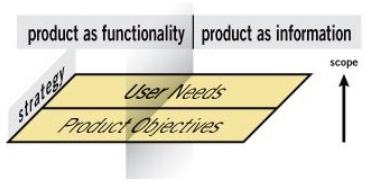
- Blind people, deaf people, quadriplegic people, etc.

But there are more frequent and less disabling diseases that we can consider:

- shortsightedness,
- High reaction times
- Physical difficulties, etc.

… and temporary difficulties in able-bodied individuals

- Forgotten glasses
- Noisy environments
- Hands occupied elsewhere, etc.



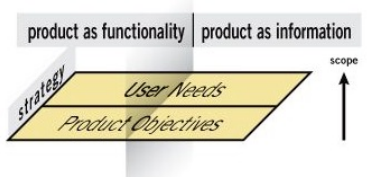
Attention levels

First it was only about work-oriented contexts:

- Primary task of a sedentary job (secretary)
- Relevant task side by side with others (a boss on the phone)
- Secondary task while doing something more important (taxi driver checking the meter while driving)

With web and mobile systems work becomes just ONE of the contexts:

- Very involving activity (teenager playing a videogame)
- Passtime (bored internet surfing on a couch)
- Outside activity under the rain (looking for an address on a smartphone)



Motivations

In a work context it is easy:

- If the tool was chosen by my organization, I must use it, but I do not have to like it:
  - I invest enough energy and time to just guarantee my job
- If I chose the tool and my career depends on it:
  - Maximum investment to achieve my goals, but nothing more

Outside of the work context it is more difficult

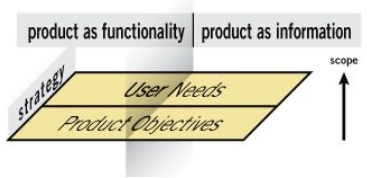
- Null hypothesis in user experience on the web
- Jakob Nielsen's Law on Internet User Experience:
- The Paradox of Free Web Applications

The null hypothesis

The null hypothesis (H_0) is the general or default statement that there is no difference between two events we are measuring, or that there is nothing actually happening in, or nothing being measured by, our experiment.

In general, an experiment is a measure of how much a variable affects or influences a population. Since we cannot test over the whole population, we test over a sample of the population that may exhibit similar behaviour.

If the impact of the variable on the sample is due to a real effect, then the *alternative hypothesis* (or H_1) is true. If it is due to peculiarities in the choice of our sample (sample error) then it is called *null hypothesis* (or H_0): the measures we are making are not meaningful and do not represent an effect in the real world.



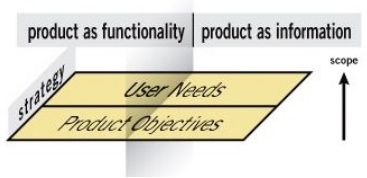
The null hypothesis in User Experience Design

In design, people often compare design choices between themselves, but forget to compare it with nothing at all.

- In testing a single parameter, subjects are required to use the software, so this is already different from the real world where they may choose to not use it.
- In A/B testing, subjects are asked what they prefer between solution A or solution B. While it may be clear that subjects cannot have both A and B, but we are not told if they can choose to have neither A nor B.

In situations where there is a discretionary or voluntary choice of technical solution, the null hypothesis is the choice of not using any tool at all.

- Compare your editing tool to drawing on paper by hand
- Compare your video game with a walk in the park
- Compare your online reservation app with showing up at the shop premises and waiting



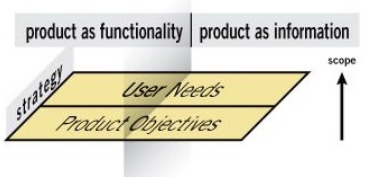
J. Nielsen's Law of Internet User Experience

*Users spend most of their time on **other** sites.*

Users prefer your site to work the same way as all the other sites they already know.

External consistency is the single most important design rationale in any mature field (such as the web).

- Do not invent. Recycle.
- If you invent, be bold and unmistakable. Do not go for small minor improvements.



The paradox of free web applications

Most web applications and many mobile applications are free. They require no economical investment and very little emotional investment.

In turn, we are shown over and over again that being free or cheap affects negatively our expectations towards the application itself.

We have little or no patience towards a free or cheap piece or software, and are ready to abandon it at the first difficulty.

On the other hand, an expensive piece of software commands time and effort just to get even of the economical investment already spent.

No investment (emotional, economical) => no patience

References

Jesse Garrett, *The elements of user experience*, New Riders, 2011

Philip Harris, *Data Driven Design*, K&R publications, 2013

A. Cooper, R. Reimann, D. Cronin, *About Face 3*, Wiley, 2009

Alan Cooper, *The inmates are running the asylum*, SAMS, 2004

T. Tullis, B. Albert, *Measuring the User Experience*, Morgan Kaufmann, 2013

Susan Weinschenk, *100 things every designer needs to know about people*, New Riders, 2011

Usability Book of Knowledge, http://www.usabilitybok.org/

David Evans, *Bottlenecks,* Apress (2020).