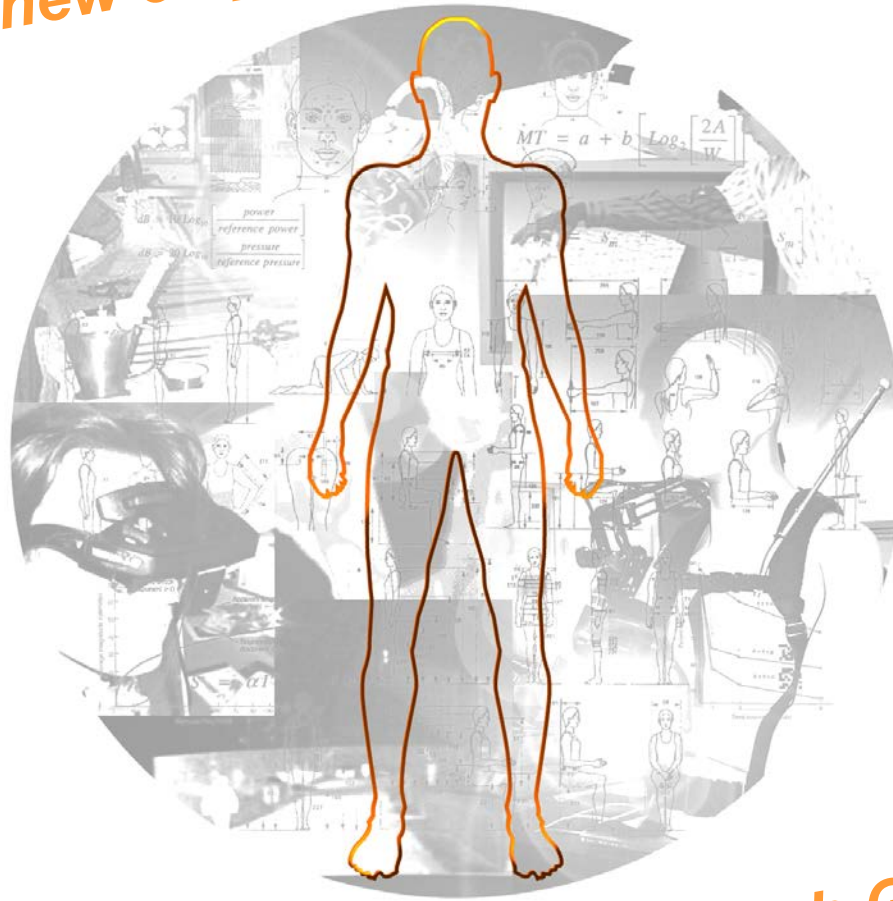From Ergonomics to Human Centred Design: a new emphasis for automotive design

Prof. Joseph Giacomin

October 24th 2013

1985

1990

1994

ALESSI

amazon.com®

Human Centred Designer

A relatively transparent figure who does not impose preferences on a project, but, instead, conveys and translates the will of the people in order to empower them through the final design solution.

Human centred design involves techniques which communicate, interact, empathise and stimulate the people involved, obtaining an understanding of their needs, desires and experiences which often transcends that which the people themselves actually knew and realised.

Some Human Centred Design Tools

Facts Regarding Humans and Society

- Anthropometric data sets and models
- Biomechanical data sets and models
- Psychophysical data sets and models
- Cognitive data sets and models
- Emotional data sets and models
- Psychological data sets and models
- Sociological data sets and models
- Philosophical data sets and models

Capture of Meanings and Needs

Verbally based

- Ethnographic interviews
- Questionnaires
- Day-in-the-life analysis
- Activity analysis
- Cognitive task analysis
- The five whys
- Conceptual landscape
- Think aloud analysis
- Metaphor elicitation
- Be your customer
- Customer journey
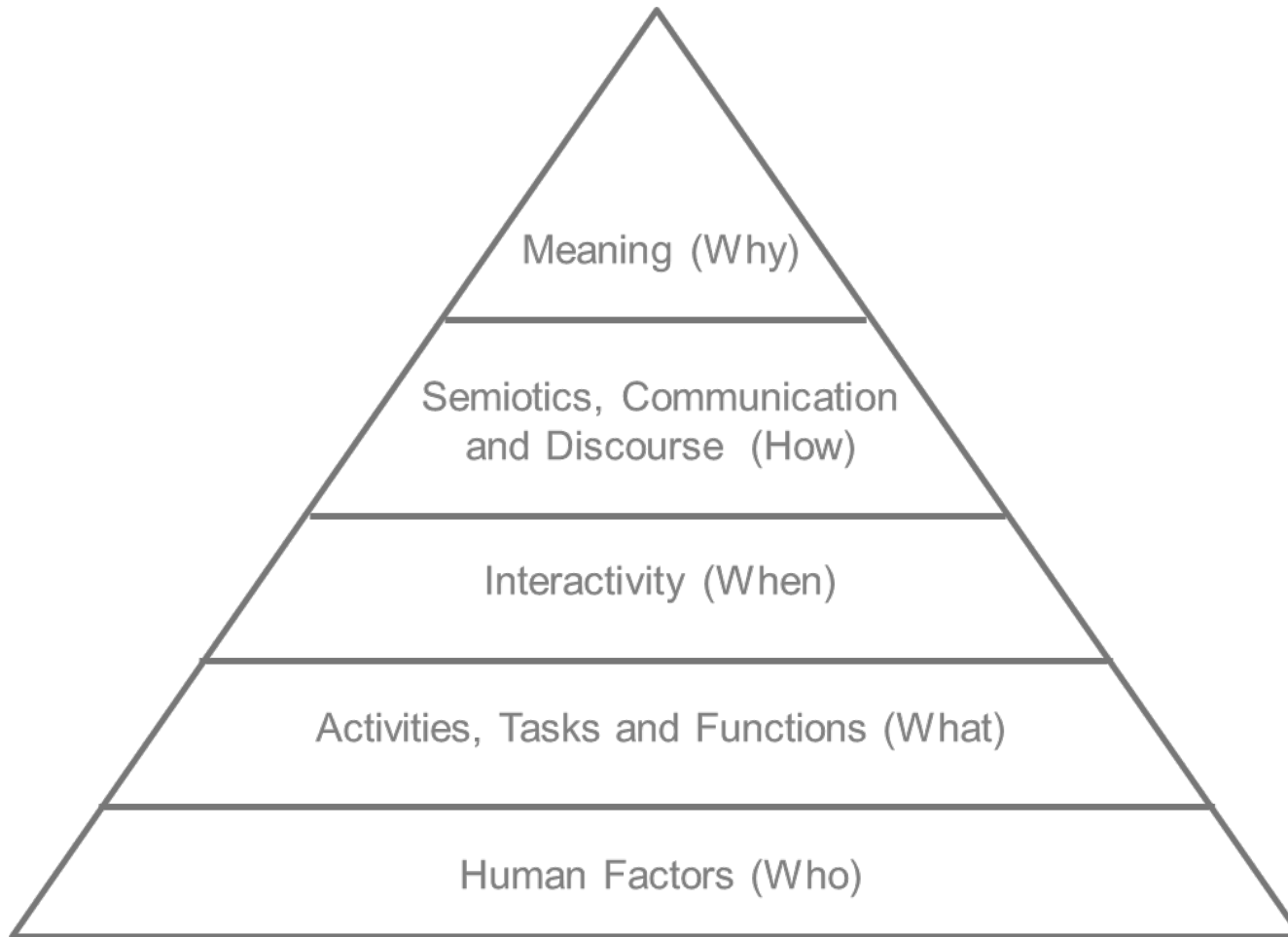- Personas
- Scenarios
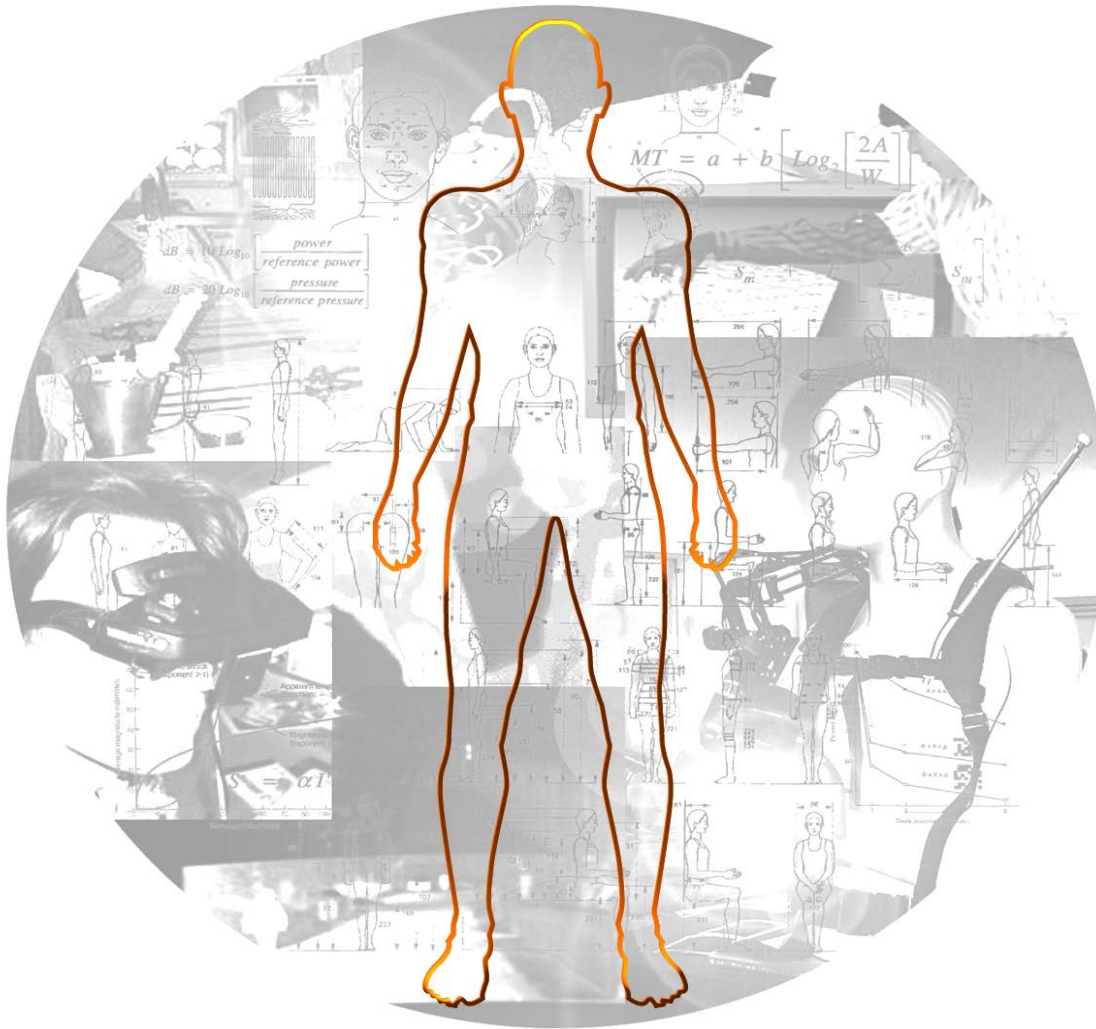- Extreme Users

Non Verbally based

- Game playing
- Cultural Probes
- Visual journals
- Error analysis
- Fly-on-the-wall observation
- Customer Shadowing
- Body language analysis
- Facial coding analysis
- Physiological measures
- Electroencephalograms

Simulation of Possible Futures

- Word concept association
- Role playing
- Focus groups
- Co-design
- Experience prototype
- Real fictions
- Para-functional prototypes

The Human Centred Design Pyramid

Meaning (Why)

Semiotics, Communication and Discourse (How)

Interactivity (When)

Activities, Tasks and Functions (What)

Human Factors (Who)

Human Centred Design

In its most basic form it leads to products, systems and services which are physically, perceptually, cognitively and emotionally intuitive.
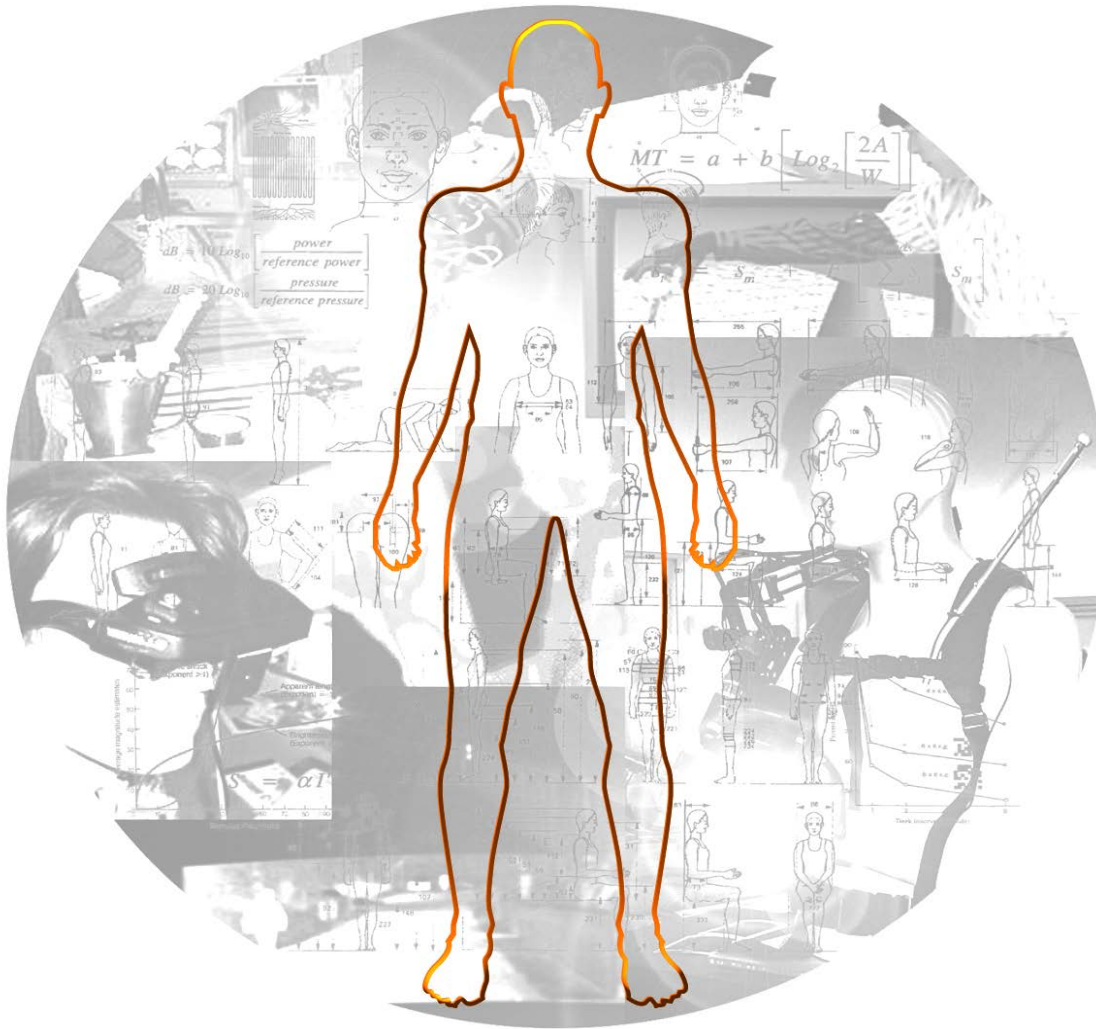
Human Centred Design

In its most advanced form it discovers and unlocks latent needs and desires, supporting the achievement of desired futures for society.

From Ergonomics to Human Centred Design

An important distinction between the ergonomic approach and the human centred design approach involves the difference between "*human performance*" and "*human behaviour*".

*"**Human performance**" is what a person can do when asked to perform a task in a specific manner.*

*"**Human behaviour**" is instead what a person will mostly likely do when left to interpret the surroundings, choose the priorities, and act in the manner which he or she feels is appropriate.*

From Ergonomics to Human Centred Design

Most driving research has been ergonomic in nature because it has focussed on the measurement of the "*human performance*" aspects of driving safety.

From Ergonomics to Human Centred Design

But as Caird and Horrey have said in reference to the use
of driving simulators in research:

> "Simulators measure driving performance, what the driver can do.
> However, safety is determined primarily by driver behaviour or what
> a driver chooses to do. It is exceedingly unlikely that a driving
> simulator can provide useful information on a driver's tendency to
> speed, drive while intoxicated, run red lights, pay attention to non-
> driving distinctions, or not fasten a safety belt. Twenty-year-olds
> perform nearly all tasks on simulators better than the 50-year-olds,
> but it is the 50-year-old who has sharply lower crash risks."

Automotive Human Centred Design Priority Research Areas

Co-Design Tools

The 21st century is one of personal freedom, democracy and human empowerment. New interaction tools for use on mobile platforms, virtual worlds and the internet of things are needed to distribute and democratise the automotive design process.
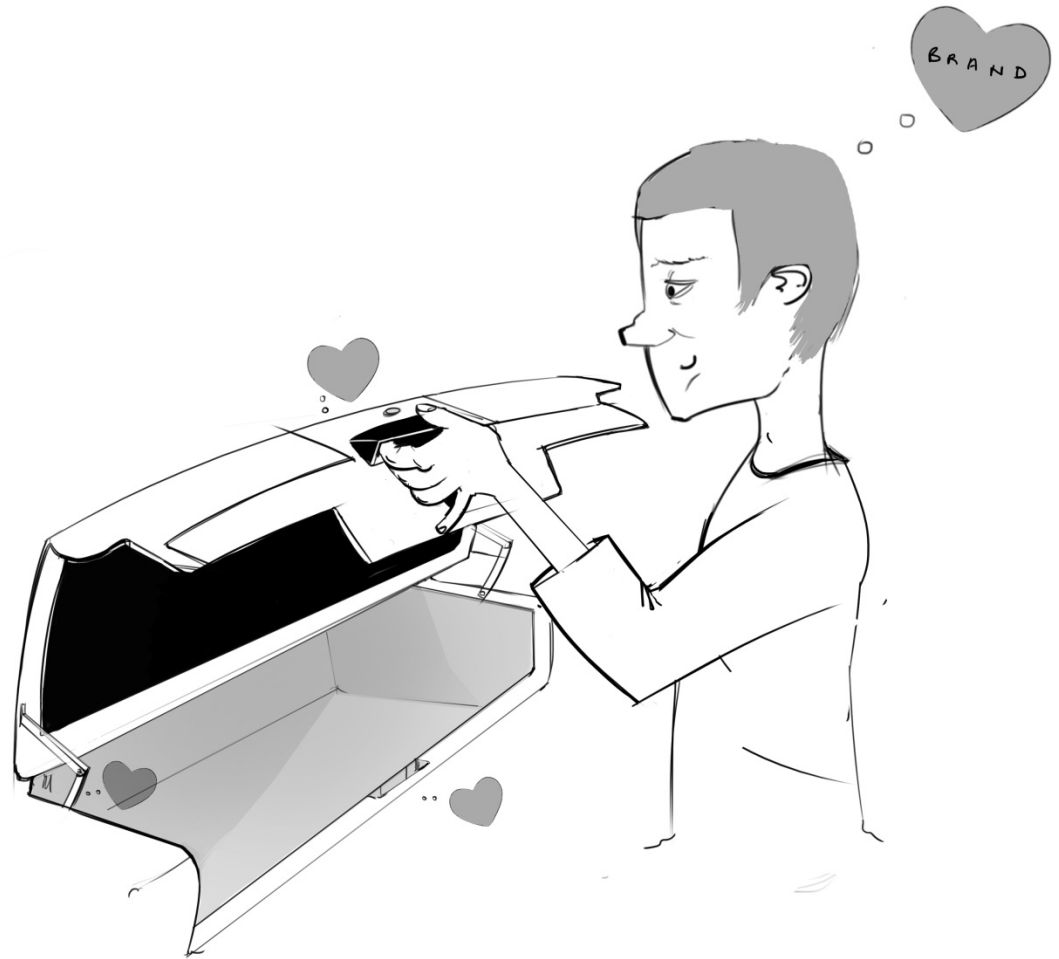
Iconic Touchpoints

The 21st century is characterised by enormous progress in the understanding of the human mind. We now know much about how sensory stimuli enter the mind, get stored in memory and, when conditions are right, become iconic. We can use this knowledge to design automobile touchpoints which rapidly become iconic.

Perception Enhancement

In the 21st century digital signal processing has made it possible to decode the natural languages of many animals and environments. These same methods can decode the sound, vibration and other stimuli of automobiles, permitting the design of controls and emissions which enhance the communication between the automobile and the driver.

Gamification

In the 21st century video and other games have demonstrated the addictive potential of well designed sensory stimuli and cognitive tasks. Design strategies based on driving flow criteria and video game criteria can sharpen the driving experience and enhance brand satisfaction.
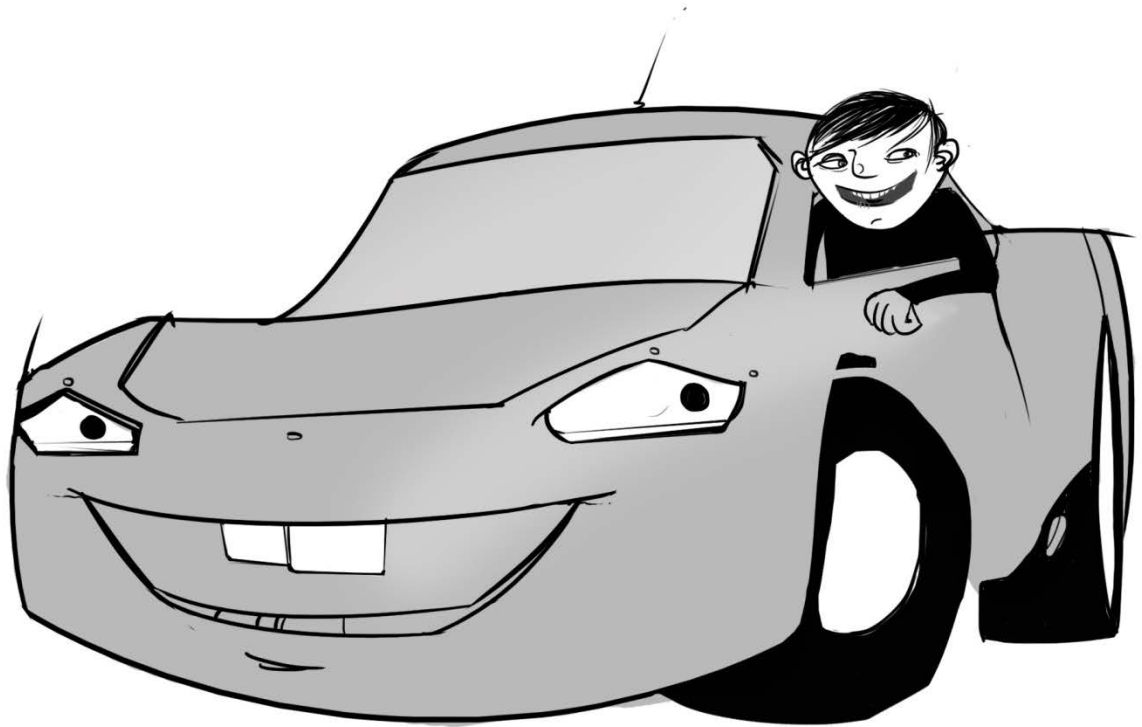
The Emotional Automobile

In the 21st century automotive technology has increased enormously in both scope and complexity. On-board systems now transcend the human ability to monitor and control them. In addition the microprocessor and memory units are now similar in terms of raw ability to the nervous systems of small animals. As with biological evolution, it is necessary to equip automobiles with emotional responses which centrally modulate and simplify the functioning of the individual on-board systems.

Thank you.