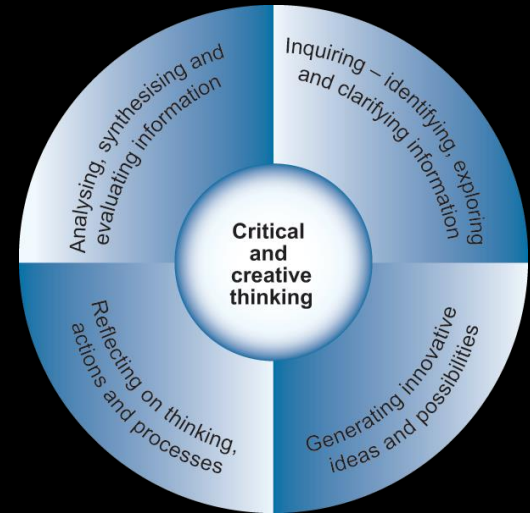


INTEGRATED

Product Design

Design, Technology
+ Innovation

Creative Thinking



Sandy Walker

INTEGRATED

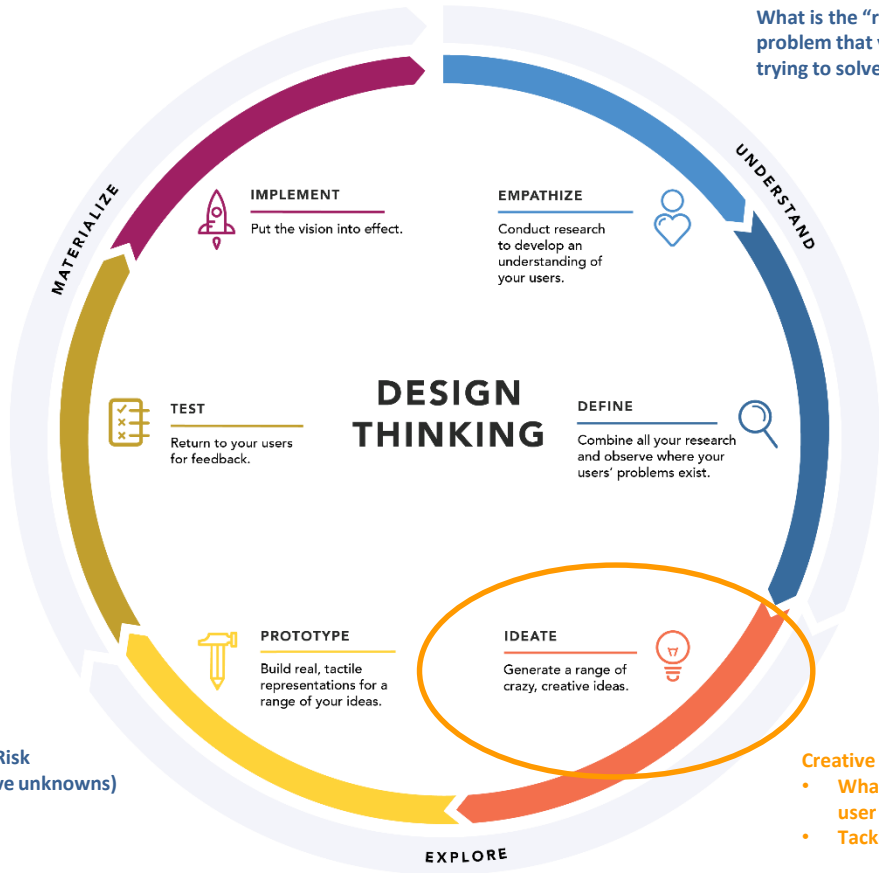
Product Design

Design, Technology
+ Innovation

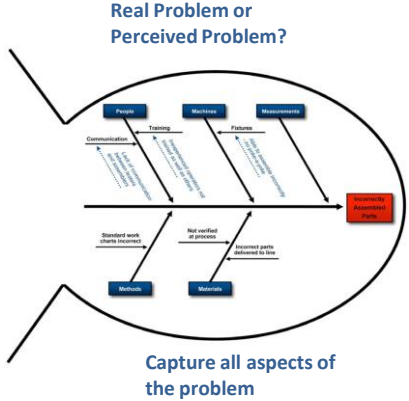
Creativity is thinking up new things. **Innovation** is doing new things.

- *Theodore Levitt*

Sandy Walker



What is the "real" problem that you are trying to solve?



Problem Research

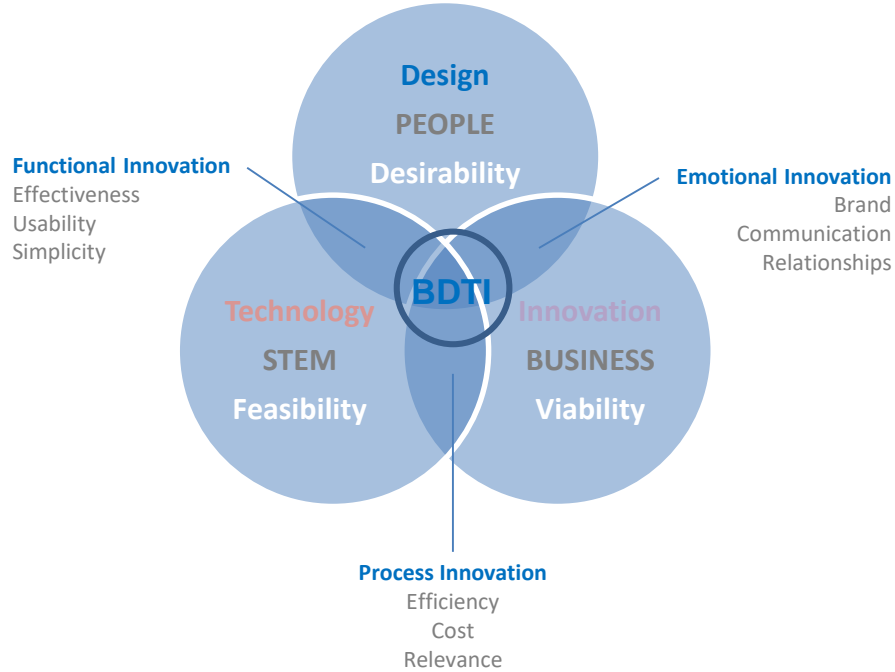
Product Definition

Prioritise (Paired Comparison)

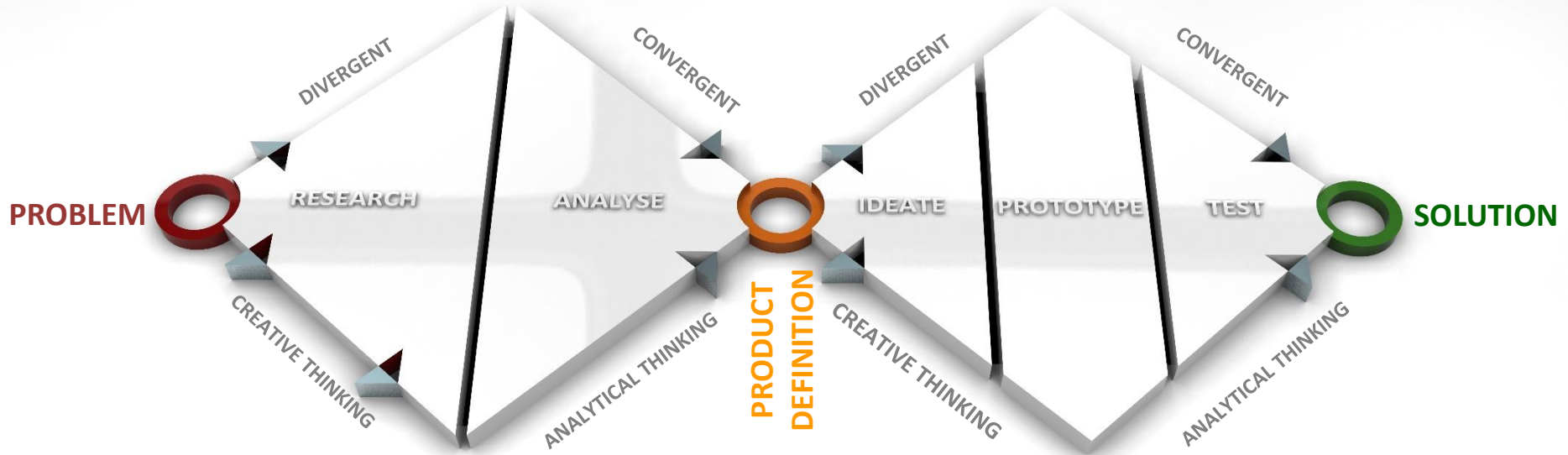
Manage Risk (Remove unknowns)

- Creative Thinking...**
- What are the unrecognised user needs and insights?
 - Tackle the big problems first!

Design + Technology + Innovation



Design Thinking Double-Diamond



Finding the right PROBLEM

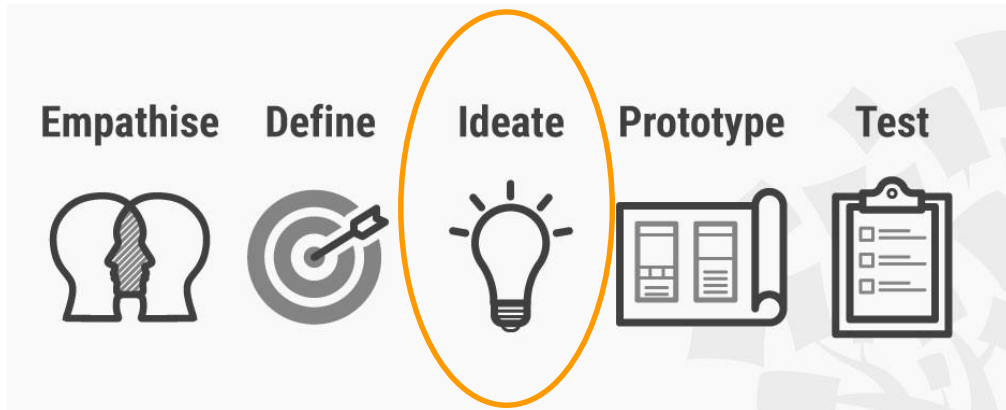
- Establish user needs.
- Expand the scope of the problem.
- Diverge to examine user and all the fundamental issues (technology, market, competition).
- Converge towards a single clear reframed problem.
- Product Definition/Product Vision/Value Proposition

Finding the right SOLUTION

- Creatively expand all possible solutions.
- Build iterative prototypes.
- Test prototypes with users.
- Converge towards an optimal solution.

creativity and innovation

A collection of loosely related thoughts about creative thinking and innovation...



creativity and innovation



What is Creativity...

<http://www.britannica.com/eb/article-9026811/creativity>

- The ability to make or otherwise bring into existence something new, whether a new solution to a problem, a new method or device, or a new artistic object or form.
- A mental process involving the generation of new ideas or concepts, or new associations between existing ideas.
- From a scientific point of view, the products of creative thought (sometimes referred to as divergent thinking) are usually considered to have both originality *and* appropriateness.

creativity and innovation

What is Creativity...

- In a product design context, creativity is about finding solutions to problems within criteria constraints and normally with a human focus.
- Simply generating a new idea is not enough, it must be a **good new idea**.
- Creativity is a uniquely human trait – perhaps the main thing that separates us from the animals?
- Creativity can be the result of either inspiration or the deliberate application of idea generation tools, techniques and processes.



creativity and innovation

What is Innovation...

Innovation can be defined as "*The successful exploitation of new ideas*".



Breaking this down a bit further –

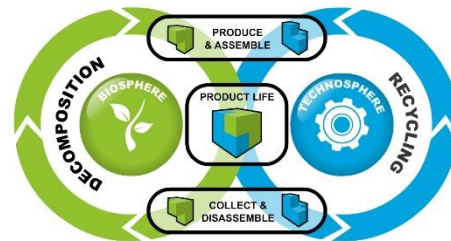
- **New ideas** - these might be for a new (or improved) product, process or service, or even a whole new business or business model.
- **Exploitation** - this indicates that the idea must be implementable and potentially value generating (i.e. innovation = invention + exploitation).
- **Successful** - finally, this implies that the innovation is actually adopted by the target audience.

creativity and innovation

What is Innovation...

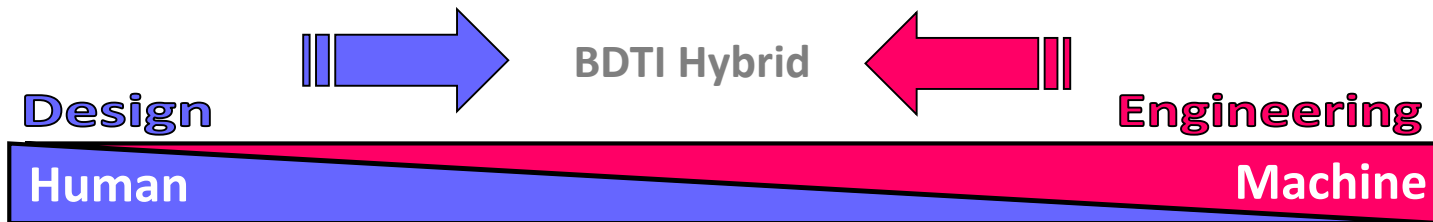
Product innovation

- Product innovation can be thought of as the complete business process of introducing new or improved products to market.
- It spans the entire product life-cycle from initial identification of market/technology opportunity, conception, design and development through to production, market launch, support, enhancement and eventual retirement or preferably rebirth.



creativity and innovation

Educational Approach...



Design

BDTI Hybrid

Engineering

Human

Machine

- Ergonomics
- Usability
- Functionality
- Anthropometrics
- Aesthetics/Desire
- Marketing
- Creative Thinking
- Design Methodology
- Design for Manufacture
- Materials and Processes
- Customer Benefits Analysis
- Value Proposition
- Communication
- Divergent Thinking

- Fluid Dynamics
- Stress Analysis
- Motion
- Pressure
- Structural Analysis
- Work, Power & Energy
- Structures
- Electromagnetics
- RFI/EMI
- Electrostatics
- Electronic Systems
- Engineering Drawing
- Thermal Dynamics
- Convergent Thinking

creativity and innovation

Inspiration or methodology

- Technique – simply sit back and wait for that flash of genius to hit.
- Often this simply does not happen. Then you need to follow a idea generation methodology.
- Genius is one percent inspiration and ninety-nine percent perspiration.



Thomas Edison
“Probably one percent of creative new ideas come from inspiration – the rest come from perspiration”.

Albert Einstein
“Creativity is intelligence having fun”

Creative Warm-up

Gaining fluency- “Creative Warm-up”

Individually for 6 minutes (2 minutes each), think of and write down, as many ways as you can to use a:

- Pen
- Book
- Plate

1



2



3



stimulating creativity

Organisational encouragement • Supervisory encouragement •
Freedom • Supportive work groups • Sufficient resources • Challenging
work • Use movement

Reference: <http://thecreativeleadershipforum.com/creativity-matters-blog/2010/12/10/environmental-stimulants-to-creativity-research-results-tere.html>

creative thinking

Creative thinking techniques and methods:

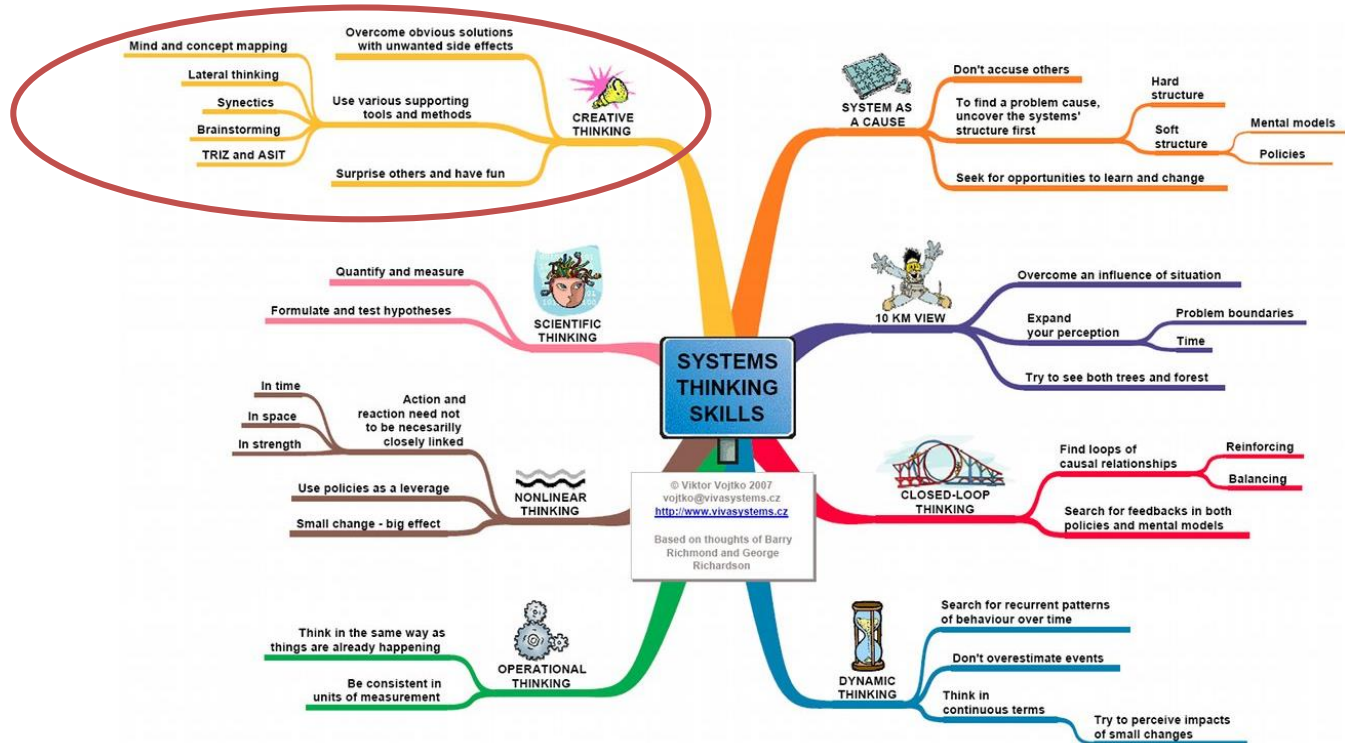
- Brainstorming
- Mind-Mapping
- **Visualisation**
- *TRIZ*
- Synectics
- Biomimicry
- Morphological Analysis
- Lateral thinking

“The best way to get good ideas is to get lots of ideas, and throw the bad ones away”

Dr. Linus Pauling

creative thinking

What is Creative Thinking...



Make the pram/pusher move forward and backward?

Problem



Research



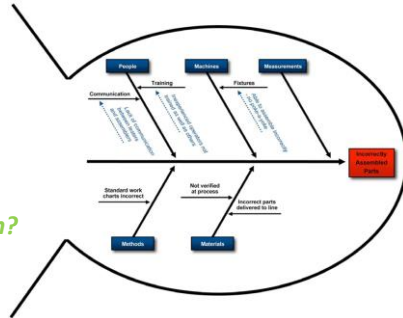
Product Definition – Settle the baby!

- Simulate womb noises, water, bubbles, vacuum cleaner, parent’s voice...
- Reduce stimuli for child
- Wrap baby tightly
- Make Hygienic
- Massage/Pat baby
- Make intuitive and easy to use.
- Make lightweight (portable and easy to manage)
- Make adaptable (to suit the requirements of different children and parents)
- Make adaptable (to 3 or 4 wheeled prams with fixed or pivoting wheels)
- Reliable (long product life-span)
- Affordable (relatively low cost for new parents)
- Operational Lifespan of 5 years
- Have rocking variability (types of rocking) ways of rocking (rocking generator)? Bounce, rock, swing etc.
- Have duration/timing
- Safe Nontoxic materials
- Sustainable
- Operable for 4 hours without mains power

What is the “real” problem that you are trying to solve?

Reframe the Problem!

What’s the Real Problem?



Capture all aspects of the problem



Problem Research



Problem Solution Vision:

- **Settle the baby.**
- Prevent the baby from becoming unsettled.
- Reduce the social impact and parent stress of having a crying baby.
- Keep the baby safe at all times.
- Comply with all relevant standards.
- Prevent abuse of the product through neglect or laziness.
- Provide peace-of-mind that the baby is OK.
- Create relaxing experience for the baby as well as the caregiver.
- Important that the baby is given sufficient rest periods.
- The caregiver is also given sufficient time to rest, also enjoy themselves.

So, in terms of solving the problem that we have researched and are experts on, which are the most important aspects to solve (come up with ideas for)?

What “insights” have you discovered?

- *Design a Laptop Stand?*
- *Design an Oyster Shucker?*

Problem



Understand and share the needs and feelings of the user

User Research



What unique insights have you gained?

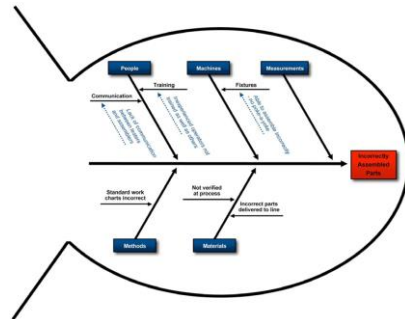
Product Definition

- *Design a Acoustic Sensor?*
- *Design an Voxiebox UX*
- *Design a Voxiebox Controller?*

What is the “real” problem that you are trying to solve?

Reframe the Problem!

What’s the Real Problem?



Capture all aspects of the problem

Understand user “EMPATHY”



User Research



Product Definition

Understand the user’s problems and their needs

What “INSIGHTS” have you discovered through user EMPATHY, that will allow you to INNOVATE a viable solution?

Product Definition – lack of laptop study places!

So, in terms of solving the problems that we have researched and are now experts on, which are the most important aspects to solve?

Alex and Charlie, what is the **real problem** you are trying to solve?

From your research:

- Adjustability
- Charging
- International Students struggling to charge
- Interfacing with Floor Mounting Plates
- Nesting/Stacking is essential
- Multiple devices being used at once
- Use with books and other items
- **Availability of laptop study places. People looking for somewhere to use their laptop (or iPad)! Therefore may also need seating.**

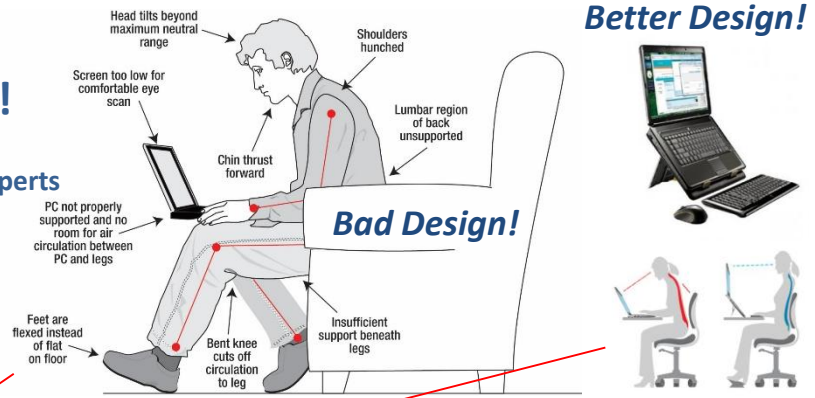
The most significant **INSIGHT** you mentioned I believe, is the lack of available study places. Solving this, and you may create an entirely new category of product.

How can what you will design, **increase the availability of laptop workspaces and use the available space more efficiently?**

How can what you will design, **accommodate the different ways people will want work** in the spaces available, safely?

Taking this on-board, I then gave the problem some thought...

What's like it???



Modular? Perch stool?

Easily mobile/reconfigurable for group work?

Integrated adjustable seating, like a bike?

Docking, like a shopping-trolley?

Motivate user to return to dock, like a shopping trolley?

Battery or electrical docking?

Magnetic linking-interconnection?

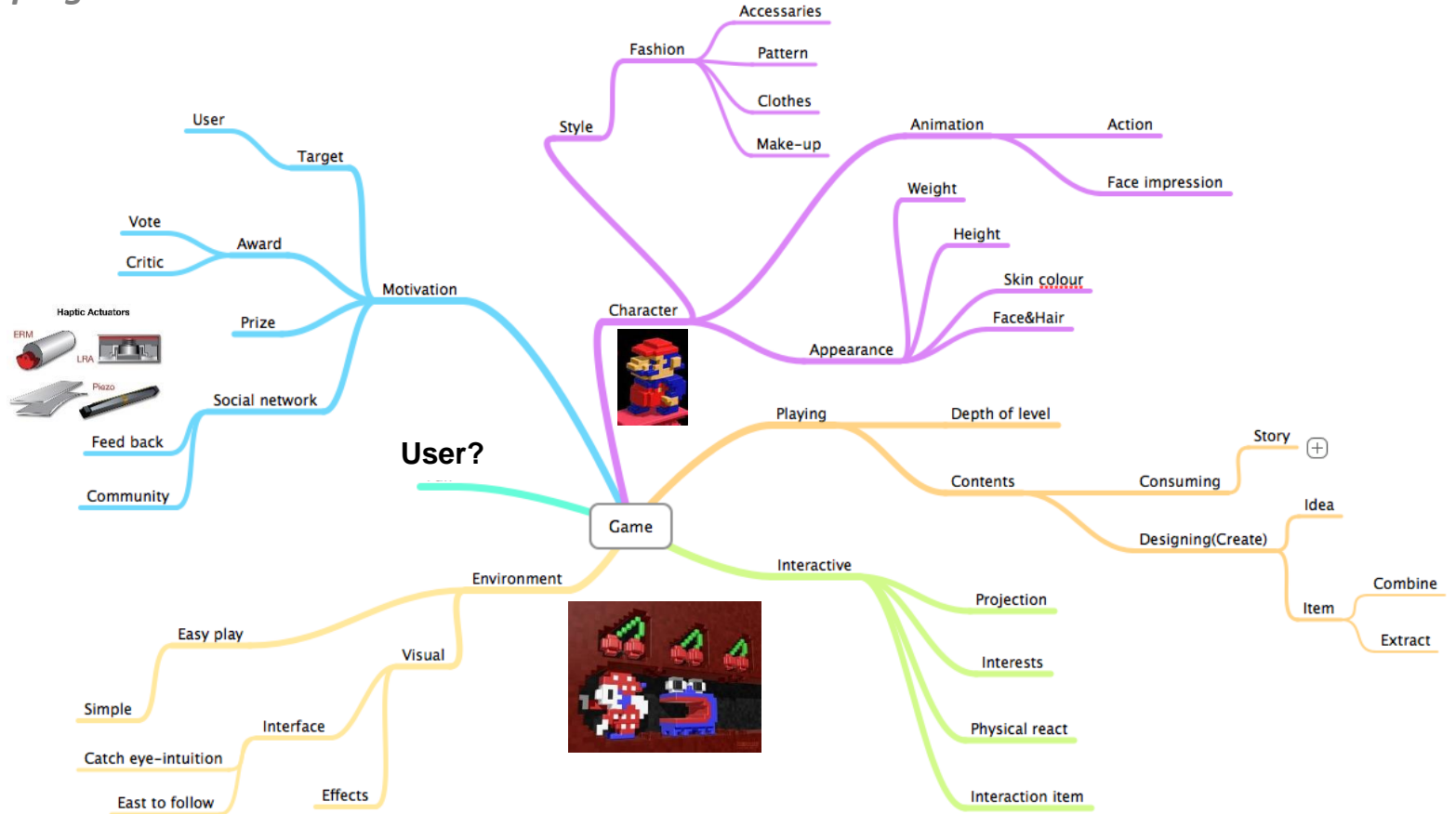
Bluetooth integrated compact keyboard?

Best Design???

Ideation Checklist...

- **Adapt-** What else is it like? What other things do this? What other idea does it suggest? Does the past offer a solution? Does nature do something similar (Biomimicry)?
- **Modify-** Change meaning, colour motion, sound, shape, technology.
- **Magnify-** What can be added, higher, longer, stronger, thicker, multiply, duplicate and exaggerate?
- **Minimise-** What can I subtract, make lighter etc.?
- **Substitute-** Another material, process, power source.
- **Rearrange-** Interchange components, other layout?
- **Reverse-** Use backwards, upside-down, transpose positive and negative.
- **Combine-** Blend, combine functions, combine components.
- **Eliminate-** Remove unnecessary elements and features.

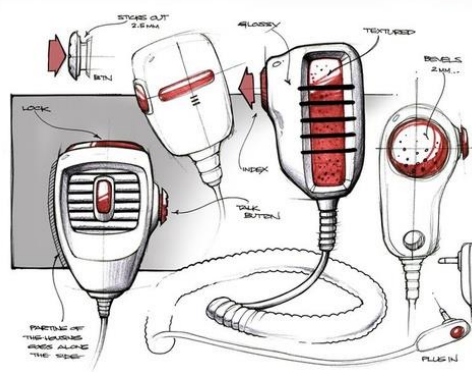
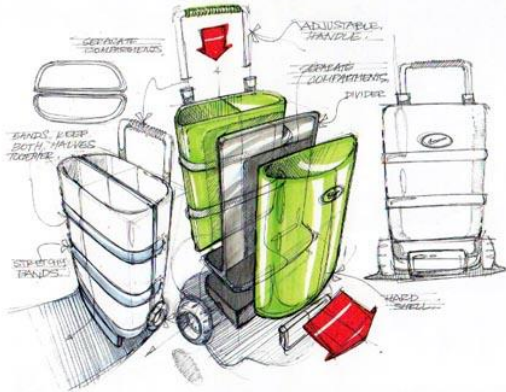
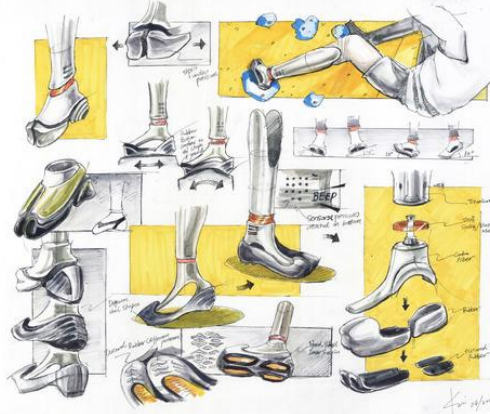
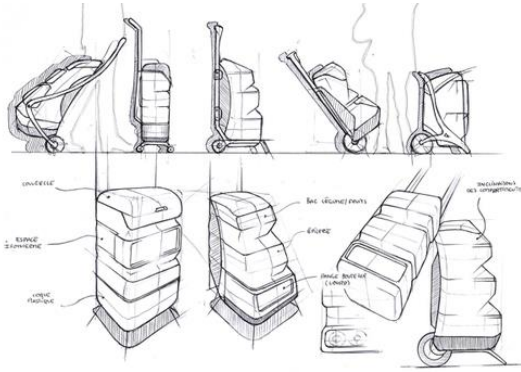
Mind Mapping



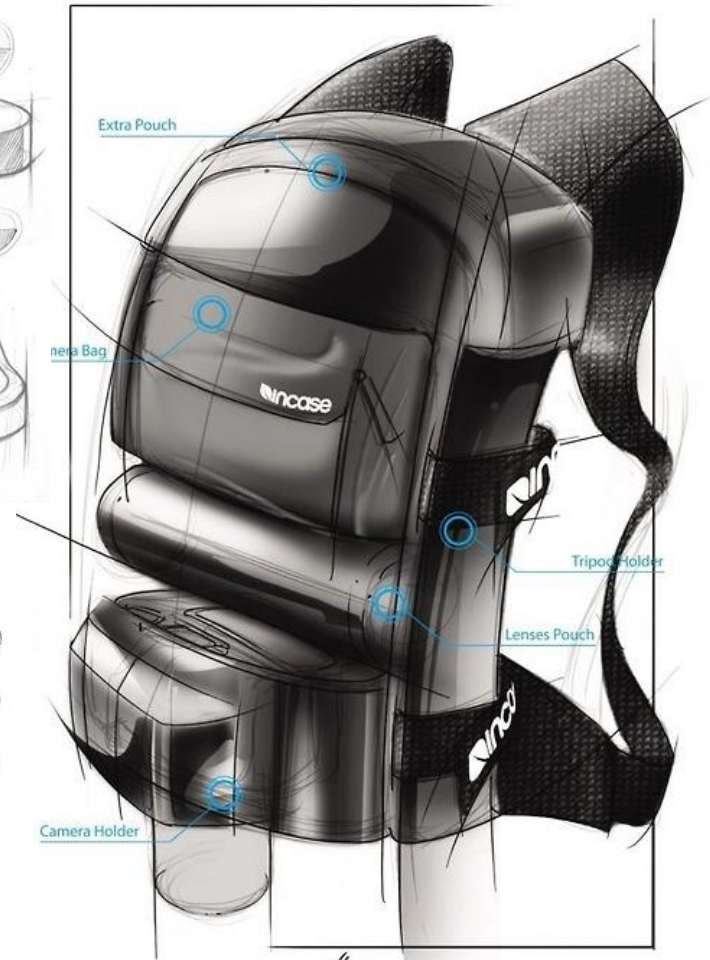
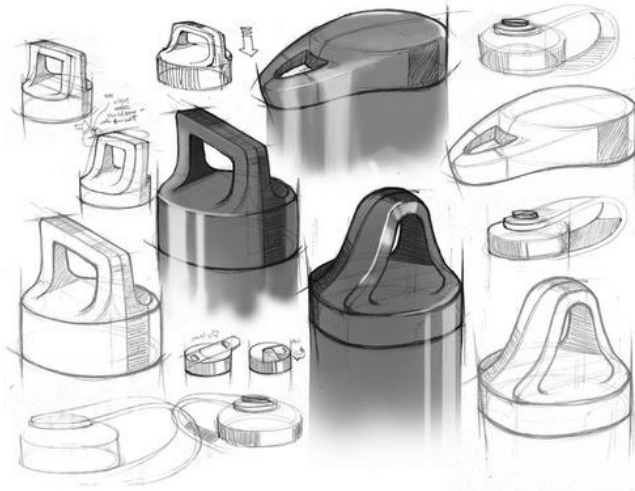
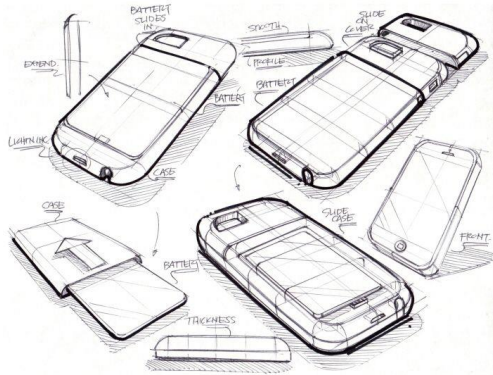
IDEATION: the formation of ideas or concepts...



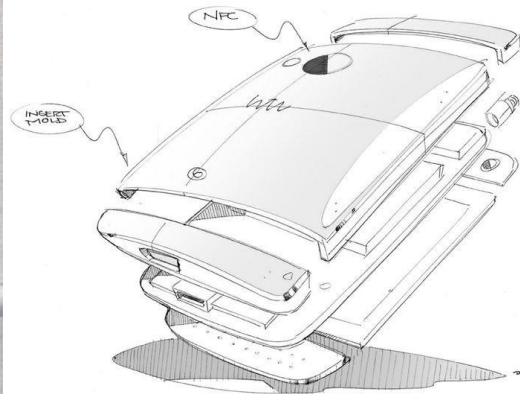
Methods of Ideation...



Methods of Ideation...



I imagined a smart shower hose with a turbine and a new generation resistance. This concept is able to instantly heat water for 1 minute, only by using the water pressure.

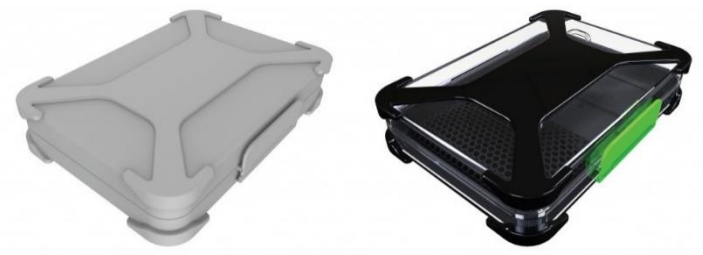
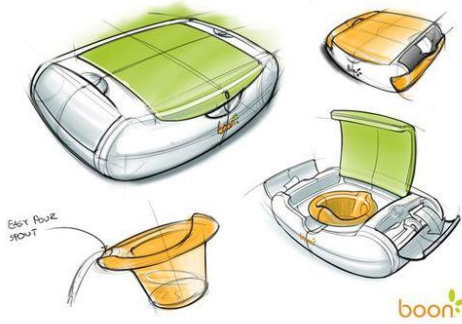


incase

ASHMA

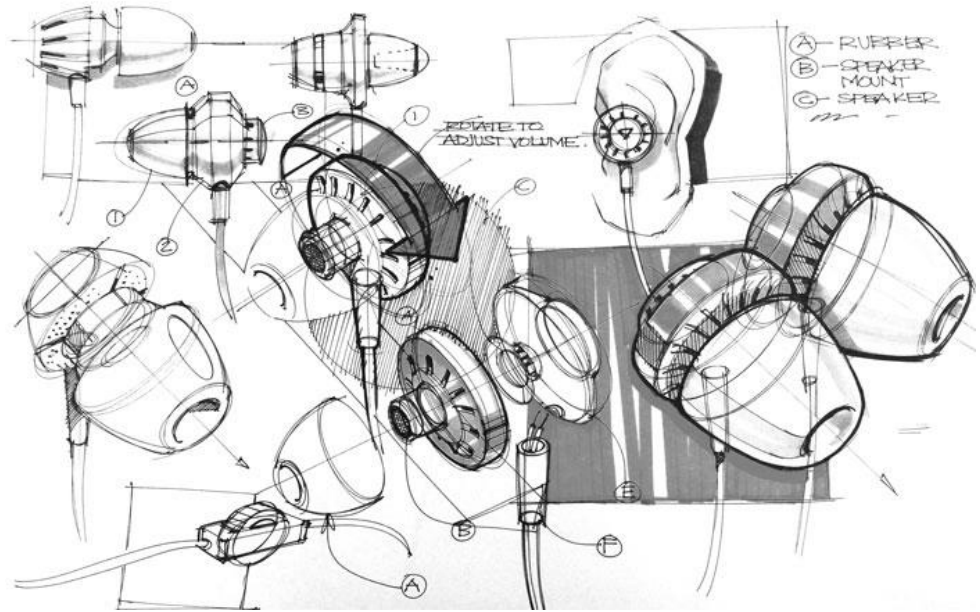
Concept 2-3

Methods of Ideation...

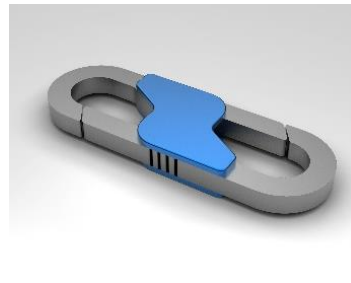
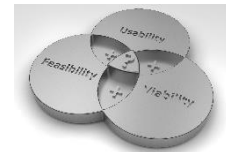
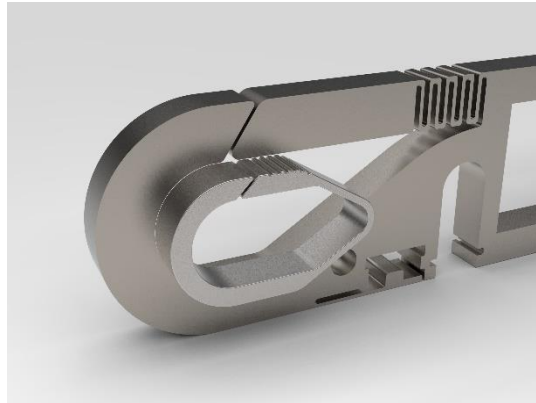
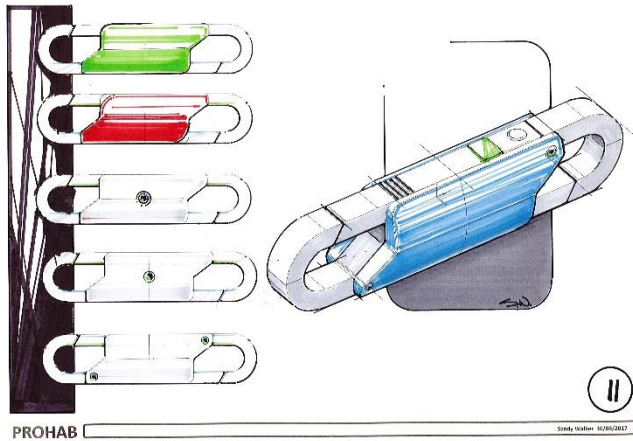


Left: CAD model without materials applied

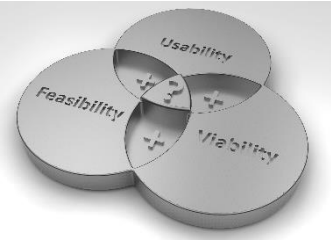
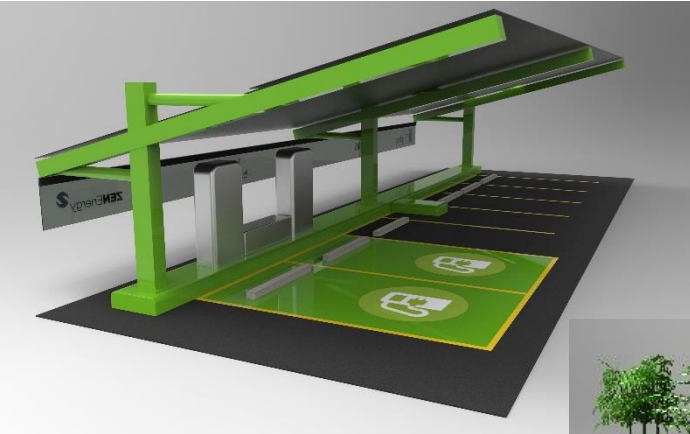
Right: Rendering after materials and environment applied



Methods of Ideation...



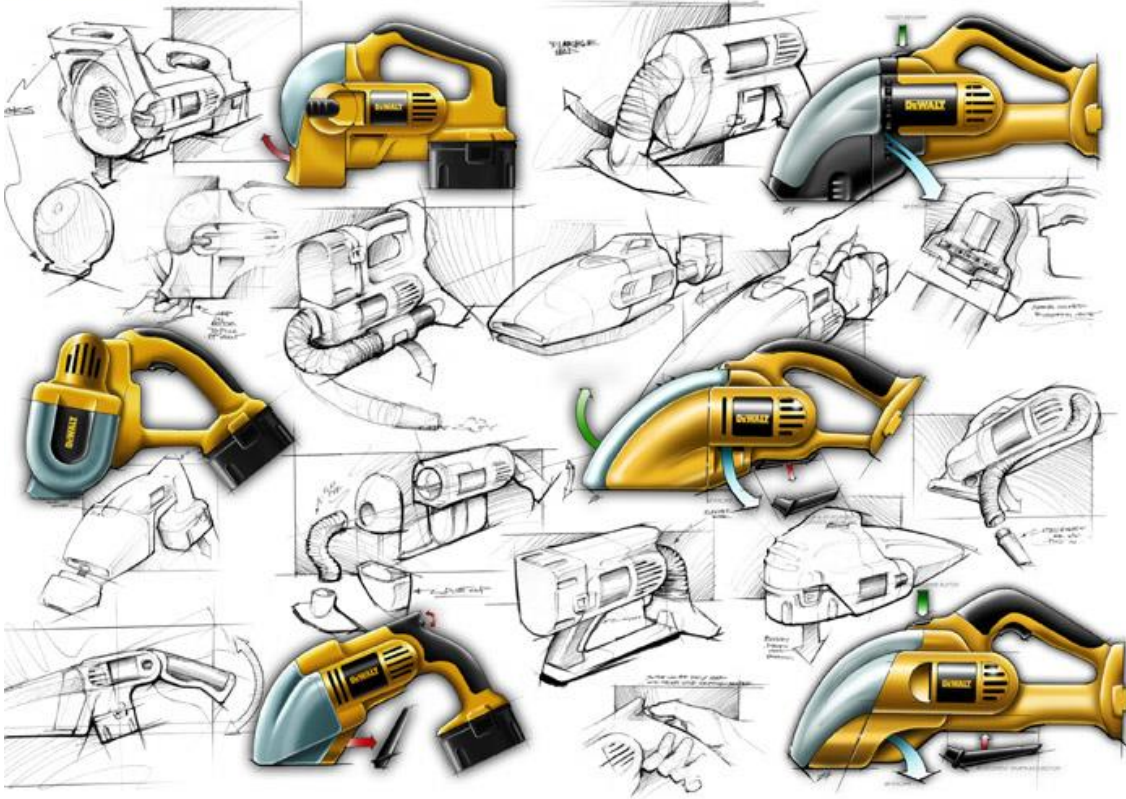
Methods of Ideation...



Methods of Ideation...

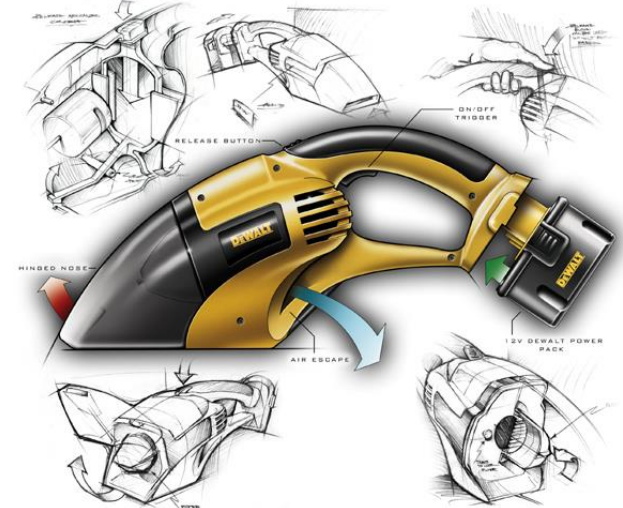
DEWALT CONCEPT IDEATION

brand integration



DEWALT FINAL DESIGN

brand integration



BRAND IDENTITY



VISUALISATION?

Reframe the Problem!

What's the Real Problem?

Integrated seating, like a bike?



Modular?

Perch stool?



ScooterDesk <http://utilia.be/collection/scooterdesk/>

Advantage:

ScooterDesks support your natural need for movement, both directly and indirectly.

They improve the ergonomic wellbeing (of workers) for all possible kinds of activities where occasional sitting and use of a small desk are needed.

When using a ScooterDesk: - Your back is in optimal position: straight. - You are stimulated to gently move and change position often: - You train your ligaments and muscles, and stimulate your circulation and metabolic processes.

Greatly improve interactivity between co-workers; organise instant group- meetings.

Improve your freedom to task everywhere, not only at the office, but also at the factory, warehouse, or even outside, wherever you are needed



Docking, like a shopping-trolley?



Adjustable like a bike?



Integrated seating, like a bike?



NOW LET'S MIND-MAP!