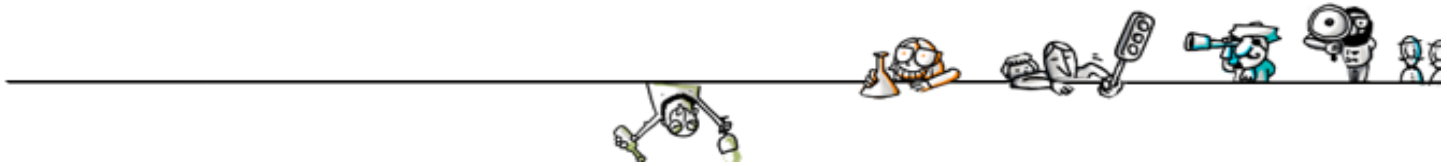
CT436
Advanced Professional Skills



Week 3: IDEA Generation Techniques

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recap

How to Create a How Now Wow Matrix

- The How Wow Now framework works best in a group where people feel able to express their opinions freely, and creativity is a result of the group dynamic. Usually, each step would be done as a single group or several smaller groups using a whiteboard, post it notes, or an online collaboration tool such as GroupMap. However, if you want to avoid groupthink or peer pressure, you can brainstorm ideas individually in the first instance and then combine them to get the complete picture.

Scope

Define the scope and the objectives of the of the How Now Wow session.

Brainstorm

Gather ideas from the group.

Group

Collate and consolidate ideas.

Position

Assess the originality and ease of implementation and position on the matrix.

Vote

Vote on the ideas you feel are most important.

Share

Share the outcomes with relevant stakeholders.

recap

High

Ease

Low

Low

Innovation

High

How?

Ideas for the future dreams or challenges

Underground car parking columns like Double Storey Car Park 1

Transport beamers 1

A car vending machine (like the one Volkswagon has) 1

Underground parking

Self-parking cars

Electric bike hire 2

Ride sharing 1

University Buses 1

Charge more to limit demand

Have an agreement with local houses to allow students to park on their driveway

Promote walking to Campus

More residential accommodation

Low risk and high acceptability

Improve local transit buses

Park and ride options

Campus personal Uber 1

People who need a car pick it up from the college, pay for it, use it for the day and return it 1

implemented

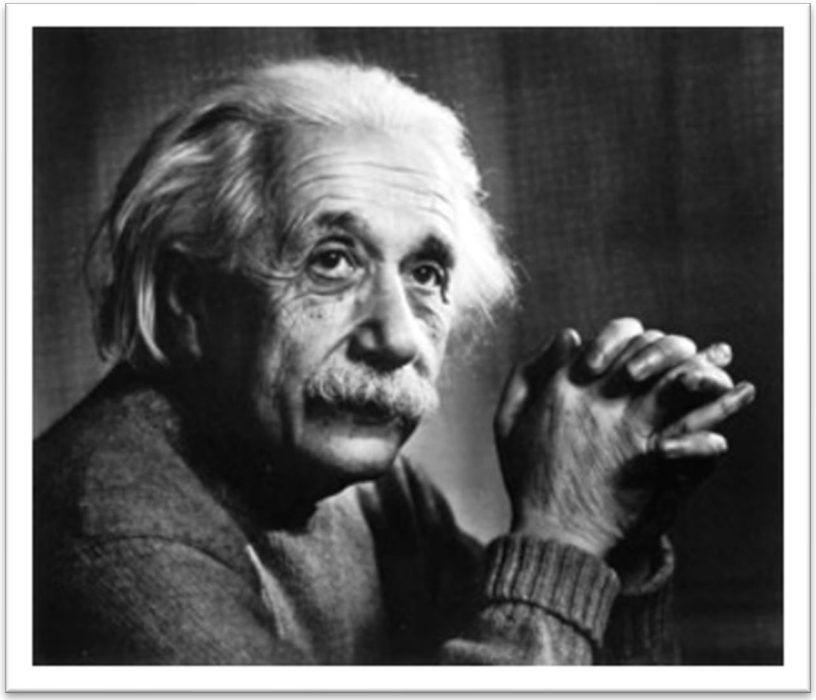
A process for generating ideas?

recap

Define your problem – Agree judging criteria – Set restrictions

- Research
- Insight
- Generate ideas
- Hone
- Test

Unhappy train commuters



Einstein is quoted as having said that if he had one hour to save the world he would spend *fifty-five minutes defining the problem and only five minutes finding the solution*.

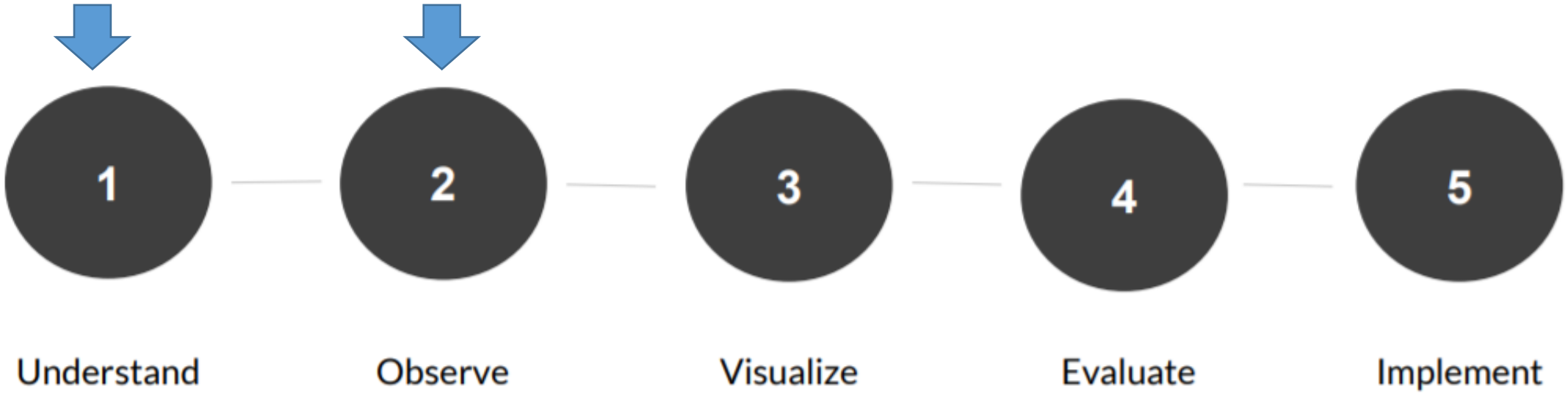
recap

The Problem is to Know what the Problem is

- Rephrase the Problem
- Expose and Challenge Assumptions
- Find Multiple Perspectives

recap

The **Process** of IDEO



Supports idea generation

recap

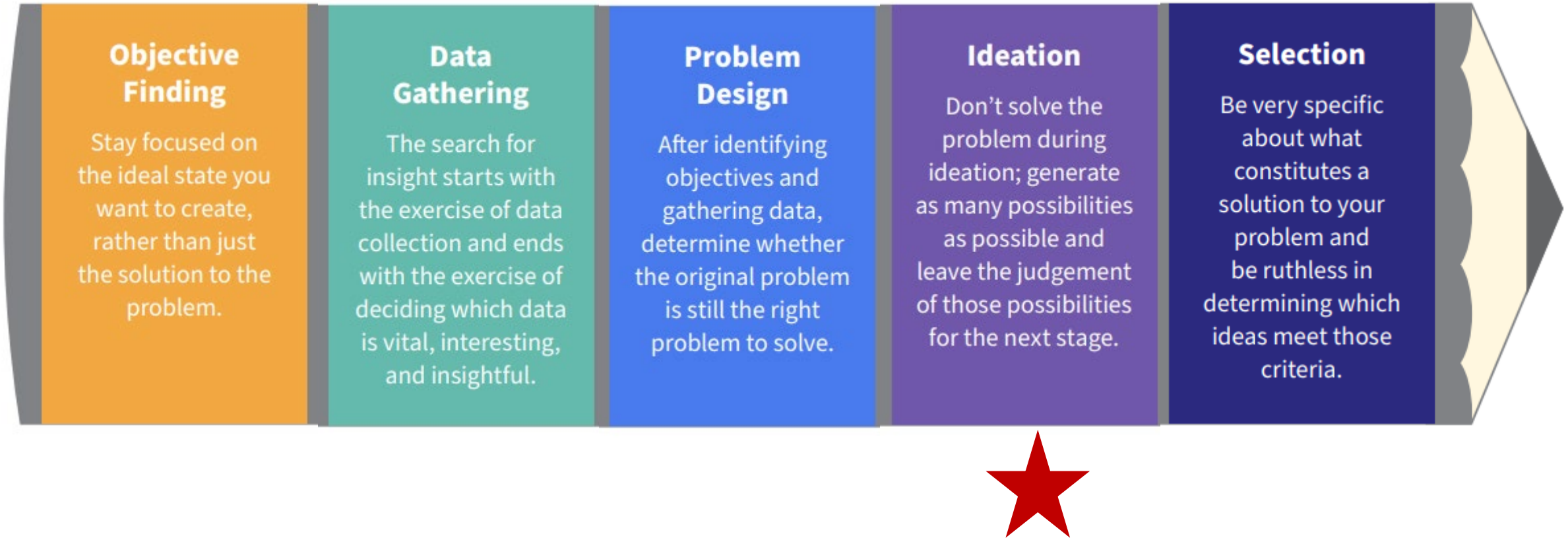
IDEO summary

- Understand ➔ The Market ➔ The client ➔ The Technology
- Observe ➔ What confuses ? ➔ What is hated ? ➔ What is not satisfied?
- Visualize/Realize ➔ Do a Role Play ➔ Write a Story board ➔ Build an early stage Prototype
- Evaluate / Refine ➔ Plan on Several Prototypes ➔ Concurrent engineering
- Implement ➔ Verify the final product works ➔ Commercialize ➔ Market

The 5 Step Creative Process

Creativity is a process that can be developed and improved

The 5-step Creative Process



Each step is critical in developing innovative solutions

1. Objective finding

2. Data gathering

3. Problem design

4. Ideation

5. Selection

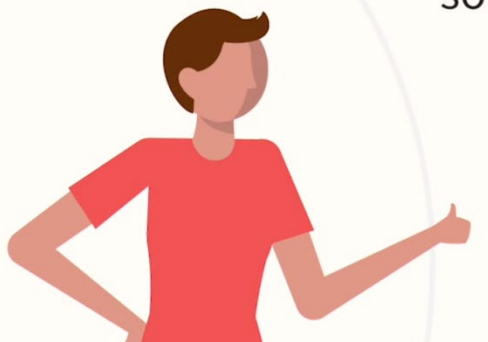
Solution

- An answer

Goal

- State of being that's the result of a solution

"Wouldn't it be great if..."



Identify what you want to happen when you solve the problem.

1. What are all of the problems you would need to be solved for that ideal state to come true?
2. What solutions would you need to get for each of those problems?
3. Where can you find those solutions?

Problem vs Outcome

- It is important and useful to differentiate between the problem you are trying to solve, and the outcome you are trying to achieve, e.g.
  - If I can solve the problem of excessive waiting times, I can improve patient outcomes
  - If I can remove the bottlenecks from the process, I can handle more orders / customers and make more money
  - If I can improve battery life, I can increase the range of ebikes / escooters, thereby opening up new modes of commuting
  - ….

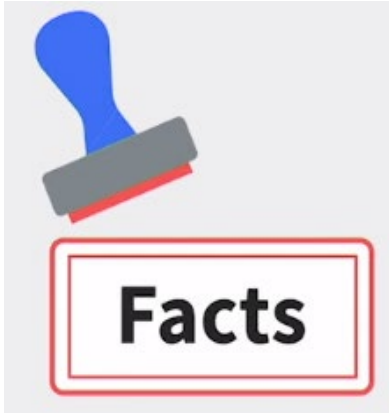
1. Objective finding

2. Data gathering

3. Problem design

4. Ideation

5. Selection



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What is the recent history of this problem?

What has made it a problem?

Who is involved?

Who are the people who will benefit from this solution?

What has been successful to this point, and why?

What has failed to this point, and why?

What hasn't been tried to this point, and why?

What are the obstacles that stand in your way?

What obstacles might arise?

What are the restrictions inherent to this problem?

How do you want people to feel when they experience this solution?

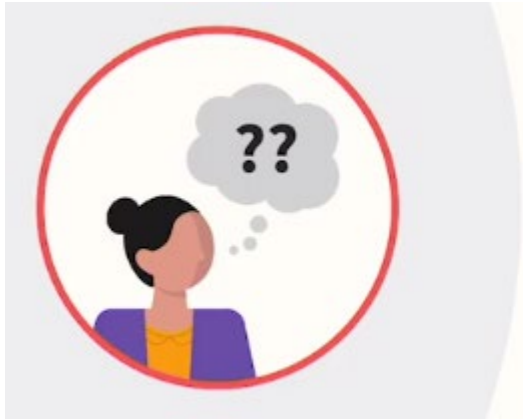
1. Objective finding

2. Data gathering

3. Problem design

4. Ideation

5. Selection



After exploring the audience for the solution, what new questions have been raised?

After exploring what has and hasn't worked to this point, what do you need to know from here?

After evaluating the restrictions of the problem and the obstacles that lie ahead, what new questions might you have?

1. Objective finding

2. Data gathering

3. Problem design

4. Ideation

5. Selection

Objective/data vs. Original problem

Will solving this problem lead to my objective?

Yes

4. Ideation

No

Alter the problem or design a new one

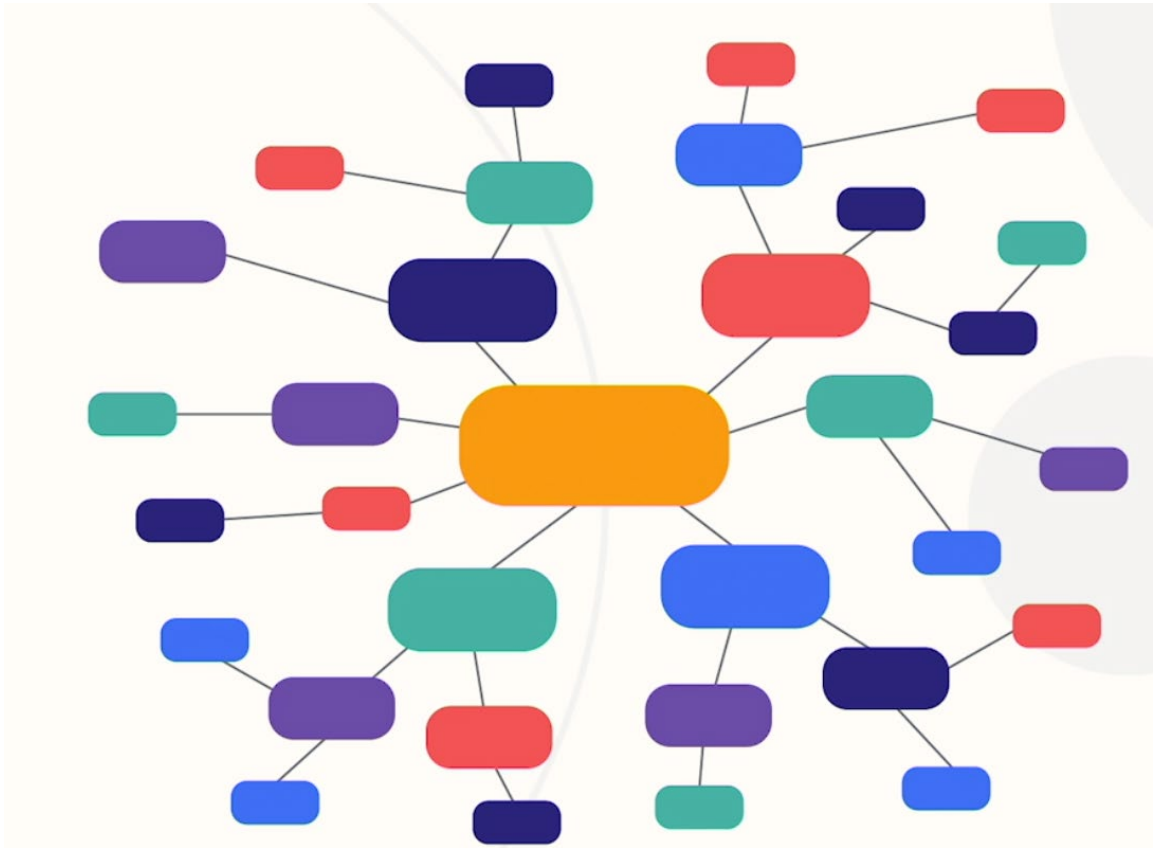
1. Objective finding

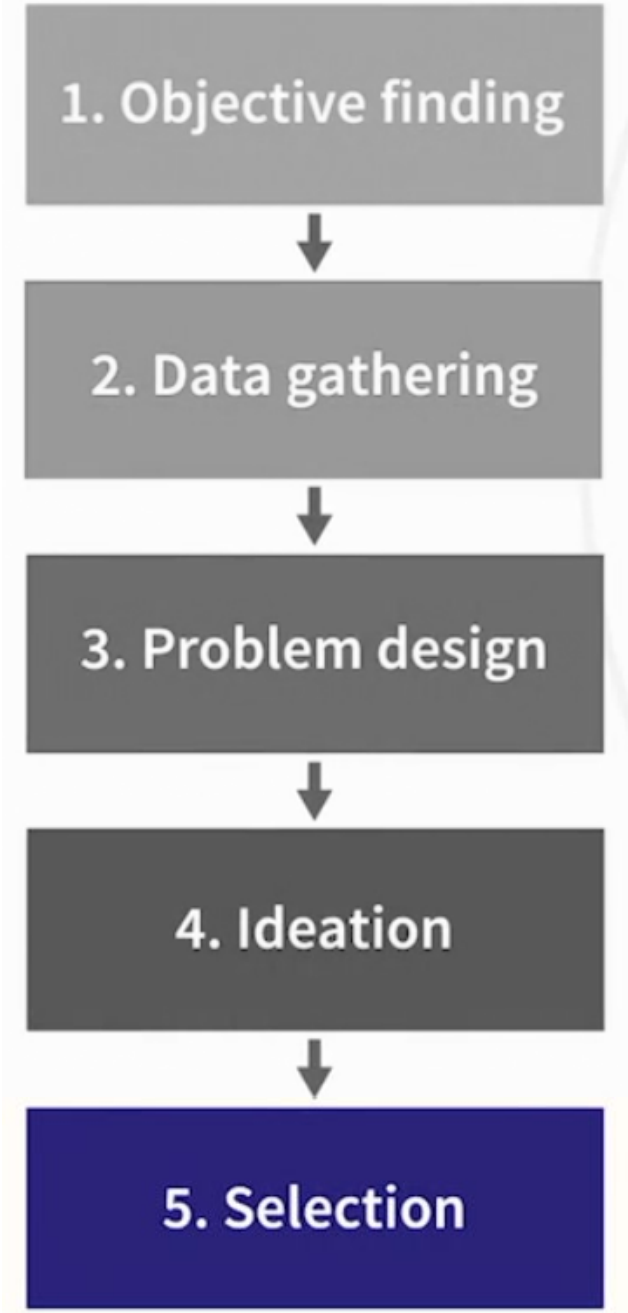
2. Data gathering

3. Problem design

4. Ideation

5. Selection





Selecting the Solution

1. Identify selection criteria.

- The solution will work if it _____.
- Will it _____?
- Does it _____?

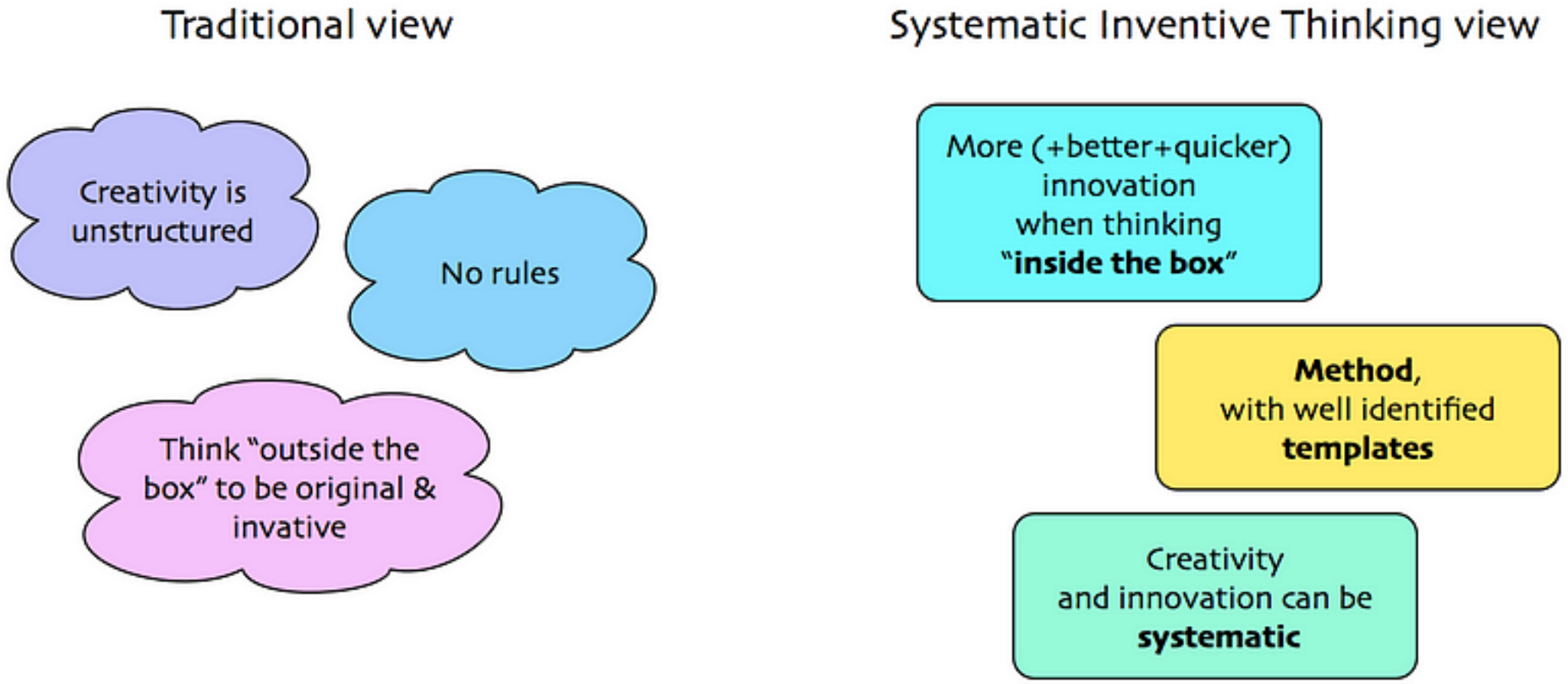
2. Improve potential ideas.

Every possible solution must be actionable.

3. Apply the selection criteria.

Be merciless when choosing the solution.

Systematic Inventive Thinking (SIT)



Innovate by starting with the solution and then work backwards to the problem

Why would that be beneficial?

Function Follows Form Principle

1. Start with an existing situation.
2. Apply one of the five thinking tools.

   Subtraction – division - multiplication – unification – attribute dependency

3. Ask “Should we do it and can we do it?”

Systematic Inventive Thinking (SIT)

SIT thinking tools : Subtraction – Division - Multiplication – Unification – Attribute dependency

1. Start with an existing situation.
2. Apply one of the five thinking tools.
3. Ask “Should we do it and can we do it?”

exercise bicycle

powdered soup

a contact lens

a child's highchair

What do they have in common?

Subtraction

Elimination of an essential component of a product

exercise bicycle

powdered soup

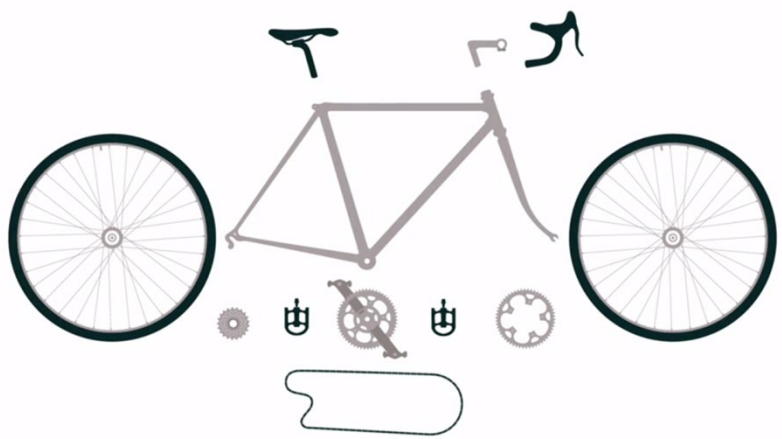
a contact lens

a child's highchair

finding innovative solutions by removing an **apparently** essential component of an existing solution

Using the Subtraction Technique

1. List all the internal components.
2. Remove a component.
3. Ask “Should we do it and can we do it?”
4. Modify the concept.



Division

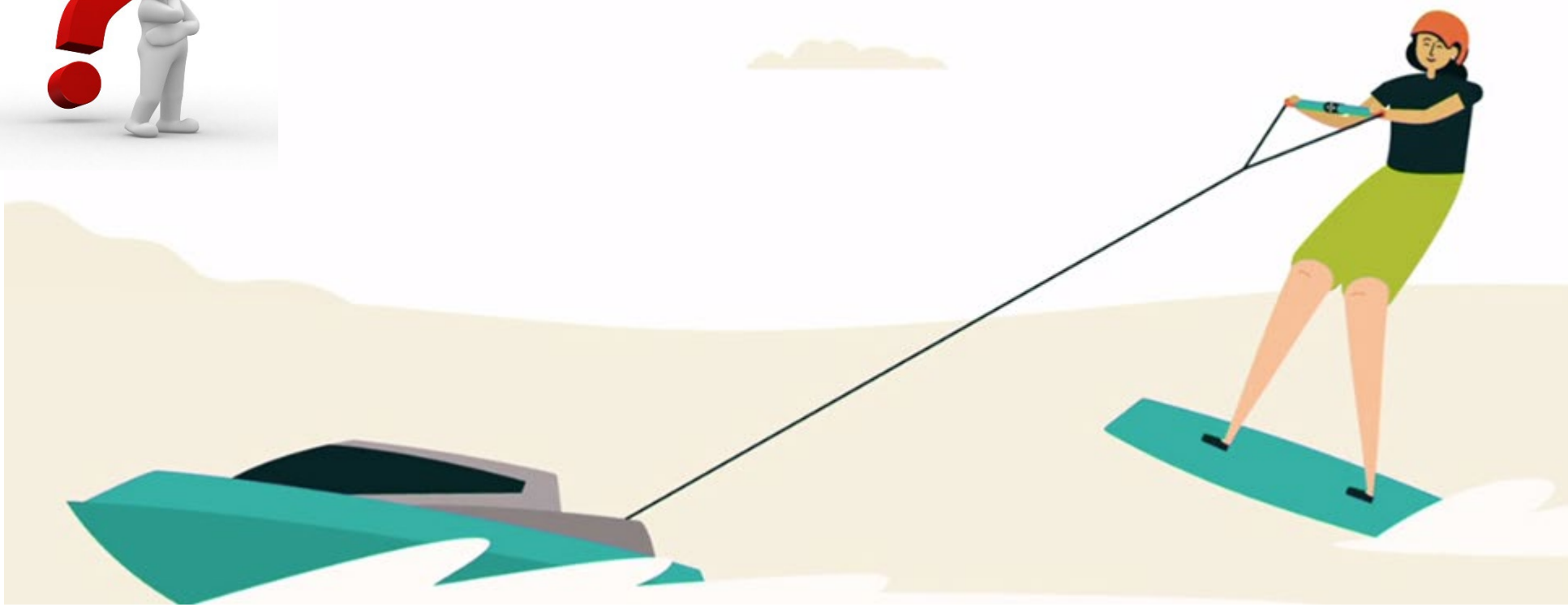
Separate the product or its components and
then rearrange them back into a product

1. List the product's internal components.
2. Divide the product or one of the components.

1. List the product's internal components.
2. Divide the product or one of the components.
   - Functionally

Division

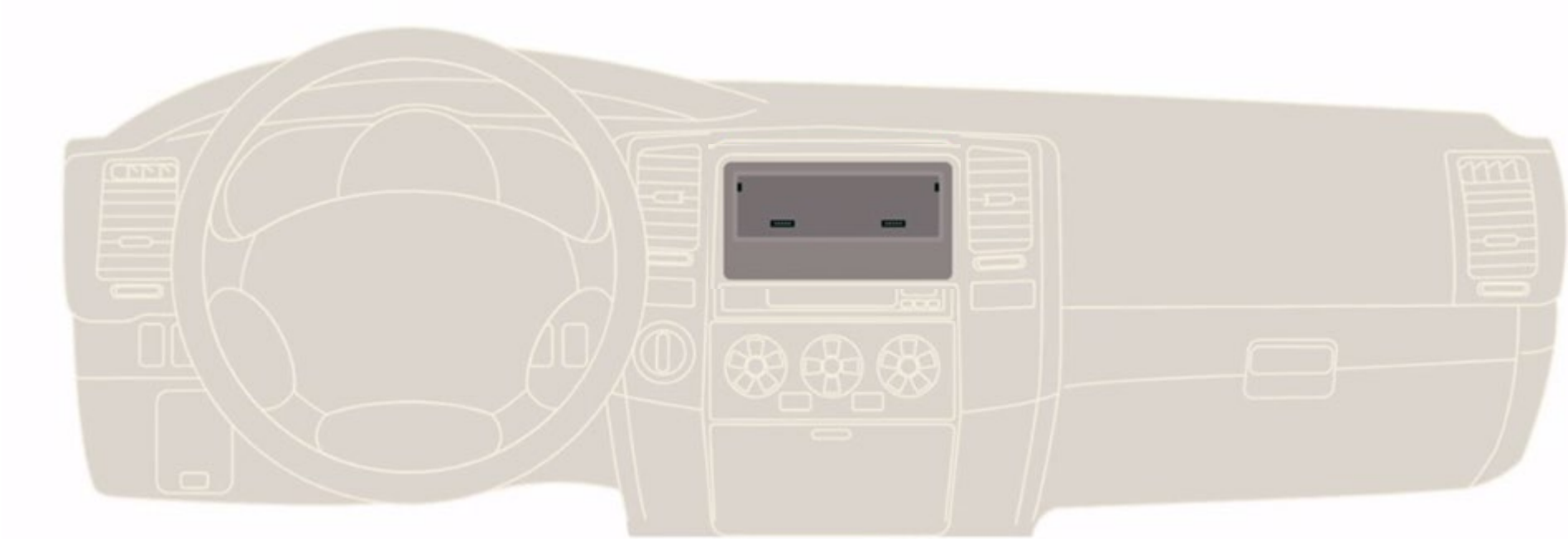
Separate the product or its components and then rearrange them back into a product



1. List the product's internal components.
2. Divide the product or one of the components.
   - Functionally
   - Physically

Division

Separate the product or its components and then rearrange them back into a product



Division

Separate the product or its components and then rearrange them back into a product

1. List the product's internal components.
2. Divide the product or one of the components.
   - Functionally
   - Physically
   - **Preservationally**

Each smaller unit preserves the characteristics of the whole

Should we do it? And can we do it?

Multiplication

Copy an element already existing in a product,
but change it in a counterintuitive way

1. List components.
2. Make a copy of one of the components and change it.
3. Look for potential benefits.

Procter & Gamble

Component	Attributes	Virtual Product

SIT thinking tools : Subtraction – Division - Multiplication – Unification – Attribute dependency

1. List the product's internal and external components.
2. Select a component and assign an additional task.
3. Look for potential benefits.
4. Modify the concept to improve it.

Task Unification

Assign additional tasks to an existing resource

Task Unification

Assign additional tasks to an existing resource

APPLY Task Unification (1)

An internal component takes the job of another internal component.

Task Unification

Assign additional tasks to an existing resource

APPLY Task Unification (2)

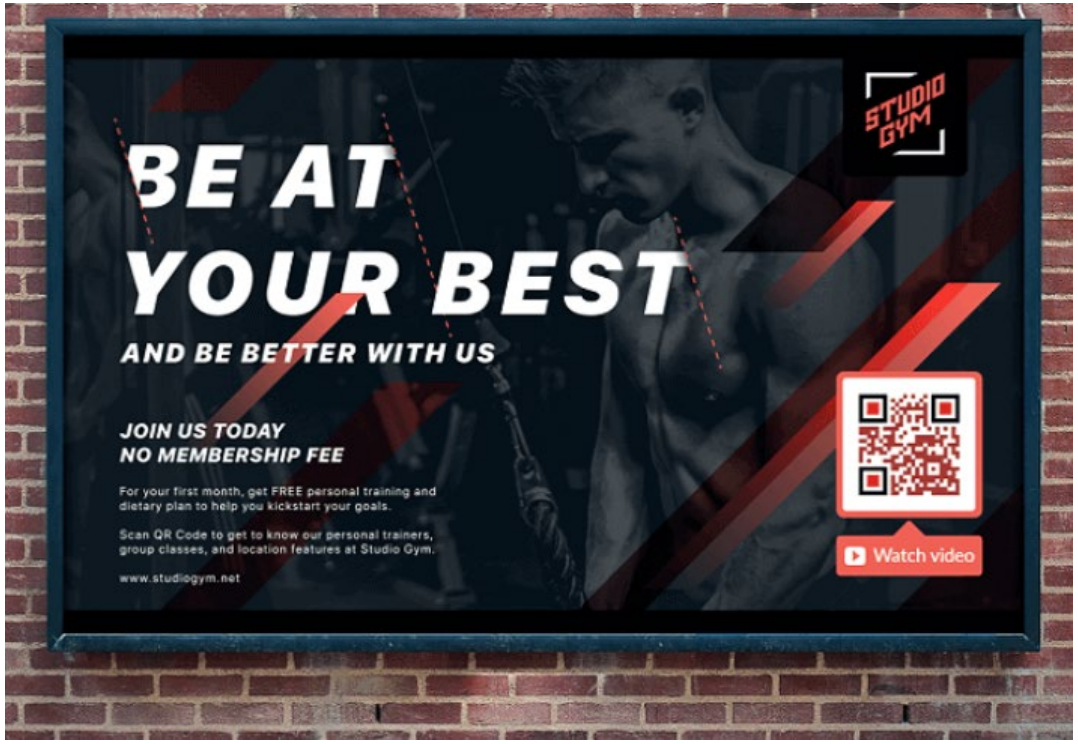
An internal component takes the job of an external component.

Task Unification

Assign additional tasks to an existing resource

APPLY Task Unification (3)

An external component takes the job of an internal component.



Billboards are assigned the additional task of becoming the point of sale
Commuters scan the products they need and that shopping list is sent to the grocery store

Attribute Dependency

One thing changes as another thing changes

What do they have in common?

Attribute Dependency

One thing changes as another thing changes

External Attributes

- Width
- Length
- Height
- Gender
- Age
- Preferences
- Time

Attributes of the surrounding environment and people related to the topic you're working on

Attribute Dependency

One thing changes as another thing changes

Where a component is usually a physical or a tangible thing you can see or touch, an attribute is a characteristic of the product or service

External Attributes

- Width
- Length
- Height
- Gender
- Age
- Preferences
- Time

Internal Attributes

- Size
- Shape
- Color

Attributes of the surrounding environment and people related to the topic you're working on

External Attributes

Where a component is usually a physical or a tangible thing you can see or touch, an attribute is a characteristic of the product or service

Internal Attributes

Examples of external and internal attributes for an alarm clock

Attributes of the surrounding environment and people related to the topic you're working on

External Attributes

- Time of day
- Elapsed time of alarm ringing
- Duration of sleep
- Characteristics of user
- Restfulness of sleep

Where a component is usually a physical or a tangible thing you can see or touch, an attribute is a characteristic of the product or service

Internal Attributes

- Volume of alarm
- Type of alarm sound
- Colour – Size - Shape

As attribute _____ changes, so does attribute _____.

As elapsed time increases, the loudness of the alarm increase.

- Identify potential benefits
- Modify and adapt the concept

SCAMPER

S **Substitute:**

Replace a thing, or concept with something else.

C **Combine:**

Unite. What? Who? Ideas? Materials?

A **Adapt:**

Adjust to a new purpose. Re-shape? Tune-up?

M **Modify:**

Change the color, sound, motion form, size. Make it larger, stronger, thicker, higher, longer. Make it smaller, lighter, slower, less frequent, reduce.

P **Put to another use:**

Change when, where, location, time, or how to use it.

E **Eliminate:**

Omit, get rid of, cut out, simplify, weed out...

R **Reverse:**

Change the order, sequence, pattern, layout, plan, scheme, regroup, redistribute

Substitute

- What can be replaced? (for example, components, materials, people)
  - Example: if you were making windows for a children's playhouse, you might substitute glass with plastic (for safety).
  - A company that produces plastic water bottles is concerned about the environmental impact of its products. They decide to substitute traditional plastic with a biodegradable alternative, such as PLA (polylactic acid).

Substitute

- Questions asked during this part are:
  - What part of the product can be substituted without affecting the whole project?
  - Who or what can be substituted without affecting the product?
  - What part in the product can be replaced with better alternatives?
  - Where else could you sell the product?
  - Could we use another alternative of X?
  - Can we substitute the current device with another better one?
  - Can we replace the product with simpler one?

Combine

- What can be combined? (for example, other features, devices)
  - Example: cell phones have combined phone features with cameras.
  - A restaurant wants to create a unique dish that will set it apart from the competition. They decide to combine two popular foods – pizza and sushi – to create a new and innovative menu item: the “sushi pizza”

Combine

- The combine technique tends to analyse the possibility of merging two ideas, stages of the process or product in one single more efficient output. In some cases, combining two innovative ideas can lead to a new product or technology which leads to market strength. For example, merging phone technology with digital camera produced a new revolutionary product in the telecommunications industry.
- The combine technique discussion can include the following questions:
  - Can we merge two products?
  - Can we apply / use two products at the same time?
  - Can we mix two or more components together?
  - Can we combine X and Y technologies?

Adapt

- What can be added? (such as new elements or functions)
  - Example: cars now have built-in wifi.
  - A smartphone manufacturer takes inspiration from the camera industry and adapts the concept of interchangeable lenses. They apply this idea to their smartphones, allowing users to attach different lenses to enhance their photography.

Adapt

- Adapt refers to a brainstorming discussion that aims to adjust or tweak product or service for better results (implies you need to figure out how you measure that!). This adjustment can range between minor changes to radical changes in the whole project. Adaption is one of the efficient techniques to solve problems through enhancing the existing system.
- The adapt technique brainstorming session can include the following questions:
  - What would we need to change to reach better results? Are there tradeoffs?
  - What else could be done in this specific task / activity (extend the range of features)?
  - How can we adjust in the existing product to improve performance?
  - How can we make the product more flexible?

Modify, Magnify, maximize, minimize

- What can be modified? (for example, change the size, shape, color, or other attribute)
  - Example: sunglasses reduced in size for babies or small children.
  - A furniture designer wants to create a more versatile and space-saving table. They modify the design of a traditional dining table, adding folding and extending mechanisms to make it adjustable and suitable for small spaces.

Modify, minify or magnify

- The modify technique refers to changing the process in a way that unleashes more innovative capabilities or solves problems. This change is more than just adjustment as it focuses on the overall product / process. The questions asked include:
  - How will modifying the product improve results?
  - What if we had more or less of a particular feature?
  - If the market was different, what would the product look like?
  - Can we change the product to work more efficiently / faster / cheaper / simpler?
  - What if the product is bigger / smaller? Can we shrink it? Make it portable?

Put to other use (purpose)

- Could you put the product to a different use, or use it in another industry?
  - Example: during COVID19 pandemic, coffee filters being used as filters in masks for faces.
  - A company that produces industrial drones for aerial photography realizes that their drones can be put to another use. They repurpose them for inspecting and maintaining wind turbines, saving time and reducing the risk for workers.

Put to another use

- This technique concerns how to put the current product or process in another purpose or how to use the existing product to solve problems. For example, this technique can be used to learn how to shift an existing product to another market segment or user type.
- The questions in this technique can include the following:
  - What features / functions could be used in other domains?
  - What other markets / users / companies might use the product?
  - What are the benefits for the product if used elsewhere?
  - What if we target another market segment?
  - What are other ways can we use it? Can we recycle / repurpose / reuse end-of-life / expired products?

Eliminate or minimize

- What can be removed or simplified?
  - Example: removing cigarette lighters from cars (to be able to use the space for charging devices?).
  - A software developer wants to simplify their app and make it more user-friendly. They decide to eliminate unnecessary features and buttons, focusing on the essential functions to improve the overall user experience.

Eliminate or elaborate

- As the name implies, this technique aims to identify the parts of the product or process that can be eliminated. It also helps to explore the unnecessary parts.
- Questions related to this part includes:
  - What would happen if we removed this part?
  - How can we achieve the same output without a specific part of the project?
  - Do we need this specific part?
  - What would we do if we had to work with half the resources?

Reverse, reengineer, or rearrange

- What would happen if you reversed the product's production process? What can be swapped or flipped?
  - Example: fast food restaurants rearranged the typical eat then pay model to pay then eat.
  - A crowdfunding platform reversing its business model: Instead of individuals seeking funding for their projects, they create a platform where investors pitch their ideas or business proposals to a community of potential backers, who then choose which projects to fund

Reverse

- Finally, the reverse or rearrange technique aims to explore the innovative potential when changing the order of the process or how the product is used. Reversing the process or part of it can help solving problems or produce more innovative output.
- The questions in this part include:
  - What would happen if we reverse the process?
  - How can we rearrange the current order of service / use for better output?
  - What if we consider it backwards?
  - Can we interchange elements?

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Unite. What? Who? Ideas? Materials?

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Change when, where, location, time, or how to use it.

E **Eliminate:**
Omit, get rid of, cut out, simplify, weed out...

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Change the order, sequence, pattern, layout, plan, scheme, regroup, redistribute

Adapt: Selling restaurants and real estate instead of just simply hamburgers.
Eliminate: Letting customers serve themselves and thereby avoiding the use of expensive waiters.
Reverse: Having customers pay before they eat.

Redesign a common product

S Substitute:
Replace a thing, or concept with something else.

C Combine:
Unite. What? Who? Ideas? Materials?

A Adapt:
Adjust to a new purpose. Re-shape? Tune-up?

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SCAMPER Flask

- **Substitute:** You could replace the metal cap with a plastic one to reduce heat loss. And perhaps there is a more environmentally-friendly manufacturing process you could use instead, that would make the product more appealing to green-minded consumers.
- **Combine:** You could work with artists and designers to make the flasks more attractive and unique.
- **Adapt:** Flasks are similar in shape to telescopes, though much shorter. Explore how you could adapt the materials and design so that your flask could extend like an old-fashioned spyglass to hold more liquid.
- **Modify:** The flask isn't especially easy or comfortable to hold. You could add a rubber sleeve to aid grip, or make the bottle thinner so that it can be held in one hand.
- **Put to another use:** So far, you've designed the flask around individual commuters, but there are many other groups of people who could also use the product. Take traveling couples, for example. They won't want to carry a flask each, so think about redesigning the flask to include detachable compartments which can be used as mugs. Then two people can share the drink from one flask.
- **Eliminate:** You could eliminate the handle on the side of the bottle so that it fits more easily into a work bag or backpack.
- **Reverse:** If you tried to do the exact opposite, you'd end up with a cold drink rather than a hot one! But this would be useful in summer months or hotter climates. So, explore ways of keeping liquid cool in the flask instead of hot.

Project Portfolio

- Start looking at some of the available tools to document your project
- The first thing to document will be your idea generation process – how you came up with your product / process idea
  - Presumably using some of the techniques we looked at today
- Some tools:
  - https://www.journoportfolio.com/
    - E.g. https://onestop.journoportfolio.com/
  - www.Wix.com
    - E.g. https://epiclyepicherm.wixsite.com/skyglide
  - Www.Wordpress.com
    - E.g. https://atreeadaycom.wordpress.com/