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Software Engineering

Introduction to Design Thinking

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Design thinking

- Design thinking is a **methodology** that designers use to brainstorm and solve complex problems related to designing and design engineering

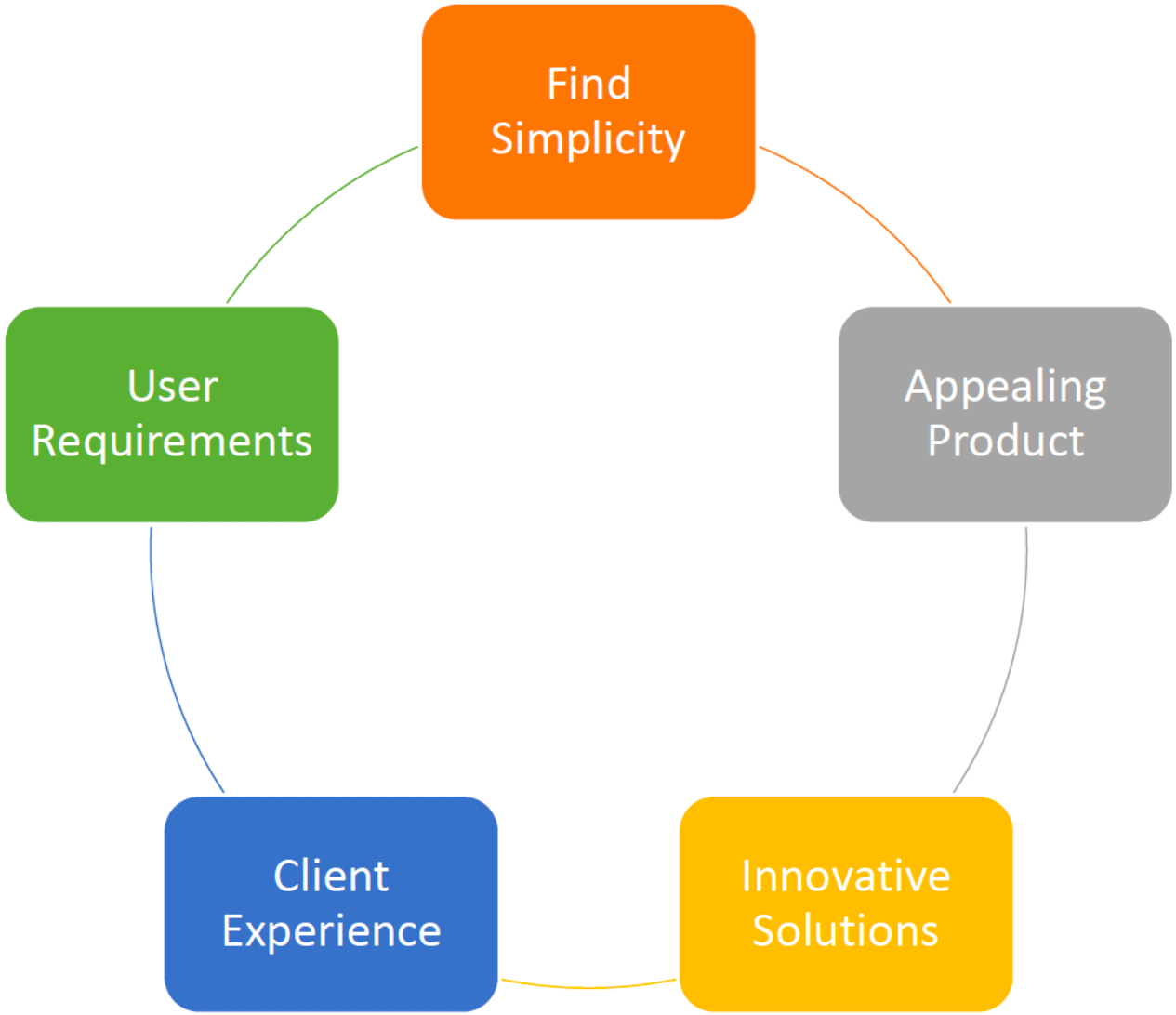
- It is also beneficial for designers to find **innovative**, **desirable** and **never-thought-before** solutions for **customers** and **clients**

- It is used extensively in the area of **healthcare** and **wellness**, **agriculture**, **food security**, **education**, financial services, and environmental sustainability, etc.

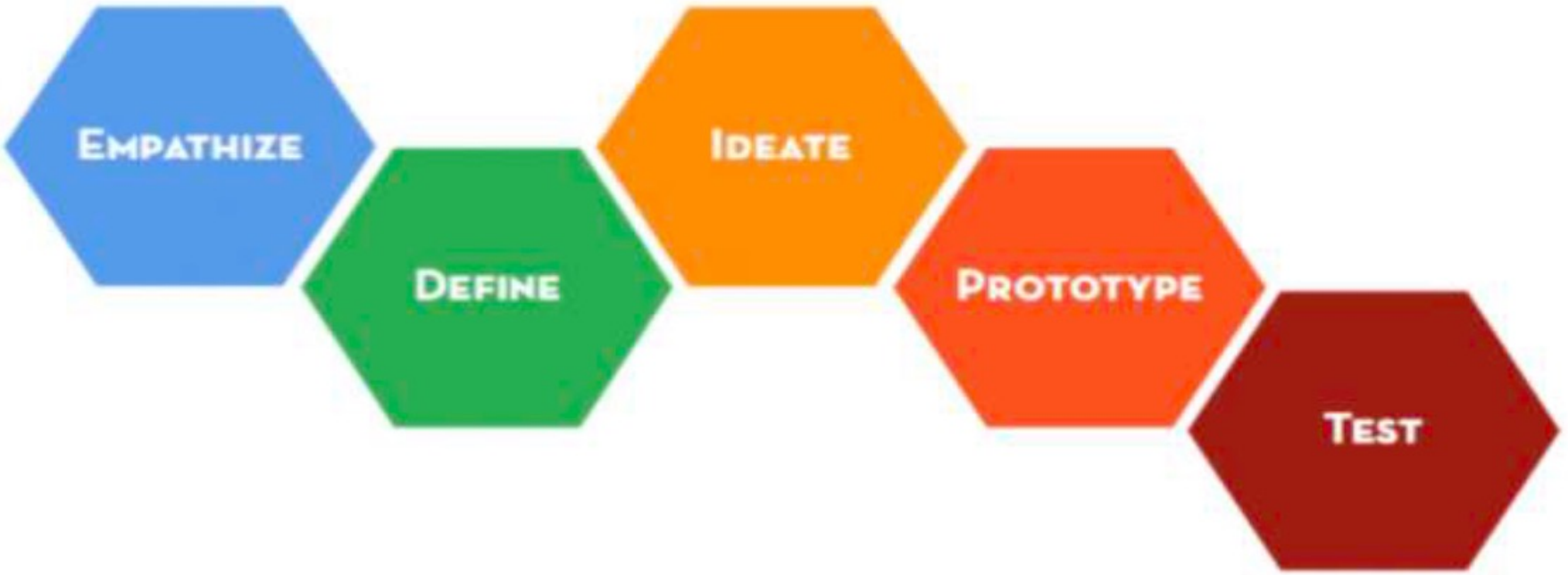
Use of Design Thinking

- Considered to be a **strategy for innovation**
- It is halfway between analytical thinking and intuitive thinking
- The **basic principle** of design thinking is that **innovation can be disciplined**
  - **Innovation** is a practice that can be **systematically approached** by a set of practical and meticulous **tools**, **methodologies**, and **frameworks**

Features of design thinking



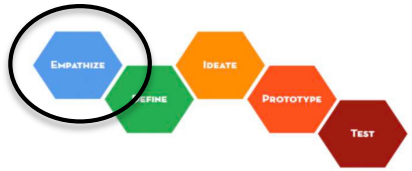
The five-step process



- Design thinkers are expected **not to think of the following steps when working on one step**
  - For example it is not recommended to think of solutions, when the problem is being defined

https://www.youtube.com/watch?v=_r0VX-aU_T8

Empathize Stage

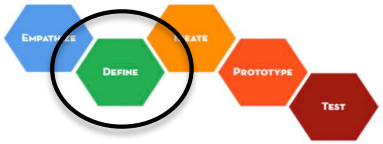


- It involves **putting oneself into the shoes** of the customer or the **end-user** of our solution
  - We need to **understand the problems** faced by the **customer**
  - As design thinkers, we **need to empathize** with the **customer**
  - It involves the **process of analysis**

- **Empathy is the centerpiece of a human-centered design process**

- Observe what people do and how
  - It **gives feedback** about **what** they **think** and **feel**
  - Helps infer **intangible meaning** of those experiences
    - **uncover insights** → give **direction of innovative solutions**

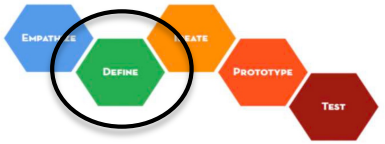
Define Stage



- It is time to define our problem → **problem statement**
- Information gathered → **coherent single statement**
- We have learnt the **problems** and **context** of our customers
  - **User, needs, insights → actionable statement**

- **Synthesis process** → bringing **clarity** and **focus** → **narrowing focus yields greater quantity/quality solutions**

Define Stage



"Framing the right problem is the only way to create the right solution"

HOW MIGHT WE..?

What is the problem you want to solve?	*Key Insights about the user*

HOW MIGHT WE HELP ..... **SOLVE** .....

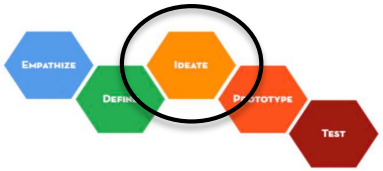
Our user *The problem*

..... **KNOWING THAT HE/SHE** ..... **?**

needs/desires/insights we found out about the user

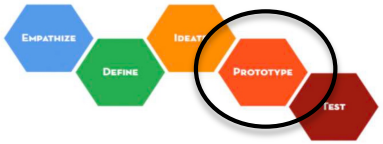
Picture from Design Thinking Playbook: http://www.catalinacatana.com/wp-content/uploads/2018/10/Design-Thinking-playbook.pdf

Ideate Stage



- At this stage a design thinker is supposed to bring to the table **as many ideas as possible**
- While brainstorming for ideas, it is not checked if the idea is **possible**, **feasible**, **viable** or not.
- Combine **rational toughts** with **imagination**
- All solutions suggested by design thinkers are brought to the table and **thought over**
- Ideation techniques: **prototyping**, **mindmapping**, **bodystorming**, **sketching**, ...

Prototype Stage



This step deals with:

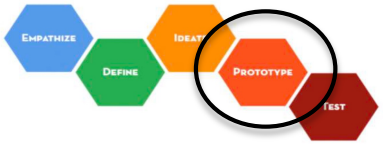
- building the ideas
- checking for their feasibility to arrive at the final solution.

In this step we take care of:

- Creation of experience (*for user, small scale, tangible*)
- Getting feedback (*from user*)
- Iteration (*through Empathize, Define, Ideate if necessary*)

End users comes into play

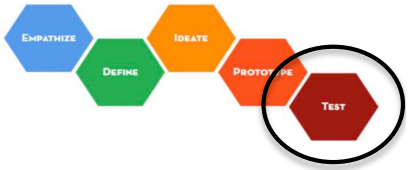
Prototype Stage



- Build the prototype → **iterative generation**
- **Don't waste too much of time/money** on building a single prototype
- The prototypes must be **built for and with the end user in mind**
- The prototype must create **an experience for the user**
- Think of **open questions** that the user can shoot towards you when he experiences the prototype
- There is no **value in the prototype** in case the **user** does not feel comfortable and satisfied with it

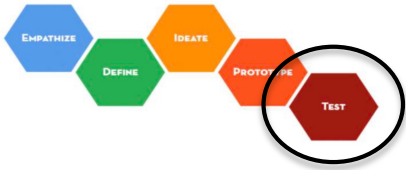
"Build to think and test to learn"

Test Stage



- The **idea** that seems the **best** according to the feedback of the customers and end users in the prototype phase will be executed
- **Full scale testing** to understand what actually works and what does not.
- This step can be:
  - the **most rewarding**, if the prototypes succeed to give positive results,
  - the **most annoying**, if the prototype fails.
- After testing
  - the entire process of design thinking **may have to be repeated**.
  - If the end user approves the solution, then the process of design thinking **stops here**.

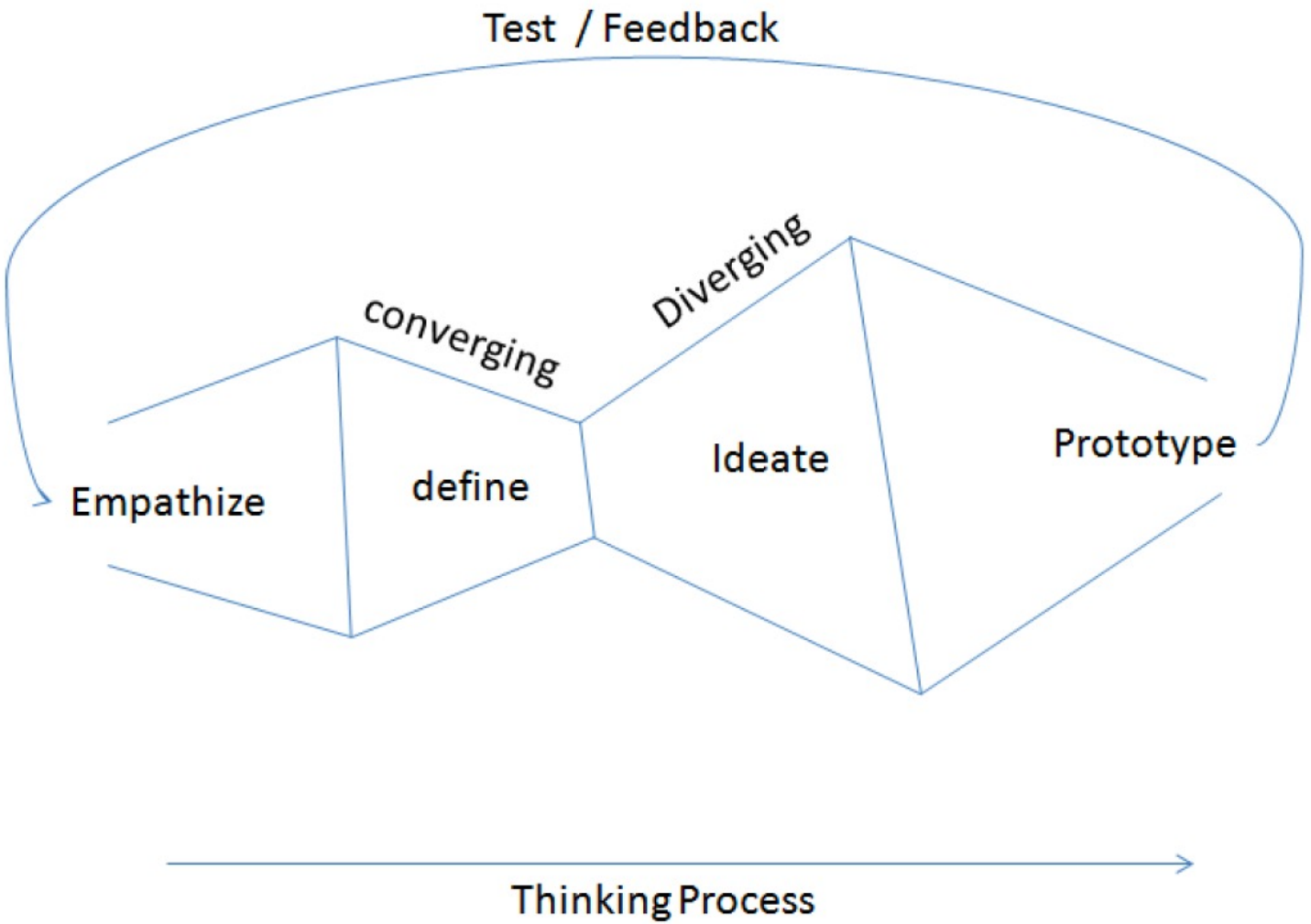
Test Stage



- Why test
  - refine prototype and solutions
  - learn more about users
  - refine problem statement
- How to test:
  - Show don't tell
  - Create experiences
  - Ask users to compare

"Testing is an opportunity to learn about your solution and your user"

Iterative process
Putting everything together



Design thinking process and IDEO shopping cart example

Design thinking process

https://www.youtube.com/watch?v=_r0VX-aU_T8

Take a few minutes to watch the following video about the IDEO Shopping Cart:

https://www.youtube.com/watch?v=M66ZU2PCIcM