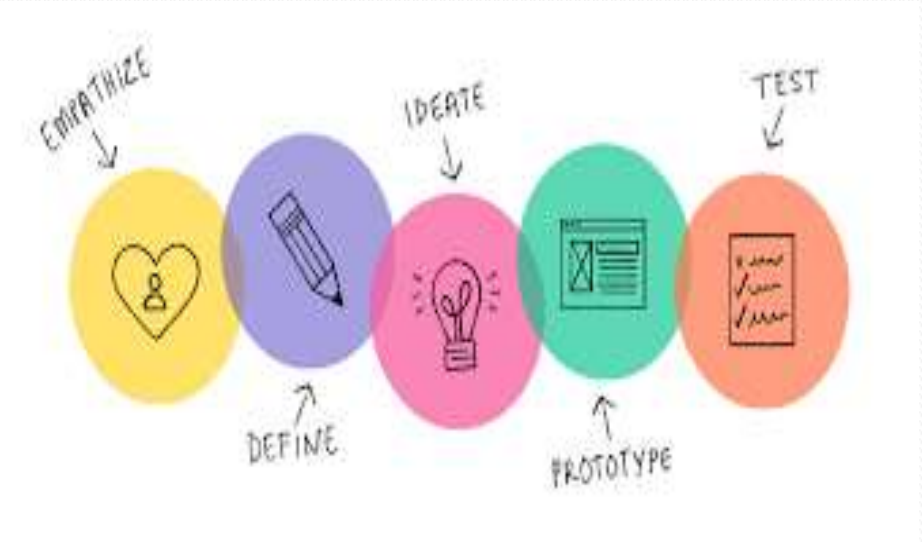
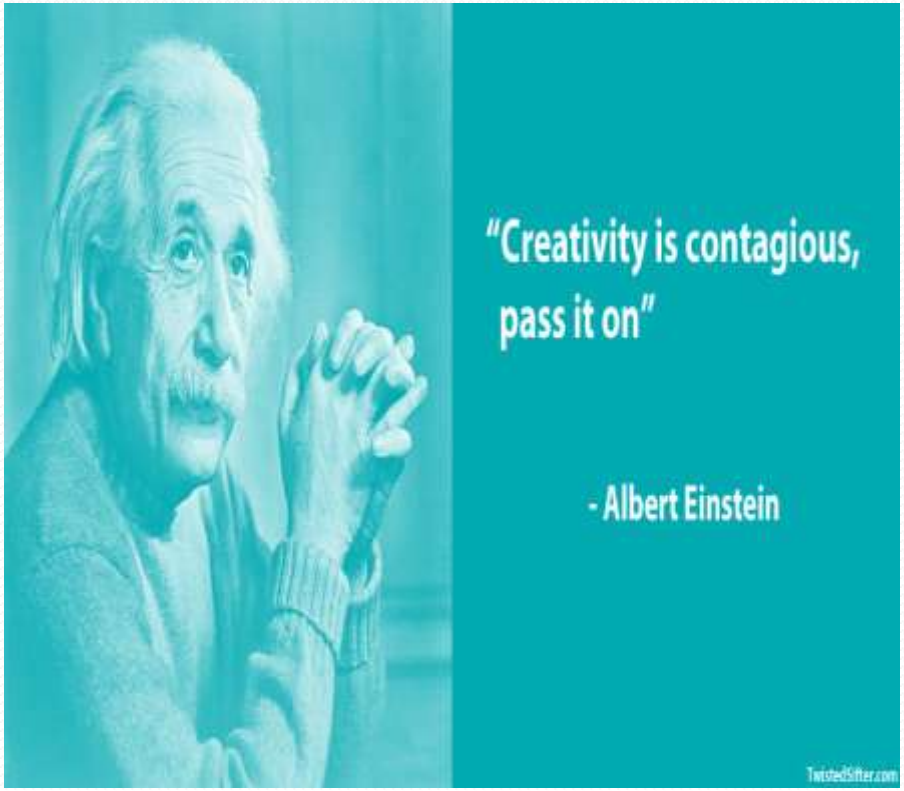
Design Thinking



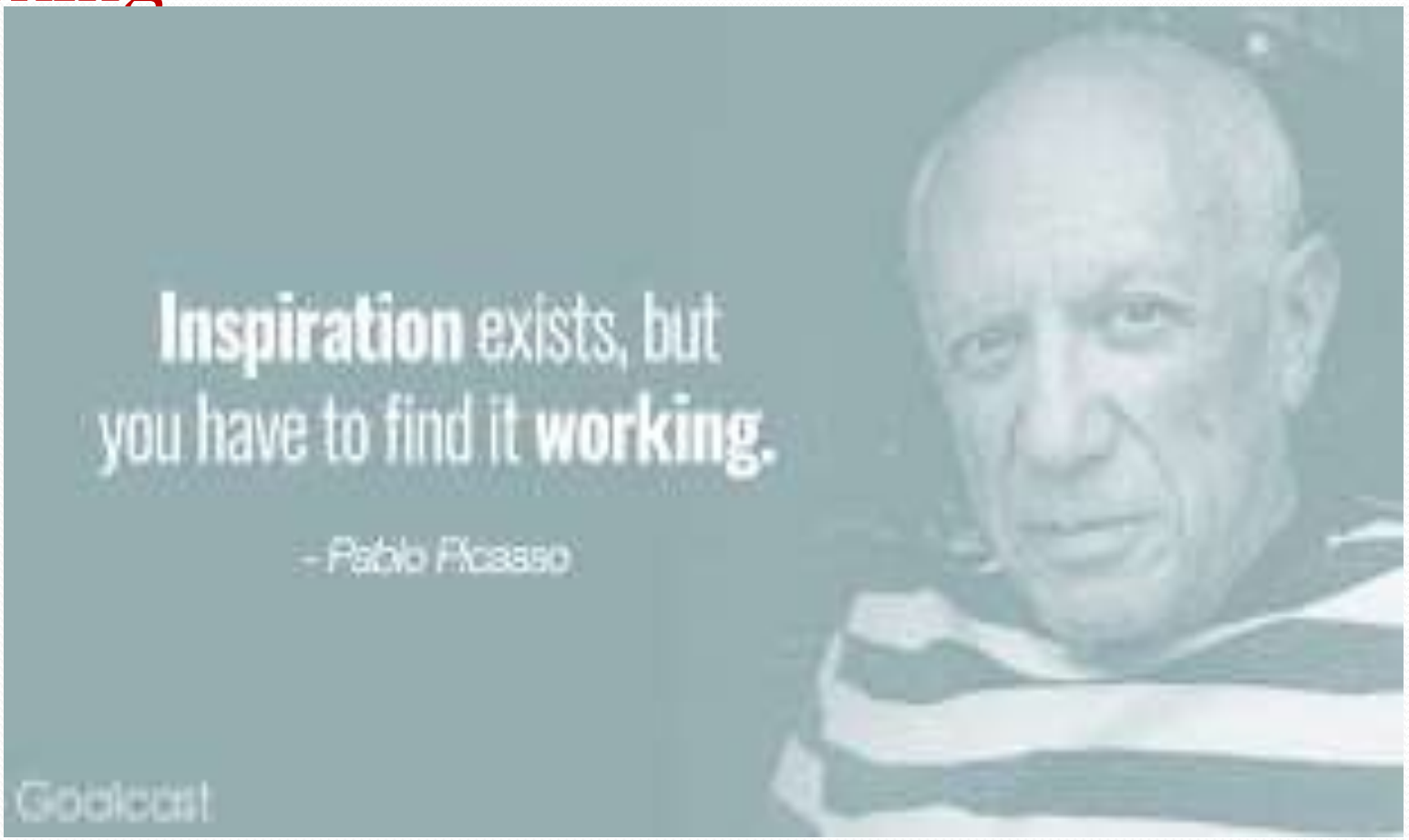
Contents:

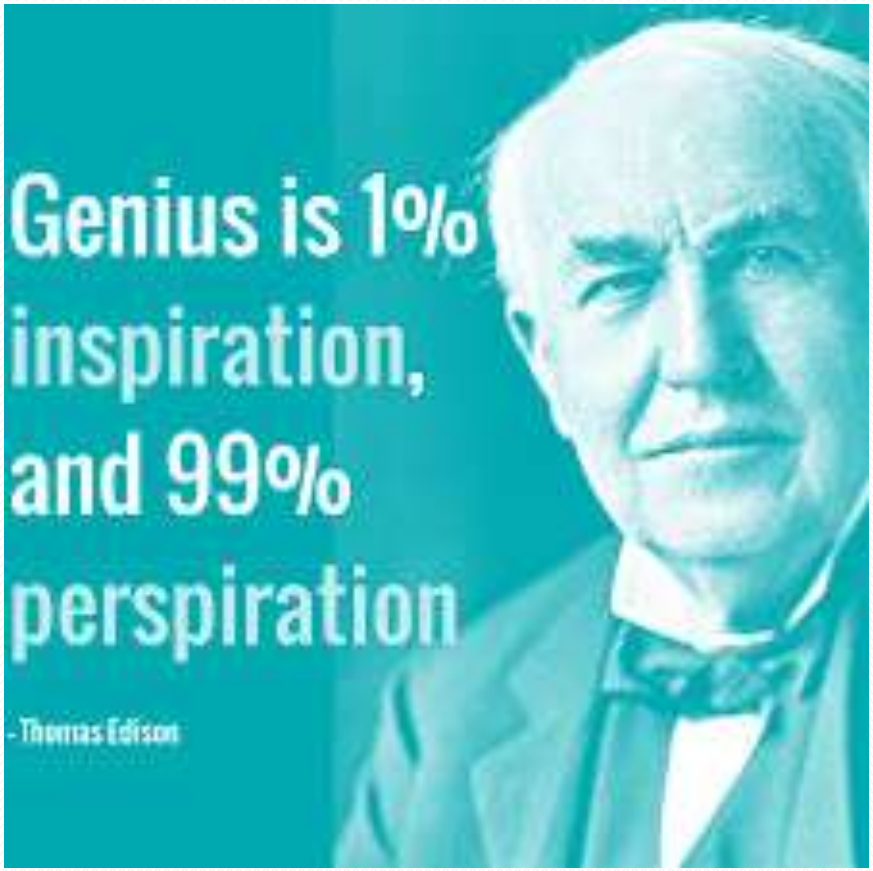
- Ideation Methods
- The creative process and creative principles
- Brain dominance theory
- Barriers to creative thinking
- Steps to enhance creative thinking
- Creativity techniques
- Methods and tools of idea Generation Techniques
- Idea Generation Skills

" creativity is a journey, not a magic event"

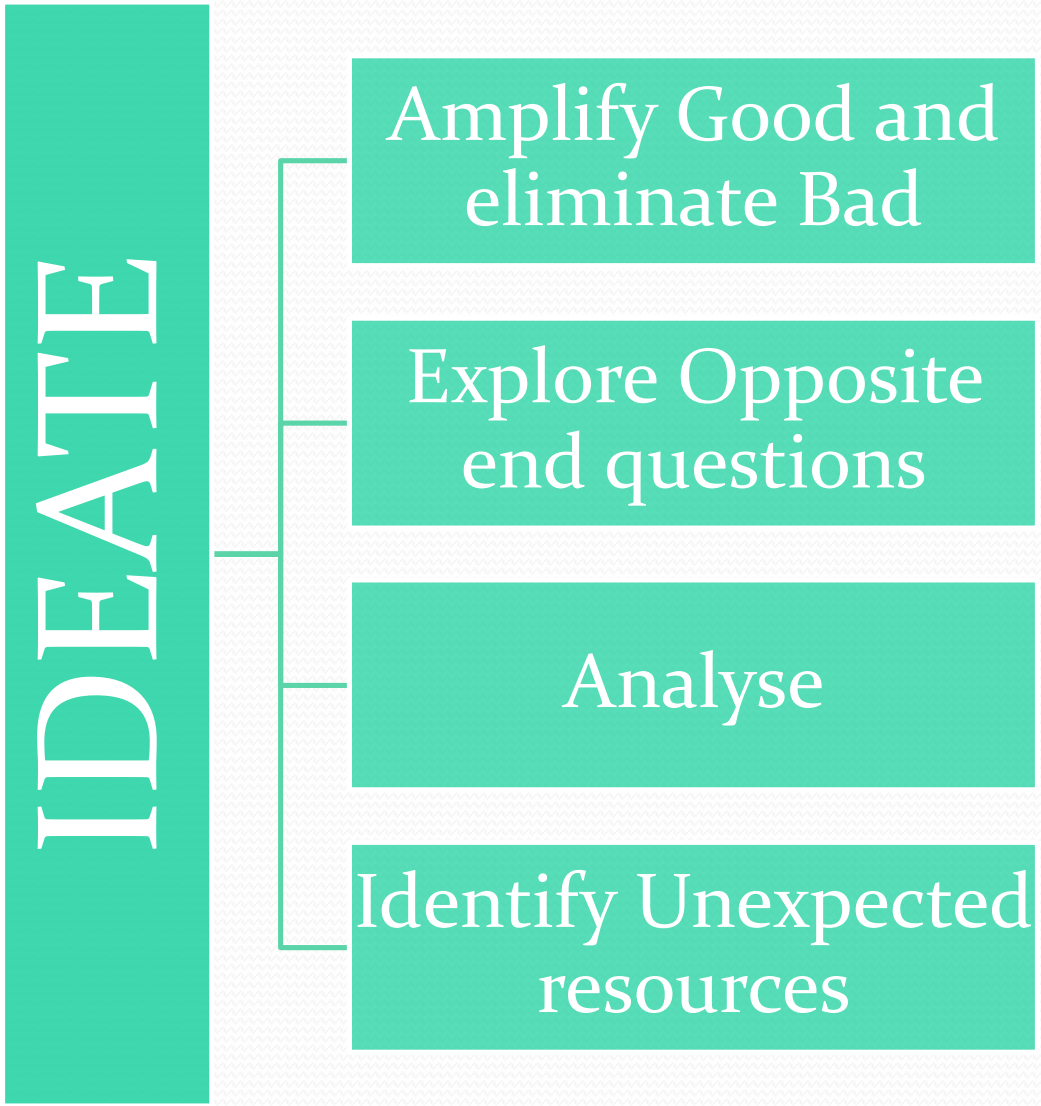


“Inspiration exists, but it has to find us working”




Genius is 1% inspiration, and 99% perspiration
- Thomas Edison


"Success is 1% inspiration, 99% perspiration"
– Thomas A. Edison
Short Quote

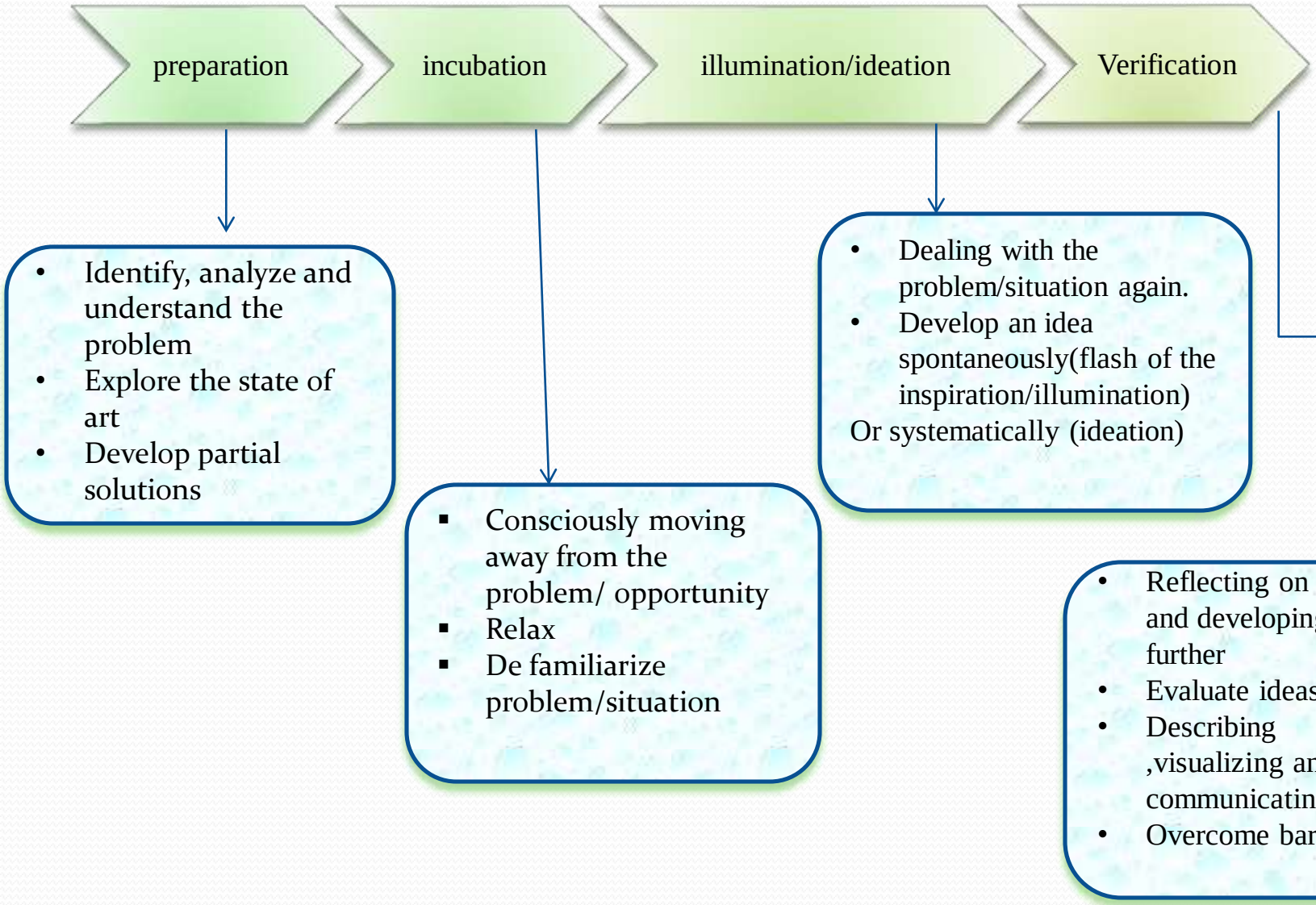

IDEATE
Amplify Good and eliminate Bad
Explore Opposite end questions
Analyse
Identify Unexpected resources


Inspiration
Vision
Idea
Knowledge
CREATIVITY
Brainstorm
Motivation
Innovation
Imagination
Mind

The creative process and creative principles

- creativity means thinking something new, whereas innovation means implementing something new.
- In this respect creativity is an integral part of every innovation project, regardless of whether it is aimed at it a new product, service, process, social/ organizational change, or business model
- Creativity is not an event but can rather be understood as a Process. The design thinking approach takes up this creative process
- Creativity is the ability to come up with ideas that are new, surprising, and valuable
- To get such ideas, we need a way of looking at problems or situations from a fresh perspective that suggests unorthodox solutions (which may look unsettling at first) which is called Creative Thinking

The creative process source: according to Walla's (1926)



Creative principles:

1. Principle of decomposition
2. Principle of association
3. Principle of analogy and confrontation
4. Principle of abstraction and imagination
5. Challenge common wisdom and industry conventions:

6. Do mental exercise:

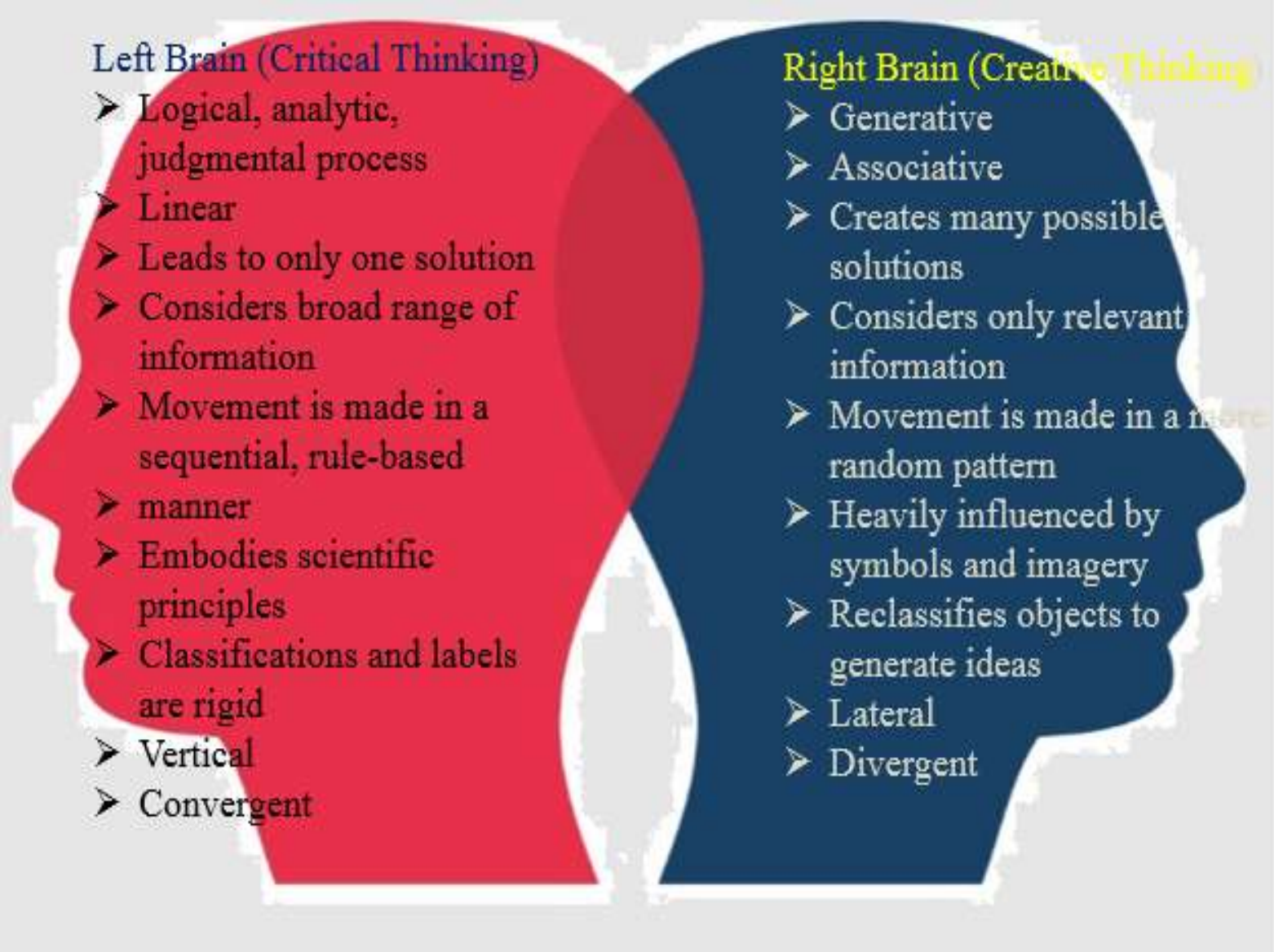
7. Change your habits:

8. Do experiment:

9. Do networking:

10. Overcome the barriers to creativity:

Brain dominance theory:



Steps to enhance creative thinking:

- Develop a creative attitude
- Unlock your imagination
- Be persistent
- Develop an open mind
- Suspend your judgment
- Set problem boundaries

Barriers to creative thinking (mental block):

1	**Perpetual Block**	• **Stereotyping** • **Information overload** • **Limiting problem unnecessarily** • **Fixation** • **Provision of cues**	The picture can't be displayed.
2	Emotional Block	• Fear of risk taking • Unease with chaos • Unwilling to incubate • motivation	The picture can't be displayed.
3	Cultural Block	• Setting too formal • Often strong resistance to change • Overlay analytical thinking	The picture can't be displayed.
4	Intellectual Block	• Poor choice of problem-solving language • Memory block • Insufficient knowledge	 The picture can't be displayed.
5	Environment Block	• Physical environment • Criticism	

Creativity techniques:

Institutive creative techniques	Systematic -analytical techniques
• Brainstorming	• Osborn Checklist (SCAMPER)
• Brain Writing	• Mind Mapping
• Random Word Techniques	• Synectic
• Semantic intuition/ the perfect prefix	• Bionics
• Forced Relationship	• Morphological box/sequential morphology's/Attribute Listing
• Provocation Technique	• HIT
• Walt-Disney Method	• Lotus Blossom
• Six Thinking Hats	• TRIZ
• Delphi Method	• SIT

Brainstorming

Rules of brainstorming:

- No criticism:
- No copyright:
- Free expansion of ideas:
- Quantity over quality:

Tips for how to brainstorm:

- Take sufficient time to claarly define the problem or question in advance
- The problem should be challenging to motivate
- The question should be focus and not too abstract (what not too specific or even imply a solution)
- it should be customer- oriented question that is actively formulated
- The question can also be communicated in advance with the invitation and is asked to already think about possible solution Idea as a kind of homework
- The group size should lie between two and almost 12 persons Ideally 5 to 8
- In case of heterogeneous group of participants who do not know yet know each other well, so organizer should insert a warmup phase before hand
- Always structure a creativity workshop with Fixed time phases. This means that brainstorming sessions must be limited in time
- Use "yes" and instead of "yes, But.... In the introduction
- Number of Ideas
- Build on ideas of others and jump from Idea to Idea
- Only one speak
- always encourage the active participation of all the participants. The person should be informed at a fixed time what has become their idea

Few tips on how to guarantee you destroy a brainstorming session

- The boss talks first and sets the goal and the requirements
- The contributions should be given in a sequence
- Only experts can submit ideas
- No silly ideas are allowed
- Everything is written down

Trigger-Questions for brainstorming

- 1. How might we…? Technique:
- 2. Yes and- technique:
- 3. What- if- technique:
- 4. Why- how laddering approach:

Variants of brainstorming

- 1. Step by step brainstorming:
- 2. Anonymous brainstorming:
- 3. Visual brainstorming/ brain painting:
- 4. Blind storming:
- 5. brain Walking:
- 6. Speed storming:
- 7. Stop and go brainstorming:
- 8. Body storming/ role storming:
- 9. Brain station:
- 10. E-Brainstorming:
- 11.Reverse Brainstorming:
- 12. Headstand method:

Brainstorming Techniques:

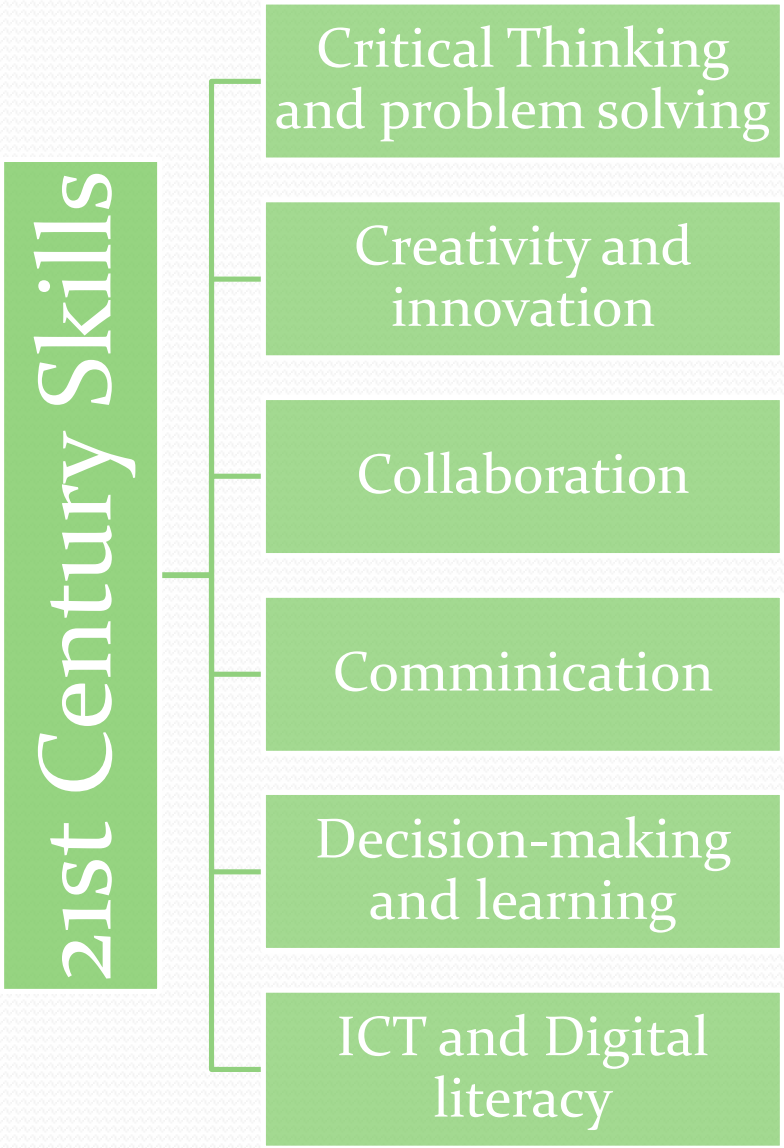
1.Freewriting:	
2. Nominal Group Technique:	
3. Group Passing Technique:	
4. Individual Brainstorming:	
5. Question Brainstorming:	Six Key Questions Who? What? When? Where? How? Why?

Methods and tools of idea Generation Techniques:

• Brainstorming	Brainstorming is listing creative ideas spontaneously without too much thinking about their quality
• Brain Dump	If the participants are hesitant to share their ideas in front of other people, then brain dump technique is used. Instead of telling their ideas, brainstorming participants individually write down their ideas on stick notes
• Reverse Brainstorming	If participants have difficulty generating creative ideas, design thinking teams can apply the reverse brain storming technique. It aims to approach the problem in a reversed way
• Benchmarking Technique	Design Thinking teams should focus designing not only functional and usable solutions but also desirable solution. Whether it is a product, service, space, or an art piece, desirability is the "Got to Have its Impact" That an object has on the person who confronts it.
• Prioritization Technique	It is not possible to convert all the ideas into prototypes and test their effectiveness in solving the design challenge. Therefore, brainstorming session, Design Thinking teams should organize assessment sessions and apply convergent Thinking to prioritize and select which solution ideas to prototype with prioritization technique.

Idea Generation Skills:

- The effectiveness of brainstorming sessions largely depend on the design thinking teams creativity and its ability to improvise and think out of box.
- Improvisation:
- Improvisation is the act of generating creative solutions for problems on the fly without a lot of upfront preparation.
- Thinking out of Box.
- To generate creative ideas during brainstorming sessions, design Thinking teams should be able to think OUT OF BOX


21st Century Skills
Critical Thinking and problem solving
Creativity and innovation
Collaboration
Comminication
Decision-making and learning
ICT and Digital literacy

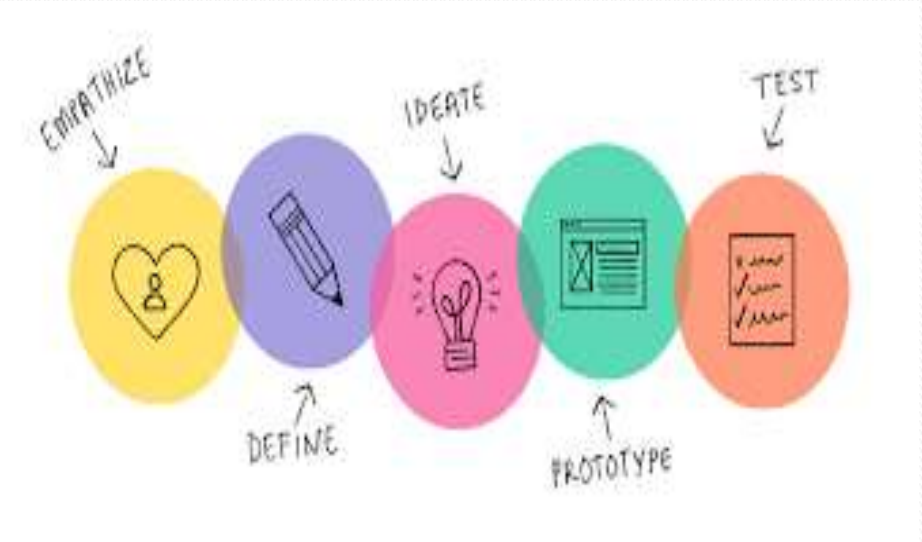
Advantages of Brainstorming:

- Many Ideas can be generated in a short time
- Requires few material Resources
- The results can be used immediately of for possible use in other projects.

Disadvantages of Brainstorming:

- Requires an experienced and sensitive Facilitator who understands the social psychology of small groups
- Requires a dedication to quantity rather than quality
- Shy people can have difficult in participating
- May not be appropriate for some business or international cultures.

Design Thinking



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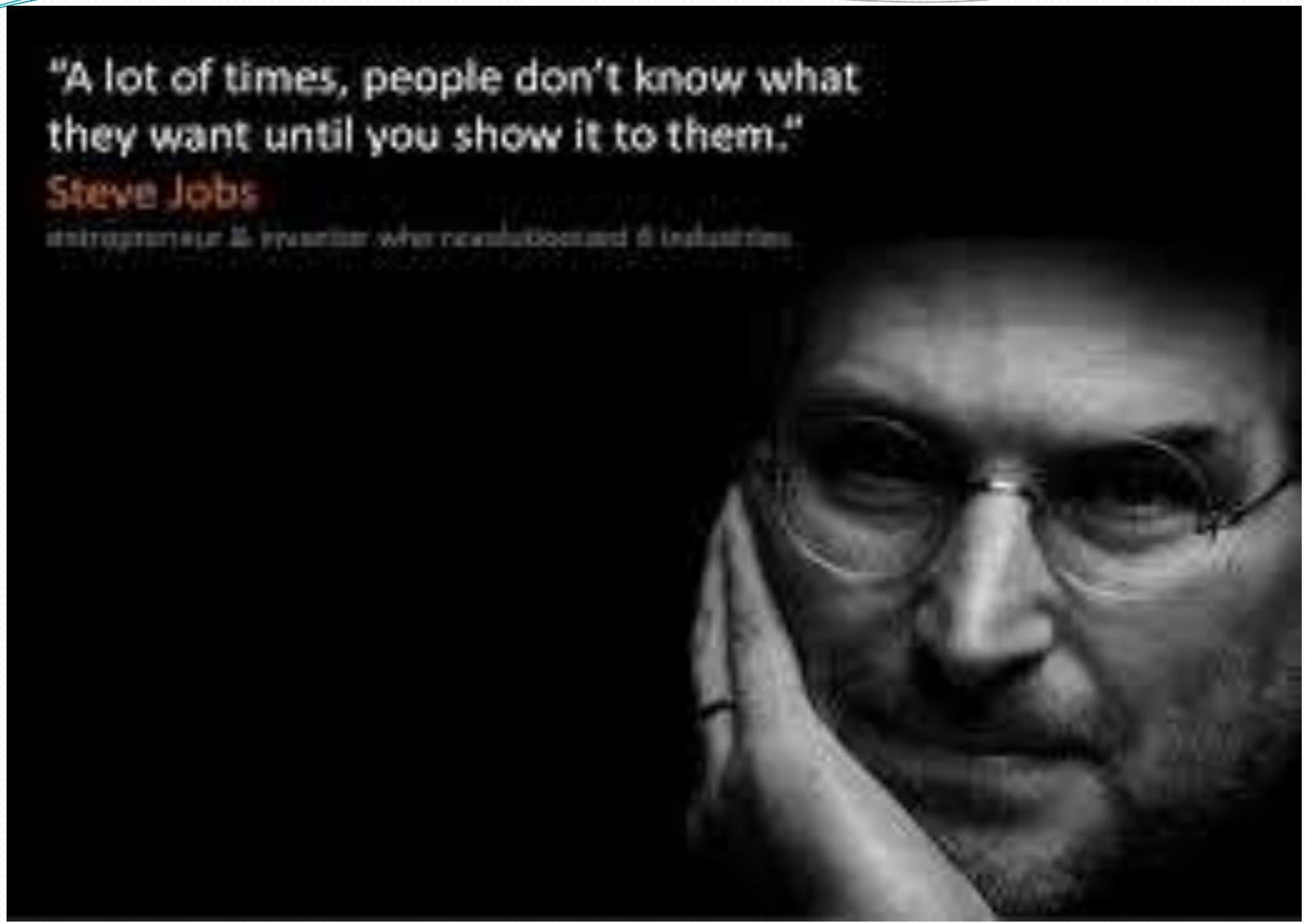
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PROTOTYPING CARDSET
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- The word "prototype" comes from the Greek term. Prototypos, a compound of protos("first") and typos ("mold, "pattern", "impression")
- Prototypes are one of the most important steps in the design process, yet it is very confusing to create and execute.
- A prototype can be almost anything from a series of sketches representing different screens of the final version of pixel-perfect product.
- Prototypes play a major role in solving the usability issues before the launch of the product.
- The prototype stage is when designer create a model designed to solve user's problems or validate ideas by testing in the test phase of the process.
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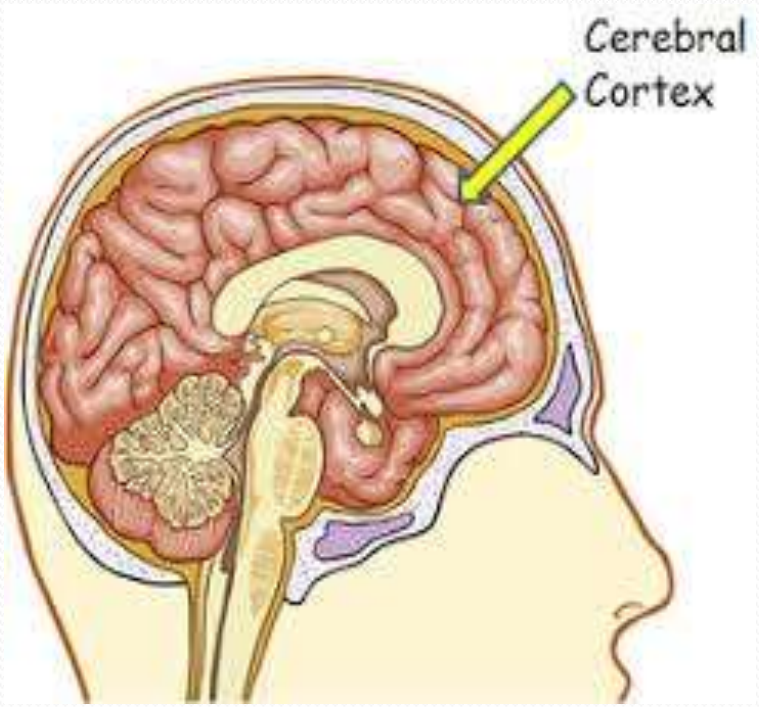

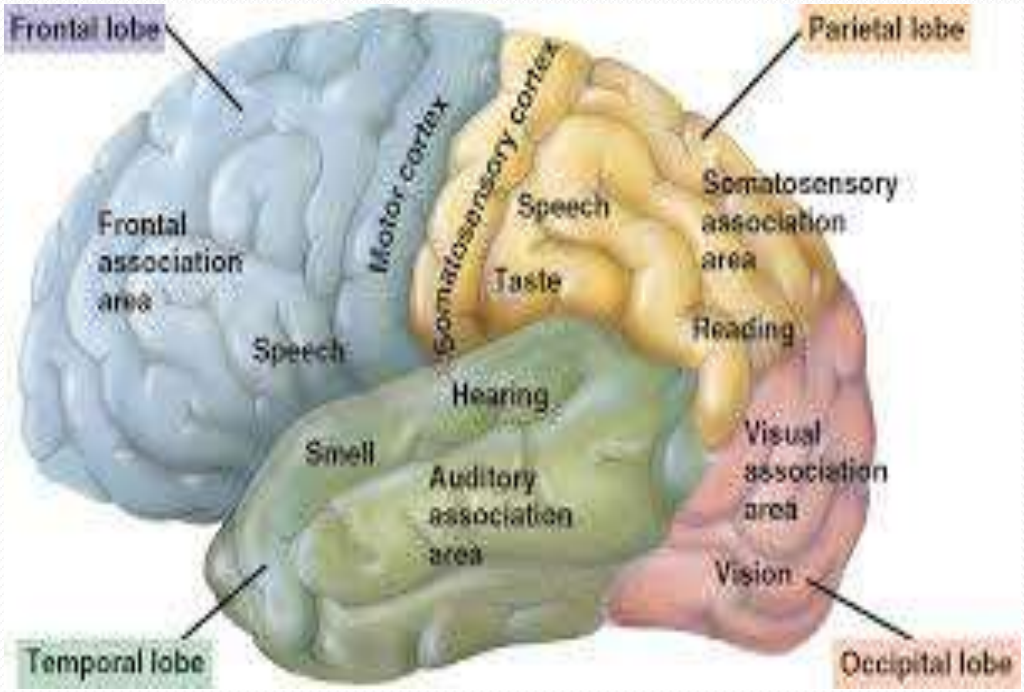

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- As a first step it must be clear which goal is to be pursued.

1. What do you want to learn from the customer/ users with the help of surveys interviews, observations, prototype, test, pilot applications?
2. How uncertain are the results?
3. What can you not experience?

- The time and cost budget are also a factor to consider when selecting visualization and prototyping techniques
- Even the most experienced design thinking teams cannot design the optimum solution on the first trial. Good design is a result of several iterations.
- Iteration is a cycle of doing something, testing it, improving it, and protecting it. The most efficient method of iterative design is prototyping.

- In general, the design teams have identified vetted solution concepts that are worth bringing farther along the design path.
- Solution concepts need stakeholder feedback as early and as often as possible in the design process.
- Prototypes are the most effective means by which stakeholders can understand what the design team intends.
- Prototyping as a creative tool requires the design team to clarify a solution concept's intentions and make decisions regarding what the concept is and is not.

- By being forced to shape the solution concept into something that can be experienced, constraints and dependencies of logical flow, time and space, human dynamics, and other principles and conventions force concepts to transform into designs.
- Prototyping causes the solution concept to evolve before the first stakeholder encounter.

- In prototyping stage three things are mainly taken care of

1. Creation of experience
2. Getting Feedback
3. iteration

- The step of prototyping is the one in which the end user comes into picture. The end user is actively involved in this component of design thinking.
- All the feedback is taken from the customer, and based on the criticisms, suggestions, and appreciations received, the design thinkers create a better solution after iterating the process of design thinking's first three steps, viz. Empathize, Define, and Ideate.
- Prototyping requires thinkers to create tangible products, which can be small-scale models

Four Qualities of Prototyping:

The Qualities of prototyping are:

Representation	This form of the prototype is mainly structured for presentation and keynote uses. That may be a paper-pen, digital or code
precision	The fidelity of the prototype is defined here. It explains the level of details, realism, and final design. Such as Low-fidelity and high-fidelity.
Interactivity	The functionality opens for the user. i.e fully functional, partially functional or no interactions at all
Evolution	The life cycle of the prototype. some are built to re iterate and re-iterate until it is precisely done and some are just designed and thrown it away after the certain outcome is made.

Primary Guidelines for Prototyping:

- Take the first step and start to build the prototype. Do not procrastinate.
- Do not waste too much of time on building a single prototype.
- The prototypes must be built with the end user in mind.
- The prototype must not be a mere piece of trash; it must create an experience for the user.

Types of Prototyping:

- Different fidelity levels allow designers to come up with solutions quickly.
- Fidelity means the level of details, functionality, or interactivity that a prototype has
- "Fidelity" can be defined (according to Oxford Dictionary) as "the Degree of exactness with which something is reproduced"
- In other words, a prototype's level of fidelity answers the question, how precisely does this present the final solution.

Prototypes are of two types

- Low- Fidelity prototype
- High-Fidelity prototype
- Low-Fidelity prototyping is intended to provide designers with Basic model or example of the product that requires testing
- With a low-Fidelity prototype, it is likely going to be incomplete or utilize a limited number of its intended features.
- The low-fidelity prototype-Known as **low-tech**, **low-fi** or **lo-fi** prototype, is a semi-finished prototype that focus on function, structure, process, and provides the simplest framework and elements of web/app.

Advantages of low fidelity prototypes:

1. Low cost: The cost of low Fidelity prototype is extremely low

2. Fast: Without focusing on every interface detail, designers can just follow their design ideas and create a simple and testing product within a few minutes

3. Easy to demonstrate, co-operate and iterate: Without too many details, prototype does not require money & professional skills. More people can join and collaborate on the same project, and it is also easy for designers to make changes and iterate the prototype during the calibration.

4. Easy to get feedback: Since being a low fidelity it is easy to carry and demonstrate designers can also directly share it with other people to collect design feedback

5. Easy to detect and tackle potential issues: A low Fidelity prototype also allows designers to test use flows, interactions. It is good for designer to detect and tackle potential issues quickly

High Fidelity Prototyping:

- Building a High-fidelity prototype needs high cost but looks more realistic as final product. It is very helpful for exposing the idea for user feedback and finding major issues that need to be fixed the early stages of design when re-designing.

- The fidelity of the prototype refers to the level of details and functionality built into a prototype. In this sense, **a high-fidelity (sometimes referred as high-fi or hi-fi) prototype is a computer-based interactive representation of the product in its closest resemblance to the final design in terms of details and functionality**. The “high” in high-fidelity refers to the level of comprehensiveness that allows you to examine usability questions in detail and make conclusions about the user behaviour.

- **When?**

- So, when is the right time to use hi-fi prototypes?

- When you have visual designs of your product
- When you have an idea about interactive elements, such as navigational schemas from a screen to another; animations; and mini-interactions, and are able to prototype them
- When you want to test the details of your products in terms of UI elements, colour schemes or copy
- When you want to test the transitions, animations, and effects of them on the user and user behaviour
- When you want to know how your target users feel about your product and you want to get their opinions on your designs.

- **Why?**

- **The main purpose of interactive prototypes is their use in the usability testing of the product have target users validate it.** It is important to test your product before launching it in the market to foresee any issues or failures. Getting the most out of the feedback can be done with a prototype that is closest to the final product in its detail and functionality.

- In addition to validating designs, interactive prototypes can be used for presentations and pitches. When you want to communicate the designs and functionalities of your product to your team members, clients or other stakeholders in the project, and when the functional build of the software is not developed, a high-fidelity prototype does the job very well.

- **How? Materials and methods.**
- In order to create an interactive prototype, you need to get all your ingredients ready. First of all, prepare your visuals and set your user flows. Identify all the transitions and animations you want to create between different objects or screens. Finally, choose the right tool according to your needs. There is a growing list of prototyping tools available for designers.
- Some of the **top mobile and web software prototyping tools** currently in the industry are:
- Proto.io
- InVision
- Pixate
- Axure
- Principle
- Form
- Framer
- Adobe XD (previously known as Project Comet)

Benefits of low-fi prototyping

- **Focus on design and concepts:** Without the pressure of making every page linked, clickable, and interactive, you can worry less about the more technical parts of prototyping and spend more energy on ideation.
- **Real-time iteration:** Let's say you're gathering customer feedback on your sketched prototype. During this test, you can quickly redo part of the design based on customer comments in real time, in just a few minutes.
- **Accessible to everyone:** Everyone can doodle. With low-fidelity prototyping, even non-designers can participate in the design process and think through content, menus, and flow.

Benefits of high-fidelity prototyping

- **More familiar to users:** High-fidelity prototypes look like live software to customers, meaning participants would be more likely to behave naturally during testing.
- **Pinpoint specific components to test:** You can dive deep into a single component (like flow, visuals, engagement, or navigation) during user testing. This allows you to get detailed feedback on certain elements of the design that would not be possible with pen and paper.
- **More presentable to stakeholders:** Clients and team members will get a clear idea of how the product will look and work before it ever goes live. You can also set clear expectations with developers in the early stages on how much time will be needed to build your prototype and have a finished product.

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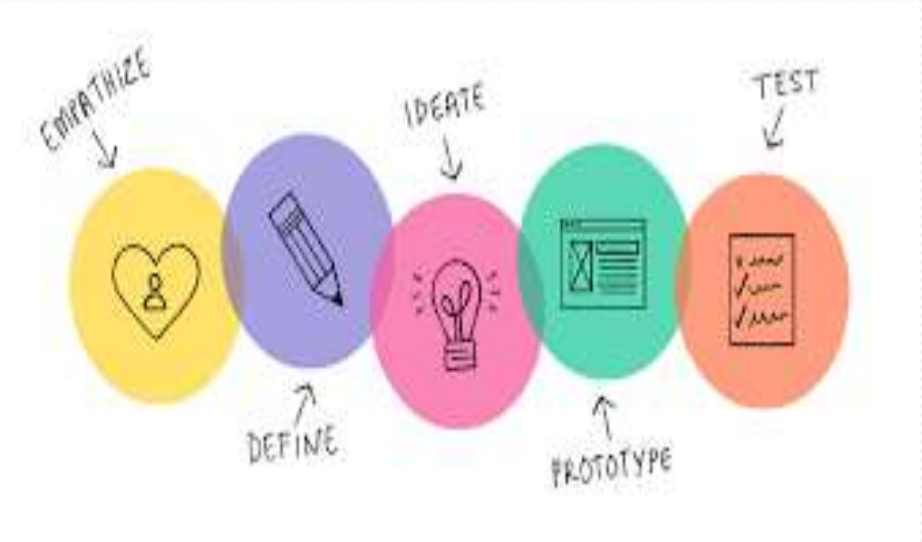

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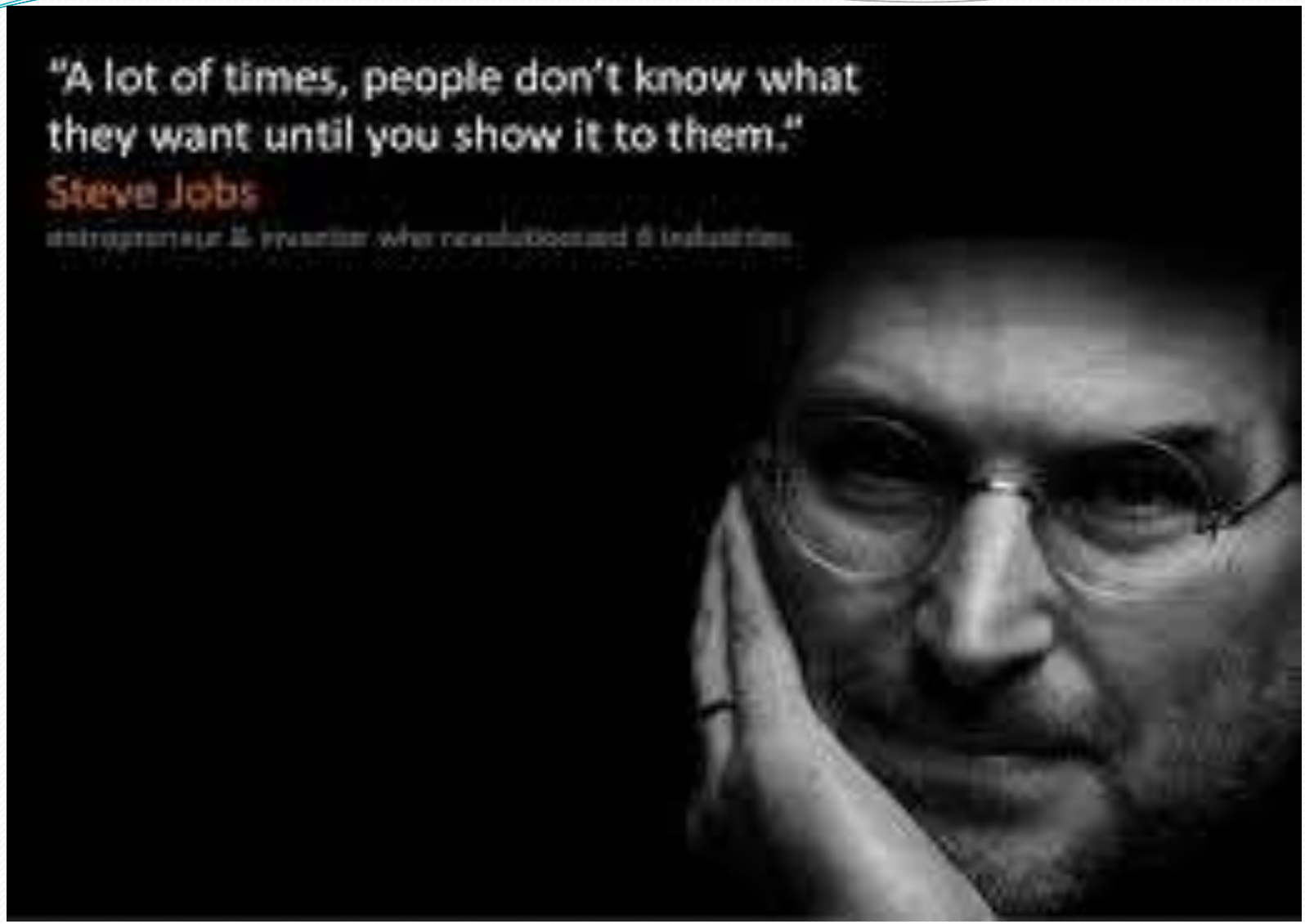
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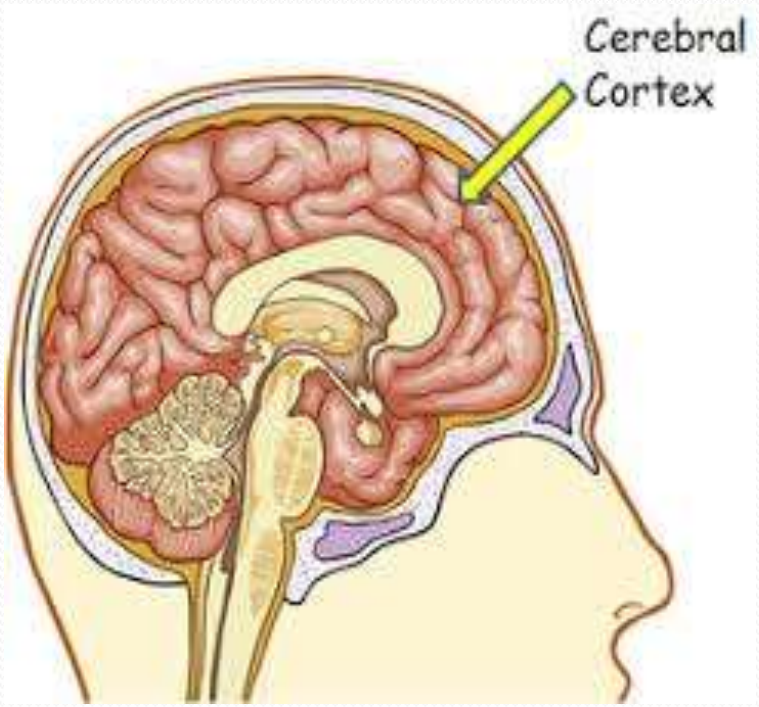

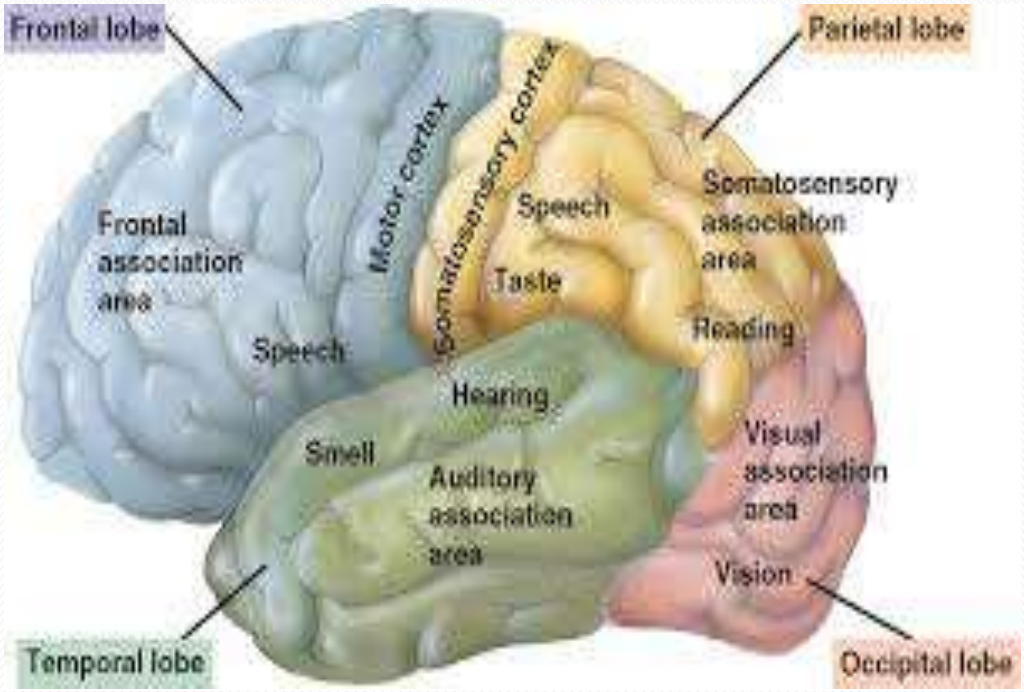

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5. Easy to detect and tackle potential issues: A low Fidelity prototype also allows designers to test use flows, interactions. It is good for designer to detect and tackle potential issues quickly

High Fidelity Prototyping:

- Building a High-fidelity prototype needs high cost but looks more realistic as final product. It is very helpful for exposing the idea for user feedback and finding major issues that need to be fixed the early stages of design when re-designing.

- The fidelity of the prototype refers to the level of details and functionality built into a prototype. In this sense, **a high-fidelity (sometimes referred as high-fi or hi-fi) prototype is a computer-based interactive representation of the product in its closest resemblance to the final design in terms of details and functionality**. The “high” in high-fidelity refers to the level of comprehensiveness that allows you to examine usability questions in detail and make conclusions about the user behaviour.

- **When?**

- So, when is the right time to use hi-fi prototypes?

- When you have visual designs of your product
- When you have an idea about interactive elements, such as navigational schemas from a screen to another; animations; and mini-interactions, and are able to prototype them
- When you want to test the details of your products in terms of UI elements, colour schemes or copy
- When you want to test the transitions, animations, and effects of them on the user and user behaviour
- When you want to know how your target users feel about your product and you want to get their opinions on your designs.

- **Why?**

- **The main purpose of interactive prototypes is their use in the usability testing of the product have target users validate it.** It is important to test your product before launching it in the market to foresee any issues or failures. Getting the most out of the feedback can be done with a prototype that is closest to the final product in its detail and functionality.

- In addition to validating designs, interactive prototypes can be used for presentations and pitches. When you want to communicate the designs and functionalities of your product to your team members, clients or other stakeholders in the project, and when the functional build of the software is not developed, a high-fidelity prototype does the job very well.

- **How? Materials and methods.**
- In order to create an interactive prototype, you need to get all your ingredients ready. First of all, prepare your visuals and set your user flows. Identify all the transitions and animations you want to create between different objects or screens. Finally, choose the right tool according to your needs. There is a growing list of prototyping tools available for designers.
- Some of the **top mobile and web software prototyping tools** currently in the industry are:
- Proto.io
- InVision
- Pixate
- Axure
- Principle
- Form
- Framer
- Adobe XD (previously known as Project Comet)

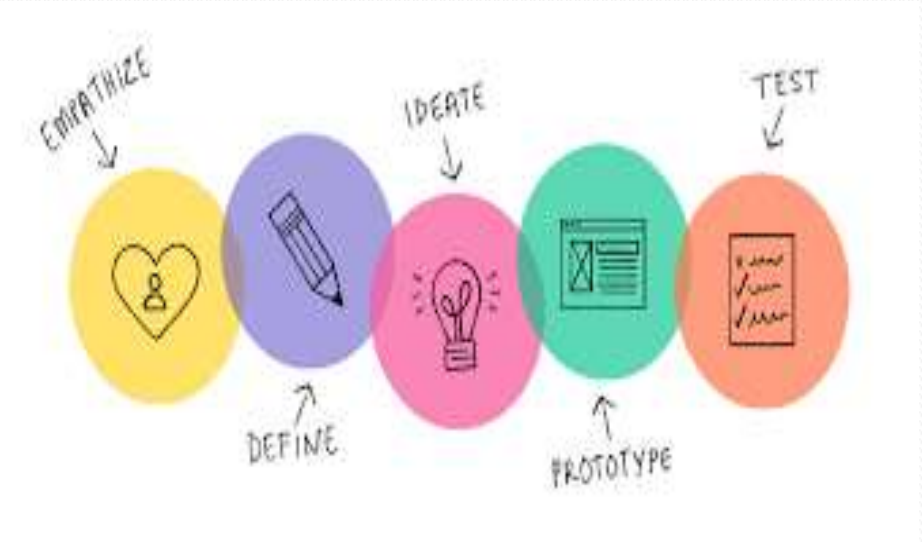
Benefits of low-fi prototyping

- **Focus on design and concepts:** Without the pressure of making every page linked, clickable, and interactive, you can worry less about the more technical parts of prototyping and spend more energy on ideation.
- **Real-time iteration:** Let's say you're gathering customer feedback on your sketched prototype. During this test, you can quickly redo part of the design based on customer comments in real time, in just a few minutes.
- **Accessible to everyone:** Everyone can doodle. With low-fidelity prototyping, even non-designers can participate in the design process and think through content, menus, and flow.

Benefits of high-fidelity prototyping

- **More familiar to users:** High-fidelity prototypes look like live software to customers, meaning participants would be more likely to behave naturally during testing.
- **Pinpoint specific components to test:** You can dive deep into a single component (like flow, visuals, engagement, or navigation) during user testing. This allows you to get detailed feedback on certain elements of the design that would not be possible with pen and paper.
- **More presentable to stakeholders:** Clients and team members will get a clear idea of how the product will look and work before it ever goes live. You can also set clear expectations with developers in the early stages on how much time will be needed to build your prototype and have a finished product.

Design Thinking



Contents

- Prototype testing Introduction
- Tips for testing
- Methods of testing
- Supporting points on testing


Good judgment comes from experience, and a lot of that comes from bad judgment.
Will Rogers

- The testing phase allows the designers to gain the feedback and insights that may not be possible without testing their prototypes
- Through these tests, designers will be able to identify aspects of their prototype that did not work well or the end user did not find the functional or pleasing.
- These failures give the designers the opportunity to fix and improve the aspects of their prototypes.
- However, failing can be difficult to accept for most of the designers. Not only does it make uncomfortable and insecure, failing can also be embarrassing, painful, and annoying and sometimes even anger.
- Despite, these designers overcome their fear of failure and embrace it as a learning opportunity.

- Time to try out new things, and innovate, even if this means pursuing the unconventional.
- In the testing phase, Design thinking teams tests prototyped solution with users representing the target personas
- The purpose of testing is to learn what works and what doesn't and then iterate.
- It involves producing the feedback as related to the prototype designers have developed, as well as hearing a deeper comprehension of end users
- Testing guarantees that designer come back to the essential core of the design thinking allowing to Empathize and gain a better knowledge of the user.
- It may drive a team to a new insight that improve the way of Define phase a design challenge.

- It may generate new ideas in the Ideation Phase and finally it might lead to an improved iteration of design prototype.
- Update the solution in an iterative manner until the solution satisfies the user needs and overcomes the challenges that is defined in the initial phase of the project.
- Design thinking team members should always appreciate user's Critiques of the solution
- The critique is natural part of any effort, including Design
- Design Thinking teams should regard the critiques of their solution positively and constructively.

- “The Customer is not always right but always having a point”
- In the testing, users have a bias towards evaluating a new solution according to its similarity to existing products with which they are familiar
- When designers asked to comment on the new solution, end users say “The old one was Better. I don’t Know why, but it was better” -----Baby-duck Syndrome.

- In human psychology, Baby duck syndrome is called the effect when a person, studying a particular area, considers the first object encountered from this area to be the best, and the subsequent ones to be the worst.
- Once the prototype is ready, test that with the users and let them go through the prototype.
- If it is the prototype of a product then let the users use the prototype.
- If it is a service prototype then show the design of the new service /modification.
- It is to be cautious that the users should use the prototype on their own without any guidance.
- The user test is performed by the users or the representatives of the users. Testing by the users /customers will give us feedback about the working of the improved component that is added to the product.
- Testing a prototype is saving the cost significantly.
- There are multiple levels of testing among that usability is one of the

Tips for prototype testing:

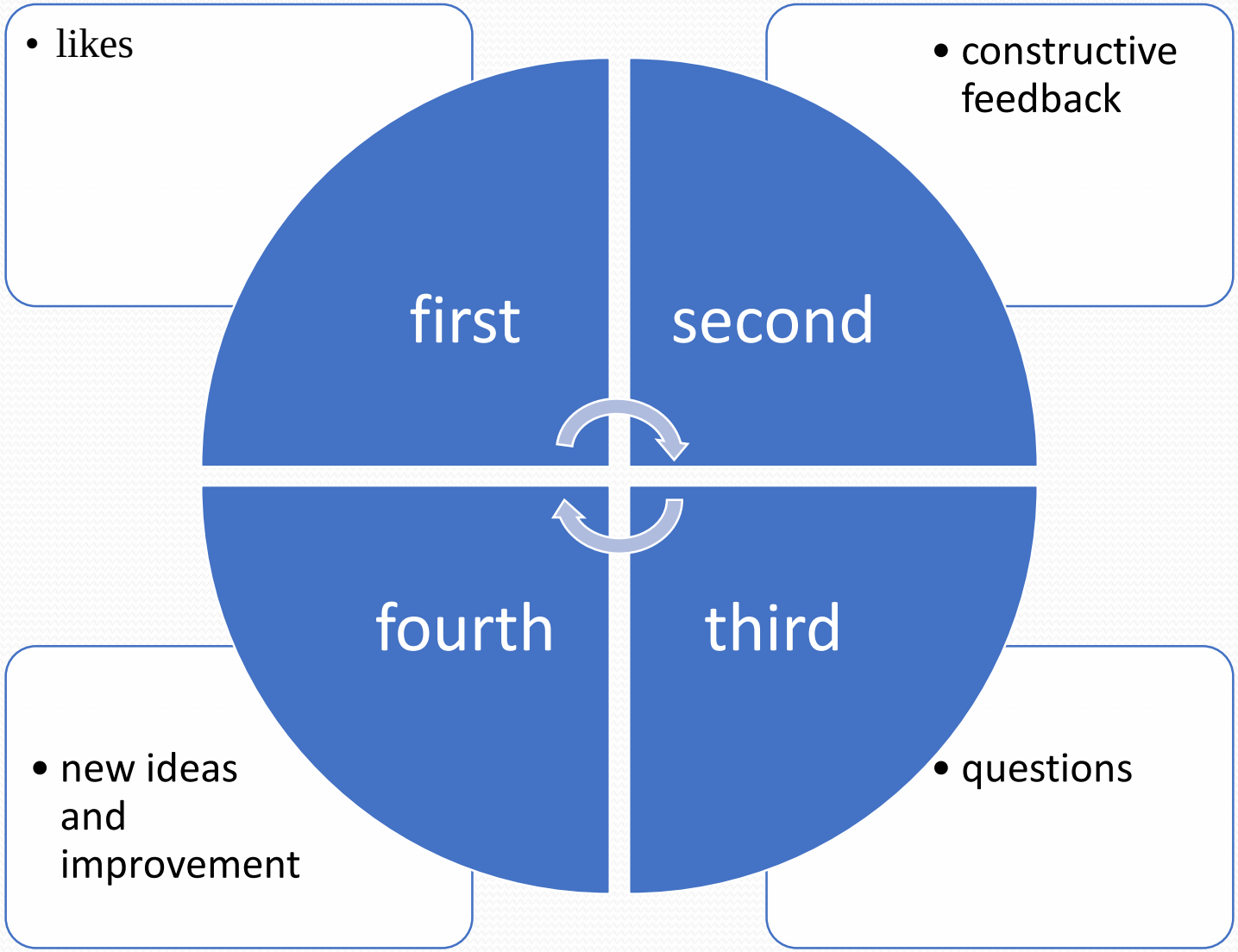
- offer multiple prototypes for comparsion.in addition to the very promising ideas, designer can also deliberately create prototype for an idea that would exclude inefficiency
- ask for feedback without comment. Each evaluation on designer part can influence the assessment of the customer
- ask the customer to suggest or implement changes to the prototype.

Testing with End users:

- when designers test with end users, it is another chance for them to empathize and learn something new that could be used to refine their prototypes.
- Testing brings the focus back to end users to reveal hidden insights that the designers would have never foreseen without the end users experiencing their prototype.
- According to d.school there are four aspects that designers need to consider when testing with end users

1. The prototype
2. Context and scenario
3. The interaction between the user and designer
4. The process and method used to observe, capture feedback and reflect

- Before testing session, it is important to prepare the users for their interaction so that designers proceeded in the right testing mindset
- The testing phase requires designers to not get defensive about the feedback they receive about their prototype or justify the reasoning behind their design, but instead to be attentive to feedback and surprising insights.
- One of the methods the designers captured their observational findings and user feedback through a simple tool called FEEDBACK CAPTURE GRID.
- This grid consists four quadrants
- In the first quadrant, designers wrote down their users' feedback on what they liked about the prototype
- The second quadrant contains the user's constructive feedback
- The third quadrant contained the questions that arose during the testing
- The fourth quadrant contained new ideas or improvements that emerged from the tests.


• likes
• constructive feedback
first
second
fourth
third
• new ideas and improvement
• questions

Classical Test Methods are:

1. Contextual Interview/ inquiry of Customer
2. User Observation techniques
3. Interviews on neutral location
4. Phone interviews
5. Video charts
6. Instant messaging
7. E-mails
8. Online survey
9. Focus groups/ customer Clinics/Usability-Test/Live testing
10. Eye-Tracking systems

Contextual interview:

- since most of the products or services are used individually, one-on-one interviews are usually more effective.
- Tips for interviews
- where and how to find customer for the experiments?
- First try for physical meeting for eye-to-eye contact for understanding the customer emotions and thoughts
- Use social network (contact on Facebook, twitter, phone LinkedIn,) for the survey
- Ask for recommendations for friends to friends (so called second-degree connections) to do this create redirectable mails with request
- If designer do not have a clear idea of the exact target customers, start broadly, but focus on the potential target group as quickly as possible
- Search for studies, news articles, reports about the target group and collect statements, contacts data or other relevant information
- With already existing, similar products or predecessor products, designer can address existing customers directly

How to formulate the right questions?

- avoid technical terms! speak in customer's language. Better something more colloquial than incompressible or misleading
- always concentrate on certain activities, events or decisions in the past or present
- good questions are about the current situation of the customer and his previous experiences.
- Never accept or take anything for granted: Ask also if designer know the supposed reason or take something for granted

❖ Template for interview protocol for testing:

Source: according to Alvarez (2014) and with the addition of pauck/owen (2013)

Interview protocol				
Hypothesis(assumptions)				
Interview conducted by:		At		
Information about the interviewee:				
Name:			position	
Gender:	Male	Female	Age:	
Other characteristics traits: (work experience, leisure activities, usage habits etc)				
Keywords of the key message:	Notes:			
Summary:				

- Observation Techniques:

1. Drawings and design of models
2. Storyboarding
3. Storytelling/comics/Lego serious games
4. Body storming
5. Wireframes/Mockups
6. Website/Landing Page
7. Videos
8. Concierge MVP (Minimum Viable Product)
9. Wizard-of-Oz MVP
10. Open-source Prototypes
11. 3D-Rapid prototyping
12. Crowd Funding

Storyboarding:

- Storyboarding is a method, initially used by Walt Disney for cinema film production, which schematically visualize scenes of an action (hence also called visual storytelling) and summarizes dialogues or activities of person in a situation in a keyword manner.
- Storyboards can be used in Design Thinking to visualize customer activities during problem identification on the hand, and as a kind of prototype during the solution finding phase on the other, in order to obtain customer feedback.
- For the development of service offerings, storyboarding is a good opportunity for visualization.

Storytelling:

- Storytelling describes in a narrative form as a real (but also fictitious) story the vision/strategy, the benefits or use of an innovation or the success (best practices) or typical mistakes in innovation activities.
- Storytelling can be used as a kind of prototype test to illustrate an innovate idea to customers and to ask for feedback.
- The procedure for the creation of a story is similar to the creation of a communication concept in marketing or can be part of such a concept
- First, the central message of the story (goal) should be defined or the target group determined in very simple words.

- the following questions need to be answered in order to create a central message.

1) who is the target group for the message?
2) why should this story be told?
3) what should the reader /listeners/ viewers take with them?
4) How will the reader/listeners/viewers benefit from the story?
5) Is the message relevant?
6) what can the reader /listeners/viewers learn from it
7) what should be the reader /listener/viewer think, feel or do after the story?

- In order to prepare the storytelling, relevant background information on theses elements e.g interviews with the people actually involved in the story, must be researched, which is relevant in the broadest sense
- Quotations of the personality can incorporate in the story.
- In order to better understand the role of the characters, the persona method or the empathy map can be used to prepare the story
- The realization of the story can be realized as text, radio play or video or as a combination of these possibilities of various multimedia.

Supporting points on testing techniques:

- Most products /services are used individually, one -on -one interviews are usually more effective than focus group sessions
- People/end-users are affecting each other's opinion during focus-group sessions, and this may undermine the testing results.
- It is beneficial to conduct focus group session after the interviews.
- During interviews and focus groups, some users may not provide complete, clear and objective feedback about the solution.
- Some of the users won't want to criticize the solution, and they will hesitate to make negative comments.

- To mitigate this risk, user observations should also be conducted following interviews and focus group sessions.
- User observation Techniques consists of observing users while they use the prototyped solution

❖ Testing a solution with limited number of users who represents the target personas is much better than testing with many random users.

❖ The optimum number of users that should be included in the testing phase is eight or ten per persona

- Finding the users who represent the target personas is one of the most challenging parts of the testing phase.
- Sometimes design thinking teams hesitate to allocate a specific time and budget for testing sessions, because a fully equipped test laboratory is mandatory for testing
- Observing users while they interact with the solution can be sufficient to detect and analyze most of the problems with the solutions.