

UNIT-1

Introduction to Design Thinking

Design thinking is a blend of logic, powerful imagination, systematic reasoning and intuition to bring to the table the ideas that promise to solve the problems of the clients with desirable outcomes. It celebrates the absence of specific formulae, algorithms, or templates for design thinking. A formulaic, simplistic approach can severely limit creative possibilities for solving problems or even finding the right questions. A thorough analysis of the problem's context as well as of the stakeholders themselves, therefore, are critical components of design thinking. Moreover, because design thinking is a process, the ideas are scalable so as to address problems large and small. To keep it simple, Design Thinking is defined as a flexible and systematic way of problem solving.

Design thinking facilitates the understanding and framing of problems, enables creative solutions, and may provide fresh perspectives on our physical and social landscapes. The concept of design thinking began only with a few domains (e.g. architects or product developers etc.), under consideration, but is now found to be applicable to a myriad of disciplines, to solve real-world problems and reconcile dilemmas ranging from medicine and aeronautics to management, operations, and human resource planning.

Origin of Design Thinking

The term “design thinking” has been applied to two different but related areas of conceptual development. The first established body of knowledge, starting in the late 1960's, investigates how designers (eg: architects, industrial designers, graphic artists) perform their craft and seeks to identify the skills, abilities and knowledge of expert designers. The second use of “design thinking” is related to business management. Since the mid-1980's, interest within the business community grew in exploring how “designerly” thinking could be applied to business challenges, and be performed by employees and leaders not trained formally as designers.

For most practitioners, the idea of design as a way of thinking and solving complex problems in a simplified manner in sciences, can be traced back to Herbert Simon and his 1969 book, ‘The Sciences of the Artificial’. An American political scientist, economist, sociologist, psychologist, and professor at Carnegie Mellon University, his distinction between critical thinking as an analytic process of “breaking down” ideas and a design-centric mode of thinking as a process of “building up” ideas is foundational to the practice. The same purpose was achieved for design engineering by the book ‘Experiences in Visual Thinking’, authored by Robert McKim in 1973.

In 1987, Peter Rowe's book titled, ‘Design Thinking’ described methods and approaches that planners, designers, and architects use. The work of Robert McKim was consolidated by Rolf Faste at Stanford University during 1980's to 1990's and then, David M. Kelly adapted design thinking for business interests. David M. Kelly founded IDEO in 1991.

The term ‘design’ which has traditionally been associated with a product's aesthetics and visual expression and, in industries where the products ‘consist of design’ – such as fashion, interior and architectural design - became increasingly

common to relate design to the ability to solve complex issues, also commonly referred to as "wicked problems". In 1992, design theorist Richard Buchanan connected fellow design theorist Horst Rittel's term "wicked problems" to Simon's Design Thinking when he published "Wicked Problems in Design Thinking." In this landmark essay, Buchanan proposed using design to solve the world's most extraordinarily persistent and difficult challenges.

Design Thinking first gained widespread popularity outside the design discourse when it entered the management discourse. This is mainly credited to the work of Tim Brown (Brown, 2008), the former CEO of IDEO, one of the most well-known design consultant firms in the US and Roger Martin, former Dean of the Rotterdam Business School. In one of the most known articles about design thinking, Brown presents design thinking as a human centred approach to innovation inspired designer's way of working and thinking, which people with non-design backgrounds can use (2009).

Importance of Design Thinking

Design thinking is beneficial for designers to find innovative, desirable and never-thought-before solutions for customers and clients.

What is so great about thinking like a designer? Firstly, it is a tried and trusted problem-solving thinking tool that anyone can employ to achieve real, concrete results. However, if one did not use it consistently enough, and actively integrate it in their mind-set, one may not be able to see effective results.

The teaching and acquisition of design thinking skills has assumed so much importance that it is now being taught at some of the leading universities of the world, as well as the leading global corporate houses across the globe. Stanford University in the United States and the University of Potsdam in Germany have also promoted design thinking, citing it as one of the most useful skills for professionals.

Infosys Ltd., India's second largest IT-based company providing business consulting, information technology and software engineering services, has also made design thinking a mandatory skill to be acquired by each of its employee. Respected design critic and educator Don Norman suggests that one of the major problems related to innovation is the ability to manage the desirable, feasible, and economically viable. Although he is referring to designing things, the problem is equally present when designing systems, services, or even cultures.

3 key factors why people need design thinking:

1 — For companies to innovate

"Innovation distinguishes between a leader and a follower." —Steve Jobs, Apple CEO

Companies need to innovate or die. Today's consumers are very aware, are spoiled for choice, and can be very fickle.

3M and Apple were companies on the brink of failure—but they proceed to adopt an innovative culture through design thinking to achieve amazing records of success. Today, 3M generated nearly \$30 billion revenue selling over 55,000 innovative products, while Apple captivated the consumer electronics market with stylish products like the iPhone, MacBook and iPad.

In a competitive market, companies, big or small, need to innovate to create an advantage over their competitors. Design thinking will allow companies and

start-ups to innovate and explore opportunities, based on unmet consumer needs and understanding of the situation.

2 — For society to solve human problems

“Design is directed toward human beings. To design is to solve human problems by identifying them and executing the best solution.” —Ivan Chermayeff, Designer & Artist

People need design thinking to solve human problems (difficulties we encounter in daily life). For example, we face issues like overcrowding at train stations, bad online banking experiences and traffic jams, which can lead to frustration and social problems. By applying design thinking principles, we identify the best possible options to streamline and make these experiences go better, faster and smoother.

3 — For individuals to compete

“Design thinking is a human-centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.” —Tim Brown, President & CEO of IDEO

Design thinking has already been seen as a competitive advantage for individuals who want to excel in their career or business. Many schools, such as the Rotman School of Design and Stanford University’s d.school, have offered exclusive courses on Design Thinking to executives and professionals. They aim to give students with design backgrounds a stronger business advantage, while offering business-minded people a more creative edge. According to the Wall Street Journal, prospects are willing to pay up to \$40,000 per year for a Design Thinking MBA, while a Stanford’s three-day Design Thinking boot camp costs \$9,500!

Thinking like a designer can transform the way organizations develop products and services on the front end. It can also improve processes and strategy in the backend. You can apply the principles to a new product or service, but you can also use to tackle a problem that plagues a city or nation.

Understanding Design Thinking- a nonlinear Process

The iterative design process helps the designers to involve clients and customers in meaningful ways. It is not just a strategy to come up with feasible solutions to a problem, but also a method to think of unimaginable solutions and then trying to make them not just feasible, but also viable.

Design thinking is a solution seeking process that incorporates:

- User-centred or human-centred design that commonly refers to a design process that seeks to understand the user as a person as well as incorporate the user’s objectives, needs and pains in design efforts. The user is consulted throughout the design and implementation stages of a solution in order to seek their insights and feedback on how the solution can be made better for the user.
- Iteration that repeats cycles of activities that seek to identify and achieve a viable solution. - One cycle consists of three activities: learning, making, and evaluating

- One cycle consists of two types of thinking: divergent and convergent thinking
 - Multiple candidate solutions instead of initially committing to one “nearly correct” solution early in solution development.
 - Low cost and ideally quick mock ups or prototypes of solutions for evaluation within the design team and by users
 - Direct and collective participation, observation and evaluation by members of the design team. These qualities of design thinking are the essence of professional design practice applied to business cases
- Consistent with the spirit of design thinking oriented problem solving, multiple systemized approaches to design thinking have been proposed to solve the problem of implementing design thinking in practice. The Hasso Plattner Institute uses six steps while there is a four-step approach from the Kanazawa Technical College in Japan. The design consulting company IDEO has yet a different approach. A collection of design thinking approaches can be found at <https://designthinkingmethodology.weebly.com/methodologies.html>

5 CHARACTERISTICS OF DESIGN THINKING

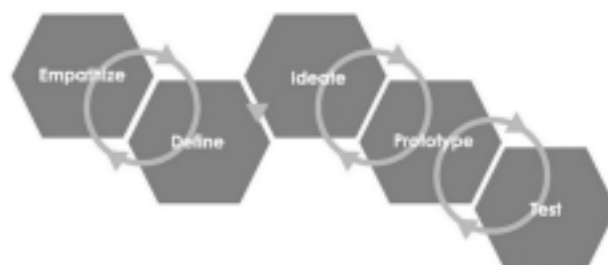
1 — It is not just a brainstorming session or a “one-day” process.

The design action plan is not a process that works instantaneously - it requires time and effort from committed individuals involved with the same objective to make it work. It is certainly not a “one-day” process where problems can be solved in 24 hours. There are phases where you need multiple iterations, testing and checking back with users and exploration where it would take time to incubate. Some have commercialized design thinking as a “brainstorming” session. It is not. Remember, design thinking is a 5-step process, and not a 1-step Ideate Phase. It seeks to define the problem, even as it finds the solution.

2 — It is an iterative process.

The design action plan is an iterative process. You need to repeat each phase backwards and forwards, and arrives at each decision or desired result, after rounds of discovery. It means to work on something over and over again, until every facet becomes crystal clear.

For example, you can iterate between Ideate and Prototype Phase several times - you sketch ideas and immediately build prototypes to make rounds and rounds of discovery of the idea. After that, you may want to go back to Ideate Phase to refine the ideas yet again.



Iterative Process of the five phases

3 — It contains phases of both divergent and convergent thinking.

The design action plan has phases of both divergent and convergent thinking. The Empathise and Ideate Phase requires divergent thinking. Divergent thinking is to create and explore ideas and possibilities, without restraint. Within the phase,

you will be encouraged to make guesses, come out with wild ideas and be creative.

The Define, Prototype and Test Phase requires convergent thinking. Convergent thinking means to actively select and decide the right solutions to the problem, based on constraints or feedback. Within the phase, you will be encouraged to analyze and make decisions and constantly ask critical questions to solve the problems at hand. Both sides of thinking are important in order to make this process work.

“Divergent thinking is to create and explore ideas and possibilities, without restraint.” “Convergent thinking is actively selecting and deciding the right solutions to the problem based on set of constraints or feedback.”

4 — It requires everyone to collaborate and go through the process together.

The design action plan is made up of phases where everyone, including the design thinking facilitator, collaborates on the process together. Everyone will bring their prior experiences and knowledge about the problem to the table and work on the issue together.

The process is not like a hot potato, where you “toss” the responsibility from one individual to another. For example, the researcher in the Empathize Phase might share to the business lead in the Define Phase and define the project, which engages a designer to coordinate the Ideate Phase, and then leave everything to the engineer in the Prototype and Test Phase!

But this is not proper design thinking. Instead, all of them (the researcher, business lead, designer and engineer) should be in the process from start to end.

This is because everyone in the team requires deep insight of what the issues are and what are needs of the users- so that everybody is on the same page. Design thinking is a process where everyone collaborates together from start till end with a common objective.

5 — There are deliverables at every phase.

There is a deliverable outcome of each action phase which will give you a point of reference, when you go through the process of iteration. This list of deliverables is not exhaustive, but you do not have to use them all. Based on the nature of your project, select the necessary deliverable.

Engineering , Innovation & Design:

Engineering:

The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, machines, processes, and systems.

Innovation:

“The term innovation means a new way of doing something. It may refer to incremental, radical, and revolutionary changes in thinking, products, processes, or organizations. The goal of innovation is positive change, to make someone or something better.”

Design:

‘To design’ refers to the process of originating and developing a plan for a product, structure, system, or component with intention.

Introduction to Engineering and Thinking:

Engineering is the designing, testing and building of machines, structures and processes using Maths and Science. Studying it can lead to a rewarding career. Engineering is a discipline dedicated to problem solving.

Thinking:

- The action of using one's mind to produce thoughts.
- The process of considering or reasoning about something
- Thinking is the base of all cognitive activities or processes and is unique to human beings. It involves manipulation and analysis of information received from the environment
- Thinking is an important mental process. It helps us to define and organise experiences, plan, learn, reflect and create. But sometimes our thinking may for a variety of reasons become unhelpful and this has a negative impact on our well being.
- The function of thinking is to create meaning. Thinking makes sense of the events of our lives; it sorts events into named categories and finds patterns for us. It continually tells us: This is what is going on.

Engineering for Social and Economic Development:

- Economic development refers to the growth in terms of economy, while social development refers to the entire well-being of the people in terms of education, health, etc.
- Engineers have a diverse role in the society regarding the economical development. They can play an important role in infrastructure development, agricultural productivity, environmental sustainability, cooperation with academia, social and ethical role and to mitigate the energy crisis etc.
- Engineers play a huge role in healthcare and food, and in manufacturing and research. Ultimately, by building this infrastructure, physical and digital alike, engineers are playing a great, lasting role in fueling economic growth in villages, cities, communities, territories, and countries.
- Social development it is generally understood to comprise of a set of objectives including equity and social justice, which subsume additional objectives including social inclusion, sustainable livelihoods, gender equity, increased voice and participation.

TYPES OF THINKING:

1. Linear Thinking

- **Definition:** A step-by-step, logical progression from one point to the next in a straight line. It relies on structure, sequence, and cause-and-effect reasoning.
- **Characteristics:**
 - Follows a systematic and predictable path.
 - Focuses on solving problems based on known methods and established rules.
 - Often used in analytical thinking, decision-making, and mathematical reasoning.
 - **Example:** Solving a math problem by following a formula or troubleshooting a machine by diagnosing issues step-by-step.

Advantages:

- Effective for **structured problems** or predictable scenarios.
- Reduces ambiguity and minimizes risk.
- Works well in **environments with clear rules**, like programming or engineering.

Disadvantages:

- May overlook creative or unconventional solutions.
- Can become **rigid** when faced with complex, ambiguous, or dynamic problems.

2. Lateral Thinking

- **Definition:** A non-linear approach to problem-solving that emphasizes creativity, imagination, and looking at problems from unconventional perspectives.
- Lateral thinking was first defined by Edward de Bono in 1967 and is synonymous with creative thinking.
- **Characteristics:**
 - Seeks to break away from traditional patterns of thought.
 - Encourages exploration of multiple ideas or solutions simultaneously.
 - Values intuition, brainstorming, and innovation.
- **Example:** Coming up with new ways to market a product by imagining entirely different target audiences or brainstorming alternative uses for it.

Advantages:

- Ideal for creative problem-solving and innovation.
- Opens up possibilities that wouldn't emerge through traditional thinking.
- Encourages flexibility and adaptability.

Disadvantages:

- Can be less structured and harder to implement systematically.
- May lead to impractical or unrealistic ideas without refinement.
- Requires time and a conducive environment for effective exploration.

| Aspect | Linear Thinking | Lateral Thinking |
|---------------|---|---|
| Definition | Logical, step-by-step, sequential thought process. | Creative, non-linear, and unconventional approach to thinking. |
| Focus | Finding the correct or most efficient solution. | Generating multiple possibilities and exploring new ideas. |
| Approach | Analytical and systematic. | Intuitive and imaginative. |
| Direction | Straightforward, moving from one point to the next logically. | Divergent, exploring different angles and breaking assumptions. |
| Problem Type | Best for structured, predictable, or well-defined problems. | Best for ambiguous, complex, or open-ended problems. |
| Tools/Methods | Algorithms, formulas, standard procedures, and logical reasoning. | Brainstorming, mind mapping, analogies, and reframing. |

| | | |
|-----------------------|--|--|
| Outcome | Focused on achieving a single solution. | Aims to uncover multiple potential solutions or ideas. |
| Strengths | Efficient, precise, and reduces ambiguity. | Encourages innovation, flexibility, and out-of-the-box thinking. |
| Limitations | Can be rigid and miss creative opportunities. | Can lack structure and produce impractical ideas. |
| Examples | Solving a mathematical equation step-by-step. | Inventing a new use for a common object. |
| Typical Fields | Science, engineering, accounting, programming. | Design, marketing, entrepreneurship, creative writing. |

3. Design Thinking:

Design thinking is a humanized and creative way of solving problems. It's human-centered,

It's iterative, It's cohesive, It's feasible, It's productive. It comprises five core phases:

empathy, define, ideate, prototype, and test.

Design thinking has been embraced by the world's top design-oriented brands including IBM,

Google, and Apple to create an absolute connection with the users. Design thinking is not just

applicable to the design industry and practiced by designers, it is applied across a variety of

industries, organizations, and practices.

The goal of design thinking is to let people feel free from the standard processes by focusing

on human needs, create improved products, services, and work culture. It's a way to approach

the problem and encourages collaboration while solving a problem.

☐ Design thinking creates relevant solutions for users.

☐ It aims to re-frame the problem to identify various possibilities before coming to the

solution.

☐ The common set of five phases is a capable and practical way of accomplishing goals.

☐ Design thinking aims to connect the mindsets of people in an organization to bring out

the best in them.

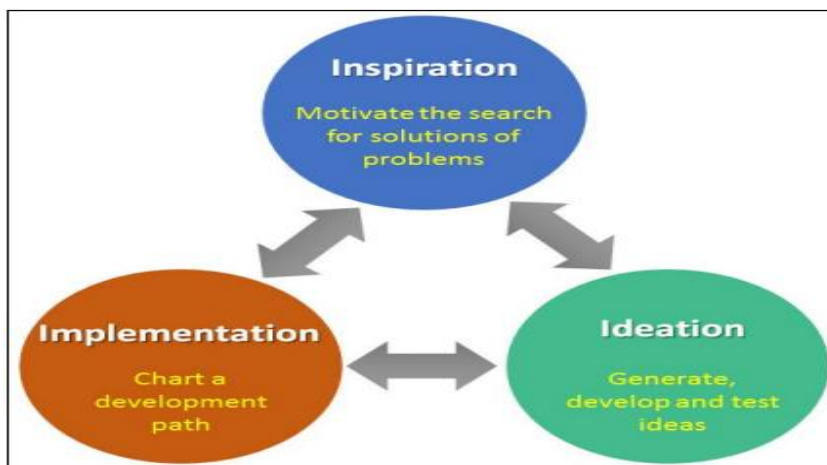
☐ It helps to think of the conceptual complex problems through the way, skills, and mindsets of designers.

Therefore, all people involved in the process of design thinking, are responsible for creating a product that is user-centered, aesthetical, functional, and commercially viable.

Phases of Design Thinking:

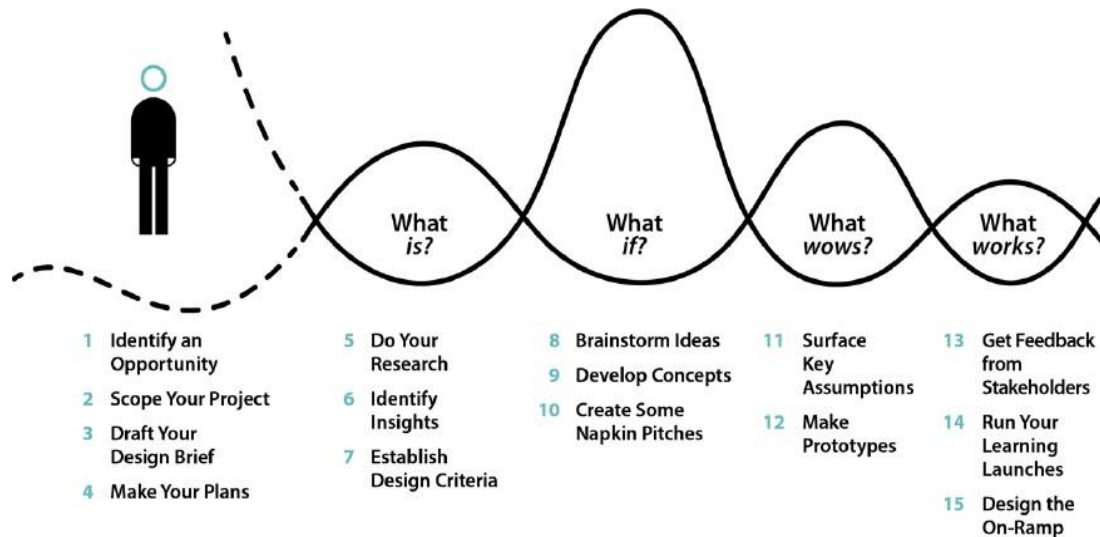
- Design thinking is a non-linear, iterative process that can have anywhere from three to seven phases, depending on whom we talk to.

3-stage Model:



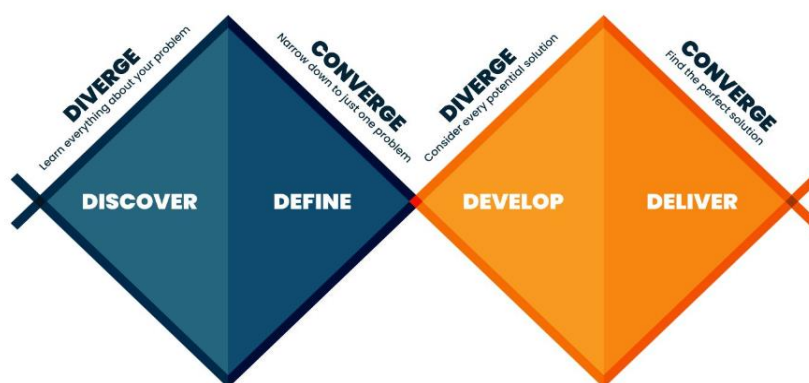
The three-phase model of Design Thinking—Inspire, Ideate, Implement—was proposed by IDEO, a global design and innovation company, to simplify the process into actionable steps.

4-Stage Model:



The Four-Stage Design Thinking Model—What Is, What If, What Wows, What Works—was proposed by **Jeanne Liedtka**, a professor at the University of Virginia Darden School of Business.

She developed this framework to provide a practical, structured approach to innovation that aligns with business needs while maintaining a human-centered focus.

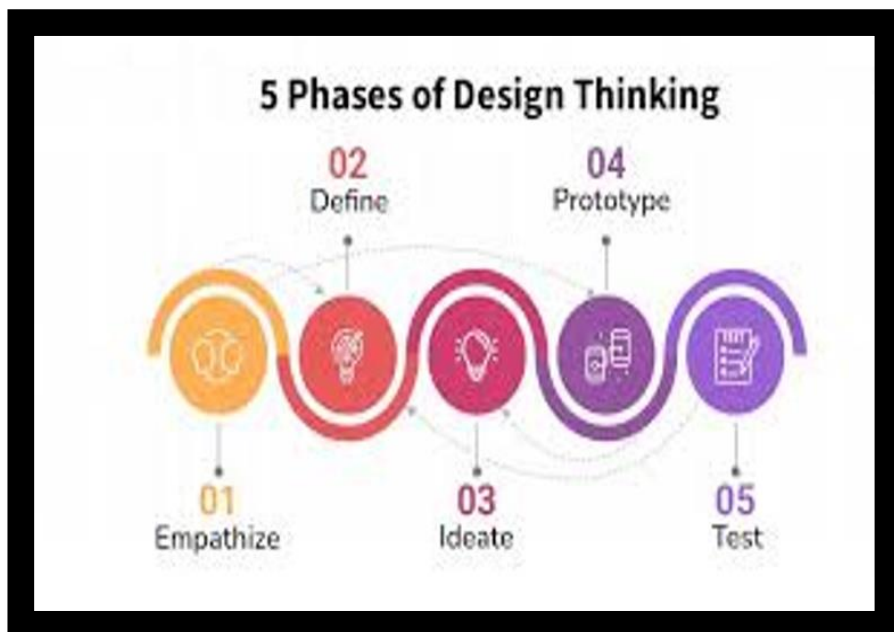


Double Diamond Design Thinking Model

- It is developed by the British Design Council. It visually represents the divergent and convergent thinking that occurs in design. The model

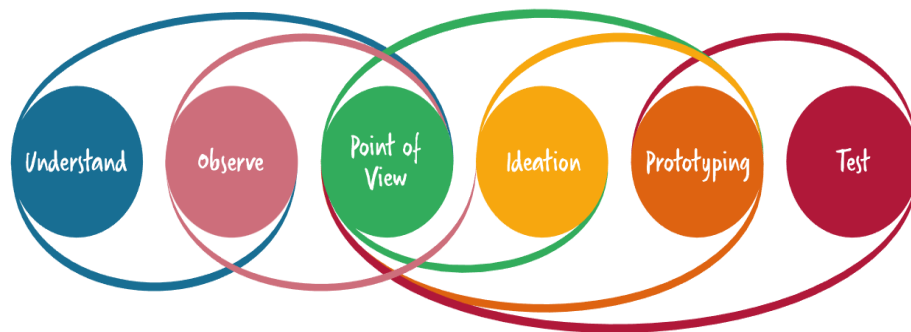
consists of four phases organized into two diamonds: the first diamond focuses on problem discovery and the second diamond on solution development. The initial focus is on expanding the understanding of the problem, which includes research, interviews, and observations. It's about identifying pain points, needs, desires, and the broader context. This is a **divergent** phase where multiple possibilities and perspectives are explored. Next we converge by analyzing the findings and framing a specific, actionable problem or opportunity. The aim is to clearly define the challenge you will solve moving forward. Third phase is divergent again, as we generate a variety of ideas and solutions to address the problem. Next phase is again convergent, focusing on evaluating ideas, making decisions, and refining the most promising solutions. It involves testing with real users and refining the solution until it's ready for production.

5-Stage Model:



The **five-stage design thinking model** was proposed by the Hasso Plattner Institute of Design at Stanford (the d.school).

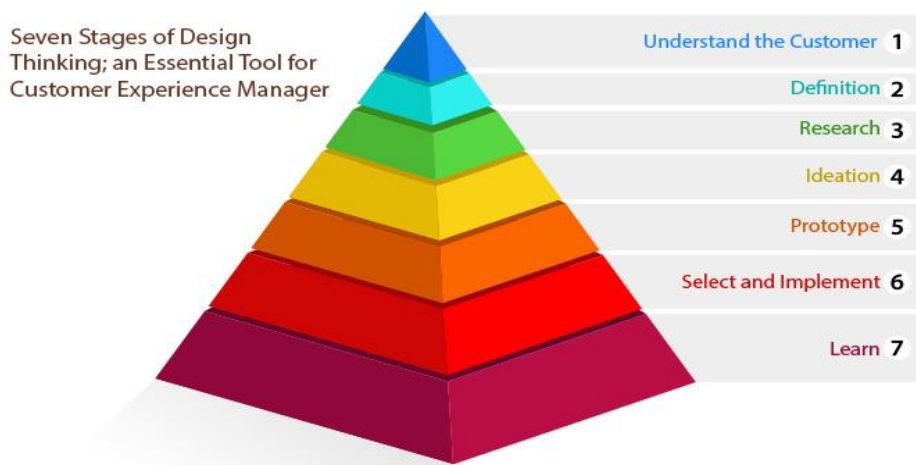
6-Stage Model:



The schematic d.school/D-School process consists of the six stages, *Understand*, *Observe*, *Point of View*, *Ideate*, *Prototype*, and *Test*.

Later the D-school proposed 5 stage model as well.

7-Satge Model:



In his book *The Science of the Artificial*, Simon defined an early model of the design process, consisting of seven stages: *define*, *research*, *ideate*, *prototype*, *choose*, *implement*, and *learn*.

This model more or less still describes the “prototypical” Design Thinking process.

5 Stage Model as Iterative Method:

- The **five-stage design thinking model** proposed by the Hasso Plattner Institute of Design at Stanford (the d.school) because they are world-renowned for the way they teach and apply design thinking.

- The *iterative and non-linear nature* of design thinking means design team can carry out these stages simultaneously, repeat them and even loop back to the previous stages at any point in the design thinking process.

Key Phases of Design Thinking:

- Empathize
- Define
- Ideate
- Prototype
- Test

Phase 1: Empathize:

- Empathy is the first step in design thinking because it is a skill that allows one to stand in the shoe of others.
- It is about understanding the feelings of fellow beings and viewing others as self.
- It involves understanding user needs through research, conducting interviews, surveys and developing empathy maps.

Phase 2: Define:

- In the Define phase, Design Thinkers will analyse the observations and synthesize them so as to define the core problems that have been identified from the first stage (the Empathise phase).
- The goal of this stage is to define a meaningful and actionable problem statement.
- A precise definition of problem statement will guide the team and kick-start the ideation process in the right direction.

Phase 3: Ideate

- The third component of design thinking process is the most interesting and perhaps, the most rigorous as well.
- In this stage, called Ideate, a design thinker is supposed to bring to the table as many ideas as possible.
- While brainstorming for ideas, it is not checked whether the idea is possible, feasible, and viable or not.
- The only task of thinkers is to think of as many ideas as possible for them.

Phase 4: Prototype:

- Prototyping in the fourth stage of design thinking.

- It involves taking the best ideas from brainstorming sessions to a higher degree of resolution and detail by building a model or prototyping the solution.
- A model or prototype is not necessarily an object or building; it is some sort of solution or “deliverable.”

For example, it could be anything from a strategy, an app, story, or

experience, to a business model that functions as a demonstration of the idea.

- A prototype can be a paper model, storyboard, wireframe or a cardboard box.
- It facilitates quick visualization and identification of the best solution among several concepts.
- It is a way to convey an idea quickly.

Phase 5: Test:

- Testing is part of an iterative phase of the design thinking process that provides design thinker with feedback based on rigorous testing of the prototype.
- The purpose of testing is to learn what works, and what doesn't and then iterate.
- Iterative in the sense going back to the prototype and modifying it based on feedback from the users.
- Testing ensures that team come back to the essential core of design thinking – empathizing with users and designing for their needs.
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Applications of Design Thinking

Design thinking is used extensively in the area of healthcare and wellness, agriculture, environmental sustainability, food security, sports, education and research to business, management, to name a few. Design thinking has helped in the digital space, contributed to the development of physical products, spurred social innovation projects and much more. Design thinking can be applied to community settings (ex. economic revitalization, social services) and education (ex. student learning, learning experiences).

An example would be to take a gadget and ask, “How do I make this work, better, faster, smoother, and reduce waste and inefficiency?” But it can go beyond product design. You can scale it up and apply it to many things.

Design thinking is a way to get businesspeople to think like designers and designers to think like businesspeople. But design thinking is more than that.

The basic principle of design thinking is that innovation can be disciplined. Innovation is not an elusive entity that only a few genius people can experience. It is, rather, a practice that can be systematically approached by a set of practical and meticulous tools, methodologies, and frameworks.

Design thinking helps you learn the following:

- How to optimize the ability to innovate?
- How to develop a variety of concepts, products, services, processes, etc. for end users?
- How to leverage the diverse ideas of innovation?
- How to convert useful data, individual insights and vague ideas into feasible reality?
- How to connect with the customers and end-users by targeting their actual requirements?
- How to use the different tools used by designers in their profession for solving your customers' problems?

Design thinking helps in Optimization of capabilities, Feasibility and viability analysis, and Addressing the needs of customers. Design thinking helps people of every profession to arrive at solutions in a planned, organized, and systematic manner.

Business uses of Design Thinking

Design thinking helps in businesses by optimizing the process of product creation, marketing, and renewal of contracts. All these processes require a companywide focus on the customer and hence, design thinking helps in these processes immensely. Design thinking helps the design thinkers to develop deep empathy for their

customers and to create solutions that match their needs exactly. The solutions are not delivered just for the sake of technology.

The value that design thinking has brought to organizations is innovation that has disrupted their markets, enhanced brands in terms of recognition, sales and performance, and business adaptation. This value has been achieved by innovating in the areas of product development (ex. Proctor & Gamble's Swiffer), service development (ex. AARP's LifeTuner.org), business models, and business strategy.

Design thinking - Education Sector

One domain in which design thinking finds a huge application is the education sector. These days, educators are using design thinking extensively to improve the quality of education in schools, especially in the kindergarten classes. Design thinking has been used in schools to upgrade the curriculum, or to redesign the student spaces or to make the entire experience of the students worthwhile.

Design thinking helps the school administrators to solve institution-based problems, helps in making the curriculum more valuable to the students and to stimulate design thinking skills in students as well.

By taking feedback from students on their requirements, goals and challenges they are facing in the classroom. By working on their feedback, the instructors can come up with solutions to address their challenges.

For example, Michael Schurr, a 2nd grade instructor from New York, realized that his students would be more comfortable with bulletin boards lowered. He also found the idea of creating comfortable semi-private space for working students as it provided them space to study. As a result, his students became more engaged and felt free to move.

REDLab Group

Stanford University's Graduate School of Education has a REDLab group which conducts research on how to apply design thinking in kindergarten, 1st to 12th grade, secondary and post-secondary academic settings. The REDLab group has teamed up with Hasso Plattner Institute to create Hasso Plattner Design Thinking Research Program, which works for applying rigorous academic methods to understand the reasons behind the success and failure of design thinking programs.

Tools at Schools

The Tools at Schools group once conducted an activity with the 8th grade students in The School at Columbia University. The activity included redesigning a locker, chair or desk to suit the requirements of 21st century students. Design thinking was applied in this activity and the results were displayed in International Contemporary Furniture Fair. Design thinking also helps the pupils to learn how to work collaboratively in a team.

<https://www.oliviergregoire.com/Tools-at-schools>

Design Thinking - IT Industry

The IT industry makes a lot of products that require trials and proof of concepts. The industry needs to empathize with its users and not simply deploy technologies. IT is not only about technology or products, but also its processes. The developers, analysts, consultants, and managers have to brainstorm on possible ideas for solving the problems of the clients. This is where design thinking helps a lot.

The IT industry is now working mostly on Agile methodology, which is a technique of project management.

Agile is an iterative or incremental method of managing development and design. Each day, the engineers have a set of tasks at hand, which they are required to complete in a day or two. Moreover, the complex problems shot by the customers to the engineers are required to be solved quickly. In such a scenario, design thinking helps to solve the problems and address the exact needs of the customer. In a Waterfall model, which is different than the Agile model, the process starts with requirements gathering, followed by creating the visual designs and then occurs the development of solution. Testing is the last step in the model. Looking closely, it is similar to the process of design thinking.



Figure 1.11 Agile Methodology

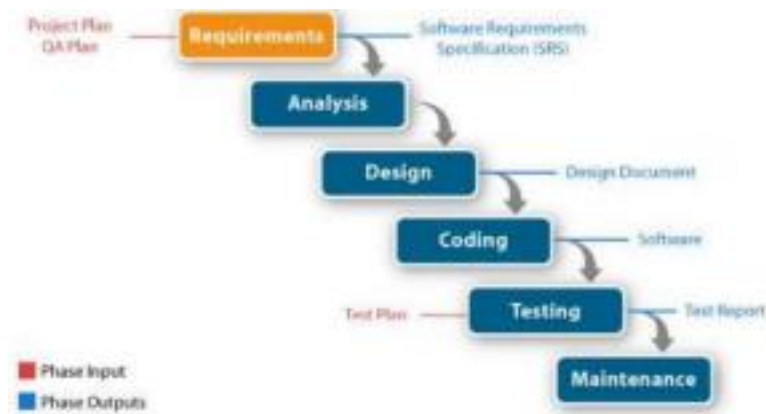


Figure 1.12 Design Thinking in IT industry

Design Thinking - Healthcare Industry

Design thinking can certainly help the healthcare experts to come up with solutions that plague the healthcare system. The basic question for every healthcare expert is ‘how to provide quality healthcare at low and affordable prices to everyone?’

Venice Family Clinic in Venice, California has come up with innovative solutions to the challenge of opening a low cost children’s clinic to serve the low-income families. Problems of finance, transportation, and language barriers had to be solved. And all this had to be done at low cost for the poor kids. Fostering good health along with profits was a challenge, as it does not sound sustainable. Using design thinking, the inefficiencies in the system and the perennial crises were addressed. This was followed by mind-blowing innovations to serve the children.

<https://www.careinnovations.org/resources/using-design-thinking-to-prescribe-food-as-medicine/>

Design Thinking - Social Innovation

Social issues are always complex problems, which have too many strands attached to them. There are too many aspects of a problem, that many a times get ignored by the social innovators. However, solving a social problem requires taking into consideration all the facts and figures, and then working on them. This is the reason why

design thinking is being widely used for social innovation. As a result, non-profits have begun to use design thinking extensively these days.

IDEO Example

In 2008, Bill and Melinda Gates Foundation asked IDEO to codify the process of design thinking. The foundation wanted the code to be used by grassroots level NGOs to solve problems for small farmers in the developing nations. A team from IDEO worked for months in association with the International Centre for Research on Women, Heifer International, and International Development Enterprise to get insights into the process of designing new products.

<https://designthinking.ideo.com/blog/human-centered-design-for-small-holder-farmers>

Naandi Foundation’s Example

In the city of Hyderabad in India, Naandi Foundation’s community water treatment plant provides safe water. However, villagers still use free water which is not safe for consumption and makes people sick. The villagers use unsafe water

not because of affordability issues or accessibility issues, but because of the flaws in the overall design of the system.

The problem is that the women folk cannot bring the heavy containers of water back to their homes from the plant. Such problems can be solved by design thinking process. A trolley-like structure is made to carry and drag the heavy water cans easily on wheels. A simple yet impactful solution.