A Comparative Study of Awareness regarding Design Thinking amongst In-service Teachers of Mumbai District.

Submitted In partial fulfilment of Requirements
For the Degree Of M. ED.

By
Heena Bhatia
Roll No: 18030220001

Guided by
Dr. Pooja Birwatkar

K. J. Somaiya college of Education

Somaiya Vidyavihar University
Vidyavihar, Mumbai - 400 077
2020 - 2022

Somaiya Vidyavihar University

K. J. Somaiya College of Education

Certificate

This is to certify that the project report on dissertation entitled **"A Comparative Study of Awareness regarding Design Thinking amongst In-service Teachers of Mumbai District"** is bonafide record of the dissertation work done by **Ms. Heena Bhatia** in the year 20**20 - 22** under the guidance of Dr. Pooja Birwatkar Department of _____ in partial fulfilment of requirement for the Masters in Education degree in K.J. Somaiya College of Education of Somaiya Vidyavihar University.

_____ _____

Guide / Co-Guide Head of the Department/ACP

_____

Principal/Director

Date:

Place: Mumbai-77

Somaiya Vidyavihar University

K. J. Somaiya College of Education

Certificate of Approval of Examiners

This is to certify that the project report on dissertation entitled **"A Comparative Study of Awareness regarding Design Thinking amongst In-service Teachers of Mumbai District"** is bonafide record of the dissertation work done by **Ms. Heena Bhatia** in partial fulfilment of requirement for the Masters in Education degree in K.J. Somaiya College of Education of Somaiya Vidyavihar University.

_____ _____

External Examiner /Expert Internal Examiner/ Guide

Date:

Place: Mumbai-77

Somaiya Vidyavihar University

K. J. Somaiya College of Education

DECLARATION

I declare that this written report submission represents the work done based on my and / or others' ideas with adequately cited and referenced the original source. I also declare that I have adhered to all principles of academic honesty and integrity as I have not misinterpreted or fabricated or falsified any idea/data/fact/source/original work/ matter in my submission.

I understand that any violation of the above will be cause for disciplinary action by the college and may evoke the penal action from the sources which have not been properly cited or from whom proper permission is not sought.

Signature of the Student

Name of the Student

Roll No.

Date:

Place: Mumbai-77

Abstract

Design Thinking is a technique that helps us understand the user and the types of difficulties and challenges that the user has, after which this approach aims to redefine the problems and provide alternative solutions that were not obvious in our original level of comprehension.

When it comes to integrating design thinking into the curriculum, it simply allows students to focus on learning from their failures. It assists students and instructors in solving real-world challenges. The design thinking process begins with empathy, which helps students comprehend the needs of individuals or groups of individuals. The designers collaborate to identify the problem in this way. Once the problem has been discovered, the team will work together to solve it.

Many research on Design Thinking have been performed, indicating that it is a very emerging method that may be applied into educational institutions.
During the literature study, it was discovered that relatively few studies on Design Thinking had been undertaken in India. This suggests that few instructors in India are familiar with Design Thinking.

This research seeks to raise knowledge of Design Thinking among instructors, with the goal of transforming the educational process through the use of Design Thinking.

Classrooms and schools throughout the world encounter design difficulties every day, from teacher feedback systems to everyday routines. The challenges that educators encounter, regardless of where they fall on the scale, are true, nuanced, and diverse. As a result, they require new perspectives, tools, and strategies. Design thinking is one of them.

It has been demonstrated that instilling a design thinking viewpoint in teachers is an excellent technique for fostering meaningful collaboration while also enhancing teachers' capacity to teach creativity, critical thinking, and interpersonal skills.

To integrate and execute Design Thinking in the classroom, instructors must first understand what Design Thinking is and what the process, tools, and strategies for implementing Design Thinking are.

When educators adopt a design thinking mindset, they may encourage a culture of cooperation, development, and experimentation.

Contents

Chapter 1 - Introduction

1.1 Introduction

After India gained independence there were many efforts made to spread education. The government aimed to provide free and compulsory education to all children up to the age of 14 but this aim could not be achieved yet. Government announced a National Policy on Education in 1986 to go with the changing socioeconomic needs of the country. Some of the main features of the policy were universalization of primary education, vocationalization of secondary education and specialization of higher education.

While the general education was being planned out, India saw an increase in the literacy rate and enrolment ratio over the years. Besides general education technical education also played a very important role. The government established many training institutions in various different fields. While the literacy rates of the men was quite high then the women, women education was given a priority in the National Policy on Education.

The scheme of non-formal education was planned as an experimental basis from the 6th plan and it became a regular thing starting from the 7th plan. This scheme was planned for those children who could not attend schools due to poverty and who were preoccupied with the other work to make amendments for their living.

Education for all became important. Free Education of the children of the age group 6 to 14 years became a fundamental right. There were many efforts made and policies formed to spread education to all regions and all sections of the society.

Education in India has seen many rapid changes in the past decade. Education system has had a major shift and things like online learning and blended learning has become a norm in almost all levels of education.

Chalkboards were replaced by smart boards. This was technology driven as all the materials needed we're ready to download and were accessible at any time of the day. This attracted many students and also led to the decrease in the dropout rates.

At first, online education was given importance by the private sector. This resolved the issue of providing education to the masses and it reduced the problem of delivering quality education. Online education started gaining more importance during the COVID-19 pandemic and it soon became the main platform for education of the people of the country.

One of the significant changes due to the technology was the availability of content. There are many apps and websites which provide free content for the learners of all the fields. This was taken advantage of by the top educational institutions as they use the online medium to provide courses to the learners.

Slowly and steadily the technology has been so advanced that experiential and project based learning has become a part of the curriculum.

1.2 Educational Policies and their evolving educational structure

- **NEP 1986**

A new national education policy was introduced by the government in 1986 which called for *"special emphasis on removal of disparities and to equalise educational opportunity"*.

The policy focused on child-centred education and introduced Operation Blackboard to improve the quality of primary schools nationwide.

According to NEP 1986 " *The child-centred approach commended in NPE attempts to build the academic programme and school activities around the child. The Policy 'also recognises that unattractive school environment, unsatisfactory condition of buildings and insufficiency of instructional material function as demotivating factors for children and their parents*."

These changes have had a very big impact on the Indian education system and thus have been incorporated in the New Education Policy 2020.

As a result, the Policy calls for a concerted effort to enhance elementary schools and provide support services. A number of proposals have been made to ensure the inclusion of females and children from Scheduled Castes and Scheduled Tribes households, as well as other educationally backward groups and minorities.

- **Programme of Action 1992**

In India, education policies are aimed towards reorganising the organisation of education at various levels. Following the NPE 1986, the POA 1992 attempted to achieve long-term objectives such as universal enrolment and retention.

Early children development and care were prioritised under POA 1992. It is advocated that Anganwadi workers received specialised training (through training centres) in order to increase the quality of early childhood education.

Another goal of the POA was to meet the UEE objectives. It proposed several improvements and revisions, such as the 'Non-Formal Education' programme for pupils who are unable to attend full-time schools.

This policy, more than any other in India's history, prioritised the growth of scientific knowledge and foresaw the need for 21st-century education. It aspired to make a significant difference in our educational system and they focused on the factors that will decide our developing country's growth.

- **National Curriculum Framework 2005**

NCF 2005 focuses on Learning without Burden in order to make learning a pleasurable experience and to move away from textbooks as a basis for testing and to relieve children of stress.

- To foster an individual's feeling of self-reliance and dignity, which will serve as the foundation for social relationships and foster a sense of nonviolence and oneness across society.
- To encourage universal enrolment and retention up to the age of 14, and to build a child-centred strategy.
- The curriculum is able to reinforce our national identity and help the next generation to reassess by instilling a sense of oneness, democracy, and togetherness in the pupils.
- In terms of the social backdrop, the NCF 2005 has guaranteed that all people, regardless of caste, creed, religion, or sex, are treated equally.

NCF 2005 also says that "*Constructive learning has to be part of the curriculum. Situations and opportunities have to be created for students to provide students with challenges, encourage creativity and active participation for students. Students have to be encouraged to interact with peers, teachers and older people which would open up many more rich learning opportunities.*"

- **National Education Policy 2020**

NEP 2020 has suggested major changes which will be a turning point of education in India. Some of the very important policy announcements of NEP 2020 include:

- Blended learning in the classes
- Focus on experiential learning
- Focus on vocational education from class 6
- Flexible learning at all levels of education
- Multiple entry and exit points from the degree courses
- Use of online education and technology in a balanced manner to improve the quality of education.

In the recent times where technology is advancing the new education policy 2020 also talks about the importance of artificial intelligence in education. The government here focused on imparting necessary technical knowledge so that artificial intelligence can be incorporated in the curriculum.

The policy also focuses on a multidisciplinary and multilingual approach, skill development, and digital learning ramp-up in general. The goal is to educate students for real-world difficulties by encouraging value-based education.

The National Education Policy 2020 curriculum puts design thinking as an optional subject, at par with existing theory-based courses. Learners would be exposed to fundamentals of design and the design-thinking process before Class 9 and hands-on workshops for 160 hours (annually) would be conducted between Class 9 and Class 12. Modules on design thinking and innovation will be available and workbooks are to be implemented in CBSE schools from 2022.

NEP 2020 states that from a very young age school children will be exposed to skills such as coding, digital literacy and computational thinking so that subjects such as artificial intelligence and design thinking can be incorporated. NEP 2020 also aims to use AI powered technology to fulfil all its goals. AI powered technology will help in recording the data about the students and also help in the teaching learning process which will aim at the holistic development of the student.

1.3 What is Design Thinking ?

Design Thinking is a process which helps us to understand the user and the kind of problems and challenges faced by the user, post which this process seeks to redefine the problems and suggests alternative solutions which were not very apparent in our initial level of understanding. It is a way of thinking and

working together which uses a solution-based approach to solve the problems of the users.

In order to apply the Design Thinking process, it is very important to have an interest in understanding the user as it is for whom the products and services are being designed. By understanding the user, we can develop empathy for them, and this process will help us to develop questioning skills which can help us to face the problems that are ill-defined or unknown. This further leads to identification of problems and redefining them in human centric ways where through this process, some solutions to tackle these problems are suggested by brain-storming sessions or adopting a hands-on approach in prototyping and testing.

Design thinking is "human-centred," which means it bases its decisions on evidence of how customers (people) interact with a product or service, rather than how someone else or an organization believes they will interact with it.

An Institute of Design at Stanford describes Design Thinking as a five-stage process.

Stage 1: Empathize

This stage allows us to gain an empathetic understanding of the problem we are trying to solve. Empathy is essential to the design thinking process because it helps us to put our personal worldview aside and obtain a true understanding of consumers and their requirements.

Stage 2: Define

Here, we organize the information that is gathered from the first empathetic stage. We then synthesize and evaluate our findings to establish the team's primary issues. Problem statements are the names given to these definitions.

Stage 3: Ideate

Because we have a strong foundation of information from the prior two phases, we can begin to "think outside the box," seek for new perspectives on the problem, and come up with creative solutions to the problem statement we've constructed. Brainstorming sessions are especially effective in this situation.

Stage 4: Prototype

This is the start of a trial period. The goal is to find the best solution for each problem encountered.

Stage 5: Testing

The prototypes are thoroughly tested by evaluators. Despite the fact that this is the end of the process, design thinking is iterative: teams frequently utilize the outcomes to reframe one or more challenges. As a result, we may go back to earlier phases to make more iterations, changes, and improvements – or to rule out alternate solutions.

It should be kept in mind that these steps are the different modes which contribute to the Design Thinking process, so rather than viewing these steps as sequential we can keep in mind that it is possible to go back to any of these steps at any point of time.

Design Thinking is a user – centred approach to solve problems. This approach focuses on understanding the user and it's problems. It empathises with the user to seek a deeper knowledge into the problems faced by the user and suggests a solution based approach to solve the problems.

This approach helps understand the user in a better sense and helps develop empathy with the user. Questioning has a major role to play when it comes to design thinking, as it helps question the problems faced by the user, questions the assumptions and the implications of the solutions that are suggested. This way it helps to tackle the problems which are unknown or unclear and helps us understand those problems in more deeper and in a human – centric way.

Design thinking is a process which encourages thinking outside the box by brainstorming ways on suggesting innovative solutions to the problems faced. It helps break the pattern of our already ingrained mind.

When talking about the integration of design thinking in curriculum, it simply helps the students to focus on learning from their mistakes. It helps the students and the teachers to solve real world problems. The process of design thinking begins with empathy which helps the students to understand the needs of the people or a group of people. Through this the designers work together to identify the problem. Once the problem is identified, the work collaboratively and come together to brainstorm ideas and suggest solutions for the same.

1.4 Evolution of Design thinking over the years

The concept of design thinking dates back to 50's and 60s as it struggled to survive in the changing environment during those times. As the times were

changing new approaches to solving complex problems were emerging which lead to people changing their ways of thinking and solving their problems.

Especially in the 1960s, where the people struggled to understand the process of design thinking, how it should be implemented and what would be its implications.

Herbert A. Simon (Computer scientist and Nobel Prize laureate) was the first person to identify Design as a way of thinking. He had very important contributions to design thinking, a major part of which forms a core of the design thinking process. Some of his work also focused on the development of Artificial Intelligence and how it could be incorporated as a means to improve thinking and productivity.

The concept of design thinking gained more insight in the 1980s as many tests and developments were made. A professor in the United Kingdom, conducted some tests related t0 problem solving, on the students and found out that there were two types of problem solvers, one who were problem focused problem solvers and the other who were solution focused problem solvers who generated a large number of solutions and eliminated those which did not seem to work out.

These solution focused problem solvers were found to be more fit for the design thinking process.

As the process of design thinking was emerging various experts of different fields used this approach in their respective areas and thus it became a subject of focus.

In 1991, IDEO was formed which was one of the companies who incorporated design thinking and made it a mainstream subject.
Slowly over the years design thinking made it way and in 2005 Design Thinking soon made its way into education as it was being taught in some universities.

At present, design thinking is still an emerging concept as it is becoming popular among people. There are people who are still unaware of this concept but companies and universities who have started incorporating this concept have gained many new insights into their own field and have made a pathway and encourage the others to teach and incorporate the same.

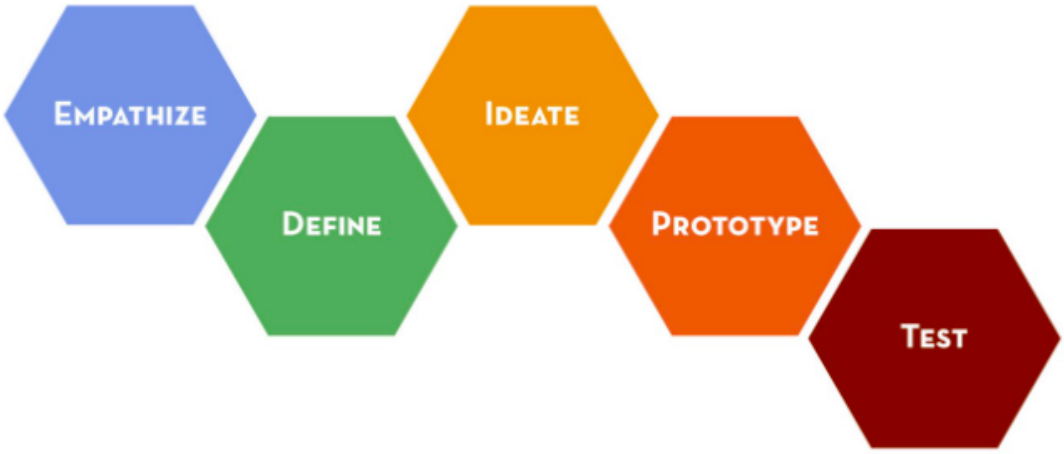
Design thinking is a concept which was caught up late in India. An article highlighted the differences in the practices of design thinking in India and the reason of the delay.

According to the article, India is typified by scarcity. Here people almost struggle to find growth over the years in securing jobs, in college admissions, lack of opportunities and chances etc. As the basis of Design thinking is Empathy and Experimentation, it is difficult for people to do that as they struggle to survive themselves.

As the Design Thinking is still new and emerging, more and more people are taking interest towards it and trying ways to incorporate it in their respective fields.

1.5 Models of Design Thinking

→ **Model by Hasso Plattner Institute of Design at Stanford**



According to the model above, there are five stages of Design Thinking: Define, Ideate, Prototype, and Test: Empathize, Define, Ideate, Prototype, and Test.

1. Empathize

Within the context of the design challenge, the Empathize mode refers to the effort you do to understand people. There appears to be a lot of work being done in partnership with the users at this time. Observing what individuals do and how they interact with their surroundings can provide insight into their thoughts and feelings. The surprising insights produced by a successful discussion can sometimes surprise both the designer and the topic.

2. Define

It's all about bringing clarity and emphasis to the design area in the Define phase of the design process. The Define mode's purpose is to create a meaningful and actionable issue statement, also known as a point-of-view.
The Define mode is all about creating sense. It leads to point-of-view (POV), which is the problem's explicit statement. The Define mode also aims to synthesise our results and turn them into insights.
The final point of view must incorporate all three parts – user, need, and insight – into an actionable issue statement that will guide the rest of the design process.

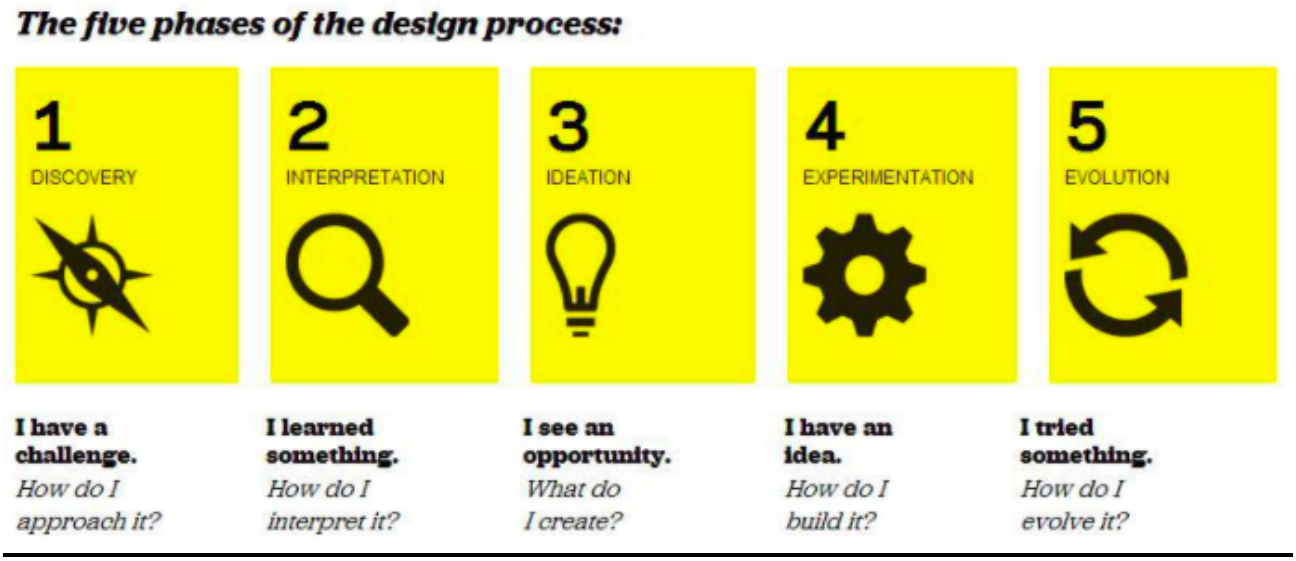
3. Ideate
Ideate is the design process mode in which focus on idea generation is done. Ideation is utilised to move from recognising challenges to developing solutions for the users.
Ideation is about striving for the greatest possible range of ideas from which to choose, especially early in a design process, rather than merely choosing a single, best option.

4. Prototype
The Prototype mode is used to create artefacts in an iterative fashion to answer questions that help you get closer to your ultimate solution. You should design low-resolution prototypes that are simple and inexpensive to make (think minutes and cents) yet can elicit meaningful input from consumers and colleagues in the early stages.
A prototype is something with which a user can interact. A wall of post-it notes, a homemade gadget, a role-playing game, or even a storyboard.

5. Test
When you're in Test mode, you're looking for feedback on the prototypes you've made. Show them to your users for another chance to develop empathy for the individuals you're developing for.

In an ideal world, you'd be able to test in the context of the user's daily life. Create a scenario at a location that is representative to the real situation. Pay attention to what they have to say about it, as well as the questions they have.

→ **Model by IDEO, International Design and Consulting Firm**



1. Discovery

The collecting of data is the focus of the discovery phase. The question is, where can you find this motivation? One of the design thinking ideas is to begin with people, often known as customers, and strive to understand their requirements and difficulties. There is a growing amount of evidence that going outside of your organisation and to the requirements of your customers can generate more inventive ideas than looking only internally. The key to success is meeting the needs of customers.

2. Interpretation

After you've gathered the information, you'll need to make sense of it and attempt to comprehend it. The interpretation step's goal is to describe a clear and compelling opportunity you've identified in the market.

You should be able to explain obvious potential for creative business model designs at the end of your interpretation process. It's generally easier to express these as "breakthrough questions," as I call them. Questions for breakthroughs should be both tough and encouraging. At first, they should appear impossible to answer.

3. Ideation

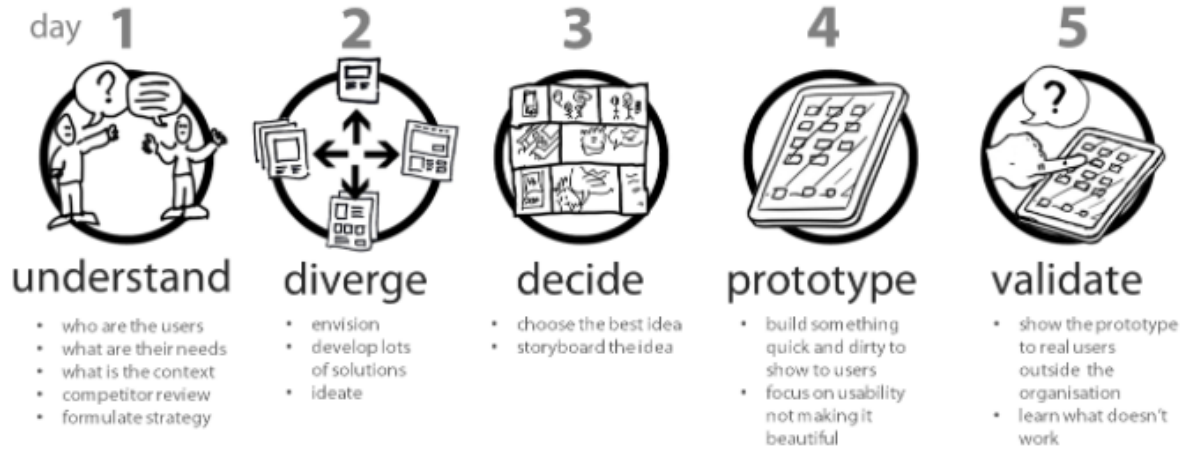
Ideation is the process of generating ideas about how to take advantage of the opportunities you've identified. Consider the value each concept brings to your customers, your organisation, and your environment. If you get all three right, you've probably come up with a good idea that has the potential to become a profitable company model.

4. Experimentation

Experimentation takes place more on the level of how to make this one idea work rather than which business model alternative is the most effective.

5. Evolution
Evolution is about analysing the results of your experiments and the lessons you've learned. Evolution can be viewed as the beginning of the next cycle of discovery, interpretation, ideation, and experimentation: new ideas are gained through experimentation and discovery of what works and what does not, which must then be understood. Fine-tuning or re-designing the business model and re-experimentation are carried out based on the interpretation ideation.

→ **Model by Google Design Sprints (II)**



1. Understand
To be understood, you must first understand. The first stage of the Sprint entails gathering the right people to discuss corporate objectives, technological capabilities, and user requirements. The purpose of this stage is to deepen your knowledge of the product/project.
The purpose of this stage is to deepen your knowledge of the product/project.

2. Diverge/Sketch
It is possible to achieve anything. During the Design Sprint, participants should look at all possible solutions to their user concerns.

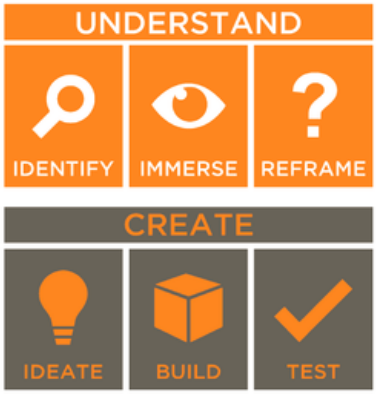
3. Decide
It's time to go over all of the possibilities and vote on the best ones as a group.

4. Prototype
Prototyping and testing without a lot of time, money, or resources is possible.

5. Validate

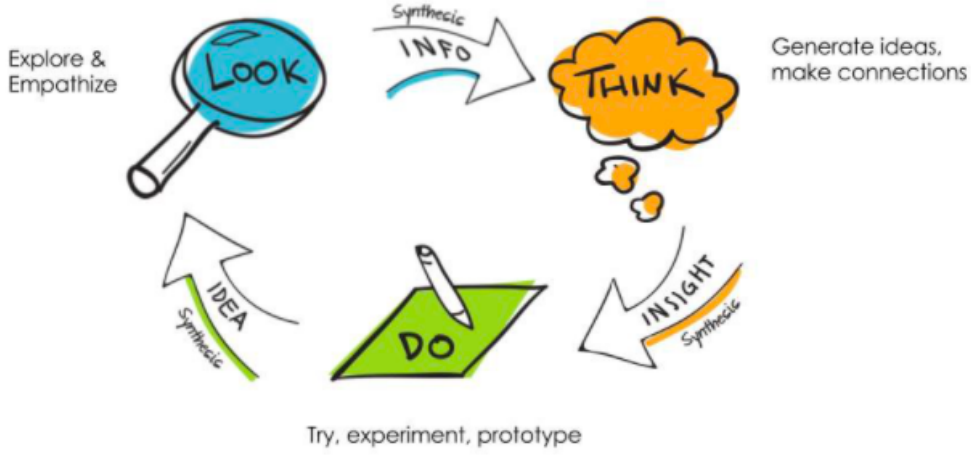
Allows the team to not just learn new approaches to design, but also to hear each other's opinions on their own creations.

→ **Design for America, Student Social Innovation Firm**

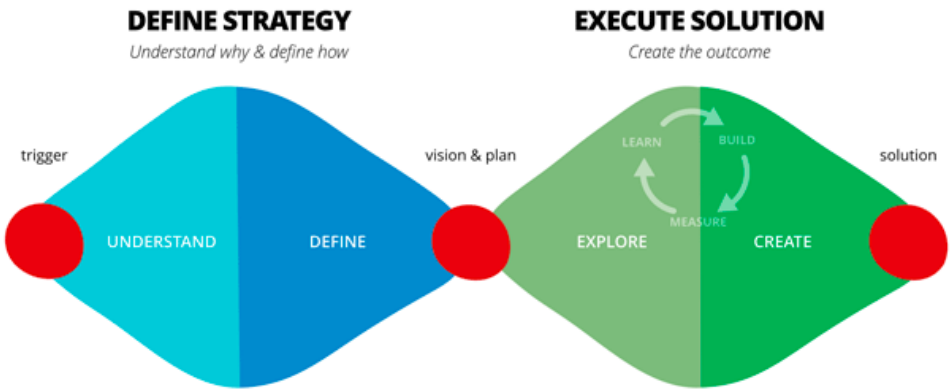


The first step is gaining a thorough understanding of the target market, followed by the creation of the product.
Identifying the issues and wants of the customers, absorbing and evaluating their true demands, and reframing their concerns and needs to be more precise are all part of the understanding stage.
The creation step entails brainstorming solutions and alternatives, constructing the listed ideas, and lastly testing the chosen concept, reframing, and returning to ideation if necessary.

→ **Model no 2 by SAP**



→ **Model by Design Council UK, *Charity for Strategic Design***



1. Discover

The project starts with an idea or inspiration, which is usually the result of some sort of exploration procedure.
A basic concept or inspiration is usually the beginning point for most initiatives. As a team opens a solution area and investigates a wide variety of ideas and opportunities, the discovery phase is marked by diverse thinking.

2. Define

An idea's interpretation and selection
The examination and selection of concepts are part of this step. The outcomes of the discovery stage are analysed, developed, and elaborated, and solution ideas are prototyped and pitched.

3. Develop

The idea is developed into a specific product or experience during the development stage.
The project is authorised (for example, by a case firm) for further development during the Develop stage, and one or more of the concepts are implemented.

4. Deliver

The final idea, final testing, manufacturing, and launch are all part of the Deliver stage of the Double Diamond model. The product or service created during the Discovery stage to answer a specific need has now been completed.
Final testing, approval, launch, and assessment are all important actions at this stage.

1.6 NEP 2020 on Design Thinking

Design Thinking was first conceptualised in 2010 by IIT Bombay as a way to sift the rote learning methods and memorisation to experiential learning methods.

It can be a little difficult to introduce Design Thinking in schools as it involves evaluation of the learning process, portfolios or exhibits created by the students. Each student comes up with unique process as the traditional method would involve the production of identical answers. Thus, it involves the learners and the teachers to be active throughout the process.

According to NEP 2020, "Concerted curricular and pedagogical initiatives, including the introduction of contemporary subjects such as Artificial Intelligence, Design Thinking, Holistic Health, Organic Living, Environmental Education, Global Citizenship Education (GCED), etc. at relevant stages will be undertaken to develop these various important skills in students at all levels."

NEP 2020 curriculum puts Design thinking at par with the theory based courses offering it as an optional subject. Before class 9 learners are introduced to the basics of design and design thinking and along with it they are also provided a hands on workshop of a duration of 160 hours between class 9 and class 12.

The committee drafting the curriculum is trying to obtain feedback from the students, teachers and other experts on the content of the design thinking process. A teacher guiding manual is also developed to aid the teachers in the training process.

State boards and individual schools are permitted to adapt and modify the curriculum as per their local needs as one of the main key focus is to protect the culture and local language of the economy.

1.7 Significance of Design Thinking

- The inclusion of design thinking in teaching curricula encourages students to be goal-oriented and to generate ideas that would not have arisen otherwise.
- Design thinking assists students in broadening their horizons and formulating many sustainable and successful solutions.
- It encourages kids to be creative and imaginative in all of their endeavours. As a result, students are better prepared to tackle issues on a broader scale.
- Design thinking not only improves students' design and art talents, but also enables them to think creatively and independently.
- Design thinking produces the next generation of innovators and industry experts who are able to think outside the box and create ideas rather than follow them.
- Students gain much-needed skills for the actual world by combining design principles with daily information.

- Design thinking broadens pupils' mental boundaries while also assisting them in developing their self-confidence and personalities.
- Design thinking encourages students to empathise with users - Empathy is at the heart of Design Thinking; it enables students to have a better knowledge of the user's behaviour and wants.
- Collaboration, teamwork, problem-solving, risk-taking, creative thinking, and adaptability are all highly valued talents in 21st-century organisations. Design thinking aids in the instillation of these abilities in students beginning in the classroom, easing the transfer to professional settings.
- Design thinking aids in the definition of challenges as well as the development of actionable questions and solutions. It allows users to produce and visualise ideas via the use of creative activities.
- It also emphasises creativity, which aids in the generation of numerous ideas. Students learn to be open-minded through problem-solving methods that include describing challenges, prototyping solutions, and repeating the process until they arrive at real answers. It provides a neutral environment for reviewing and testing their solutions.
- Skills in design thinking are not just essential in 21st-century companies; they are also required in a variety of graduate and undergraduate programmes. Design thinking abilities are required in many academic subjects, including engineering, business, computer science, liberal arts, and all design courses.

1.8 Rationale of the study

Human Beings may not know what the future contains, but as educators, it must be ensured that the children are prepared to thrive in it. In the future, the world will be very different; many new jobs will emerge, and many present ones will vanish. Because we can't anticipate which occupations will lead to greater success, we can only do our best to prepare our students for the difficulties of the future.

Educators must empower students and mould them to meet market demands. They shouldn't only focus on teaching certain skills to students; rather, they should focus on their overall growth. Learners will be able to deal with obstacles if they develop flexibility to change and inventiveness. It will also remove a learner's restriction of just being good at one thing.

Design Thinking is a systematic way for resolving complicated challenges. The main concept is to comprehend the issue and devise the greatest potential

remedy. The process is then repeated multiple times in order to arrive at the best possible result. Design Thinking is creative, and each person has their own style and ideas.

Design thinking is a human-centred approach to solving real-world issues that provides educators with the essential steps to identify the best answer, i.e., preparing students for the future. When educators lead initiatives toward innovation, Design Thinking is at its finest. It is a mentality of being able to use an innovative strategy in a step-by-step manner to build a better future for learners.

NEP 2020 has also focused on the use of AI and Design Thinking in achieving its goal of a multilingual education and a holistic development.

Through the introduction of Design Thinking in education, it plans to transform the educational process.

Design thinking is a way of thinking. It is the belief that everyone can contribute to a better desired future, as well as a method for taking action when confronted with a challenging task. In education, that type of positivity is desperately required.

Every day, from teacher feedback systems to daily routines, classrooms and schools throughout the world face design issues. The obstacles that educators face, no matter where they lie on the scale, are genuine, complicated, and varied. As a result, they necessitate fresh viewpoints, tools, and techniques. One of them is design thinking.

Instilling a design thinking perspective in teachers has been shown to be an effective strategy to foster meaningful collaboration while also increasing teachers' capacity to teach creativity, critical thinking, and interpersonal skills.

Therefore to integrate and implement Design Thinking into the classrooms, the teachers should be well versed and aware of what exactly is Design Thinking and what exactly is the process, tools and methods of using design thinking.

When instructors embrace a design thinking perspective, they may foster a culture of collaboration, development, and experimentation. A mix of design experience, professional development, and continuous support helps teachers acquire a design thinking mentality.

Because there have been few studies on Design Thinking in India, the first step in taking advantage of the benefits of DT and integrating it into the curriculum would be for instructors to be aware of the phrase Design Thinking.

Teachers will only be able to plan to include DT into their teaching learning process or pedagogy once they are aware of it.

Therefore, this research aims to compare the teachers awareness about design thinking with various different aspects.

1.9 Title of the study

"A Comparative Study of Awareness regarding Design Thinking amongst In-service Teachers of Mumbai District"

1.9.1 Statement of the problem

Comparative Analysis of Teachers with respect to certain variables with respect to how much they are aware about Design Thinking.

1.9.2 Aim of the study

To compare the extent of awareness regarding Design Thinking amongst teachers with regard to school level, school board, gender, teaching experience and subjects taught.

1.9.3 Objectives of the study

To compare th**e** awareness regarding Design Thinking amongst teachers with regard to the following:

- school level (primary and secondary;
- school board;(SSC, ICSE, CBSE,IGCSE and IB)
- teaching experience(from 6 months onwards);
- subjects taught.

1.9.4 Hypothesis / Research Question

R1 - What is teachers' awareness of Design Thinking?
R2 - How do teachers' awareness of design thinking differ depending on their teaching experience, school level, school board, and subjects taught?

1.9.5 Variables of the study

Awareness regarding Design Thinking

1.9.6 Conceptual and Operational Definition of the term Design Thinking

Conceptual Definition

Design thinking:

According to Oxford "Design Thinking is a method for practical, creative resolution of problems. It is a form of solution-based thinking with the intent of producing a constructive future result."

Operational Definitions

Design thinking- in this study design thinking awareness will be evaluated in terms of responses to the questionnaire developed by the researcher which would have questions related to concept of design thinking, its components and usage as well significance in education

1.9.7 Limitations and Delimitations of the study

The study is delimited in terms of:

- Sample of teacher only from Mumbai district
- Tools of research in English
- Tools made by researcher
- Only variables like school level (primary and secondary), school board;(SSC, ICSE, CBSE,IGCSE and IB)gender; teaching experience(from 6 months onwards) and subjects taught are considered

1.9.8 Scope of the study

Design Thinking is a human-centred approach to problem-solving that focuses on human needs. In other terms, it is a method or a process for leveraging creativity and innovation to find answers to real-world issues. It's a five-step procedure for coming up with significant solutions to real-world situations.

Design thinking has various benefits for various different stakeholders.

- **Benefits of Design Thinking for students:**
  - Students learn to have creative faith in their ability to adapt and respond to new and tough circumstances.
  - Students who learn design thinking abilities may recognise and produce unique and creative solutions to challenges as they arise.

- Students mature into hopeful, sympathetic, and hardworking members of society capable of addressing complicated future issues. real-world issues.
- Design Thinking teaches students the principles of problem-solving.
- Students may apply and combine their design thinking abilities to tackle real-world situations.
- Students are taught the most in-demand skills, such as problem-solving, decision-making, and creative thinking, by industry professionals.
- Instead than only obtaining certifications, students focus learning as part of the design thinking course.
- Students gain from studying the most up-to-date skills and become future-ready for their ideal employment.

❖ **Benefits of Design Thinking for teachers:**

- Instilling in instructors a design thinking mentality. This has been shown to be an effective strategy to foster meaningful cooperation while also increasing instructors' capacity to teach creativity, critical thinking, and interpersonal skills.
- Using co-design as a kind of professional development to satisfy these demands in a way that could reach every teacher in a state via a combination of face-to-face and online workshops.
- Maintaining these relationships throughout time involves providing online places for instructors to exchange and repurpose information while remaining linked to real-world institutions and activities.

❖ **Benefits of Design Thinking in Curriculum Development:**

- The core areas of reading, history, social studies, science, and mathematics are all included in the curriculum. Experts split subjects into tiny, digestible bundles for each curriculum area, which are then taught according to a predefined lesson plan. From the first day of class to university education, this framework dominates much of the world's instruction.
- Rather than a formal study of curricular information, the focus is on the student and actual situations.
- Design thinking is very effective in enhancing the three qualities of "character," "skills," and "learning to learn."
- Because its heart is a we-culture of reciprocal production, design thinking provides a framework for multidisciplinary cooperation. Diversity is not only allowed, but encouraged as a necessary component of the process.

1.10 Conclusion

Design Thinking is a technique that helps us understand the user and the types of difficulties and challenges that the user has, after which this approach aims to redefine the problems and provide alternative solutions that were not obvious in our original level of comprehension. Thus, understanding about design thinking and researching it is becoming increasingly necessary in order to enhance teaching and learning approaches.

Chapter 1 included background information on design thinking, its history over time, scope, relevance, and certain models, as well as many motivations for doing this study. Chapter 2 continues with a survey of related literature.

Chapter 2 - Review of related literature

2.1 Need for literature Review

A formal literature review is an in-depth, evidence-based investigation of a topic. A literature review is a critical evaluation of the present collective knowledge on a subject. There are various reasons for writing one, and these will determine the length and style of the review. A literature review is more than a list of everything that has been published; it is an informed, personal, yet unbiased summary of the information, offering a balanced view that incorporates opposing results and contradictions, as well as established and current thought.

Conducting a literature review is critical for generating research ideas, consolidating what is already known about a topic, and identifying knowledge gaps and how the study might add to better understanding.

A literature review's goal is to summarise and synthesise current knowledge in a topic without making any new contributions. They assist the researcher in even turning the wheels of the study topic because they are based on prior information. Overpowering current results requires a deep understanding of what is wrong with them in detail.

2.2 Studies conducted in India

Mukherjee D, Hasan K. K, Shah M, Reheman M, Nasrin M, Karim R (2022) conducted a study on Evolution of classrooms in primary education using a design thinking approach. The finest place to learn and interact with pupils is in the classroom. The innovative educational strategies examine children's physical and psychological well-being and affect their activities in order to distinguish the impact of the classroom environment from other teaching-learning techniques. The current situation forces educators to rethink the classroom's role as a learning environment. This study is focused on the evaluation of a child's creative thinking abilities through focus group talks with 144 primary school pupils from Bangladesh's Rajshahi area. Significant improvements in the teacher's capacity to interact with students, as well as the student's attitude toward learning, are revealed in the study. Furthermore, when children were encouraged to learn in the classroom, they demonstrated higher involvement, and classrooms changed to create a better environment for young learners by adopting fast iterations and an agile approach to design thinking.

Bhandari, A. (2022) conducted a study on Design Thinking: from Bibliometric Analysis to Content Analysis, Current Research Trends, and Future Research Directions. The goal of this research was to undertake a systematic evaluation of the literature, bibliometric analysis, and content analysis of design thinking (DT). A thorough literature study was conducted to identify the research publications. Following the reading, any article titles, abstracts, keywords, and full-length articles that did not pertain to design thinking were eliminated. The papers were read more critically in the second stage. Finally, the selected papers were subjected to bibliometric and content analysis. The bibliometric coupling between the selected article and the most recent article was used to conduct the content analysis. Here, an ambiguous interpretation of research article publishing progress, research diversification on subject and subtheme of 16 clusters, current research trends, and five prospective research directions on design thinking were discovered.

C.Parikha, K.Madduletya, CJMeadowsb (2020) conducted a study on Improving creative ability of base of pyramid (BOP) students in India.
A research was conducted to see how Base of Pyramid (BOP) youngsters in India could be prepared for creativity. Seventy fifth-grade BOP students from two Mumbai municipal schools participated in the quasi-experiment. Design Thinking instruction was delivered to the training group students during two action research cycles, whereas the control group got no intervention. The current study presents data from the second action research cycle, during which the training group was taught divergent thinking abilities, which are necessary for Design Thinking. The data was gathered using classroom worksheets and intervention test sheets, with the goal of determining how ideation occurred during creative work and if divergent thinking abilities learned as part of Design Thinking training aided in the improvement of creative capacity. The Torrance Test of Creative Thinking (TTCT) inspired intervention test sheets revealed a substantial difference in creative ability indicator scores between students who received intervention and students who did not. A substantial difference was also discovered for figural tasks but not for verbal activities. The current study also shown how a mixed-method analysis may be beneficial in collecting socio-cultural variables, quantifying relevant idea production, and determining the necessity for various creative confidence-building tactics. Language was recognised as a barrier to concept expression among BOP kids for whom the language of teaching at school differed from the language spoken at home, according to the study.

Dulababu, Tapal. (2019) conducted a study on Design Thinking: Indispensable for Indian Business Schools.
The business climate is more complicated and volatile. Every day, the level of complexity rises, and decision-makers are confronted with a great deal of

uncertainty. The skill set provided to management graduates is insufficient for them to deal with the dangerous unpredictable scenarios. This research paper argues for the inclusion of design thinking in business education curricula in order to improve the performance of graduates in business organisations, as well as the author's assertion that effective design thinking teaching leads to innovativeness in business schools on the one hand and brand building on the other.

Bhatnagar, Tigmanshu & Badke-Schaub, Petra. (2017) conducted a study on Design Thinking and Creative Problem Solving for Undergraduate Engineering Education in India: The Need and Relevance.
At the Indian Institute of Technology, Delhi, a one-week research was undertaken under the guise of a "pop-up class" to assess the necessity and relevance of design thinking and creative problem solving from the perspective of engineering students (IITD). The study included 30 third-year Bachelor students from a variety of technical disciplines (chemical, mechanical, civil, production engineering, textile, electrical engineering, and engineering physics). They learned about the subject through a combination of academic lectures, case discussions, and practical workshops. Students completed a questionnaire at the end of the study to evaluate the workshop, which was then analysed. Design Thinking and Creative Problem Solving are important in their schooling, according to all respondents. Engineers must know how to tackle real-world issues in a meaningful way in order to promote innovation, according to 90 percent of those who replied positively to the notion of include such a course in their curriculum. Although the majority of students thought that it should become a required course, many were concerned that it would lose its value if it were graded like other courses.

2.3 Studies conducted abroad

McLaughlin JE, Chen E, Lake D, Guo W, Skywark ER, Chernik A, (2022) conducted a study on Design thinking teaching and learning in higher education: Experiences across four universities. A rising body of research shows that college graduates are increasingly expected to have the problem-finding, problem-framing, and problem-solving abilities needed to face difficult real-world situations. Understanding how DT is taught in higher education may assist institutions in promoting learning and aligning their educational programmes with professional, personal, and civic requirements. In this study, 19 teachers and 196 students from 23 courses at four institutions completed surveys. Three DT activities and five outcomes characterised DT teaching and learning. Gender and race/ethnicity did not show statistically significant differences, but study discipline and student type (i.e., graduate versus undergraduate) did. These findings can be utilised to help higher education

institutions and fields construct classroom-based DT teaching-learning methodologies.

Noel L, Liu T (2022) conducted a study on Using Design Thinking to Create a New Education Paradigm for Elementary Level Children for Higher Student Engagement and Success. This research aims to analyse and synthesise current literature as well as conduct preliminary analyses to aid in the creation of design thinking education interventions at the primary school level, which might lead to a paradigm shift in education. While it has been widely demonstrated that design education can support traditional education models in the delivery of skills such as math and language arts, this paper aims to show that, in addition to meeting traditional education demands, design thinking principles in children's education, such as empathy, collaboration and facilitation, human-centeredness, and creativity through iterations of prototyping and testing, can provide a source of inspiration.

Guaman-Quintanilla, S., Everaert, P., Chiluiza, K. (2022) conducted a study on the Impact of design thinking in higher education: a multi-actor perspective on problem solving and creativity. Using a constructivist learning framework, this study analyses the effects of design thinking on students' problem-solving and creativity skills. A course was assessed in which students used design thinking to analyse real-world problems and provide solutions. 910 first-year university students from various fields participated in the study, which was conducted in teams throughout the semester. After completing a short case study, data was collected three times over the semester: at the start (t0), in the middle (t1), and at the end (t2). Each time, three separate actors appraised each student's problem-solving and creativity skills: the students themselves (self-evaluation), one classmate, and one teacher (facilitator). The goal of this study is to see if the three actors' problem-solving and creativity skills improved as they progressed through the training. This within-subjects design's data was analysed using a repeated measures ANOVA. According to the three rates, the results reveal a considerable development in students' problem-solving and creativity skills. Effect sizes were estimated as well; in every case, the effect sizes from t0 to t1 were bigger than the effect sizes from t1 to t2. The study's multi-actor viewpoint, use of trustworthy and valid metrics, and large sample size give solid evidence that design thinking should be included into higher education curricula to promote critical abilities such as problem solving and creativity, which are in great demand in the labour market.

G. Sarah (2021) studied Design Thinking in Practice: Research Methodology. Nielsen Norman Group conducted a long-term research project to understand design thinking in practice. The research project included 3 studies involving more than 1000 participants and took place from 2018 to 2020.

Through the research they found that although there may be no single, widely used definition of design thinking, there is unexpected unity in how people conceptualize design thinking. 62% of our research participants associated characteristic-related words with design thinking, and not only that — they tended to come up with the same words. This high proportion of vague "process" words suggests that most people know something about design thinking, but may not be able to articulate precisely what it entails.

Kijima R, Yoshihara M.Y and Maekawa M S (2021) conducted a study on Using design thinking to cultivate the next generation of female STEAM thinkers. Countries all around the world have battled to develop policies and methods in education to encourage more female youngsters to seek careers in science, technology, engineering, and mathematics (STEM) (STEM). In certain nations, this has resulted in a persistent and significant gender disparity in scientific and mathematics courses. This research uses a mixed-methods sequential explanatory design to investigate an educational intervention in Japan—specifically, a 3-day design thinking workshop—with the goal of changing female teenagers' perspectives of STEM issues. The workshops, which used a constructivist learning method, aimed to instil creative confidence, empathy, and global competency in young people. Female youngsters who took part in the workshop showed increased interest in engineering, greater creative confidence, more positive opinions of STEM, higher levels of empathy and pro-social characteristics, and a more diverse outlook on future prospects, according to the findings. We contend that this brief intervention had a significant impact on female teenagers' attitudes, self-images, and STEM perceptions.

Wrigley C, Mosely G and Tomitsch M conducted a study on Design Thinking Education: A comparison of Massive Open Online Courses. The purpose of this research is to examine the many types of design thinking MOOCs that are available to aid in the classroom instruction of design thinking. The what (material), how (higher education and evaluation), or why of design thinking as taught through Web - Based Training are all presented and analysed (MOOCs). Currently available design thinking MOOCs do not provide the same level of information and comprehension as an undergraduate or master's degree. Universities have the option of developing their own introductory design thinking MOOCs to showcase their degrees to prospective students.

Magistretti S, Dell'Era C, Verganti R, Bianchi M (2021) studied The contribution of Design Thinking to the R of R&D in technological innovation. This article examines how it is possible and desirable to apply Design Thinking to the research phase of the technological innovation process. How can Design Thinking support innovation, even when advanced breakthrough technologies are at stake, the market is distant, and product applications and specific user

needs have not been identified yet? To respond to this question, we investigate the research work of the design centre of a global electronics company that uses a design approach called Proxemics to envision future interactions between bodies (people), objects (technology), and spaces (context). Although Proxemics is consistent with and implements the human centeredness and experimentation principles of Design Thinking, results of this study show that its logics and tools are different from those used in Design Thinking in the D of R&D due to the more abstract nature of the tasks in the R of R&D.

Panke, S (2019) studied design thinking as a process and mindset for collaboratively finding solutions for wicked problems in a variety of educational settings.
Through a systematic literature review the article organizes case studies, reports, theoretical reflections, and other scholarly work to enhance our understanding of the purposes, contexts, benefits, limitations, affordances, constraints, effects and outcomes of design thinking in education.

McLaughlin, J.E., Wolcott, M., Hubbard, D. (2019) conducted a study on A qualitative review of the design thinking framework in health professions education. A problem-solving approach called design thinking has been applied to improve patient experiences, clinical results, and medical curriculum. The role of design thinking in health professions education was examined in this study. All of the papers were published after 2009 and varied in terms of setting, participants, and approach. Six studies focused on the early phases of design thinking, with activities such as lectures, small group talks, and workshops helping to encourage inspiration and ideation. Self-efficacy, perceptions, and solutions to a specific situation were all addressed in the studies. The findings raised important questions for health professions education, such as whether we should: 1) teach students design thinking as a skill-based tool to prepare them for problem solving in complex healthcare environments; and 2) use design thinking to develop, implement, and refine health professions curricula and educational programmes. Despite the obvious benefits of design thinking, there are still many unanswered problems in the field of health professions education.

Henriksen D, Richardson C, Mehta R, (2017) conducted a study on Design thinking: A creative approach to educational problems of practice, Thinking Skills and Creativity. The issues that educators encounter in their professional activity are many, complicated, and difficult to solve. These concerns vary from teaching and learning to social and community issues, classroom atmosphere, and a variety of other subjects. Such issues are complex, cross-disciplinary, and human-centred, and they rarely have easy or linear answers. A qualitative study

of a graduate teaching course focused on applying design thinking to creatively tackle educational practise difficulties was conducted. There was a discussion about theme takeaways that teachers had learned about and used design thinking techniques to solve educational practise difficulties. Design thinking abilities may give habits of thought that help instructors navigate creative problems, according to the implications.

Retna, Kala S. (2016) conducted a research on Thinking about "Design Thinking": A Study of Teacher Experiences.
Qualitative case study research was carried out in a school using teacher narratives. Data includes in-depth face-to-face interviews and participant observation. The findings show that teachers perceive that design thinking holds the potential for enhancing skills such as creativity, problem solving, communication and team work as well as empower students to develop empathy for others within and beyond the community. The research also highlighted several challenges such as inadequate resources, time constraints, fear of poor grades and the difficulty of shifting to a new way of teaching and learning that differs vastly from the traditional approach.

Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., Lee, H. Y., O'Brien, J., Flint, K., Roberts, A., Trott, J., Greene, D., Walton, G. M., & Dweck, C. S conducted a study on Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school (2016)
Although there are plenty of potential psychological therapies on the horizon, but no clear approach for scaling them up. The study formalises an approach for rethinking and customising early treatments based on design thinking. During the transition to high school, we put the methods to the test by comparing fixed and development mindsets. To guide intervention modifications for this group, qualitative inquiry and quick, iterative, randomised "A/B" studies were done with 3,000 participants. Following that, two experimental evaluations found that the revised growth mindset intervention improved 9th grade core-course GPA and reduced D/F GPAs for lower-achieving students when delivered via the Internet under routine conditions to 95 percent of students at 10 schools, and that it improved 9th grade core-course GPA and reduced D/F GPAs for lower-achieving students. Although the intervention might yet be improved, the current study serves as an example for how to enhance and scale therapies that target significant educational issues. It also explains how to teach a development mindset in a more effective way.

Razzouk, Rim & Shute, Valerie. (2012) conducted research on What Is Design Thinking and Why Is It Important.

The primary purpose of the article was to summarize and synthesize the research on design thinking to (a) better understand its characteristics and processes, as well as the differences between novice and expert design thinkers, and (b) apply the findings from the literature regarding the application of design thinking to our educational system. Several characteristics (e.g., visualization, creativity) that a good design thinker should possess have been identified from this article.

Melles G, Howard Z and Whiteside S T conducted a study on Teaching Design Thinking: Expanding Horizons in Design Education (2012). The phrase "design thinking" is increasingly being used to refer to the human-centred, "open" problem-solving process used by decision-makers to tackle real-world "wicked" situations. It has been claimed that design thinking in this sense can dramatically improve decision-making in a variety of sectors, including management, public health, and organisations in general. Many design and management institutions now offer design thinking courses, yet little is known about how well they are received by students. The lack of such courses gives an opportunity to create a design thinking curriculum that incorporates design thinking's own methods.

Badke-Schaub, Petra & Cardoso, Carlos. (2010) conducted A research on Design thinking: A paradigm on its way from dilution to meaninglessness? This paper is a critical view on design thinking, addressing both, the limitations of the traditional design thinking research as well as the contributions of the new approach, often referred to as design thinking movement. The traditional design thinking approach has meanwhile produced a broad research history but has to cope with its fragmented variety of empirical results, due to a lack of theoretical integration; the new view on design thinking as management strategy is not grounded on empirical studies or evaluations and suffers from an ambitious and too general concept. Both approaches could gain from each other in different ways.

2.4 Tying Researches together

The research carried out in India focuses on the notion of Design Thinking and how it might help schools and other stakeholders. It also contrasts the concepts of design thinking and critical thinking in the context of curriculum; however, the studies do not include the implementation process, as well as the actions and outcomes of the same.

In this case, we're talking about international research on Design Thinking. It focuses on Design Thinking in a variety of ways, including vocational elements, psychological aspects, curricular integration, influence on school children, and what exactly the phrase means. The research conducted in other countries covers all aspects of design thinking holistically, providing the researcher and readers with knowledge of the concept and how people perceive it, how its implementation can help educational institutions, how it can be integrated into the curriculum in various ways, and different perspectives of design thinking from various different aspects such as research and development, healthcare professional education, and so on. It also highlights the teachers' experiences with incorporating the Design Thinking method into the curriculum, as well as how it fosters teamwork and cooperation among instructors, enhancing the teachers' capacity to teach creative problem solving.

Based on the results of the literature review so far, we can conclude that Design Thinking is a new and innovative approach to solving real-world problems that has a variety of potential benefits. According to reviews, it has been shown to increase students' intellectual ability and problem-solving skills. Students' GPAs increase when the design thinking approach is integrated into the curriculum, according to studies; however, there are fewer studies conducted in India, indicating a lack of awareness of the terminology and concept of Design Thinking.

2.5 Conclusion

Based on a survey of the related literature, it is possible to conclude that Design Thinking has several advantages and may be implemented in a variety of ways for a variety of people. It may be used to increase performance not just in the education area, but also in other fields.

Various people play different roles when design thinking is used.

Another issue that could be determined was that this field had not been extensively researched by Indian researchers, and many studies on this topic had yet to be undertaken in India. Only after learning the detailed material will educators be able to come up with their own ideas for incorporating it into the curriculum.

Chapter 3 – Research Design

3.1 Introduction

A research design is a method or concept for carrying out the various duties of a research project. It is critical for the researcher to understand the study design in order to complete the assignment properly.

The goal of research design is to allow the researcher to stay on track and avoid deviating from the tasks at hand. It is a precise strategy for the research process as a whole.

Experiment design is a critical part of every research project. In terms of time, people, and money, a bad study design might bring the entire research endeavour to a halt.

The Importance of a Good Research design is important because it helps the different research activities go smoothly, resulting in research that is as efficient as possible, giving maximum knowledge with the least amount of work, time, and money. We also need a research design or plan in advance of data collection and analysis for our research project.

Design planning must be done with caution, as even a minor blunder might jeopardise the project's overall goal. The design aids the investigator in organising his thoughts, allowing him to spot and correct any flaws.

All of the components of a good study design work together in a logical manner. The theoretical and conceptual framework should be aligned with the study objectives and aims. Similarly, the data collection approach must be compatible with the study objectives, conceptual and theoretical framework, and data analysis process.

3.2 Design and Studies

The research design that will be used in this study is a comparative survey which aims to compare the In-service teachers knowledge about design thinking with respect to various variables such as gender, experiences, school level, school board, subjects taught etc.

3.3 Population and sample of the study

3.3.1 Sampling Technique:

The sampling technique used for this research is purposive sampling.

Purposeful sampling is a strategy used by researchers to find individuals who can offer in-depth and specific information on the topic being researched.

3.3.2 Sample

A sample, in research terminology, is a group of individuals, things, or products selected for assessment from a wider population. To guarantee that the findings from the study sample can be applied to the entire population, the sample should be representative of the population.

The sample for the present research comprises of In-service Teachers of Mumbai District.

3.3.3 Sample Size

The sample for the present study consists of a combination of around 100 In-service Teachers of the Mumbai District.

3.4 Tools of the research

The tool used for conducting this research is a questionnaire which contains 33 closed ended questions and 5 open ended questions.

The close ended questions required the respondents to choose the response from the given options and the open ended questions required the users to provide their thoughts and opinions on the question being asked.

The questionnaire includes questions to determine whether respondents are aware of Design Thinking, the challenges that students and teachers face when implementing Design Thinking, the qualities a Design Thinker should possess, the types of positive changes seen in teachers and students, and which subject has the most potential for Design Thinking to be used, among other things. The purpose of the survey is to learn how respondents feel about Design Thinking and how they have applied it in their classrooms, as well as whether or not they are aware of the phrase and how they plan to utilise it in the future.

3.5 Data collection procedure

The researcher created a questionnaire in order to collect data for the current investigation. The questionnaire was then given to professionals for review to ensure that the questions were accurate.

Data was collected in both an online and offline way, with a google form produced and handouts handed to certain instructors to complete the questionnaire, with minor revisions proposed by the experts.

Permission to distribute the questionnaire was obtained from the principals of the schools, and the questionnaire was distributed among the group of In-service teachers after ensuring the confidentiality of the information.

3.6 Data Analysis

The data was analysed in terms of frequency and percentage.

No. of Teachers with respect to school Board

ICSE	State Board	CBSE	IGCSE	College	Not Applicable
10	50 (48 SSC & 2 HSC)	36	3	1	2

No. of Teachers with respect to school Board and Teaching Experience

	0-5 years	5-10 years	10-15 years	15-20 years	20-25 years	>25 years
ICSE	3	1	4	2	-	-
State Board	11	9	11	10	4	5
CBSE	4	18	9	3	-	2
IGCSE	1	1	1	-	-	-
College	-	1	-	-	-	-
Not Applicable	1	-	-	1	-	-

3.7 Conclusion

This chapter provides us with a thorough understanding of how the study was carried out. It explained what we meant by study design, why it was essential,

the sample, sample size, population, sampling strategy, tool used to conduct the research, and the procedure for collecting data.
This also gave us a clear picture of the type of study that was undertaken, as well as who the respondents were and where they came from. It also contains a statistical analysis, which covers the number of instructors per school board and teaching experience.

This chapter also paved the door for more data analysis in terms of analysing the responses to each question posed.

Chapter 4 – Data Analysis

4.1 Introduction

The practise of methodically applying statistical and/or logical approaches to describe and demonstrate, compress and recapitulate, and assess data is known as data analysis. While statistical approaches may be used in qualitative research, analysis is frequently an ongoing iterative process in which data is continually collected and processed virtually concurrently. The specific qualitative technique used and the data format influence the nature of the study.

The precise and proper interpretation of study findings is a critical component of guaranteeing data integrity. Incorrect statistical analyses distort scientific findings, confuse casual readers, and may harm public view of research. Integrity concerns are also significant in the study of non-statistical data.

During the data analysis process, three important things happen. The first is data organisation. Summarization and classification work together to make the second recognised approach for data reduction. It aids in the discovery of patterns and themes in data enabling simple identification and linkage. The third and final method is data analysis, which can be done top-down or bottom-up.

Every type of data has the unusual property of describing objects after being assigned a precise value. To make analysis helpful, these values must be organised, processed, and presented in a specific context. Data can take many formats; these are the most common.

Qualitative data is data that contains words and descriptions. Although this data may be observed, it is subjective and difficult to examine in study, especially for comparison. Quality data is anything that describes flavour, sensation, texture, or an opinion. This information is typically gathered through focus groups, personal interviews, or open-ended questions in surveys.

Quantitative data is any data that is expressed in numbers of numerical values. This form of data can be classified, grouped, measured, computed, or rated. For example, age, rank, cost, length, weight, scores, and so on. This category includes everything. You can show such data in graphical style, using charts, or by using statistical analysis tools.

Data categorical: It is information displayed in groups. A categorical data item, on the other hand, cannot belong to more than one group. A individual

answering to a survey by mentioning his living style, marital status, smoking habit, or drinking habit is an example of a categorical response.
Data analysis and qualitative data study differ from numerical data in that qualitative data consists of words, descriptions, images, objects, and occasionally symbols. Obtaining understanding from such complex information is a difficult process. As a result, it is commonly utilised for exploratory research and data analysis.

4.2 Analysis of Data

Data analysis is significant in research because it simplifies and improves data analysis. It assists researchers in clearly interpreting data so that they do not leave anything out that might help them develop insights from it.

Data analysis is a technique for studying and analysing large volumes of data. Research frequently entails sifting through mountains of data, which is becoming increasingly difficult for academics to manage with each passing minute.

As a result, understanding of data analysis is a great advantage for researchers in the contemporary period, making them more efficient and productive.

The data analysis process, includes acquiring all information, processing it, studying the data, and applying it to discover patterns and other insights.

Gathering Data Requirements: This includes realising on the need of gathering the data.

Data Gathering: It's time to gather data from your sources, guided by the specific needs. Case studies, surveys, interviews, questionnaires, direct observation, and focus groups are examples of sources.

Cleaning Data: Because not all of the data acquired will be valuable, it's time to clean it up. This is the procedure for removing white spaces, duplicate data, and fundamental mistakes. Data cleansing is required before submitting the information to be analysed.

Data Analysis: This is the stage at which we try to utilise data analysis software and other tools to assist you evaluate and comprehend the data and draw conclusions.

Data Interpretation: Now that the data is in hand it’s time to evaluate the data and choose the best next steps based on your findings.

Data visualisation includes organising the data in the form of c harts, graphs, maps, bullet points, and a variety of other ways that can be used. By allowing people to compare information and detect correlations, visualisation may help us get crucial insights.

4.3 Awareness of Teachers regarding Design Thinking

Are you aware about the concept of 'Design Thinking'?

This question aimed to see the teachers' awareness on the concept of Design Thinking. The respondents were expected to answer in yes or no. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.3.1 Awareness of In-service Teachers on Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**9 (19%)** (5 Primary, 4 Secondary)	-	**3 (8%)** (1 Primary, 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Primary)	**8 (17%)** (6 Primary, 2 College)	-	**17 (47%)** (11 Primary, 4 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**4 (40 %)** (Secondary)	**7 (15%)** (5 Primary, 2 Secondary)	-	**7 (19%)** (4 Primary, 2 Secondary & 1 College)	**1 (34%)** (Primary)	-
		> 15	**2 (20%)** (1 Secondary, 1 College)	**11 (23%)** (6 Primary, 5 Secondary)	**2 (100%)** (2 College)	**5 (14%)** (1 Primary, 2 Secondary, 2 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (2 Primary)	-	**1 (3%)** (Primary)	-	-
		5-10	-	**1 (2%)**	-	**1 (3%)**	-	-

				(1 College)		(Primary)		
		10-15	-	**4 (8%)** (2 Primary, 2 Secondary)	-	**2 (6%)** (2 Secondary)	-	-
		>15	-	**6 (12%)** (3 Primary, 3 Secondary)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- All 10 of ICSE teachers said yes to the question, with 30% having 0-5 years of teaching experience and teaching the primary section, 10% having 5-10 years of teaching experience and teaching the primary section again, 40% having 10-15 years of teaching experience and teaching the secondary level, and 20% having more than 15 years of teaching experience and teaching the secondary section and college.
- There were no ICSE instructors who were unfamiliar with the notion of design thinking.
- Around 73% of SSC instructors said yes to the question, while around 27% of teachers had never heard of Design Thinking before.
- 16 teachers from the elementary section and 13 teachers from the secondary section were among the 73% of teachers who knew about Design thinking.
- 7 elementary teachers, 2 secondary teachers, and 3 college instructors were among the 27% of teachers who were not aware of design thinking.
- When it came to the HSC board, all of the instructors indicated they were aware of the notion of design thinking, given the fact that they mostly seemed to have upto 15 years of expertise.
- In the CBSE board, around 89% of instructors were familiar with the notion of design thinking, whereas around 11% were not.
- With a combined experience of up to 15 years, all IGCSE board teachers were familiar with the phrase designing thinking.
- All the teachers who taught in college responded yes to the question asked.

4.4 Concept of Design Thinking

Where have you come across the concept of design thinking?

This question aimed to check the respondent's knowledge on the term Design Thinking. The respondents were expected to select one option out of the various

options provided. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.4.1 Knowledge of In-service Teachers on Design Thinking with regard to School Board, Teaching Experience and Teaching Level

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
I use it myself in Teaching-Learning	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (Primary)	**5 (10%)** (3 Primary, 2 Secondary)	-	**2 (6%)** (Primary)	**1 (33 %)** (University)	-
		5 – 10	-	**1 (2%)** (Primary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	**1 (33 %)** (Secondary)	-
		10 – 15	**1 (10%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**2 (6%)** (1 Secondary, 1 College)	-	-
		> 15	**1 (10%)** (College)	**4 (8%)** (3 Primary & 1 Secondary)	-	**1 (3%)** (primary)	-	-
My colleagues use it	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	-	-	-
		5-10	-	-	-	**1 (3%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	-	-	-
		>15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	**1 (3%)** (Secondary)	-	-
New Education Policy	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	-	-	-
		5-10	-	**2 (4%)** (Primary)	-	**5 (14%)** (4 Primary, 1 Secondary)	-	-

		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		>15		**5 (10%)** (3 Primary, 1 Secondary, 1 College)	-	**2 (6%)** (College)	-	-
From Seminars/ Conferences/ Workshops	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**2 (4%)** (Secondary)		**2 (6%)** (Secondary)	-	-
		5-10	**1 (10%)** (Secondary)	**2 (4%)** (1 Primary, 1 College)	-	**5 (14%)** (2 Primary, 2 Secondary, 1 College)	-	**1 (100%)** (College)
		10-15	-	**1 (2%)** (Primary)	-	**5 (14%)** (3 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**4 (8%)** (1 Primary, 2 Secondary & 1 College)	**1 (50%)** (College)	**1 (3%)** (Secondary)	-	-
From some researches	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (Primary)	-	-	-	-
		5-10	-	**4 (8%)** (3 Primary & 1 College)	-	**2 (6%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	-	-	-
		>15	-	**5 (10%)** (1 Primary, 2 Secondary and 2 College)	**1 (50%)** (college)	-	-	-

Following are the conclusions drawn from the table presented above:

- Design thinking is used by 40% of ICSE teachers in their own teaching and learning.
- With all of them having more than 10 years of teaching experience, 20% of ICSE instructors stated that they are aware of design thinking because of their colleagues who apply it in their teaching learning.
- From the New Education Policy, 10% of ICSE instructors are aware of design thinking.
- Approximately 20% of ICSE instructors learned about design thinking through seminars, conferences, or workshops.
- According to some studies, 10% of ICSE instructors are aware of design thinking, with all of them having at least 15 years of teaching experience.
- Around 27% of SSC instructors employ Design thinking in their own teaching-learning, with the majority of them having varying years of experience in the classroom.
- Approximately 8% of SSC instructors replied that their colleagues utilise design thinking in their teaching-learning, and that this is how they learned about design thinking.
- Due to the New Education Policy, about 19% of SSC instructors are aware of design thinking.
- Around 19 % of SSC teachers learned about design thinking through seminars, conferences, and workshops.
- According to certain data, around 31% of SSC teachers are familiar with the notion of design thinking.
- Around half of HSC instructors learned about design thinking through seminars, conferences, and workshops, while the other half learned about it through research.
- Around 27% of SSC instructors employ Design thinking in their own teaching-learning, with the majority of them having varying years of experience in the classroom.
- Approximately 8% of SSC instructors replied that their colleagues utilise design thinking in their teaching-learning, and that this is how they learned about design thinking.
- Due to the New Education Policy, about 19% of SSC instructors are aware of design thinking.
- Around 19 % of SSC teachers learned about design thinking through seminars, conferences, and workshops.
- According to certain data, around 31% of SSC teachers are familiar with the notion of design thinking.
- Around half of HSC instructors learned about design thinking through seminars, conferences, and workshops, while the other half learned about it through research.

4.5 Teachers' perception of the term Design thinking

What according to you is design thinking?

This question aimed to identify how teachers perceive design thinking. The respondents were expected to respond from the options given. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.5.1 Perception of In-service Teachers on Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Process	**Teaching Experience (in years)**	**0 – 5**	-	**1 (2%)** (Secondary)	-	-	-	-
		5 – 10	-	**2 (4%)** (1 Primary, 1 College)	-	-	-	-
		10 – 15	-	**5 (10%)** (4 primary & 1 Secondary)	-	-	-	-
		> 15	-	**3 (6%)** (2 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	-	-
Tool	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	-	-	-	-	-
		5-10	-	-	-	-	**1 (33%)** (Secondary)	-
		10-15	-	-	-	**2 (6%)** (Primary)	**1 (33%)** (Primary)	-
		>15	-	**1 (2%)** (Primary)	-	-	-	-
Technique	**Teaching Experience**	**0- 5**	**1 (10%)** (Primary)	**3 (6%)** (2 Primary	-	-	-	-

	(in years)			& 1 Secondary)				
		5-10	-	-	-	**1 (3%)** (Primary)	-	-
		10-15	**2 (20%)** (Secondary)	**1 (2%)** (Primary)	-	--	-	-
		>15	-	**4 (8%)** (2 Primary & 2 Secondary)	-	**1 (3%)** (Secondary)	-	-
Mindset	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		5-10	-	-	-	**1 (3%)** (Secondary)	-	-
		10-15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
		>15	-	-	-	-	-	-
All of the above-	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**6 (13%)** (4 Primary, 2 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	**1 (34%)** (University)	--
		5-10	**1 (10%)** (Secondary)	**7 (15%)** (5 Primary & 2 College)	-	**16 (44%)** (10 Primary, 4 Secondary & 2 College)	-	**1 (100%)** (College)
		10-15	**2 (20%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**7 (19%)** (2 Primary, 4 Secondary & 1 College)	-	-
		>15	**2 (20%)** (1 Secondary, 1 College)	**9 (19%)** (4 Primary, 3 Secondary & 2 College)	**2 (100%)** (College)	**3 (8%)** (1 Primary, 1 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- 10% of ICSE teachers think of Design Thinking as a tool, 30% of ICSE teachers think of Design Thinking as a technique, and 60% of ICSE teachers chose the option all of the above, which encompasses mindset, technique, tool, and process.
- Design thinking is viewed as a process by 22% of SSC teachers, a tool by 2%, a method by 16 percent, a mentality by 6%, and a mindset by 53 percent of SSC teachers who replied to the question with the option all of the above, which covers mindset, technique, tool, and process.
- The answer all of the above was selected by all of the HSC teachers in response to the inquiry, which encompasses mindset, technique, tool, and process.
- Design thinking is viewed as a process by 3% of CBSE teachers, a tool by 5%, a technique by 6%, a mindset by 6%, and a mindset by 7% of CBSE teachers. Overall, % of CBSE teachers chose the option all of the above, which encompasses mindset, technique, tool, and process.
- 66 % of IGCSE instructors consider Design Thinking to be a tool, and 34% of IGCSE teachers chose the option all of the above, which covers mindset, technique, tool, and process in response to the question.
- In response to the question, all of the professors at the college chose the option all of the above, which encompasses mindset, technique, tool, and process.

4.6 Rating knowledge on Design Thinking

How would you rate your knowledge about design thinking?

This question required the teachers to rate their knowledge on design thinking. They were expected to respond by selecting one option out of the various options provided to them. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.6.1 Rating the knowledge of In-service Teachers on Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
I have complete know-how about it	**Teaching Experience (in years)**	**0 – 5**	-	**1 (2%)** (Primary)	-	-		-
		5 – 10	-	-	-	**3 (8%)** (1 Primary, 1	-	-

						Secondary & 1 College)		
		10 – 15	-	**1 (2%)** (Primary)	-	**1 (3%)** (Secondary)	-	-
		> 15	**1 (10%)** (Secondary)	-	-	-	-	-
I partially know about it	**Teaching Experience (in years)**	**0- 5**	-	**4 (8%)** (1 Primary & 3 Secondary)	-	**1 (3%)** (Secondary)	**1 (33%)** (University)	-
		5-10	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	**8 (22%)** (5 Primary, 2 Secondary & 1 College)	**1 (33%)** (Secondary)	-
		10-15	**4 (40%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**4 (11%)** (3 Primary & 1 College)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (College)	**8 (17%)** (5 Primary & 3 Secondary)	**1 (50%)** (College)	**2 (6%)** (1 Primary & 1 Secondary)	-	-
I am just aware about the term	**Teaching Experience (in years)**	**0- 5**	**3 (30%)** (Primary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		5-10	-	**5 (10%)** (3 Primary & 2 College)	-	**7 (19%)** (5 Primary & 2 Secondary)	-	**1 (100%)** (College)
		10-15	-	**4 (8%)** (3 Primary & 1 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		>15		**4 (8%)** (1 Primary, 2 Secondary & 1 College)	**1 (50%)** (College)	**3 (8%)** (2 Secondary & 1 College)	-	-
I have no	**Teaching**	**0- 5**	-	**2**	-	-	-	-

awareness about what it is	**Experience (in years)**			**(4%)** (Primary)				
		5-10	-	**2 (4%)** (1 Primary & 1 College)	-	-	-	-
		10-15	-	**2 (4%)** (Primary)	-	**2 (6%)** (Secondary)	-	-
		>15	-	**5 (10%)** (3 Primary, 1 Secondary & 1 College)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- Around 10% of ICSE instructors have a complete understanding of design thinking, 60% of ICSE teachers have a partial understanding of the idea of Design Thinking, and 30% of ICSE teachers are just aware of the term. None of the ICSE instructors said they had no knowledge of Design Thinking.
- About 4% of SSC instructors have a thorough understanding of design thinking, 37% of SSC teachers are slightly aware of the word design thinking, 34% of SSC teachers are just aware of the term Design Thinking, and 22% of SSC teachers are completely unaware of the term Design Thinking.
- About half of HSC instructors are only partially familiar with the term Design Thinking, while the other half are only familiar with the term.
- 11% of CBSE teachers have a complete know-how about Design Thinking, about 42% of CBSE instructors are partially aware of the term Design Thinking, 41% are only aware of the term, and 6% have no knowledge what Design Thinking is.
- With varied years of teaching experience, all IGCSE teachers are only partially familiar with the phrase Design Thinking.
- Teachers at the **college** are only partially familiar with the phrase Design Thinking.

4.7 Using design thinking conventionally

According to you, where all can design, thinking be used to conventionally teach a topic?

This question required teachers to select the areas they think design thinking can be used to conventionally teach a topic. They were expected to respond by

selecting one option out of the various options provided to them. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.7.1 Comparison of In-service Teachers using Design Thinking conventionally with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Curriculum Designing	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**1 (2%)** (Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5 – 10	-	**2 (4%)** (Primary)	-	**1 (8%)** (Primary)	-	-
		10 – 15	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	-	-	-
		> 15	-	**5 (10%)** (3 Primary, 1 Secondary & 1 College)	-	-	-	-
Project work of students	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (Primary)	-	-	-	-
		5-10	-	**1 (2%)** (Primary)	-	**2 (6%)** (1 Secondary & 1 Primary)	-	-
		10-15	**1 (10%)** (Secondary)	-	-	-	-	-
		>15	-	**3 (6%)** (1 Primary & 2 Secondary)	-	-	-	-
Pedagogy	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	
		10-15	-	-	-	-	-	-
		>15	-	**1**	-	-	-	-

				(2%) (Secondary)				
Evaluation	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-	-	-	**1 (3%)** (Primary)	-	-
All of the above	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	**1 (10%)** (Secondary)	**6 (13%)** (3 Primary & 3 College)	-	**15 (42%)** (9 primary, 4 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**2 (20%)** (Secondary)	**7 (15%)** (5 Primary & 2 Secondary)	-	**9 (25%)** (4 Primary, 4 Secondary & 1 College)	**1 (34%)** (Primary)	-
		>15	**2 (20%)** (1 Secondary & 1 College)	**8 (17%)** (5 Primary, 2 Secondary & 1 College)	**2 (100%)** (College)	**4 (11%)** (3 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- 20% of ICSE teachers believe that Design Thinking can be applied in curriculum design, with 10% having less than 5 years of experience and 10% having with over 15 years of experience.
- Another 10% of ICSE instructors with up to 15 years of experience believe that design thinking can be integrated into students' project work, while 70% of ICSE teachers chose the option all of the above, which covers pedagogy and evaluation in addition to curriculum design and student project work.
- Design Thinking may be applied in curriculum design, according to 24 % of SSC instructors, all of whom had varied degrees of teaching experience. 14 % of SSC teachers believe that integrating Design Thinking into student project work can be done, 2% believe that Design Thinking can also be integrated into pedagogy, and 60% of SSC teachers

responded to the question with the option all of the above, which includes evaluation in addition to curriculum design, student project work, and pedagogy.

- All HSC teachers chose the option all of the above in response to the question, which covers curriculum design, student project work, pedagogy, and evaluation.
- Approximately 6 % of instructors having up to 5 years of teaching experience and 8 % having up to 10% of teaching experience, 14 % of CBSE teachers believe curriculum design may be integrated in design thinking. With up to 10 years of teaching experience, 6 % of CBSE instructors believe that students' project work may be incorporated in design thinking, and 3% believe that things can be evaluated using design thinking.
- In response to the question, 84% of CBSE instructors selected the option all of the above, which includes pedagogy as well as curriculum design, student project work, and evaluation.
- With varied levels of teaching experience, all IGCSE teachers answered to the question with the choice all of the above, which covers curriculum design, student project work, pedagogy, and evaluation.
- All of the professors at college answered to the question by selecting all of the above, which includes curriculum design, student project work, pedagogy, and assessment, and they all have at least 10 years of teaching experience.

4.8 Structuring curriculum around Design Thinking

Do you think the entire curriculum can be structured around design thinking?

This question required the teachers to given their input on whether the curriculum can be structured around Design Thinking. They were expected to respond in yes, no or may be. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.8.1 Comparison of In-service Teachers structuring the curriculum around Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience**	**0 – 5**	**2 (20%)** (Primary)	**4 (8%)** (3 Primary	-	**3 (8%)** (2 Primary &	-	-

	(in years)			& 1 Secondary)		1 Secondary)		
		5 – 10	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 College)	-	**6 (17%)** (2 Primary, 3 Secondary & 1 College)	-	**1 (100%)** (College)
		10 – 15	**2 (20%)** (Secondary)	**1 (2%)** (Primary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**8 (17%)** (4 Primary & 4 Secondary)	-	-	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (1 Primary & 2 Secondary)	-	-	-	-
		5-10	-	-	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	-	-	-	-	**1 (33%)** (Secondary)	-
		>15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
Maybe	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**4 (8%)** (1 Primary & 3 Secondary)	-	**1 (3%)** (Secondary)	**1 (33%)** (University)	-
		5-10	-	**5 (10%)** (3 Primary & 2 College)	-	**10 (28%)** (8 Primary, 1 Secondary & 1 College)	-	-
		10-15	**2 (20%)** (Secondary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**5 (14%)** (3 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**7 (15%)** (4 Primary,	**2 (100%**	**4 (11%)** (1 Primary, 2	-	-

				1 Secondary & 1 College)	) (College)	Secondary & 1 College)		

Following are the conclusions drawn from the table presented above:

- With varying degrees of teaching experience, almost 70% of ICSE instructors believe that the entire curriculum can be designed around design thinking. The remaining 30% of instructors chose the choice maybe because they are dubious whether or not the entire curriculum can be designed around design thinking.
- Around 35% of SSC teachers believe that the entire curriculum can be structured around design thinking, 10% believe that the entire curriculum cannot be planned around design thinking, and around 55% of SSC teachers are unsure whether the entire curriculum can be structured around design thinking or not because they responded to the question with the option maybe.
- Despite having more than 15 years of experience, all HSC instructors are uncertain if the entire curriculum can be designed around design thinking or not. They all answered to the question with the option maybe.
- 36% of CBSE teachers agree that the entire curriculum should be structured around design thinking, 6% said no to the question, and 58% said they are unsure whether the entire curriculum should be structured around design thinking or not because they responded to the question with the option maybe, despite the fact that they all have different levels of teaching experience.
- While 33% of IGCSE instructors answered "no" to the question, the remaining 67% are unsure if design thinking can be implemented across the curriculum or not since they responded to the question with the option "maybe," despite the fact that they all have various degrees of teaching experience.
- All of the professors at the college said yes, agreeing that design thinking can be used to build the whole curriculum.

4.9 Most favorable subjects for design thinking

Which subjects do you think are most favorable for design thinking?

This question asked respondents to give their thoughts on which areas they believe will be the most beneficial to incorporate design thinking into. They were expected to respond by selecting one option out of the various options provided to them. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Computer Science	**Teaching Experience (in years)**	**0 – 5**	-	**1 (2%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		5 – 10	-	**1 (2%)** (Primary)	-	**1 (3%)** (College)	-	-
		10 – 15	-	-	-	**1 (3%)** (Secondary)	-	-
		> 15	**1 (10%)** (College)	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
Science	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	-	**1 (33%)** (University)	-
		5-10	-	**4 (8%)** (3 Primary & 1 College)	-	**8 (22%)** (6 Primary, 1 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Secondary)	-	**1 (3%)** (Secondary)	-	-
		>15		**4 (8%)** (2 Primary & 2 Secondary)	**2 (100)** (College)	**2 (6%)** (1 Secondary & 1 College)	-	-
Social Studies	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (Primary)	-	**1 (3%)** (Secondary)	-	-
		5-10	-	-	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	-	-	**2 (6%)** (1 Primary & 1 College)	-	-

		>15	-	**1 (2%)** (Secondary)	-	-	-	-
Mathematics	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
		5-10	**1 (10%)** (Secondary)	-	-	**2 (6%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**2 (6%)** (Primary)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	-	-	-
Art	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	-	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	-	**3 (6%)** (Primary)	-	-	-	-
		>15	-	**7 (15%)** (4 Primary, 2 Secondary & 1 College)	-	-	-	-
Languages	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (2 Primary & 1 Secondary)	-	-	-	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**3 (6%)** (2 Primary & 1	-	**3 (8%)** (1 Primary & 2	-	-

				Secondary)		Secondary)		
		>15	-	**1 (2%)** (College)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- Computer science is the most favorable subject for design thinking, according to 10% of ICSE teachers with more than 15 years of teaching experience, science is the most favorable subject for design thinking according to 20% of ICSE teachers, according to 10% of ICSE teachers social studies is the most favorable subject for design thinking, and mathematics is the most favorable subject for design thinking, according to 50% of ICSE teachers with varying levels of teaching experience and the remaining 10% of ICSE teacher regard languages to be the most favorable subject for design thinking.
- Computer science is regarded as the most favorable subject for design thinking by 8% of SSC teachers, science is regarded as the most favorable subject by another 22% of SSC teachers, social studies is regarded as the most favorable subject by another 6% of SSC teachers, mathematics is regarded as the most favorable subject by 16 % of SSC teachers, art is regarded as the most favorable subject by 23 % of SSC teachers, and the remaining 22 % regard languages to the most favorable subject for design thinking.
- Science, according to all HSC instructors, is the best subject for design thinking.
- Computer science is regarded as the most favorable subject for design thinking by 9% of CBSE teachers, science is regarded as the most favorable subject for design thinking by 31% of CBSE teachers, social studies is regarded as the most favorable subject for design thinking by another 17% of CBSE teachers, mathematics is regarded as the most favorable subject for design thinking by 12% of CBSE teachers, and the same is true for art, and the remaining 22% regard languages to be the most favorable subject for design thinking.
- Science is seen as the most favorable subject by 66 % of IGCSE instructors, while mathematics is regarded as the most favorable subject by the remaining 34%.
- All of the teachers at college believe that science is the most favorable for design thinking.

4.10 Product – oriented Design Thinking

Do you think design thinking is product oriented?

This question required the teacher's opinion on design thinking being product oriented. They were expected to respond in yes, no, or unsure. The table given below indicates the responses of the in-service teachers with respect to each variable in percentage.

Table 4.10.1 Comparison of In-service Teachers on Design Thinking being Product-oriented with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (Primary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5 – 10	**1 (10%)** (Secondary)	**3 (6%)** (Primary)	-	**8 (22%)** (4 Primary, 2 Secondary & 2 College)	-	-
		10 – 15	**2 (20%)** (Secondary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**4 (11%)** (2 Primary, 1 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**3 (6%)** (1 Primary, 1 Secondary & 1 College)	**2 (100%)** (College)		-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (1 Primary & 2 Secondary)	-	**1 (3%)** (Secondary)	**1 (33%)** (University)	-
		5-10	-	**3 (6%)** (2 Primary & 1 College)	-	**4 (11%)** (2 Primary & 2 Secondary)	-	-

		10-15	**1 (10%)** (Secondary)	-	-	**1 (3%)** (Secondary)	-	-
		>15	-	**3 (6%)** (Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
Unsure	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**3 (6%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		5-10	-	**3 (6%)** (1 Primary & 2 College)	-	**6 (17%)** (5 Primary & 1 Secondary)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**6 (13%)** (5 Primary & 1 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**11 (23%)** (8 Primary, 2 Secondary & 1 College)	-	**3 (8%)** (2 Secondary & 1 College)	--	-

Following are the conclusions drawn from the table presented above:

- 70% of ICSE instructors believe Design Thinking is product-oriented, 10% disagree, and 20% are undecided.
- 32 % of SSC teachers agree that design thinking is product oriented, 18 % disagree, and % are unclear if design thinking is product oriented or not.
- All of the HSC teachers believe that design thinking is focused on the product.
- • Product centric design thinking is agreed with by 39 % of CBSE teachers, disagreed upon by 23 % of CBSE teachers, and undecided by 38 % of CBSE teachers.
- 33% of IGCSE instructors disagree that design thinking is product-oriented, while the remaining 67% are uncertain whether design thinking is product-oriented or not.
- At college, all of the instructors are unclear if design thinking is product-oriented or not.

4.11 Learner centered Design Thinking

Do you think design thinking is learner centered?

This question required the teacher's opinion on design thinking being learner centered. They were expected to respond in yes, no or may be. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.11.1 Comparison of In-service Teachers on Design Thinking being learner centred with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**9 (19%)** (6 Primary & 3 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**7 (15%)** (4 Primary & 3 College)	-	**16 (44%)** (11 Primary, 4 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**2 (20%)** (Secondary)	**8 (17%)** (5 Primary & 3 Secondary)	-	**6 (17%)** (2 Primary, 3 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**9 (19%)** (6 Primary, 1 Secondary & 2 College)	**2 (100%)** (College)	**4 (11%)** (3 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	**1 (3%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	-	-	-
		>15	-	**4 (8%)** (Secondary)	-	**1 (3%)** (Primary)	-	-
Unsure	**Teaching Experience**	**0- 5**	-	**2 (4%)** (1 Primary	-	-	-	-

	(in years)			& 1 Secondary)				
		5-10	-	**2 (4%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**4 (8%)** (3 Primary & 1 Secondary)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- 80% of ICSE instructors believe Design Thinking is learner-centred, 10% disagree, and 10% are undecided.
- 70 % of SSC teachers agree that design thinking is learner-centred, 10 % disagree, and 20 % are unclear if design thinking is learner-centred or not.
- All of the HSC teachers agree to design thinking being focused on the learner.
- learner centric design thinking is agreed with by 83 % of CBSE teachers, disagreed upon by 6 % of CBSE teachers, and undecided by 11 % of CBSE teachers.
- 66% of IGCSE instructors agree that design thinking is learner-centred, while the remaining 34 % are uncertain whether design thinking is learner-centred or not.
- At college, all of the instructors are agree to design thinking being learner-centred.

4.12 Design Thinking product having an outcome

Design thinking means a product has to have an outcome.

This question asked the teachers if design thinking implies that a product must have a result. They were expected to respond in yes, no, or can't say. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.12.1 Comparison of In-service Teachers on Design Thinking meaning a product must have an outcome with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (Primary)	**3 (6%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		5 – 10	**1 (10%)** (Secondary)	**6 (13%)** (4 Primary & 2 College)	-	**10 (28%)** (7 Primary, 2 Secondary & 1 College)	-	**1 (100%)** (College)
		10 – 15	**2 (20%)** (Secondary)	**4 (8%)** (Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		> 15	**1 (10%)** (College)	**6 (13%)** (5 Primary & 1 college)	**2 (100%)** (1 Secondary & 1 College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Secondary)	-	**1 (3%)** (Secondary)	-	-
		5-10	-	-	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		10-15	**1 (10%)** (Secondary)	-	-	**1 (3%)** (Secondary)	-	-
		>15	**1 (10%)** (Secondary)	**1 (2%)** (Secondary)	-	**1 (3%)** (Secondary)	-	-
Can't say	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**2 (4%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**1 (2%)** (College)	-	**3 (8%)** (3 Primary & 2 Secondary)	**1 (33%)** (Secondary)	-
		10-15	**1**	**4**	-	**5**	**1**	-

			(10%) (Secondary)	**(8%)** (1 Primary & 3 Secondary)		**(10%)** (2 Primary, 2 Secondary & 1 College)	**(34%)** (Primary)	
		>15	-	**2 (4%)** (1 Primary & 1 College)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- About 60% of ICSE instructors believe that a product must have an outcome, whereas 20% disagree and 20% are unsure about the question.
- About 40% of SSC teachers believe that design thinking has an outcome, 4% disagree, and 24% are unsure whether design thinking indicates that a product must have an outcome.
- All of the HSC professors believe that design thinking necessitates the creation of a product with a goal.
- Nearly half of CBSE teachers agree with the assertion provided to them, 20% disagree, and the remainder are unsure about the subject.
- With varied degrees of teaching experience, all of the IGCSE instructors are unsure whether design thinking means that a product must have a result.
- At the college, all of the instructors believe that design thinking means that a product must have a purpose.

4.13 Overburdened curriculums having a scope of including Design Thinking

Do you think overburdened curriculums have a scope of including design thinking?

This question inquired teachers if they thought overburdened curriculums could include Design Thinking. They were expected to respond in yes, no or can't say. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.13.1 Comparison of In-service Teachers on overburdened curriculums including Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**5 (10%)** (4 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	-	-
		5 – 10	**1 (10%)** (Secondary)	**7 (15%)** (4 Primary & 3 College)	-	**15 (41%)** (11 Primary, 2 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**2 (20%)** (Secondary)	**6 (13%)** (4 Primary & 2 Secondary)	-	**6 (13%)** (1 Primary, 4 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**9 (19%)** (3 Primary, 5 Secondary & 1 College)	**1 (50%)** (College)	**3 (8%)** (2 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	-	**1 (33%)** (University)	-
		5-10	-	-	-	**1 (3%)** (Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		>15	-	**1 (2%)** (Primary)	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-
Can't say	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	**3 (6%)** (1 Primary & 2 Secondary)	-	-
		5-10	-	**2 (4%)** (Primary)	-	**1 (3%)** (Secondary)	-	-

		10-15	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**2 (4%)** (Primary)	**1 (34%)** (Primary)	-
		>15	-	**7 (15%)** (5 Primary, 1 Secondary & 1 College)	**1 (50%)** (College)	-	-	-

Following are the conclusions drawn from the table presented above:

- Approximately 60% of ICSE teachers believed that overcrowded curricula have the potential to include design thinking, 20% disagreed, and 20% were unsure of the topic asked to them.
- Around % of SSC instructors believed that overburdened curricula have the potential to include design thinking, whereas 12% disagreed and 31% were unsure about the subject.
- Around half of HSC instructors believed that overcrowded curriculums have the potential to include design thinking, while the other half were unsure about the topic.
- Around 65% of CBSE teachers believed that overburdened curriculums have the potential to include design thinking, while 10% disagreed and 15% were unsure about the subject.
- Around 33% of IGCSE instructors thought that overcrowded curriculums have the potential to include design thinking, 33% disagreed, and 34% were unsure about the subject asked to them.
- All of the teachers at the college acknowledged that overcrowded curricula had the potential to include design thinking.

4.14 Design Thinking being experiential in Nature

Do you think design thinking is experiential in nature?

Teachers were asked to say yes or no to the topic of whether design thinking is experiential in nature. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.14.1 Comparison of In-service teachers thoughts on Design thinking being experiential in nature with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**

Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**4 (8%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**8 (17%)** (5 Primary & 3 College)	-	**17 (35%)** (10 Primary, 5 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**4 (40%)** (Secondary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**9 (19%)** (4 Primary, 4 Secondary & 1 College)	**1 (34%)** (Primary)	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**15 (31%)** (8 Primary, 5 Secondary & 2 College)	**2 (100%)** (1 Secondary & 1 College)	**4 (8%)** (3 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Secondary)	-	-	-	-
		5-10	-	**1 (2%)** (Primary)	-	**3 (8%)** (Primary)	-	-
		10-15	-	**1 (2%)** (Primary)	-	-	-	-
		>15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**3 (8%)** (Primary)	-	-

Following are the conclusions drawn from the table presented above:

- All ICSE instructors, with varying levels of teaching experience, agreed that design thinking is an experiential process.
- 90 % of SSC instructors agreed that Design Thinking is an experiential process, whereas the remaining 10% disagreed.
- All HSC instructors, with varying levels of teaching experience, agreed that design thinking is an experiential process.
- 70 % of CBSE instructors agreed that Design Thinking is experiential in nature, while the remaining 16 % disagreed.

- All of IGCSE teachers with varying levels of teaching experience agreed to the statement that design thinking is experiential in nature.
- All of the professors of college with teaching experience upto 10 years agreed to the statement that design thinking is experiential in nature.

4.15 Design Thinking being used for developing skills

Can design thinking be used for developing skills like problem solving?

Teachers were asked to say yes or no to the topic of whether design thinking can be used in developing skills like problem solving. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.15.1 Comparison of In-service teachers thoughts on Design thinking being used in developing skills with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**11 (23%)** (7 Primary & 4 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**18 (50%)** (11 Primary, 5 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**4 (40%)** (Secondary)	**11 (23%)** (8 Primary & 3 Secondary)	-	**9 (25%)** (4 Primary, 4 Secondary & 1 College)	**1 (33%)** (Primary)	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**17 (35%)** (9 Primary, 6 Secondary & 2 College)	**2 (100%)** (1 Secondary & 1 College)	**4 (11%)** (3 Secondary & 1 College)	-	-
No	**Teaching Experience**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-

	(in years)	**10-15**	-	-	-	-	-	-
		>15	-	-	-	**1 (3%)** (Primary)	-	-

Following are the conclusions drawn from the table presented above:

- All responders from the ICSE, SSC, and HSC boards believe that Design Thinking may be utilized to improve problem-solving skills. The teachers all have different levels of teaching experience.
- 97% of CBSE instructors agree that design thinking can be utilized to help students learn problem-solving abilities, while the remaining 3% disagree.
- All IGCSE and college respondents believe that incorporating design thinking into problem-solving skills can help develop problem-solving skills.
- None of the ICSE, SSC, HSC, IGCSE, or college respondents disagreed with the statement provided to them.

4.16 Design Thinking having a future in education

Do you think design thinking has a future in education?

Teachers were asked to say yes or no to the topic of whether design thinking can have a future in education. The tables given below indicate the responses of the in-service teachers with respect to each variable in percentage.

Table 4.16.1 Comparison of In-service teachers thoughts on Design thinking having a future in education with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**11 (23%)** (7 Primary & 4 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**18 (50%)** (11 Primary, 5 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 –	**4**	**11**	-	**9**	**1**	

		15	**(40%)** (Secondary)	**(23%)** (8 Primary & 3 Secondary)		**(25%)** (4 Primary, 4 Secondary & 1 College)	**(34%)** (Primary)	
		> 15	**2 (20%)** (1 Secondary & 1 College)	**17 (35%)** (9 Primary, 6 Secondary & 2 College)	**2 (100%)** (1 Secondary & 1 College)	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-	-	-	-	-	-

Following are the conclusions drawn from the table presented above:

- With varied degrees of teaching experience, all respondents from all boards, i.e., ICSE, SSC, HSC, CBSE, IGCSE, and college, believe that Design Thinking has a future in education.
- No one disagreed with the idea that design thinking had a future in education.

4.17 Design Thinking creating empathy in a child

Do you think design thinking can create empathy in a child?

Teachers were asked to say yes or no to the topic of whether design thinking can create empathy in a child. The table given below indicates the responses of the in-service teachers with respect to each variable in percentage.

Table 4.17.1 Comparison of In-service teachers thoughts on Design thinking creating empathy in a child with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**8 (17%)** (6 Primary & 2 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)**	**8 (17%)**	-	**13 (36%)**	**1 (33%)**	**1 (100%)**

			(Secondary)	(6 Primary & 2 College)		(6 Primary, 5 Secondary & 2 College)	(Secondary)	(College)
		10 – 15	**4 (40%)** (Secondary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**7 (19%)** (2 Primary, 4 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**12 (25%)** (7 Primary, 3 Secondary & 2 College)	**2 (100%)** (1 Secondary & 1 College)	**4 (11%)** (3 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (1 Primary & 2 Secondary)	-	-	-	-
		5-10	-	**1 (2%)** (College)	-	**5 (14%)** (Primary)	-	-
		10-15	-	**4 (8%)** (Primary)	-	**2 (6%)** (Primary)	**1 (34%)** (Primary)	-
		>15	-	**5 (10%)** (2 Primary & 3 Secondary)	-	**1 (3%)** (Primary)	-	-

Following are the conclusions drawn from the table presented above:

- Despite having varying levels of teaching experience, all responders from the ICSE, HSC, and college feel that Design Thinking may help children develop empathy.
- While 74% of SSC board members think that Design Thinking helps children develop empathy, the remaining 24% disagree.
- Approximately 77 % of CBSE board respondents agreed that design thinking helps children develop empathy, while the remaining 33 % disagreed.
- 66 % of IGCSE board respondents agree with the proposition offered to them, while the rest disagree that empathy can be taught through design thinking.

4.18 Degree of freedom in understanding design thinking.

What degree of freedom can be used while understanding design thinking?

In this question, Teachers were asked if they perceive of design thinking as a strict process or one that can be changed to meet the needs of the students in this question. They were offered two choices from which to choose based on their prior experience and expertise. The percentage responses of in-service instructors to each variable are displayed in the table below.

Table 4.18.1 Comparison of In-service teachers thoughts on Degree of freedom in understanding Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Design Thinking is a very rigid process	**Teaching Experience (in years)**	**0 – 5**	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**1 (3%)** (Primary)	-	-
		5 – 10	-	-	-	**1 (3%)** (Primary)	-	-
		10 – 15	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	-	-	--
		> 15	-	**1 (2%)** (Primary)	-	-	-	
Design Thinking can be altered as per requirement	**Teaching Experience (in years)**	**0- 5**	**3 (30%)** (Primary)	**9 (19%)** (6 Primary & 3 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5-10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**17 (47%)** (10 Primary, 5 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**3 (30%)** (Secondary)	**9 (19%)** (6 Primary & 3	-	**9 (25%)** (4 Primary, 4	**1 (34%)** (Primary)	-

				Secondary)		Secondary & 1 College)		
		>15	**2 (20%)** (1 Secondary & 1 College)	**16 (33%)** (8 Primary, 6 Secondary & 2 College)	**2 (100%)** (1 Secondary & 1 College)	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- While 90% of ICSE board respondents believe that design thinking can be modified to meet specific needs, the remaining 10% believe it is a rather inflexible approach. The SSC board respondents are in the same boat.
- Every HSC board responder believes that design thinking can be adapted to meet the needs.
- While approximately 6% of CBSE respondents feel that design thinking is a highly rigid approach, the remaining 94% disagree, claiming that it can be changed to meet the needs.
- Every IGCSE board and college respondent believes that Design Thinking can be adapted to meet the needs of the situation.

4.19 Solving Real world problems using Design Thinking

Can design thinking be used for solving real world problems?

Teachers were asked if they believe Design Thinking can solve real-world problems in this question. Yes, no, or May be was the intended response. The table below shows the percentage replies of in-service teachers to each variable.

Table 4.19.1 Comparison of In-service teachers on solving real world problems using Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Yes	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (Primary)	**4 (8%)** (4 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)**	**4 (8%)**	-	**12 (33%)**	**1 (33%)**	**1 (100%)**

			(Secondary)	(2 Primary & 2 College)		(6 Primary, 4 Secondary & 2 College)	(Secondary)	(College)
		10 – 15	**3 (30%)** (Secondary)	**4 (8%)** (Primary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**6 (13%)** (4 Primary & 2 Secondary)	**2 (100%)** (1 Secondary & 1 College)	**3 (8%)** (2 Secondary & 1 College)	-	-
No	**Teaching Experience (in years)**	**0- 5**	-	-	-	**1 (3%)** (Primary)	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15		**1 (2%)** (Secondary)	-	-	-	-
May be	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**6 (13%)** (3 Primary & 3 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**5 (10%)** (4 Primary & 1 College)	-	**6 (17%)** (5 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**4 (8%)** (2 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**10 (21%)** (5 Primary, 3 Secondary & 2 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- While about 80% of ICSE respondents feel that design thinking can be applied to tackle real-world issues, the other 20% appear perplexed, responding with a 'maybe' to the question.
- 37% of SSC respondents believe that design thinking can be applied to solve real-world issues, 2% disagree, and the rest are unsure about the idea of design thinking being used as a tool to solve the real-world problems.
- Every HSC board and college responder agrees that Design Thinking can solve real-world problems.
- 58% of CBSE respondents believe that design thinking can be applied to tackle real-world issues, 3% disagree, and 37% are unsure.
- While 66% of IGCSE students agree that design thinking may be applied to tackle real-world issues, 34% are unsure about the idea of design thinking being used as a tool to solve the real-world problems.

4.20 Importance given to Process or Outcome in Design Thinking.

In design thinking, should importance be given to the process or the outcome?

This question asked instructors to weigh in on whether the process or the outcome should be prioritized in Design Thinking. The respondents were supposed to answer in one of three ways: procedure, outcome, or both. The percentage responses of in-service instructors to each variable are shown in the table below.

Table 4.20.1 Comparison of In-service teachers on priority being given to process or outcome in Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Process	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**1 (3%)** (Primary)	**1 (33%)** (University)	-
		5 – 10	-	**3 (6%)** (Primary)	-	**6 (17%)** (2 Primary, 3 Secondary & 1 College)	-	-

		10 – 15	**2 (20%)** (Secondary)	**2 (4%)** (1 Primary & 1 Secondary)	-	**2 (3%)** (1 Secondary & 1 College)	-	-
		> 15	**1 (10%)** (Secondary)	**3 (6%)** (1 Primary & 2 Secondary)	**1 (50%)** (College)	**1 (2%)** (Secondary)	-	-
Outcome	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-	**3 (6%)** (2 Primary & 1 Secondary)	-	-	-	-
Both	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**8 (17%)** (4 Primary & 4 Secondary)	--	**3 (8%)** (1 Primary & 2 Secondary)-	-	-
		5-10	**1 (10%)** (Secondary)	**6 (13%)** (3 Primary & 3 College)	-	**12 (33%)** (9 Primary, **2 (3%)** Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**2 (20%)** (Secondary)	**9 (19%)** (7 Primary & 2 Secondary)	-	**7 (19%)** (4 Primary & 3 Secondary)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (College)	**11 (23%)** (5 Primary, 4 Secondary & 2 College)	**1 (50%)** (College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- Approximately 40% of ICSE teachers believe that process should be given importance to in design thinking and the other 60% respondents believe that process and outcome both should be given equal importance.

- About 22% SSC respondents believe that process should be given importance, around 6% believe that outcome should be given importance and 72% believe that process and outcome both should be given equal importance.
- About half of HSC respondents given more importance to process and another half give equal importance to both process and outcome
- Around 25% of CBSE respondents believe that process should be given more importance and around 74% believe in giving equal importance to both process and outcome.
- Around 33% of IGCSE teachers believe in giving importance to the process and the remaining believe in giving more importance to process and outcome.
- Respondents from college believe in giving equal importance to process and outcome.

4.21 Important skills to develop Design Thinking

Select the three most important skills you think you can develop through design thinking. (More than one option can be chosen)

Respondents were asked to choose any three of the most critical abilities they believe are required to develop Design Thinking in this question. The respondents were presented with a variety of alternatives from which they were expected to choose three. The table below shows the percentage replies of in-service teachers to each variable.

Table 4.21.1 Comparison of In-service teachers on three most important skills to develop Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Innovation	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**10 (21%)** (6 Primary & 4 Secondary)	-	**2 (6%)** (Primary)	**1** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**6 (13%)** (4 Primary & 2 College)	-	**14 (39%)** (8 Primary, 5 Secondary & 1 College)	-	**1 (100%)** (College)

		10 –15	**3 (30%)** (Secondary)	**9 (19%)** (6 Primary & 3 Secondary)	-	**5 (14%)** (2 Primary & 3 Secondary)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**14 (29%)** (8 Primary & 6 Secondary)	**1** (College)	**1 (3%)** (Secondary)	-	-
Creativity	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1** (University)	-
		5-10	-	**9 (19%)** (6 Primary & 3 College)	-	**16 (44%)** (9 Primary, 5 Secondary & 2 College)	**1** (Secondary)	**1 (100%)** (College)
		10-15	**2 (20%)** (Secondary)	**8 (17%)** (6 Primary & 2 Secondary)	-	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
		>15	**1 (10%)** (College)	**14 (29%)** (7 Primary, 5 Secondary & 2 College)	**1** (College)	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
Collaboration	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**1 (2%)** (Primary)	-	**3 (36%)** (2 Primary & 1 Secondary)	-	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**5 (14%)** (3 Primary, 1 Secondary & 1 College)	-	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**2 (4%)** (Primary)	-	**6 (17%)** (1 Primary, 4 Secondary	-	-

						& 1 College)		
		>15		**4 (8%)** (3 Primary & 1 Secondary)	**1** (College)	**1 (2%)** (Secondary)	-	-
Empathy	**Teaching Experience (in years)**	**0- 5**	**3 (30%)** (Primary)	**4 (8%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	**1 (10%)** (Secondary)	**7 (15%)** (5 Primary & 2 College)	-	**7 (19%)** (5 Primary & 2 Secondary)	-	-
		10-15	**3 (30%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**4 (11%)** (Secondary)	-	-
		>15	**1 (10%)** (College)	**6 (13%)** (2 Primary, 2 Secondary & 2 College)	**2** (College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
Inquiry	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1** (University)	-
		5-10	-	-	-	**2 (6%)** (1 Primary & 1 Secondary)	**1** (Secondary)	-
		10-15	**3 (30%)** (Secondary)	**3 (6%)** (Primary)	-	**3 (8%)** (Secondary)	-	-
		>15	**1 (10%)** (Secondary)	**3 (6%)** (1 Primary & 2 Secondary)	**1** (College)	-	-	-
Problem Solving	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	-	-
		5-10	**1**	**6**	-	**16**	**1**	**1**

			(20%) (Secondary)	**(13%)** (5 Primary & 1 College)		**(44%)** (9 Primary, 5 Secondary & 2 College)	(Secondary)	**(100%)** (College)
		10-15	**3 (30%)** (Secondary)	**8 (17%)** (6 Primary & 2 Secondary)	-	**9 (25%)** (4 Primary, 4 Secondary & 1 College)	**1** (Primary)	-
		>15	**1 (10%)** (Secondary)	**12 (25%)** (6 Primary, 4 Secondary & 2 College)	**2** (College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- 90 % of ICSE respondents rated innovation as one of the most important design thinking skills, followed by creativity, which was rated as important by 50 % of ICSE respondents. 20 % of ICSE respondents rated collaboration as one of the most important design thinking skills. Empathy is ranked as one of the most significant abilities for design thinking by 80 % of ICSE respondents, followed by inquiry (40 %) and problem solving (80 %).
- 82% of SSC respondents believe innovation is the most important skill to develop design thinking, followed by 86 % who believe creativity is the most important skill to develop design thinking. Collaboration was chosen as an important skill by 22 % of SSC respondents, empathy by 42 %, and 16 % believe inquiry is one of the most important skills to develop design thinking.
- The most essential skills for HSC board respondents were problem solving and empathy, followed by the other abilities.
- 62% of CBSE respondents believe innovation is the most important skill to develop design thinking, followed by 80 % who believe creativity is the most important skill to develop design thinking. Collaboration was chosen as an important skill by 69 % of CBSE respondents, empathy by 47 %, and 20 % believe inquiry is one of the most important skills to develop design thinking and 91% believe problem solving to be one of the most important skills of developing design thinking.

- IGCSE respondents named creativity, inquiry, and problem solving as three of the most crucial abilities for developing design thinking.
- The top skills for developing design thinking, according to college respondents, are problem solving, collaboration, creativity, and innovation.

4.22 Learning and Practicing Design Thinking

Anyone can learn and practice Design Thinking?

The respondents were asked whether they believe everyone can learn and apply Design Thinking, and they were supposed to respond yes or no. The percentage responses of in-service instructors to each variable are shown in the table below.

Table 4.22.1 Comparison of In-service teachers on learning and practicing Design Thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Agree	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	-	-
		5 – 10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**14 (39%)** (8 Primary, 4 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 –15	**2 (20%)** (Secondary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**10 (21%)** (6 Primary, 3 Secondary & 1 College)	**2 (100%)** (College)	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
Disagree	**Teaching Experience**	**0- 5**	**1 (10%)**	-	-	-	-	-

	(in years)		(Primary)					
		5-10	--	-	-	**2 (6%)** (Primary)	-	-
		10-15	**1 (10%)** (Secondary)	-	-	-	-	-
		>15	-	**1 (2%)** (Secondary)	-	-	-	-
Unsure	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**1 (2%)** (Secondary)	-	-	**1 (33%)** (University)	-
		5-10	-	**4 (8%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**-**	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**6 (13%)** (3 Primary, 2 Secondary & 1 College)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- Approximately 60% of ICSE respondents believe that everyone can practice design thinking, 20% disagree, and 20% are unclear.
- About 65 % of SSC respondents believe that everyone can apply design thinking, while only 2% disagree and 23 % are undecided.
- Every HSC board member agrees that everyone can study and apply design thinking.
- Around 78 % of CBSE respondents believe that anybody can use design thinking, whereas 6% disagree and 17 % are undecided.
- About 33% of IGCSE respondents believe that anybody can use design thinking, while 64% are doubtful.
- Every college responder agrees that everyone can study and apply design thinking.

4.23 Design Thinking empowering personal Growth

Design thinking empowers personal growth.

The respondents were asked to agree, disagree, or indicate undecided on a statement that stated whether they believe design thinking may help people improve personally. The table below shows the percentage replies of in-service teachers to each variable.

Table 4.23.1 Comparison of In-service teachers on Design Thinking being used to empower personal growth with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Agree	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (Primary)	**10 (21%)** (7 Primary & 3 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	
		5 – 10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**17 (47%)** (11 Primary, 4 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 –15	**4 (40%)** (Secondary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**7 (19%)** (2 Primary, 4 Secondary & 1 College)	-	
		> 15	**2 (20%)** (1 Secondary & 1 College)	**10 (21%)** (6 Primary, 3 Secondary & 1 College)	-	**5 (10%)** (1 Primary, 2 Secondary & 2 College)	-	
Disagree	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	
		5-10	-	-	-	-	-	
		10-15	-	-	-	-	-	
		>15	-	**1 (2%)** (Secondary)	**2 (100%)** (College)	-	-	
Unsure	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**1 (2%)** (Secondary)	-	-	-	
		5-10	-	-	-	**1**	-	

						(3%) (Secondary)		
		10-15	-	**4 (8%)** (Primary)	-	**2 (6%)** (Primary)	**1 (34%)** (Primary)	
		>15	-	**6 (13%)** (3 Primary, 2 Secondary & 1 College)	-	-	-	

Following are the conclusions drawn from the table presented above:

- While 90% of ICSE respondents feel that design thinking promotes personal development, 10% are doubtful.
- While 76% of SSC respondents feel that design thinking promotes personal development, 2 % disagree and 23% are doubtful.
- All of HSC respondents disagree to the notion that design thinking empowers personal growth.
- While 87% of CBSE respondents agree to the notion that personal growth is developed through design thinking, 9% disagree.
- While 66% of IGCSE respondents agree to the notion that personal growth is developed through design thinking, 34% disagree.
- All of Collage respondents agree to the notion that design thinking empowers personal growth.

4.24 Design Thinking catering to stakeholders

Who does design thinking cater to the most?

This topic asked for responses on who design thinking benefits the most. The responders were presented with a number of alternatives from which to pick. The percentage responses of in-service instructors to each variable are shown in the table below.

Table 4.24.1 Comparison of In-service teachers on Design Thinking catering to stakeholders with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**Collage**
Students	**Teaching Experience**	**0 – 5**	**1 (10%)**	**1 (2%)**	-	**1 (3%)**	-	-

	(in years)		(Primary)	(Secondary)		(Primary)		
		5 – 10	**-**	-	-	**1 (3%)** (College)	-	-
		10 –15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	-	-	-
		> 15	-	**4 (8%)** (2 Primary, 1 Secondary & 1 College)	-	-	-	-
Teachers	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	-	-	-
		5-10	-	**1 (2%)** (College)	-	-	-	-
		10-15	-	**3 (6%)** (2 Primary & 1 Secondary)	-	-	-	-
		>15	-	**1 (2%)** (Secondary)	-	-	-	-
Leaders	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-	-	-		-	-
Schools	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-		-	-	-	-
		>15	-		-	**1 (3%)** (Secondary)	-	-
All of the above	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**8 (17%)** (5 Primary & 3 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5-10	**1 (10%)** (Secondary)	**8 (17%)** (6 Primary & 2 College)	-	**17 (47%)** (11 Primary, 5 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)

		10-15	**3 (30%)** (Secondary)	**7 (15%)** (5 Primary & 2 Secondary)	-	**9 (25%)** (4 Primary, 4 Secondary & 1 College)	**1 (34%)** (Primary)	-
		>15	**2 (20%)** (1 Secondary & 1 College)	**10 (21%)** (6 Primary, 3 Secondary & 1 College)	**2 (100%)** (College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- 20 % of ICSE respondents believe that design thinking is solely for students, while the rest believe it is for everyone, including schools, teachers, leaders, and students.
- 12 % of SSC respondents believe that design thinking is exclusively for students, another 12 % believe it is only for teachers, and another 2 % believe it is only for schools, while the majority believe it is for everyone, including schools, teachers, leaders, and students.
- All responders from the HSC, IGCSE, and collage believe that Design Thinking is beneficial to everyone, including schools, instructors, leaders, and students.
- 6 % of CBSE respondents believe that design thinking is solely for students, while another 3% believe it is only for schools, and the majority believe it is for everyone, including schools, teachers, leaders, and students.

4.25 Design Thinking Implementation

Where does design thinking implementation play an important role?

This question asked respondents to provide their opinions on where they believe design thinking should be implemented. The respondents were given a number of options from which to choose. The table below shows the percentage replies of in-service teachers to each variable.

Table 4.25.1 Comparison of In-service teachers on Design Thinking catering to stakeholders with regard to School Board, Teaching Experience and Teaching Level.

			School Board

			ICSE	SSC	HSC	CBSE	IGCSE	College
Student - curriculum / classroom / lesson	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**2 (4%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5 – 10	-	**1 (2%)** (Primary)	-	**1 (3%)** (Primary)	-	-
		10 –15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	-	-	-
		> 15	-	**4 (8%)** (2 Primary, 1 Secondary & 1 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
Teacher - professional development	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
		>15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
Pre-service teacher education	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-		-	-	-	-
Adult education	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	**1 (3%)** (College)	-	-
		10-15	-	**1 (2%)** (Secondary)		-	-	-
		>15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
All of the above	**Teaching Experience**	**0- 5**	**2 (20%)** (Primary)	**9 (19%)** (5 Primary	-	**2 (6%)** (1 Primary	**1 (33%)** (University)	-

	(in years)			& 4 Secondary)		& 1 Secondary)		
		5-10	**1 (10%)** (Secondary)	**8 (17%)** (5 Primary & 3 College)	-	**16 (44%)** (10 Primary, 5 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**3 (30%)** (Secondary)	**7 (15%)** (6 Primary & 1 Secondary)	-	**9 (25%)** (4 Primary, 4 Secondary & 1 College)	**1 (34%)** (Primary)	-
		>15	**2 (20%)** (1 Secondary & 1 College)	**9 (19%)** (5 Primary, 3 Secondary & 1 College)	**2 (100%)** (College)	**3 (8%)** (2 Secondary & 1 College)	-	-

Following are the conclusions drawn from the table presented above:

- 80 % of ICSE respondents believe that design thinking is relevant in all of the variables stated, including adult education, pre-service teacher education, teacher professional development, student curriculum, and classroom lessons. Others argue that in design thinking, only student curricula and classroom lessons are important.
- Only 16 % of SSC respondents believe that only student curriculum and classroom lessons are important in design thinking, 8% believe that only teacher professional development is important, 6% believe adult education is important in design thinking implementation, and the remaining 70% believe that all factors are equally important.
- All responders from the HSC, IGCSE, and college feel that all aspects are equally significant in the implementation of design thinking.
- Only 15% of CBSE respondents say that student curriculum and classroom lessons are significant in design thinking, 3% believe adult education is crucial in design thinking implementation, and the remaining 75% believe that all variables are equally important in design thinking implementation.

4.26 Essential characteristics of a Design Thinker

Select any top three characteristics according to you which are essential for a design thinker. (More than one option can be chosen)

Respondents were asked to choose any three of the most essential characteristics they believe are required for design thinkers in this question. The respondents were presented with a variety of alternatives from which they were expected to choose three. The table below shows the percentage replies of in-service teachers to each variable.

Table 4.26.1 Comparison of In-service teachers on essential characteristics of a Design Thinker with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Dynamic mindset	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (Primary)	**6 (13%)** (3 Primary & 3 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**8 (17%)** (6 Primary & 2 College)	-	**12 (33%)** (8 Primary, 2 Secondary & 2 College)	-	-
		10 –15	**1 (10%)** (Secondary)	**6 (13%)** (4 Primary & 2 Secondary)	-	**3 (8%)** (2 Primary & 1 College)	-	-
		> 15	**1 (10%)** (College)	**9 (19%)** (6 Primary, 2 Secondary & 1 College)	**1 (50%)** (College)	**2 (6%)** (Secondary)	-	-
Human centred	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		5-10	**1 (10%)** (Secondary)	**5 (10%)** (3 Primary & 2 College)	-	**2 (6%)** (1 Secondary & 1 College)	-	-
		10-15	**1 (10%)** (Secondary)	**5 (10%)** (Primary)	-	**4 (11%)** (1 Primary	-	-

						& 3 Secondary)		
		>15	**2 (20%)** (1 Secondary & 1 College)	**6 (13%)** (4 Primary, 1 Secondary & 1 College)	**1 (50%)** (College)	**2 (6%)** (Secondary)	-	-
Empathetic	**Teaching Experience (in years)**	**0- 5**	**3 (30%)** (Primary)	**1 (2%)** (Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		5-10	**1 (10%)** (Secondary)	**7 (15%)** (5 Primary & 2 College)	-	**6 (17%)** (3 Primary, 1 Secondary & 2 College)	-	-
		10-15	**2 (20%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**5 (14%)** (1 Primary & 4 Secondary)	-	-
		>15	**1 (10%)** (College)	**8 (17%)** (3 Primary, 3 Secondary & 2 College)	**2 (20%)** (College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
Engaging in prototyping	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**1 (2%)** (Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**3 (6%)** (2 Primary & 1 College)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**1 (3%)** (Primary)	-	-
		>15	-	-	**1 (50%)** (College)	-	-	-
Comfortable in ambiguity	**Teaching Experience**	**0- 5**	**1 (10%)** (Primary)	-	-	**2 (6%)** (1 Primary	-	-

	(in years)					& 1 Secondary)		
		5-10	-	**1 (2%)** (College)	-	-	-	-
		10-15	-	**1 (2%)** (Primary)	-	-	-	-
		>15	-	**2 (4%)** (Primary)	**1 (50%)** (College)	**1 (3%)** (Secondary)	-	-
Collaboration	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**6 (13%)** (4 Primary & 2 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**3 (6%)** (2 Primary & 1 College)	-	**5 (14%)** (4 Primary & 1 College)	-	**1 (100%)** (College)
		10-15	-	**4 (8%)** (3 Primary & 1 Secondary)	-	**2 (6%)** (1 Secondary & 1 College)	-	-
		>15	-	**5 (10%)** (3 Primary & 2 Secondary)	**1 (50%)** (College)	**2 (6%)** (1 Primary & 1 Secondary)	-	-
Reflective	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**2 (6%)** (Primary)	-	-
		5-10	-	**2 (4%)** (1 Primary & 1 College)	-	**5 (14%)** (Primary)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**5 (10%)** (Primary)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	--
		>15	**1 (10%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	**2 (100%)** (College)	**3 (8%)** (1 Primary, 1 Secondary	-	

						& 1 College)		
Visual	**Teaching Experience (in years)**	**0- 5**	-	**6 (13%)** (3 Primary & 3 Secondary)	-	**2 (6%)** (Primary)	-	-
		5-10	-	**1 (2%)** (College)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (Secondary)	-
		10-15	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	-	-
		>15	-	**6 (13%)** (2 Primary, 3 Secondary & 1 College)	**1 (10%)** (College)	-	-	-
Open to risk taking	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**7 (19%)** (4 Primary, 2 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**5 (10%)** (4 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	-	-
		>15	-	**5 (10%)** (2 Primary, 2 Secondary & 1 College)	**1 (50%)** (College)	-	-	-
Embracing failures	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (Secondary)	-	**1 (3%)** (Primary)	-	-
		5-10	-	**2 (4%)** (Primary)	-	**3 (8%)** (2 Secondary	-	-

						& 1 College)		
		10-15	-	**2 (4%)** (Primary)	-	-	-	-
		>15	-		**1 (50%)** (College)	-	-	-
Optimistic	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**3 (6%)** (2 Primary & 1 Secondary)	-	-	-	-
		5-10	-	**4 (8%)** (Primary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	-	-
		10-15	**3 (30%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (Secondary)	**7 (15%)** (5 Primary & 2 Secondary)	**2 (20%)** (College)	**1 (3%)** (College)	-	-

Following are the conclusions drawn from the table presented above:

- 40 % of ICSE respondents believe that having a dynamic mindset is crucial for 60 % of respondents to be human-centered, 70 % of respondents to be empathic, 20 % to engage in prototyping, 10 % to be comfortable with ambiguity, 10 % to collaborate, 20 % to be reflective, 10 % to be visual, 10 % to be willing to take risks, and 50 % to be optimistic.
- 62 % of SSC respondents believe that having a dynamic mindset is crucial for 37 % of respondents to be human-centered, 42 % of respondents to be empathic, 14 % to engage in prototyping, 8 % to be comfortable with ambiguity, 37 % to collaborate, 26 % to be reflective, 36 % to be visual, 26 % to be willing to take risks, 10% to be embracing failures and 37 % to be optimistic.
- The design thinking process comes to mind for over half of HSC respondents when they hear the words "dynamic mentality," "human-centered," "engaged in prototype," "comfortable in ambiguity,"

"collaborative," "reflective," "visual," and "open to risk taking and embracing setbacks." And approximately 20% believe that empathy and optimism are key design thinking competencies.

- 49 % of CBSE respondents believe that having a dynamic mindset is crucial for 31 % of respondents to be human-centered, nearly half of respondents to be empathic, 19 % to engage in prototyping, 9 % to be comfortable with ambiguity, 32 % to collaborate, 36 % to be reflective, 15 % to be visual, 28 % to be willing to take risks, 11% to be embracing failures and 28 % to be optimistic.
- According to 33% of IGCSE respondents engaging in prototype, reflective and visual are the most essential skills of design thinking. 66% respondents chose open to risk taking as the most essential skill and 34% choose optimistic as the essential skill required for design thinking.
- According to all collage respondents, cooperation, reflection, and a willingness to take risks are necessary qualities for design thinking.

4.27 Positive changes in students after inculcation of Design Thinking.

What positive changes do you think are seen in the students after inculcating design thinking? (More than one option can be chosen)

This question asked instructors to comment on the positive changes in pupils that have occurred as a result of incorporating design thinking into the curriculum. The respondents were given a selection of options to pick from, and they were allowed to select as many as they wanted. The in-service teachers' responses are summarized in the table below.

Table 4.27.1 Comparison of In-service teachers on positive changes seen in the students after inculcating Design Thinking in the curriculum with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**Collage**
Students thinking becomes more creative	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**8 (17%)** (5 Primary & 3 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**-**	**9 (19%)** (6 Primary & 3 College)	-	**16 (44%)** (10 Primary, 4 Secondary & 2	**1 (33%)** (Secondary)	**1 (100%)** (College)

						College)		
		10 –15	**3 (30%)** (Secondary)	**9 (19%)** (6 Primary & 3 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		> 15	**1 (10%)** (College)	**12 (25%)** (8 Primary, 2 Secondary & 2 College)	**1 (50%)** (College)	**3 (8%)** (2 Secondary & 1 College)	-	-
More resilient	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**2 (4%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**2 (4%)** (1 Primary & 1 College)	-	**5 (14%)** (4 Primary & 1 College)	-	-
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	-	-	-
		>15	**1 (10%)** (College)	**2 (4%)** (Primary)	**1 (50%)** (College)	-	-	-
Ability to understand and apply new strategies	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**8 (22%)** (5 Primary & 3 Secondary)	**1 (33%)** (University)	-
		5-10	-	**8 (17%)** (5 Primary & 3 College)	-	**13 (36%)** (8 Primary, 3 Secondary & 2 College)	-	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**8 (17%)** (6 Primary & 2 Secondary)	-	**6 (17%)** (1 Primary, 4 Secondary & 1 College)	-	-
		>15	**2 (20%)** (1 Secondary	**10 (21%)** (5 Primary, 3 Secondary	**2 (100%)** (College)	**3 (8%)** (Secondary)	-	-

			& 1 College)	& 2 College)				
Higher levels of engagement and collaboration in the class	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**3 (6%)** (Primary)		**1 (3%)** (Secondary)	**1 (33%)** (University)	-
		5-10	-	**7 (15%)** (4 Primary & 3 College)	-	**9 (25%)** (5 Primary, 3 Secondary & 1 College)	-	**1 (100%)** (College)
		10-15	**3 (30%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**6 (17%)** (1 Primary, 4 Secondary & 1 College)	-	-
		>15	**1 (10%)** (Secondary)	**6 (13%)** (3 Primary, 2 Secondary & 1 College)	**1 (50%)** (College)	**4 (11%)** (3 Secondary & 1 College)	-	-
More ownership in learning	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**3 (6%)** (Primary)	-	**1 (3%)** (Secondary)	-	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**6 (17%)** (4 Primary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	-	**4 (8%)** (Primary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		>15	-	**4 (8%)** (2 Primary & 2 Secondary)	**2 (100%)** (College)	**1 (3%)** (Secondary)	-	-
Confidence in problem solving	**Teaching Experience (in years)**	**0- 5**	-	**6 (13%)** (3 Primary & 3 College)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		5-10	-	**5 (10%)** (4 Primary	-	**14 (39%)** (9 Primary,	**1 (33%)** (Secondary)	**1 (100%)** (College)

				& 1 College)		3 Secondary & 2 College)		
		10-15	**2 (20%)** (Secondary)	**6 (13%)** (3 Primary & 3 Secondary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (Secondary)	**10 (21%)** (4 Primary, 4 Secondary & 2 College)	**2 (100%)** (College)	**2 (6%)** (Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- 70 % of ICSE respondents said that students' thinking becomes more creative; 30 % said that students become more resilient; nearly half said that students' capacity to comprehend and use new strategies improves; and they experience higher levels of engagement and understanding. 30% of respondents think it boosts their confidence in problem-solving, while 10% think they take more responsibility of their learning.
- 80 % of SSC respondents said that students' thinking becomes more creative; 14 % said that students become more resilient; 63% said that students' capacity to comprehend and use new strategies improves; and 42% said that they experience higher levels of engagement and understanding. 30% of respondents think it boosts their confidence in problem-solving, while 36% think they take more responsibility of their learning.
- Nearly half of HSC respondents say that when design thinking is used in the classroom, students' thinking improves, they become more resilient, and they become more engaged and collaborative. According to all HSC respondents, integrating design thinking into the curriculum strengthens students' capacity to comprehend and apply new concepts, as well as their sense of ownership over their education and confidence in their abilities to solve problems.
- 74 % of CBSE respondents said that students' thinking becomes more creative; 20 % said that students become more resilient; 83% said that students' capacity to comprehend and use new strategies improves; and 56% said that they experience higher levels of engagement and understanding. 34% of respondents think it boosts their confidence in problem-solving, while 67% think they take more responsibility of their learning.

- According to over 33% of IGCSE respondents, the benefits of design thinking for students include their capacity to apply and comprehend new techniques, increased levels of engagement and cooperation, and more control over their education. Almost 67 % of respondents said that pupils' thinking improved, and they were more self-assured in handling problems.
- According to responders from Collage, the benefits of design thinking for students include increased creativity, improved application and comprehension of new techniques, higher levels of engagement and cooperation, and more self-assurance in problem-solving.

4.28 Positive changes in educators after inculcation of Design Thinking.

What positive changes can be seen in oneself as an educator after inculcating design thinking in the teaching learning process? (More than one option can be chosen)

This question asked instructors to comment on the positive changes in educators that have occurred as a result of incorporating design thinking into the curriculum. The respondents were given a selection of options to pick from, and they were allowed to select as many as they wanted. The in-service teachers' responses are summarized in the table below.

Table 4.28.1 Comparison of In-service teachers on positive changes seen in the educators after inculcating Design Thinking in the curriculum with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Inspiration to change teaching pedagogy	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	-	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**8 (17%)** (6 Primary & 2 College)	-	**11 (31%)** (8 Primary, 2 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**3 (30%)** (Secondary)	**6 (13%)** (5 Primary & 1	-	**3 (8%)** (1 Primary, 1	-	-

				Secondary)		Secondary & 1 College)		
		> 15	**1 (10%)** (College)	**8 (17%)** (6 Primary, 1 Secondary & 1 College)	**2 (100%)** (College)	**2 (6%)** (1 Secondary & 1 College)	-	-
Increased knowledge	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**5 (10%)** (2 Primary & 3 Secondary)	-	-	-	-
		5-10	-	**5 (10%)** (4 Primary & 1 College)	-	**8 (22%)** (5 Primary, 1 Secondary & 2 College)	-	-
		10-15	**2 (20%)** (Secondary)	**8 (17%)** (6 Primary & 2 Secondary)	-	**2 (6%)** (Secondary)	-	-
		>15	**1 (10%)** (College)	**9 (19%)** (6 Primary, 1 Secondary & 2 College)	**2 (100%)** (College)	**2 (6%)** (1 Secondary & 1 College)	-	-
Different mindset	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**1 (2%)** (Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**6 (13%)** (5 Primary & 1 College)	-	**10 (28%)** (7 Primary & 3 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**3 (6%)** (Primary)	-	**3 (8%)** (2 Secondary & 1 College)	-	-
		>15	-	**6 (13%)** (4 Primary, 2 Secondary & 1	**1 (50%)** (College)	**2 (6%)** (Secondary)	-	-

				College)				
Open to new ideas	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**1 (3%)** (Primary)	-	-
		5-10	-	**7 (15%)** (5 Primary & 2 College)	-	**11 (31%)** (7 Primary, 3 Secondary & 1 College)	-	-
		10-15	**1 (10%)** (Secondary)	**5 (10%)** (4 Primary & 1 Secondary)	-	**4 (11%)** (3 Secondary & 1 College)	-	-
		>15	**1 (10%)** (Secondary)	**12 (25%)** (7 Primary, 3 Secondary & 2 College)	**1 (50%)** (College)	**2 (6%)** (1 Secondary & 1 College)	-	-
Thinking more critically, creatively and empathetically	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**3 (6%)** (1 Primary & 2 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**8 (17%)** (6 Primary & 2 College)	-	**12 (33%)** (7 Primary, 3 Secondary & 2 College)	**1 (33%)** (Secondary)	-
		10-15	**3 (30%)** (Secondary)	-	-	**5 (14%)** (1 Primary & 4 Secondary)	-	-
		>15	**1 (10%)** (College)	**7 (15%)** (3 Primary, 3 Secondary & 1 College)	**2 (100%)** (College)	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
More confidence	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**8 (17%)** (5 Primary & 3	-	**1 (3%)** (Primary)	-	-

				Secondary)				
		5-10	-	**6 (13%)** (4 Primary & 2 College)	-	**7 (19%)** (4 Primary, 2 Secondary & 1 College)	-	-
		10-15	**1 (10%)** (Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (34%)** (Primary)	-
		>15	-	**4 (8%)** (2 Primary, 1 Secondary & 1 College)	**1 (50%)** (College)	-	-	-

Following are the conclusions drawn from the table presented above:

- According to 80% of ICSE respondents, when teachers incorporate design thinking into their lessons, they become inspired to change the way they teach, 40% say they gain knowledge, 20% say they adopt a new mindset, 40% are open to new ideas, 60% say their thinking becomes more critical, creative, and empathetic, and 20% say they gain more confidence.
- According to 62% of SSC respondents, when teachers incorporate design thinking into their lessons, they become inspired to change the way they teach, 56% say they gain knowledge, 34% say they adopt a new mindset, 58% are open to new ideas, 38% say their thinking becomes more critical, creative, and empathetic, and 46% say they gain more confidence.
- A changed mindset, new ideas, and more confidence are some advantages of introducing design thinking into teaching, according to nearly half of HSC respondents. They almost unanimously agree that the benefits of introducing design thinking into pedagogy include increased knowledge, more creative and empathic thinking, and motivation to modify teaching methods.
- According to 45% of CBSE respondents, when teachers incorporate design thinking into their lessons, they become inspired to change the way they teach, 34% say they gain knowledge, 50% say they adopt a new mindset, 51% are open to new ideas, 67% say their thinking becomes more critical, creative, and empathetic, and 33% say they gain more confidence.

- Nearly 66 % of IGCSE respondents think that incorporating design thinking into pedagogy will inspire teachers to change their methods of instruction and encourage them to think more critically, creatively, and compassionately. The remaining respondents think that doing so will give teachers a different perspective and give them more confidence.
- According to responders from the collage, the sole advantage of incorporating design thinking is motivation to modify instructional methods.

4.29 Impact of Design Thinking on schools.

How do you think Design Thinking has impacted the school? (More than one option can be chosen)

The educators were asked to explain how Design thinking has impacted schools in line with the research questions. The respondents had the freedom to choose any number of items from a variety that was presented to them. The table below summarizes the in-service instructors' responses.

Table 4.29.1 Comparison of In-service teachers responses on impact on schools when design thinking is included with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
More open to new ideas/willingness to share ideas or be involved	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (Primary)	**5 (10%)** (2 Primary & 3 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	**1 (33%)** (University)	-
		5 – 10	**1 (10%)** (Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**12 (33%)** (6 Primary, 4 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 – 15	**3 (30%)** (Secondary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
		> 15	**2 (20%)**	**14 (29%)**	**2 (100%)**	**2 (6%)**	-	-

			(1 Secondary & 1 College)	(7 Primary, 3 Secondary & 4 College)	(College)	(2 Secondary)		
Better collaboration with teachers and students	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**6 (13%)** (3 Primary & 3 Secondary)	-	**4 (11%)** (3 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**7 (15%)** (5 Primary & 2 College)	-	**10 (28%)** (7 Primary, 1 Secondary & 2 College)	-	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 Secondary)	**1 (34%)** (Primary)	-
		>15	**1 (10%)** (Secondary)	**9 (19%)** (4 Primary, 2 Secondary & 3 College)	**1 (50%)** (College)	**1 (3%)** (Secondary)	-	-
Implemented strategies/tools and design thinking framework	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (Primary)	**1 (2%)** (Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (33%)** (University)	-
		5-10	-	**7 (15%)** (5 Primary & 2 College)	-	**5 (14%)** (3 Primary & 2 Secondary)	**1 (33%)** (Secondary)	-
		10-15	**2 (20%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 Secondary)	-	-
		>15	-	**4 (8%)** (2 Primary & 2 College)	**2 (100%)** (College)	**1 (3%)** (Secondary)	-	-

Better understanding and support in design thinking	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**6 (13%)** (5 Primary & 1 Secondary)	-	**1 (3%)** (Secondary)	-	-
		5-10	-	**6 (13%)** (4 Primary & 2 College)	-	**5 (14%)** (4 Primary & 1 College)	-	-
		10-15	**3 (30%)** (Secondary)	**7 (15%)** (5 Primary & 2 Secondary)	-	**2 (6%)** (2 Secondary)	-	-
		>15	**1 (10%)** (College)	**11 (23%)** (5 Primary, 4 Secondary & 2 College)	**1 (50%)** (College)	**2 (6%)** (1 Primary & 1 Secondary)	-	-
Buy-in/ more positive and enthusiastic	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	-	-	**1 (3%)** (Secondary)	-	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	**1 (3%)** (Secondary)	-	-
		>15	-	**2 (4%)** (2 Primary)	**1 (50%)** (College)	-	-	-
Changes in how the meeting was conducted/ better conversations	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**1 (3%)** (Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**1 (2%)** (Primary)	-	-	-	-
		>15	-	**2 (2%)**	**1 (50%)**	**1 (3%)**	-	-

				(1 Primary)	(College)	(Secondary)		
Positive changes to the curriculum/develop new programs in the school	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**2 (6%)** (2 Secondary)	**1 (33%)** (University)	-
		5-10	-	**2 (4%)** (2 Primary)	-	**9 (25%)** (7 Primary & 2 Secondary)	-	**1 (100%)** (College)
		10-15	**1 (10%)** (Secondary)	**6 (13%)** (4 Primary & 2 Secondary)	-	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
		>15	**1 (10%)** (College-)	**6 (13%)** (3 Primary, 1 Secondary & 1 College)	-	**2 (6%)** (2 Secondary)	-	-
Broader thinking/ unstructured thinking	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (2 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**2 (4%)** (1 Primary & 1 College)	-	**4 (11%)** (2 Primary & 2 Secondary)	-	-
		10-15	**1 (10%)** (Secondary)	**3 (6%)** (1 Primary & 2 Secondary)	-	**3 (8%)** (3 Secondary)	-	-
		>15	-	**2 (4%)** (1 Secondary & 1 College)	**1 (50%)** (College)	-	-	-
Higher level of student engagement	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (2 Primary)	-	-	**1 (33%)** (University)	-
		5-10	-	**2 (4%)**	-	**7 (15%)**	**1 (33%)**	**1 (100%)**

				(2 Primary)		(4 Primary & 3 Secondary)	(Secondary)	(College)
		10-15	**1 (10%)** (Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		>15	**1 (10%)** (Secondary)	**6 (13%)** (1 Primary, 2 Secondary & 3 College)	**1 (50%)** (College)	**1 (3%)** (Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- 90% of ICSE respondents believe that when design thinking is used, the school becomes more receptive to new ideas; 30% believe that teachers and students collaborate better; 40% believe that new strategies can be implemented; 50% say design thinking has improved their understanding and support; and 20% each say they are more upbeat and enthusiastic and can observe changes in how meetings are conducted. Positive curricular modifications are visible to 30% of respondents, 10% of respondents exhibit more expansive and unstructured thinking, and 20% report improved levels of student involvement.
- 68% of SSC respondents believe that when design thinking is used, the school becomes more receptive to new ideas; 55% believe that teachers and students collaborate better; 31% believe that new strategies can be implemented; 64% say design thinking has improved their understanding and support; and 14% say they are more upbeat and enthusiastic and 16% can observe changes in how meetings are conducted. Positive curricular modifications are visible to 38% of respondents, 18% of respondents exhibit more expansive and unstructured thinking, and 27% report improved levels of student involvement.
- The half of HSC respondents (50%) believe that design thinking promotes better collaboration between teachers and students, better understanding and support, better conversations, unstructured thinking, and higher levels of student engagement. However, majority believe that design thinking promotes better understanding and support.
- 61% of CBSE respondents believe that when design thinking is used, the school becomes more receptive to new ideas; 53% believe that teachers and students collaborate better; 34% believe that new strategies can be implemented; 29% say design thinking has improved their understanding and support; and 12% each say they are more upbeat and enthusiastic and

can observe changes in how meetings are conducted. Positive curricular modifications are visible to 51% of respondents, 25% of respondents exhibit more expansive and unstructured thinking, and 29% report improved levels of student involvement.

- While 66 % of IGCSE respondents agree that schools are more receptive to new ideas, that teachers and students collaborate better, that new tactics may be applied more often, and that student participation is higher, just 33 % feel that the curriculum can be positively altered.
- According to all responders from the college, schools are more receptive to new ideas, instructors and students work together better, the curriculum can be positively altered, and student engagement is higher.

4.30 Ease of Implementing Design Thinking.

While thinking of design thinking holistically, how would you rate the ease of implementing it?

The respondents were asked to rank how simple it was to integrate design thinking into the curriculum. They were given a variety of parameters, and they had to pick the one that they felt was the most suited for them. The table that follows summarizes the in-service instructors' responses.

Table 4.30.1 Comparison of In-service teachers responses on ease of implementing design thinking into the curriculum with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Extremely easy	**Teaching Experience (in years)**	**0 – 5**	-	**2 (4%)** (2 Primary)	-	**1 (3%)** (1 Primary)	-	-
		5 – 10	-	-	-	**1 (3%)** (1 Primary)	-	-
		10 –15	**1 (10%)** (1 Secondary)	**1 (2%)** (1 Primary)	-	-	-	-
		> 15		**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-

Easy	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		5-10	**1 (10%)** (1 Secondary)	**9 (19%)** (6 Primary & 3 College)	-	**10 (28%)** (5 Primary, 4 Secondary & 1 College)	**1 (33%)** (Secondary)	-
		10-15	-	**7 (15%)** (4 Primary & 3 Secondary)	-	**7 (19%)** (3 Primary, 3 Secondary & 1 College)	**1 (33%)** (Primary)	-
		>15	**1 (10%)** (1 Secondary)	**7 (15%)** (3 Primary, 2 Secondary & 2 College)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
Extremely tough	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	-	-	-
		>15	-	-	-	-	-	-
Tough	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	-	**1 (34%)** (University)	-
		5-10	-	-	-	**7 (19%)** (5 Primary, 1 Secondary & 1 College)	-	**1 (100%)** (College)
		10-15	**3 (30%)** (3 Secondary)	**3 (6%)** (3 Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**8 (17%)** (5 Primary & 3 Secondary)	**2 (100%)** (2 College)	**1 (3%)** (1 Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- 50% ICSE respondents feel that it is tough to implement design thinking, 40% believe that it is easy and 10% believe that it is extremely easy with all the respondents having varying years of teaching experience.
- 10% of SSC respondents feel that it is extremely easy to implement design thinking, 59% respondents believe that it is easy whereas 31% believe that it is tough.
- All of the respondents from HSC board having an experience of more than 15 years believe that it is tough to implement design thinking.
- 6% CBSE respondents believe that it is extremely easy to implement design thinking, 66% respondents believe that it is easy to implement design thinking and 28% feel design thinking implementation to be tough.
- Majority of IGCSE respondents feel design thinking implementation to be easy whereas the rest of them feel it is tough.
- All of the respondents in collage having upto 10 years of teaching experience believe that it is tough to implement design thinking.
- None of the respondents from any of the board believe that it is extremely tough to implement design thinking.

4.31 Impact of Design Thinking on schools.

How useful had design thinking been to you?

The purpose of this question was to ask respondents how helpful they had found design thinking to be. They were given a variety of parameters, and they had to pick the one that they felt was the most suited for them. The table that follows summarizes the in-service instructors' responses.

Table 4.31.1 Comparison of In-service teachers responses on the usefulness of design thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Extremely useful	**Teaching Experience (in years)**	**0 – 5**	**1 (10%)** (1 Primary)	**2 (4%)** (1 Secondary & 1 College)	-	-	**1 (34%)** (University)	-
		5 – 10	**-**	**2**	-	**2**	-	-

				(4%) (1 Primary & 1 College)		**(6%)** (2 Primary)		
		10 –15	-	**2 (4%)** (2 Primary)	-	**1 (3%)** (1 Secondary)	-	-
		> 15	**2 (20%)** (1 Secondary & 1 College)	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
Very useful	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**2 (6%)** (2 Primary)	-	-
		5-10	-	**4 (8%)** (3 Primary & 1 College)	-	**8 (22%)** (5 Primary, 2 Secondary & 1 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10-15	-	**5 (10%)** (3 Primary & 2 Secondary)	-	**5 (14%)** (2 Primary, 2 Secondary & 1 College)	-	-
		>15	-	**6 (13%)** (2 Primary, 3 Secondary & 1 College)	**2 (100%)** (2 College)	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
Somewhat Useful	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**2 (4%)** (2 Primary)	-	**2 (6%)** (2 Primary)	-	-
		5-10	**1 (10%)** (1 Secondary)	**3 (6%)** (2 Primary & 1 College)	-	**8 (22%)** (4 Primary, 3 Secondary & 1 College)	-	-
		10-15	**4 (40%)** (4	**4 (8%)** (3 Primary	-	**2 (6%)** (1 Primary	-	-

			Secondary)	& 1 Secondary)		& 1 Secondary)		
		>15	-	**8 (17%)** (6 Primary, 1 Secondary & 1 College)	-	**1 (3%)** (1 Secondary)	-	-
Not at all useful	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	-	-	-	-	-	-
		10-15	-	-	-	**1 (3%)** (1 Secondary)	**1 (33%)** (Primary)	-
		>15	-	**1 (2%)** (1 Secondary)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- According to 30% of ICSE respondents, design thinking has been extremely useful to them, 10% say that it has been very useful and 50% believe that it has been somewhat useful to them.
- 16% SSC respondents feel that design thinking has been extremely useful to them while 46% believe that it has been very useful to them. 35% respondents believe that it has been somewhat useful to them and 2% believe that it has been not at all useful.
- All of HSC respondents believe that Design Thinking has been very useful to them.
- 9% CBSE respondents believe that Design Thinking has been extremely useful to them, 53% believe that it has been very useful, 37% believe that it has been somewhat useful while 3% believe that it has been not at all useful.
- 34% IGCSE respondents believe that design thinking has been extremely useful to then, another 33% believe that it has been somewhat useful whereas, another 33% believe that design thinking has not been of any use to them at all.
- All of the respondents of college believe that Design Thinking has been very useful to them.

4.32 Factors influencing the implementation of Design Thinking.

What has helped you the most in implementing design thinking with your students? (More than one option can be chosen)

The purpose of this question was to ask respondents on what factors help in the implementation of Design Thinking with the students. The respondents had the freedom to choose any number of items from a variety that was presented to them. The table below summarizes the in-service instructors' responses.

Table 4.32.1 Comparison of In-service teachers responses on the usefulness of design thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Building clarity/ protocols, create a stimulus, develop learning outcomes, resources, strategies	**Teaching Experience (in years)**	**0 – 5**	**2 (20%)** (2 Primary)	**7 (15%)** (3 Primary, 3 Secondary & 1 College)	-	**2 (6%)** (2 Primary)	**1 (34%)** (University)	-
		5 – 10	**1 (10%)** (1 Secondary)	**6 (13%)** (3 Primary, 1 Secondary & 2 College)	-	**14 (39%)** (9 Primary, 3 Secondary & 2 College)	**1 (33%)** (Secondary)	**1 (100%)** (College)
		10 –15	**3 (30%)** (3 Secondary)	**5 (10%)** (4 Primary & 1 Secondary)	-	**6 (17%)** (4 Primary, 1 Secondary & 1 College)	-	-
		> 15	**1 (10%)** (1 College)	**3 (6%)** (2 Primary & 1 Secondary)	-	**2 (6%)** (2 Secondary)	-	-
Supportive colleagues - with the same aim/ willing to try something new/ takes ownership/to collaborate	**Teaching Experience (in years)**	**0- 5**	**3 (30%)** (3 Primary)	**5 (10%)** (2 Primary & 3 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**9 (19%)** (5 Primary, 1 Secondary & 3 College)	-	**4 (11%)** (3 Primary & 1 Secondary)	**1 (33%)** (Secondary)	-
		10-15	**2 (20%)** (2	**5 (10%)** (3 Primary	-	**3 (8%)** (2 Primary	-	-

			Secondary)	& 2 Secondary)		& 1 Secondary)		
		>15	**1 (10%)** (1 Secondary)	**6 (13%)** (4 Primary, 1 Secondary & 1 College)	-	**3 (8%)** (3 Secondary)	-	-
Student's willingness, ownership of learning	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**10 (21%)** (6 Primary, 3 Secondary & 1 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (34%)** (University)	-
		5-10	-	**7 (15%)** (2 Primary, 1 Secondary & 4 College)	-	**11 (31%)** (6 Primary, 4 Secondary & 1 College)	-	**1 (100%)** (College)
		10-15	**2 (20%)** (2 Secondary)	**9 (19%)** (7 Primary & 2 Secondary)	-	**5 (14%)** (4 Primary & 1 Secondary)	-	-
		>15	**2 (20%)** (1 Secondary & 1 College)	**10 (21%)** (4 Primary, 4 Secondary & 2 College)	**2 (100%)** (2 College)	**2 (6%)** (1 Primary & 1 College)	-	-
Time to implement, plan	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**3 (6%)** (3 Primary)	-	**1 (3%)** (1 Primary)	-	-
		5-10	-	**5 (10%)** (2 Primary & 3 College)	-	**2 (6%)** (2 Secondary)	-	**1 (100%)** (College)
		10-15	**2 (20%)** (2 Secondary)	**1 (2%)** (1 Primary)	-	**3 (8%)** (1 Primary, 1 Secondary & 1 College)	-	-
		>15	-	**4 (8%)** (2 Primary, 2 Secondary & 1 College)	**2 (100%)** (2 College)	-	-	-

Teachers modelling desired behaviour/ teacher's confidence		**0- 5**	**1 (10%)** (1 Primary)	**3 (6%)** (2 Secondary & 1 College)	-	**2 (6%)** (2 Primary)	-	-
		5-10	-	**9 (19%)** (3 Primary, 3 Secondary & 3 College)	-	**4 (11%)** (3 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (1 Secondary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
		>15	-	**5 (10%)** (4 Primary & 1 College)	-	-	-	-
Feedback (from facilitators and students)		**0- 5**	**1 (10%)** (1 Primary)	**1 (2%)** (1 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	**1 (34%)** (University)	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**6 (17%)** (2 Primary & 4 Secondary)	-	-
		10-15	**1 (10%)** (1 Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		>15	**1 (10%)** (1 Secondary)	**5 (10%)** (1 Primary, 3 Secondary & 1 College)	-	**1 (3%)** (1 Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- Building clarity, according to 70% of ICSE teachers, has helped them integrate design thinking, supportive colleagues, according to 60% of ICSE teachers, has helped them integrate design thinking into their

curriculum, and student willingness and ownership of learning, according to 60% of teachers, has helped them integrate design thinking into their curriculum. The time it took to implement the design thinking plan, according to 40% of respondents, teachers modelling the desired behavior, according to 20% of ICSE respondents, and feedback, according to 30% of respondents, have all been significant factors in the success of the implementation of design thinking.

- Building clarity, according to 44% of SSC teachers, has helped them integrate design thinking, supportive colleagues, according to 55% of ICSE teachers, has helped them integrate design thinking into their curriculum, and student willingness and ownership of learning, according to 76% of teachers, has helped them integrate design thinking into their curriculum. The time it took to implement the design thinking plan, according to 26% of respondents, teachers modelling the desired behavior, according to 50% of SSC respondents, and feedback, according to 26% of respondents, have all been significant factors in the success of the implementation of design thinking.
- According to all HSC respondents, variables that aid in better integrating design thinking into the curriculum include student willingness, instructor confidence, and time for planning.
- Building clarity, according to 68% of CBSE teachers, has helped them integrate design thinking, supportive colleagues, according to 33% of ICSE teachers, has helped them integrate design thinking into their curriculum, and student willingness and ownership of learning, according to 57% of teachers, has helped them integrate design thinking into their curriculum. The time it took to implement the design thinking plan, according to 17% of respondents, teachers modelling the desired behavior, according to 31% of CBSE respondents, and feedback, according to 39% of respondents, have all been significant factors in the success of the implementation of design thinking.
- Approximately 67 % of IGCSE respondents believe that developing clarity aids them in better implementing design thinking, while 33 % believe that constructive feedback and helpful colleagues are the things that aid in better implementing design thinking.
- The college faculty are better able to utilize design thinking when there is greater clarity, student willingness, and planning time.

4.33 Challenges in the implementation of Design Thinking.

What can be some of the barriers or challenges that can be faced in implementing design thinking with your students? (More than one option can be chosen)

The responders to this question were asked to list some potential obstacles to design thinking implementation. The respondents had the freedom to choose any number of items from a variety that was presented to them. The table below summarizes the in-service instructors' responses.

Table 4.33.1 Comparison of In-service teachers responses on the challenges in implementing design thinking with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Lack of time (to implement, to brainstorm ideas, to 'fail' in prototypes, timetabling issue)	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (3 Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (34%)** (University)	-
		5 – 10	-	**4 (8%)** (2 Primary & 2 College)	-	**13 (36%)** (8 Primary, 4 Secondary & 1 College)	-	**1 (100%)** (College)
		10 – 15	**4 (40%)** (4 Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**5 (14%)** (1 Primary, 3 Secondary & 1 College)	-	-
		> 15	**1 (10%)** (1 College)	**7 (15%)** (5 Primary & 2 Secondary)	**2 (100%)** (2 College)	**2 (6%)** (2 Secondary)	-	-
Changing mindsets/resistance	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**2 (4%)** (1 Primary & 1 Secondary)	-	**4 (11%)** (2 Primary & 2 Secondary)	-	-
		5-10	-	**7 (15%)** (4 Primary & 3 College)	-	**6 (17%)** (4 Primary & 2 Secondary)	-	**1 (100%)** (College)
		10-15	**2 (20%)** (2	**3 (6%)** (3	-	**4 (11%)** (1 Primary	-	-

			Secondary)	Primary)		& 3 Secondary)		
		>15		**6 (13%)** (3 Primary & 3 Secondary)	**1 (50%)** (1 College)	**2 (6%)** (1 Secondary & 1 College)	-	-
Not suitable for all students (i.e. learning disorder, different learning stage, large student cohort)	**Teaching Experience (in years)**	**0- 5**	-	**1 (2%)** (1 Secondary)	-	**2 (6%)** (2 Primary)	-	-
		5-10	-	**4 (8%)** (3 Primary & 1 College)	-	**6 (17%)** (5 Primary & 1 Secondary)	**1 (33%)** (Secondary)	-
		10-15	**2 (20%)** (2 Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**4 (11%)** (1 Primary, 2 Secondary & 1 College)	-	-
		>15	-	**4 (8%)** (3 Primary & 1 College)	**1 (50%)** (1 College)	**2 (6%)** (1 Primary & 1 Secondary)	-	-
Lack of guidelines to teach students/ lack of rigour/ lack of ability to assess students	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**3 (6%)** (3 Primary)	-	-	**1 (34%)** (University)	-
		5-10	-	**5 (10%)** (4 Primary & 1 College)	-	**5 (14%)** (1 Primary & 4 Secondary)	-	**1 (100%)** (College)
		10-15	**2 (20%)** (2 Secondary)	**1 (2%)** (1 Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**7 (15%)** (5 Primary & 2 Secondary)	**1 (50%)** (1 College)	-	-	-
None	**Teaching Experience (in years)**	**0- 5**	-	-	-	-	-	-
		5-10	**1 (10%)** (1 Secondary)	-	-	**2 (6%)** (1 Secondary	-	-

						& 1 College)		
		10-15	-	**3 (6%)** (2 Primary & 1 Secondary)	-	**2 (6%)** (2 Primary)	**1 (33%)** (Primary)	-
		>15	**1 (10%)** (1 Secondary)	**5 (10%)** (2 Primary, 2 Secondary & 1 College)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- According to ICSE survey respondents, 80% believe they don't have enough time to use design thinking with their students, 40% say changing mindsets is a hurdle, and 20% say it isn't appropriate for all types of pupils. According to 40 % responses, they lack sufficient guidelines to teach the pupils, while 20 % indicate that there are no barriers.
- According to SSC survey respondents, 46% believe they don't have enough time to use design thinking with their students, 38% say changing mindsets is a hurdle, and 26% say it isn't appropriate for all types of pupils. According to 33% responses, they lack sufficient guidelines to teach the pupils, while 16% indicate that there are no barriers.
- While the majority of HSC respondents believe that lack of time is a barrier to using design thinking with students, half believe that changing attitudes, a lack of guidelines, and not being appropriate for all students are the hurdles to design thinking.
- According to CBSE survey respondents, 62% believe they don't have enough time to use design thinking with their students, 45% say changing mindsets is a hurdle, and 40% say it isn't appropriate for all types of pupils. According to 20% responses, they lack sufficient guidelines to teach the pupils, while 12% indicate that there are no barriers.
- A lack of time, not being acceptable for all types of students, and a lack of rules, according to about 34% of IGCSE respondents each, are some of the obstacles to teaching design thinking to students. 33 % more people believe that there are no obstacles to applying design thinking.
- According to respondents at the college, obstacles to using Design Thinking with students include a lack of time, a need to change mindsets, and a lack of rules.

4.34 Factors helping implementation of Design Thinking in school's curriculum.

What has helped you the most in implementing design thinking in your school's curriculum? (More than one option can be chosen)

The responders to this question were asked to list the elements that support the integration of design thinking into the curriculum at their educational units. The respondents had the freedom to choose any number of items from a variety that was presented to them. The table below summarizes the in-service instructors' responses.

Table 4.34.1 Comparison of In-service teachers responses on the factors which help in the implementation of Design Thinking in school's curriculum with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Committed and collaborative team/ colleagues willing to try new ideas	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (3 Primary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1 (34%)** (University)	-
		5 – 10	**1 (10%)** (1 Secondary)	**8 (17%)** (5 Primary & 3 College)	-	**11 (31%)** (8 Primary, 2 Secondary & 1 College)	-	-
		10 – 15	**1 (10%)** (1 Secondary)	**7 (15%)** (5 Primary & 2 Secondary)	-	**6 (17%)** (2 Primary & 4 Secondary)	-	-
		> 15	**1 (10%)** (1 College)	**6 (13%)** (3 Primary & 3 Secondary)	-	**4 (11%)** (1 Primary & 3 Secondary)	-	-
Facilitator's support and modelling of technique	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**5 (10%)** (3 Primary & 2 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	**1 (34%)** (University)	-
		5-10	**1 (10%)** (1	**3 (6%)** (1 Primary	-	**5 (14%)** (3 Primary,	-	**1 (100%)** (College)

			Secondary)	& 2 College)		1 Secondary & 1 College)		
		10-15	**2 (20%)** (2 Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**8 (17%)** (5 Primary, 1 Secondary & 2 College)	**1 (50%)** (1 College)	-	-	-
Leadership support	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**1 (4%)** (1 Primary)	-	-	**1 (34%)** (University)	-
		5-10		**4 (8%)** (2 Primary & 2 College)	-	**3 (8%)** (2 Primary & 1 Secondary)	-	-
		10-15	**2 (20%)** (2 Secondary)	**4 (8%)** (2 Primary & 2 Secondary)	-	**1 (3%)** (1 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**8 (17%)** (4 Primary, 3 Secondary & 1 College)	-	**3 (8%)** (2 Secondary & 1 College)	-	-
Time and opportunity to implement/ plan	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**8 (17%)** (4 Primary & 4 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		5-10	-	**5 (10%)** (2 Primary & 3 College)	-	**8 (22%)** (4 Primary, 3 Secondary & 1 College)	**1 (33%)** (Secondary)	-
		10-15	**2 (20%)** (2 Secondary)	**5 (10%)** (3 Primary & 2	-	**2 (6%)** (1 Secondary	-	-

				Secondary)		& 1 College)		
		>15	**1 (10%)** (1 College)	**6 (13%)** (3 Primary, 2 Secondary & 1 College)	**1 (50%)** (1 College)	**2 (6%)** (2 Secondary)	-	-
Shared learning with other schools	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**2 (4%)** (2 Primary)	-	-	-	-
		5-10	-	**3 (6%)** (1 Primary & 2 College)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		10-15	-	**1 (4%)** (1 Primary)	-	**5 (14%)** (2 Primary & 3 Secondary)	**1 (33%)** (Primary)	-
		>15	-	**4 (8%)** (2 Primary & 2 Secondary)	-	**1 (3%)** (1 Secondary)	-	-

Following are the conclusions drawn from the table presented above:

- Approximately 60% of ICSE respondents said that a dedicated and cooperative team had assisted them in implementing design thinking with their students. Another 60% said that the facilitators' support had been beneficial, 40% said the leadership's support, 50% said the time and opportunity to implement and plan had been beneficial, and 10% said that shared learning with other schools had been advantageous.
- Approximately 53% of SSC respondents said that a dedicated and cooperative team had assisted them in implementing design thinking with their students. Another 41% said that the facilitators' support had been beneficial, 37% said the leadership's support, 50% said the time and opportunity to implement and plan had been beneficial, and 22% said that shared learning with other schools had been advantageous.
- The support of the facilitator, along with time, space, and opportunities to execute and plan, are also cited by the other half of HSC respondents as being advantages of using design thinking with the students.
- Approximately 67% of CBSE respondents said that a dedicated and cooperative team had assisted them in implementing design thinking with

their students. Another 28% said that the facilitators' support had been beneficial, 19% said the leadership's support, 40% said the time and opportunity to implement and plan had been beneficial, and 25% said that shared learning with other schools had been advantageous.

- When using design thinking with their pupils, all of the listed aspects, according to about 33 % of IGCSE respondents, have benefited them in one way or another.
- According to respondents at the College, using modelling techniques and receiving guidance from facilitators has been beneficial for them when practicing design thinking with their students.

4.35 Challenges faced in implementing design thinking in school's curriculum.

What have been some of the barriers or challenges faced in implementing design thinking in your school's curriculum? (More than one option can be chosen)

This question required the respondents to identify the barriers faced by them in implementing design thinking into the school's curriculum. The respondents had the freedom to choose any number of items from a variety that was presented to them. The table below summarizes the in-service instructors' responses.

Table 4.35.1 Comparison of In-service teachers responses on the barriers in the implementation of Design Thinking in school's curriculum with regard to School Board, Teaching Experience and Teaching Level.

			School Board					
			ICSE	**SSC**	**HSC**	**CBSE**	**IGCSE**	**College**
Lack of time	**Teaching Experience (in years)**	**0 – 5**	**3 (30%)** (3 Primary)	**7 (15%)** (4 Primary & 3 Secondary)	-	**3 (8%)** (1 Primary & 2 Secondary)	-	-
		5 – 10	**1 (10%)** (1 Secondary)	**5 (10%)** (3 Primary & 2 College)	-	**10 (28%)** (6 Primary, 3 Secondary & 1 College)	-	**1 (100%)** (College)
		10 – 15	**4 (40%)** (4	**5 (10%)** (4 Primary	-	**3 (8%)** (1 Primary,	-	-

			Secondary)	& 1 Secondary)		1 Secondary & 1 College)		
		> 15	**2 (20%)** (1 Secondary & 1 College)	**7 (15%)** (5 Primary & 2 Secondary)	**1 (50%)** (1 College)	**3 (8%)** (3 Secondary)	-	-
Difficulty/inability integrating design thinking in a large school/ curriculum/ timetable	**Teaching Experience (in years)**	**0- 5**	**2 (20%)** (2 Primary)	**1 (4%)** (1 Secondary)	-	**1 (3%)** (1 Secondary)	**1 (34%)** (University)	-
		5-10	-	**4 (8%)** (2 Primary & 2 College)	-	**10 (28%)** (6 Primary, 3 Secondary & 1 College)	-	-
		10-15	**1 (10%)** (1 Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**(8%)** (3 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**6 (13%)** (3 Primary & 3 Secondary)	**1 (50%)** (1 College)	**2 (6%)** (2 Secondary)	-	-
Lack of leadership support/ staff resistance	**Teaching Experience (in years)**	**0- 5**	-	**2 (4%)** (1 Primary & 1 Secondary)	-	**2 (6%)** (2 Primary)	-	-
		5-10	-	**1 (4%)** (1 Primary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	**1 (10%)** (1 Secondary)	**4 (8%)** (3 Primary & 1 Secondary)	-	**1 (3%)** (1 Secondary)	-	-
		>15	-	**4 (8%)** (2 Primary & 2 Secondary)	**1 (50%)** (1 College)	-	-	-
Lack of resources, tools and materials	**Teaching Experience**	**0- 5**	**1 (10%)**	**3 (6%)**	-	**2 (6%)**	**1 (34%)**	-

or expertise to explain design thinking in the school	**(in years)**		(1 Primary)	(1 Primary & 2 Secondary)		(2 Primary)	(University)	
		5-10	-	**2 (4%)** (1 Primary & 1 College)	-	**7 (19%)** (3 Primary, 3 Secondary & 1 College)	-	-
		10-15	**2 (20%)** (1 Secondary)	**3 (6%)** (2 Primary & 1 Secondary)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		>15	**1 (10%)** (1 College)	**5 (10%)** (2 Primary & 3 Secondary)	-	**3 (8%)** (1 Primary, 1 Secondary & 1 College)	-	-
Administrative issue	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (3 Secondary)	-	**1 (3%)** (1 Secondary)	-	-
		5-10	**1 (10%)** (1 Secondary)	-	-	-	-	-
		10-15	**1 (10%)** (1 Secondary)	**1 (4%)** (1 Secondary)	-	-	-	-
		>15	-	**2 (4%)** (1 Primary & 1 Secondary)	-	-	-	-
Difficulty assessing progress/report	**Teaching Experience (in years)**	**0- 5**	-	**3 (6%)** (3 Primary)	-	**3 (8%)** (2 Primary & 1 Secondary)	**1 (34%)** (University)	-
		5-10	-	**4 (8%)** (3 Primary & 1 College)	-	**1 (3%)** (1 Primary)	**1 (33%)** (Secondary)	-
		10-15	**1 (10%)** (1 Secondary)	**1 (4%)** (1 Primary)	-	**2 (6%)** (1 Primary & 1	-	-

						Secondary)		
		>15	-	**3 (6%)** (2 Primary & 1 Secondary)	-	**1 (3%)** (1 Secondary)	-	-
Getting students on board	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**6 (13%)** (4 Primary & 2 Secondary)	-	-	-	-
		5-10	-	**2 (4%)** (2 Primary)	-	**3 (8%)** (3 Primary)	-	**1 (100%)** (College)
		10-15	-	**1 (4%)** (1 Primary)	-	-	-	-
		>15	-	**4 (8%)** (3 Primary & 1 Secondary)	-	**1 (3%)** (1 Secondary)	-	-
Lack of space	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**1 (4%)** (1 Primary)	-	**1 (3%)** (1 Secondary)	-	-
		5-10	**1 (10%)** (1 Secondary)	**1 (4%)** (1 College)	-	**2 (6%)** (1 Primary & 1 Secondary)	-	-
		10-15	-	**1 (4%)** (1 Secondary)	-	-	-	-
		>15	-	**1 (4%)** (1 Secondary)	-	-	-	-
Not suitable for certain students (i.e. on the spectrum)	**Teaching Experience (in years)**	**0- 5**	**1 (10%)** (1 Primary)	**2 (4%)** (2 Secondary)	-	-	**1 (34%)** (University)	-
		5-10	-	**3 (6%)** (3 Primary)	-	**6 (17%)** (4 Primary, 1 Secondary & 1 College)	-	-

		10-15	-	**4 (8%)** (3 Primary & 1 Secondary)	-	**3 (8%)** (2 Primary & 1 College)	**1 (33%)** (Primary)	-
		>15	-	**7 (15%)** (4 Primary, 1 Secondary & 2 College)	-	-	-	-

Following are the conclusions drawn from the table presented above:

- According to all ICSE respondents, a problem encountered when integrating design thinking into the curriculum at the school is a shortage of time. According to 40% of respondents, it is difficult to incorporate design thinking into the curriculum of large schools, 10% blame a lack of leadership support, 40% blame a lack of funding, 20% blame administrative problems, 10% blame difficulty in assessing projects, 10% blame difficulty in getting students on board, 20% blame a lack of space, and 10% blame it not being appropriate for some students.
- According to half of SSC respondents, a problem encountered when integrating design thinking into the curriculum at the school is a shortage of time. According to 33% of respondents, it is difficult to incorporate design thinking into the curriculum of large schools, 24% blame a lack of leadership support, 26% blame a lack of funding, 14% blame administrative problems, 24% blame difficulty in assessing projects, 29% blame difficulty in getting students on board, 20% blame a lack of space, and 10% blame it not being appropriate for some students.
- The obstacles encountered during the adoption of design thinking into schools' curricula, according to 50% of HSC respondents each, include a lack of time, difficulty implementing design thinking into the curriculum of large schools, and a lack of leadership support.
- According to 52% CBSE respondents, a problem encountered when integrating design thinking into the curriculum at the school is a shortage of time. According to 45% of respondents, it is difficult to incorporate design thinking into the curriculum of large schools, 15% blame a lack of leadership support, 39% blame a lack of funding, 3% blame administrative problems, 20% blame difficulty in assessing projects, 11% blame difficulty in getting students on board, 9% blame a lack of space, and 25% blame it not being appropriate for some students.
- According to nearly 67 % of IGCSE respondents, obtaining projects and reports is a barrier, and 34 % each believe that integrating design thinking

into the curricula of big schools and lacking resources, tools, and materials are obstacles to implement design thinking.

- According to respondents at college, the difficulties encountered when integrating design thinking into the curriculum are a lack of time and getting students on board.

4.36 Respondents opinions on Design Thinking.

What comes into your mind when you think of design thinking?

The respondents were asked to describe what they believed design thinking to be in response to this question. The responses from the in-service teachers are shown in the table below.

Table 4.36.1 In-service teachers responses on Design Thinking.

	Creativity and Innovation	**Cognition and Practicality**	**New techniques**	**Problem Solving**	**Solution-based (Learner centred & project based)**	**Empathetic**
ICSE	To teach in a creative way	Cognitive and practical	transforming ideas into concepts	-	-	-
	Designing an approach in an innovative way to solve problems	Constructive approach	-	-	-	-
	Innovation in teaching	-	-	-	-	-
	Creating an innovative technique to overcome the challenges faced by the students	-	-	-	-	-
	Way of fun learning	-	-	-	-	-
SSC	It's a creative and systematic approach in teaching method.	-	-	Problem solving and innovative methods	A project based learning	-
	To be creative	It represents a set of cognitive, strategic and	New teaching methods	Process of solving or making something	Customised solutions	-

		practical processes				
	Creating innovative solutions	Practicality	New method of teaching learning process that is planned.	Design thinking gives you an opportunity to take a look at problems from a completely different perspective.	It is a process where in I research the needs and problems of my students, make assumptions, create new ideas and try to start creating different solutions depending on each child	-
	Different way of thinking to teach students	It is a practical learning process.	-	It's the process of problem solving	I think of solving problems by prioritizing the consumer's needs above all else.	-
	Innovative ideas to make learning process easier and enjoyable for students and teacher as well.	-	-	Design thinking helps in solving problems or achieving ones set goals effectively.	-	-
	Creativity	How to canvas the concept of any topic in step by step manner	-	You can use design thinking as problem solving approach to im prove teaching.	Solution to any problem in any field.	-
	Creative learning process	-	-	-	-	-
	Creative ways to teach students	-	-	-	-	-
HSC	-	A cognitive process to design a concepts	Teaching different levels of students using different	-	-	-

			methods of your choice			
CBSE	Innovative ambassadors	cognitive, strategic and practical processes by which design concepts are developed.	Way to explain concept in a simple way	Design Thinking helps you solve problems from the user	Need based designing involving a structured thought process	observing, empathize, hands on approach
	Creative thinking	-	Sketches, Testing and Trials of new concepts ,ideas and whats human needs.	developing students ability to solve a problem	Design Thinking caters to the needs of present day generation with a lot of emphasis on student-centered teaching-learning process.	Design Thinking is a human-centered approach to design. It embraces empathy, inspires creativity, and encourages experimentation to create solutions .
	It uses a creative, systematic approach to teach problem-solving	-	-	It uses a creative, systematic approach to teach problem-solving	Planned solution based on situation	-
	Innovative way of problem solving	-	-	Problem solving technique	-	-
	Creativity, Innovative, Collaboration and Problem solving	-	-	approach to teach problem solving, brainstorming	-	-
	Innovative ways of thinking	-	-	-	-	-
IGCSE	Lateral Thinking innovation and skill	-	-	-	Learner centred	-
College	-	-	-	Problem solving by creating an idea that helps a larger audience	-	-

4.37 The most promising subject to apply design thinking to.

Which subject do you think has the most potential for design thinking to be used?

Respondents were asked to choose a subject that has the most potential for using design thinking. The table that follows provides a summary of the in-service instructors' responses.

Table 4.37.1 In-service teachers responses on the most potential subject for Design Thinking.

	Languages	Mathematics	Social Science	Science	Art	Computer	Miscellaneous responses
ICSE	-	4	1	4	-	-	Almost all
	-	-	-	-	-	-	All
SSC	6	16	1	18	8	4	Production management
	-	-	-	-	-	-	No Idea
	-	-	-	-	-	-	Almost all
HSC	1	-	-	1	-	-	-
CBSE	3	9	4	15	1	4	All ..but subjects which has analytical and problem solving as a skill imparted uses
	-	-	-	-	-	-	It can be used in teaching most of the subjects
	-	-	-	-	-	-	humanities subject
	-	-	-	-	-	-	All subjects
IGCSE	1	1	-	1	-	-	Not Applicable
College	-	1	-	1	-	1	Management

4.38 The least promising subject to apply design thinking to..

Which subject do you think has the least potential for design thinking?

Respondents were asked to choose a subject that has the least potential for using design thinking. The table that follows provides a summary of the in-service instructors' responses.

Table 4.38.1 In-service teachers responses on the least potential subject for Design Thinking.

	Languages	Mathematics	Social Science	Science	Art	Computer	Miscellaneous responses
ICSE	3	1	-	-	1	-	None
SSC	12	6	6	-	5	-	Technical subjects P.T
	-	-	-	-	-	-	Marathi
	-	-	-	-	-	-	Hardly any
HSC	1	-	-	-	-	-	Nil
CBSE	8	1	2	1	4	2	I feel design thinking can happen in all subjects
	-	-	-	-	-	-	Regional language
	-	-	-	-	-	-	All subjects must have the potential
	-	-	-	-	-	-	A bit of it can be integrated with every subject
IGCSE	1	1	-	1	-	-	Theatre
College	-	-	1	-	-	-	-

4.39 Conventional way vs Design Thinking.

What according to you is the difference between teaching a topic in a conventional way and using design thinking?

Respondents were questioned about the differences between teaching a subject conventionally and teaching it through design thinking. The table that follows provides a summary of the in-service instructors' responses.

Table 4.39.1 In-service teachers responses on conventional way vs design thinking.

	More Creativity / Innovation	New Methods / Practical Learning	Learner focused	Focus on concept	Feedback based	Exploration of knowledge	Miscellaneous responses
ICSE	It can be more creative	Same as rote and practical or interesting and boring	It is more child centred.	More appropriately content can be delivered.	-	-	Design thinking is the need of the hour in education field.
	Innovation	-	Design Thinking is way much better as it is learner Centred	-	-	-	you can demonstrate your method
	It's creative way of teaching a particular concept	-	-	-	-	-	-
SSC	Thinking become more creative	New unconventional ideas can be developed to solve a problem	Conventional methods are students oriented whereas design thinking can be used by both	The concept is understood fast.	In the traditional approach, we used data at the beginning of the process to guide our thinking, solution, and plan. In design thinking, we use a constant flow of feedback to come up with the right solution.	Traditional courses progress the student learning from conceptual understanding towards demonstrations of skill and capacity in a linear, topically focused manner. In Design Thinking, they are discovering knowledge through exploration.	Design thinking gives experiential learning to students
	It will be very innovative and creative	It bring the different technique	It helps to increase student involvement	The concept is more clear	-	Design thinking we are open to learn new	It is the process for solving problems in a

			in teaching learning process.			ideas on individual knowledge	easy way.
	Students can learn in creative way	It is more practical.	It will pique the curiosity of students	Design thinking is where students get involved and use their own ideas to grasp new concepts	-	-	It encourages the learner to feel and experience the topic, he /she more interestingly pays attention in design thinking.
	-	-	D T starts with the user need	Design thinking can help to understand the concept in better way.	-	-	-
	-	-	Design thinking is beneficial for learner as he/she takes part in learning with interest.	Design thinking can give better results and concepts can be understood efficiently	-	-	-
	-	-	The traditional approach is generally solution-oriented, with the goal of achieving perfection on the first try. On the other hand, on a very basic level, the design thinking technique comprises five steps: empathise, define, iterate, prototype, and test.	By using design thinking students can learn easy way .	-	-	-
	-	-		Its more productive	-	-	-

				way if past experience is inculcated to clarify the new concept			
HSC	-	-	First one is teacher centered later one is students centred and used as per there convenience.	-	Design thinking is based on feedbacks	-	-
CBSE	Design thinking will help students think out of the box and can also lead to creativity and divergent thinking	The real time aspect of the situation and feasibility of the solution	Design thinking is student centric.	It helps to understand better	We usually use data to go about, think and plan in conventional way but in design thinking there is more of feedback to come up with a right solution	Teaching using design thinking is based on responses and hence more effective.	Conventional way is the 'what' of teaching whereas design thinking is the 'why and how' of teaching.
	Conventional way of teaching teaches students to be familiar with textbooks whereas design thinking focuses on learning with creativity.	More practical	-	-	In the traditional approach, we used data at the beginning of the process to guide our thinking, solution, and plan. In design thinking, we use a constant flow of feedback to come up with the right solution.	-	A different point of view
	Creative thinking and better progress	-	-	-	In the traditional approach, we use data	-	Conventional teaching just develops knowledge but

					to plan; in design thinking there is feedback		design thinking helps to develop 21st century skills
	It can be more creative	Design thinking is more practical	-	-	It becomes more easy and practice for a child to understand design thinking.	-	Focus on core areas of problem
	Creativity, active participation, collaboration of students	Design thinking is always based on practical implementation whereas conventional way may not be always.	-	-	-	-	More experimental learning
	With using creative ideas	-	-	-	-	-	It's experiential learning
	Using design thinking will help students think in an innovative way.	-	-	-	-	-	Design thinking and traditional thinking are two different methods used in problem-solving. Compare and contrast design thinking and traditional problem-solving and discover how design thinking provides more possibilities and solutions.
IGCSE	-	-	-	-	-	-	The most important fabric is the development of lateral and liberal thinking

	-	-	-	-	-	-	Better retention
College	It can be more creative	-	-	-	-	-	-

4.40 Respondents opinions on Design Thinking creating empathy.

If the answer to the previous question is yes, then according to you how does design thinking create empathy?

This question was posed to respondents in conjunction with the prior question in the survey, in which respondents were asked to vote yes or no and give their view on whether design thinking generates empathy or not. This question asked respondents to express their perspectives and thoughts on how they believe design thinking fosters empathy. The table below summarizes the responses of in-service instructors.

Table 4.40.1 In-service teachers responses on design thinking creating empathy.

	Student's Perspectives	**Interaction with the environment**	**Problem Analysis & Solving**	**Comprehension of others**	**Training and Enrichment**	**Miscellaneous responses**
ICSE	To think from a student's point of view	As it is based on how people interact with environment.	-	The child realises through the journey what the other person work looks like.	You will be giving real experience to child	Liberty in thinking
	To some extent yes as it's a process which makes students think and thought process creates empathy I'm every manner	-	-	-	-	through demonstration
	Thinking from learners view	-	-	-	-	-
	Learners needs based	-	-	-	-	-
	Learner Centred	-	-	-	-	-
SSC	It helps the students to understand the concept in a easy way	Students learn their environment and then reacts to the situation	By understanding problems	Evokes an individual specific emotions in a child	-	Better collaboration with teachers and students

	It has freedom to express your own idea for learning	-	Helps a person analyse a problem they'd helping them understand it and create empathy	Empathy is the first step in design thinking because it is a skill that allows us to understand and share the same feelings that others feel.	-	It will help my students to see the concept in my way, it's a process where children learn with the flow
	teaches them how to solve another person's problems by providing creative and innovative solutions that relate to his or her needs	-	-	Because it is a skill that allows us to understand and share the same feeling that others feel.	-	As said above the learner feels the concept and shows empathy.
	-	-	It helps to tackle the problem easily.	Identify the end users and observe their behaviour, while leaving your subjective assumptions and experiences behind.	-	Students feel the concept and create empathy.
	-	-	Design thinking can be a useful tool for teaching empathy because it teaches students how to solve issues for others by giving creative and imaginative solutions that are relevant to their needs.	Empathy is the first step in design thinking because it is a skill that allows us to understand and share the same feelings that others feel.	-	It will help the child to understand and modify
	-	-	-	It is a skill that allows us to understand and share the same feelings that others feel.	-	By giving daily examples
HSC	Motivate students as per their interest,	-	It teaches the students how to solve	-	-	-

	requirements.		another's problem			
CBSE	Design thinking uses the concept of end users perspective.	Communicate with the child with empathy	understanding about the problem is the first step in design thinking so when a learner is aware about a problem , he tries to relate the problem , keep his foot in the same shoe and will try to find out the solution	Empathize is the first step and students understand the personal issues hence they feel more connected.	Learner becomes affective with the exposure	the first step is to empathise with the challenge
	-	Through interaction	Design thinking creates deep understanding of problems and realities.	To understand every possibilities that a child brings to the table...	-	First step is to empathize with the pain points of the user
	-	-	Understanding problem of students easily	As it is the first skill that allows ones to understand and share their feeling of others	-	Thinking leads to feel the situation and thus leads to empathize
	-	-	-	It is a skill that allows us to understand, share and connect with how the other person might be feeling about their problems or situation.	-	Makes them to get a complete knowledge of situations
	-	-	-	Empathy is used to imagine, feelings, and thinking this all the things create empathy.	-	Value based teaching can be done using any method
	-	-	-	Students can understand & recognise each other's views, emotions etc..	-	-
	-	-	-	we are able to put ourselves in other people's shoes	-	-

				and connect with how they might be feeling about their problem, circumstance, or situation		
IGCSE	-	-	-	-	Through ethical training and nourishment of a concept	It helps students to fore see the consequences hence it can aid empathy
College	To think from a student's point of view	-	-	-	-	-

4.41 Conclusion

This chapter informed us about the perspectives of in-service teachers on many areas of Design Thinking. While just a few instructors were aware of design thinking as a concept, others were aware of it as a word, and some offered their own thoughts on it. This chapter informed us of the study's findings and provided information on how well instructors understood design thinking.

This chapter also assisted us in reaching numerous conclusions and forming our own opinions on what further can be done to integrate design thinking into our curriculum and schools, as well as what else can be done to make the instructors aware of it.

Chapter 5 – Summary and Conclusion

5.1 Introduction

Many efforts were made to expand education after India's freedom. The government sought to give free and obligatory education to all children up to the age of 14. In 1986, the government adopted a National Policy on Education in response to the country's evolving socioeconomic requirements. The policy's principal components included universalization of basic education, vocationalization of secondary education, and specialization of higher education.

The system of non-formal education was intended as an experimental foundation beginning with the sixth plan and became a regular occurrence beginning with the seventh plan. This initiative was designed for youngsters who were unable to attend school owing to poverty and were too distracted with other tasks to make ends meet.

In the last decade, education in India has seen several significant changes. The education system has undergone significant change, with online learning and blended learning becoming the standard at practically all levels of school.

The availability of material was one of the most major developments brought about by technology. There are several applications and websites that offer free information to learners in various professions. The finest educational institutions took advantage of this since they use the internet media to give courses to students.

Technology has gradually improved to the point where experiential and project-based learning are now part of the curriculum.

The government developed several educational policies, and many previous policies were amended in order to improve the curriculum while also preserving Indian culture and fulfilling requirements.

The National Educational Policy 2020 is one of the most recent educational policies. The NEP 2020 has proposed big changes that will mark a watershed moment in Indian education.

In this age of technological advancement, the new education strategy 2020 emphasizes the relevance of artificial intelligence in education. The

administration in this country has prioritized the dissemination of technological information in order to include artificial intelligence into the curriculum.

The policy also emphasizes a multidisciplinary and multilingual approach, skill development, and overall digital learning ramp-up. The purpose is to prepare students for real-world challenges by promoting value-based education.

Design thinking is included as an optional subject in the National Education Policy 2020 curriculum, alongside current theory-based courses. Learners would also be introduced to design foundations and the design-thinking process.

The notion of design thinking extends back to the 1950s and 1960s, when people were struggling to thrive in a changing world. As the times changed, new techniques to handling complicated issues emerged, causing individuals to change their ways of thinking, and solving difficulties.

People struggled to grasp the concept of design thinking, how it should be executed, and what its ramifications were, particularly in the 1960s.

The notion of design thinking gained traction in the 1980s as a result of several testing and advancements. A professor in the United Kingdom conducted some problem-solving tests on his students and discovered that there were two types of problem solvers: problem focused problem solvers and solution focused problem solvers who generated a large number of solutions and eliminated those that did not appear to work out.

These solution-oriented issue solvers were discovered to be more suited to the design thinking process.

As the technique of design thinking evolved, several specialists from various professions used it in their own domains, and so it became a topic of interest.

Design Thinking is a technique that helps us understand the user and the types of difficulties and challenges that the user has, after which this approach aims to redefine the problems and provide alternative solutions that were not obvious in our original level of comprehension. It is a style of thinking and working together that employs a solution-based approach to solving user problems.

To implement the Design Thinking approach, it is critical to be interested in knowing the user for whom the goods and services are being produced. We may create empathy for the user by understanding them, and this process will help us develop questioning abilities, which will help us address situations that are ill-defined or unknown. This leads to the discovery of issues and their reframing in

human-centric ways, where some solutions to these problems are given through brainstorming sessions or by taking a hands-on approach in prototyping and testing.

Design thinking is "human-centered," which implies that it makes decisions based on evidence of how consumers (people) engage with a product or service, rather than how someone else or an organization believes they will interact with it.

Design Thinking is described as a five-stage process by the Stanford Institute of Design.

Empathize is the first stage.

This step enables us to develop an empathic grasp of the situation we're attempting to address. Empathy is critical to the design thinking process because it allows us to set aside our personal viewpoint and gain a real knowledge of consumers and their needs.

Stage 2: Specify

We organize the information received from the initial empathic step here. We then summaries and assess our data to determine the team's top priorities. These definitions are known as problem statements.

Stage 3: Create an idea

We can begin to "think outside the box," explore new views on the problem, and come up with innovative solutions to the problem statement we've developed since we have a firm foundation of facts from the previous two phases. Brainstorming sessions are very useful in this case.

Prototype (Stage 4)

This is the beginning of a trial period. The objective is to discover the best solution for every problem that arises.

5th stage: testing

Evaluators rigorously test the prototypes. Despite the assumption that this is the final step in the process, design thinking is iterative: teams usually use the results to reframe one or more issues. As a result, we may return to previous

phases to do further iterations, modifications, and enhancements - or to rule out alternative alternatives.

This technique improves understanding of the user and fosters empathy for the user. When it comes to design thinking, questioning plays an important part since it helps to challenge the user's concerns, as well as the assumptions and consequences of the solutions that are proposed. This allows us to confront situations that are unknown or confusing, as well as comprehend them more deeply and in a human-centric manner.

Design thinking is a method that fosters thinking outside the box by brainstorming ideas for new solutions to issues. It aids in breaking the pattern of our already established mentality.

When it comes to integrating design thinking into the curriculum, it simply allows students to focus on learning from their failures. It assists students and instructors in solving real-world challenges. The design thinking process begins with empathy, which helps students comprehend the needs of individuals or groups of individuals. The designers collaborate to identify the problem in this way. Once the problem has been identified, the team will work cooperatively to explore ideas and provide solutions.

5.2 Rationale of the study

Humans may not know what the future holds, but as educators, we must guarantee that our students are equipped to flourish in it. The world will be drastically different in the future; many new occupations will arise, while many existing ones will go. We can't predict which jobs will lead to higher success, so we can only do our best to prepare our pupils for future challenges.

Design Thinking is a methodical approach to tackling complex problems. The fundamental idea is to analyse the problem and develop the best possible solution. The process is then performed several times to achieve the greatest potential result. Design Thinking is a creative process, and everyone has their own style and ideas.

Design thinking is a human-centered approach to real-world problem solving that gives educators with the necessary procedures to determine the optimal solution, i.e., educating students for the future. Design Thinking is at its best when educators drive initiatives toward innovation. It is the ability to employ an inventive method in a step-by-step fashion to develop a better future for learners.

It intends to change the educational process by incorporating Design Thinking into the curriculum.

Design thinking is a mode of thought. It is both the concept that everyone can contribute to a better desired future and a means for taking action when faced with a difficult job. That kind of optimism is urgently needed in education.

Classrooms and schools throughout the world encounter design difficulties every day, from teacher feedback systems to everyday routines. The challenges that educators encounter, regardless of where they fall on the scale, are true, nuanced, and diverse. As a result, they require new perspectives, tools, and strategies. Design thinking is one of them.

It has been demonstrated that instilling a design thinking viewpoint in teachers is an excellent technique for fostering meaningful collaboration while also enhancing teachers' capacity to teach creativity, critical thinking, and interpersonal skills.

To integrate and execute Design Thinking in the classroom, instructors must first understand what Design Thinking is and what the process, tools, and strategies for implementing Design Thinking are.

When educators adopt a design thinking mindset, they may encourage a culture of cooperation, development, and experimentation. A combination of design experience, professional development, and ongoing support assists instructors in developing a design thinking mindset.

Because there has been few research on Design Thinking in India, the first step towards reaping the advantages of DT and incorporating it into the curriculum would be for educators to be familiar with the term Design Thinking.

Teachers may only plan to include DT into their teaching learning process or pedagogy once they are aware of it.

As a result, the purpose of this study is to compare instructors' understanding of design thinking with other variables such as teaching experience, teaching section and different boards.

5.3 Details of the study

Title of the study

"A Comparative Study of Awareness regarding Design Thinking amongst In-service Teachers of Mumbai District"

Statement of the problem

Comparative Analysis of Teachers with respect to certain variables with respect to how much they are aware about Design Thinking.

Aim of the study

To compare the extent of awareness regarding Design Thinking amongst teachers with regard to school level, school board, gender, teaching experience and subjects taught.

Objectives of the study

To compare the awareness regarding Design Thinking amongst teachers with regard to the following:

- school level (primary and secondary;
- school board;(SSC, ICSE, CBSE,IGCSE and IB)
- teaching experience(from 6 months onwards);
- subjects taught.

Research Question

R1 - What is teachers' awareness of Design Thinking?
R2 - How do teachers' awareness of design thinking differ depending on their teaching experience, school level, school board, and subjects taught?

Variables of the study

Awareness regarding Design Thinking

Conceptual and Operational Definition of the term Design Thinking

Conceptual Definition

Design thinking:

According to Oxford "Design Thinking is a method for practical, creative resolution of problems. It is a form of solution-based thinking with the intent of producing a constructive future result."

Operational Definitions

Design thinking- in this study design thinking awareness will be evaluated in terms of responses to the questionnaire developed by the researcher which would have questions related to concept of design thinking, its components and usage as well significance in education

Limitations and Delimitations of the study

The study is delimited in terms of:

- Sample of teacher only from Mumbai district
- Tools of research in English
- Tools made by researcher
- Only variables like school level (primary and secondary), school board;(SSC, ICSE, CBSE,IGCSE and IB)gender; teaching experience(from 6 months onwards) and subjects taught are considered

Design and Studies

The research design that will be used in this study is a comparative survey which aims to compare the In-service teachers knowledge about design thinking with respect to various variables such as gender, experiences, school level, school board, subjects taught etc.

Population and sample of the study

Sampling Technique:
The sampling technique used for this research is purposive sampling.

Purposeful sampling is a strategy used by researchers to find individuals who can offer in-depth and specific information on the topic being researched.

Sample

A sample, in research terminology, is a group of individuals, things, or products selected for assessment from a wider population. To guarantee that the findings

from the study sample can be applied to the entire population, the sample should be representative of the population.

The sample for the present research comprises of In-service Teachers of Mumbai District.

Sample Size

The sample for the present study consists of a combination of around 80 – 100 In-service Teachers of the Mumbai District.

Tools of the research

The tool used for conducting this research is a questionnaire which contains 33 closed ended questions and 5 open ended questions.

The close ended questions required the respondents to choose the response from the given options and the open ended questions required the users to provide their thoughts and opinions on the question being asked.

The questionnaire includes questions to determine whether respondents are aware of Design Thinking, the challenges that students and teachers face when implementing Design Thinking, the qualities a Design Thinker should possess, the types of positive changes seen in teachers and students, and which subject has the most potential for Design Thinking to be used, among other things. The purpose of the survey is to learn how respondents feel about Design Thinking and how they have applied it in their classrooms, as well as whether or not they are aware of the phrase and how they plan to utilise it in the future.

5.4 Major Findings

Awareness of Teachers regarding Design Thinking

- While all ICSE, HSC, IGCSE, and College professors are aware of design thinking, 27 % of SSC instructors and 12 % of CBSE instructors are still unaware.
- The majority of teachers who are aware of design thinking have up to 10 years of teaching experience, followed by teachers with more than 15 years of teaching experience, and finally instructors with up to 5 years of experience.
- The majority of instructors who are uninformed with design thinking (about 64 %) appear to be from the primary section.

Concept of Design Thinking

- When compared to other boards' instructors, ICSE and IGCSE educators apply design thinking in their own teaching and learning, followed by SSC and CBSE educators.
- The majority of instructors that employ design thinking in their own teaching and learning appear to be from the primary sector, followed by secondary and college level teachers.
- HSC and College instructors do not appear to use design thinking in their own teaching and learning.

Teachers' perception of the term Design thinking

- The majority of teachers across all boards see design thinking as a mindset, technique, tool, and process, with the majority coming from the primary section, followed by the secondary section, and then from college and university, with varied levels of teaching experience.

Rating knowledge on Design Thinking

- When asked to rank their understanding of design thinking, the majority of teachers are only partially knowledgeable, followed by instructors who are only slightly aware of the term. Only a few teachers are fully aware of what design thinking is.
- When compared to other boards' instructors, ICSE and IGCSE teachers are (partially) better aware of what design thinking is. When it comes to design thinking understanding and knowledge, CBSE teachers trail ICSE and CBSE board instructors.

Using design thinking conventionally

- Most instructors across all boards believe that all aspects of conventionally teaching a topic, such as curriculum designing, student project work, pedagogy, and evaluation, are on an equal scale; however, one of the most popular aspects of conventionally teaching a topic for ICSE, SSC, and CBSE instructors was curriculum designing.

Structuring curriculum around Design Thinking

- While most instructors were unsure when asked if design thinking could be structured around the entire curriculum, the majority of ICSE instructors were certain that it could, as the majority of them responded yes to the question, followed by teachers from the College and the CBSE board.

Most favorable subjects for design thinking

- Mathematics is regarded as the most favourable subject for design thinking majority of ICSE teachers with varying levels of teaching experience. Science, according to all HSC instructors, is the best subject for design thinking.
- Science is recognised as the most favourable topic by the majority of CBSE, IGCSE, and College instructors and professors. Languages and mathematics are two more prominent subjects for design thinking after science.

Product – oriented Design Thinking

- Most ICSE and SSC instructors feel design thinking is product-oriented, although some are uncertain. Professors at the College and IGCSE Board teachers are unsure if design thinking focuses on the product rather than the consumer.

Learner centered Design Thinking

- Most ICSE, SSC, CBSE and IGCSE instructors and all HSC and college instructors feel design thinking is learner-centred, although some are uncertain and some disagree.

Design Thinking product having an outcome

- The majority of ICSE, SSC, and HSC instructors feel that a product must have a result, but some disagree and others are doubtful. Professors from the College are certain that design thinking demands the production of a product with a purpose.
- The IGCSE teachers appear to be uncertain whether design thinking implies that a product must have a result, whereas half of the CBSE teachers agree with the assertion, half disagree, and some are unsure.

Overburdened curriculums having a scope of including Design Thinking

- The majority of ICSE, SSC, CBSE, and College instructors say that overloaded curriculum have the ability to integrate design thinking, while the remainder either disagree or are undecided, with the majority being undecided.
- At the IGCSE level, instructors' responses are evenly dispersed between Yes, no, and can’t say.

Design Thinking being experiential in Nature

- With various levels of teaching expertise, all ICSE, HSC, and IGCSE teachers and Professors at the College agreed that design thinking is an immersive process. The majority of CBSE and SSC teachers agree with the statement, but others disagree.

Design Thinking being used for developing skills

- ICSE, SSC, HSC, IGCSE, and College teachers feel that adding design thinking into problem-solving skills will assist students build problem-solving abilities. Only 3% of CBSE instructors disagree that design thinking can be utilised to assist pupils gain problem-solving abilities, while 97 % agree. None of the responders from the ICSE, SSC, HSC, IGCSE, or College disagreed with the statement provided to them.

Design Thinking having a future in education

- According to all the respondents, Design Thinking has a future in education. Everyone felt that design thinking had a bright future as an educational tool. No instructor disagreed to the statement provided to them.

Design Thinking creating empathy in a child

- Despite having varying levels of teaching experience, all responders from the ICSE, HSC, and College feel that Design Thinking may help children develop empathy. Approximately 77% of CBSE board respondents agreed that design thinking helps children to develop empathy, while the remaining 33% disagreed. 66% of IGCSE board respondents agree with the proposition offered to them, while 74% of SSC board members share the same opinion.

Degree of freedom in understanding design thinking

- While 90% of ICSE board respondents believe that design thinking can be modified to meet specific needs, the remaining 10% believe it is a rather inflexible approach. The SSC board respondents are in the same boat. Every IGCSE board and College respondent believes that Design Thinking can be adapted to meet the needs of the situation. Approximately 6% of CBSE respondents feel that design-thinking is a highly rigid approach, while the remaining 94% disagree claiming that it can be changed to meet the needs.

Solving Real world problems using Design Thinking

- Most of ICSE, CBSE, IGCSE and all of HSC board respondents feel that design thinking can be applied to tackle real-world issues, some disagree, and the rest are unsure about the idea of design thinking being used as a tool to solve the real-life problems.

Importance given to Process or Outcome in Design Thinking

- About 40% of ICSE teachers believe that process should be given importance to in design thinking majority of the respondents from SSC, CBSE and IGCSE board believe that both process and outcome should be equally important. About half of HSC respondents given more importance to process and another half give equal importance to both processes and outcomes.
- Respondents from College believe in giving equal importance to process and outcome.
- 90 % of ICSE respondents rated innovation as one of the most important design thinking skills, followed by creativity, which was rated as important by 50 % of ICSE respondents.

Important skills to develop Design Thinking

- 82% of SSC respondents believe innovation is the most important skill to develop design thinking, followed by 86 % who believe creativity is the most important skill to develop design thinking.
- 62% of CBSE respondents believe innovation is the most important skill to develop design thinking, followed by 80 % who believe creativity is the most important skill to develop design thinking.
- Collaboration was chosen as an important skill by 69 % of CBSE respondents, empathy by 47 %, and 20 % believe inquiry is one of the most important skills to develop design thinking and 91% believe problem solving to be one of the most important skills of developing design thinking.

Learning and Practicing Design Thinking

- The majority of ICSE, SSC, CBSE, and all HSC and College respondents feel that everyone can practise design thinking, while some disagree and others are unsure.
- Most IGCSE board teachers are uncertain of the idea that everyone can apply design thinking, and just a few of them agree.

Design Thinking empowering personal Growth

- While the majority of ICSE, SSC, CBSE, IGCSE, and College respondents believe that design thinking helps personal growth, others are doubtful. The assumption that design thinking may enable personal progress is rejected by all HSC board respondents.

Design Thinking catering to stakeholders

- The majority of respondents across all the boards believe that design thinking is beneficial for everyone - not just students or teachers or schools.

Design Thinking Implementation

- Most of the respondents from ICSE, SSC and CBSE board believe that design thinking is relevant in all of the variables stated, including adult education, teacher professional development, and student curriculum. Others argue that in design thinking, only cater to student curricula and classroom lessons.
- All responders from the HSC, IGCSE, and College feel that all aspects are equally significant in the implementation of design thinking.

Essential characteristics of a Design Thinker

- According to respondents across all boards, dynamic mindset appears to be one of the most important characteristics for a creative thinker, followed by empathy and, ultimately, being human-centred and optimistic, which were assigned similar importance after empathy.

Positive changes in students after inculcation of Design Thinking

- 70 % of ICSE respondents said that students' thinking becomes more creative; 30 % said that students become more resilient; nearly half said that students' capacity to comprehend and use new strategies improves; and they experience higher levels of engagement and understanding. 30% of respondents think it boosts their confidence in problem-solving, while 10% think they take more responsibility of their learning.
- Nearly half of HSC respondents say that when design thinking is used in the classroom, students' thinking improves, they become more resilient, and they become more engaged and collaborative. According to all HSC respondents, integrating design thinking into the curriculum strengthens students' capacity to comprehend and apply new concepts, as well as their sense of ownership over their education and confidence in their abilities to solve problems.
- According to over 33% of IGCSE respondents, the benefits of design thinking for students include their capacity to apply and comprehend new techniques, increased levels of engagement and cooperation, and more control over their education.

Positive changes in educators after inculcation of Design Thinking

- A changed mindset, new ideas, and more confidence are some advantages of introducing design thinking into teaching, according to nearly half of HSC respondents. They almost unanimously agree that the benefits of introducing design thinking into pedagogy include increased knowledge, more creative and empathic thinking, and motivation to modify teaching methods. According to 45% of CBSE respondents, when teachers

incorporate design thinking into their lessons, they become inspired to change the way they teach, 34% say they gain knowledge, 50% say they adopt a new mindset, 51% are open to new ideas, 67% say their thinking becomes more critical, creative, and empathetic, and 33% say they gain more confidence. Nearly 66 % of IGCSE respondents think that incorporating design thinking into pedagogy will inspire teachers to change their methods of instruction and encourage them to think more critically, creatively, and compassionately. The remaining respondents think that doing so will give teachers a different perspective and give them more confidence.

Impact of Design Thinking on schools

- Positive curricular modifications are visible to 30% of respondents, 10% of respondents exhibit more expansive and unstructured thinking, and 20% report improved levels of student involvement. Positive curricular modifications are visible to 38% of respondents, 18% of respondents exhibit more expansive and unstructured thinking, and 27% report improved levels of student involvement. The half of HSC respondents believe that design thinking promotes better collaboration between teachers and students, better understanding and support, better conversations, unstructured thinking, and higher levels of student engagement. Positive curricular modifications are visible to 51% of respondents, 25% of respondents exhibit more expansive and unstructured thinking, and 29% report improved levels of student involvement. While 66 % of IGCSE respondents agree that schools are more receptive to new ideas, that teachers and students collaborate better, that new tactics may be applied more often, and that student participation is higher, just 33 % feel that the curriculum can be positively altered. According to all responders from the College, schools are more receptive to new ideas, instructors and students work together better, the curriculum can be positively altered, and student engagement is higher.

Ease of Implementing Design Thinking

- 50% ICSE respondents feel that it is tough to implement design thinking, 40% believe that it is easy and 10% believe that it is extremely easy with all the respondents having varying years of teaching experience. All the respondents from HSC board having an experience of more than 15 years believe that it is tough to implement design thinking. Majority of IGCSE respondents feel design thinking implementation to be easy whereas the rest of them feel it is tough.

Respondents' opinions on Design Thinking

- According to 30% of ICSE respondents, design thinking has been extremely useful to them, 10% say that it has been very useful and 50% believe that it has been somewhat useful to them. 35% respondents believe that it has been somewhat useful to them and 2% believe that it has been not at all useful. 9% CBSE respondents believe that Design Thinking has been extremely useful to them, 53% believe that it has been very useful, 37% believe that it has been somewhat useful while 3% believe that it has been not at all useful.

Respondents' opinions on Design Thinking creating empathy

- According to the responses of the in-service teachers, student understanding of a concept improves, they believe students are better able to interact with the environment, they gain an understanding of the problems and realities of the world as they try to come up with solutions for the same, which results in the development of their problem solving abilities, and the children are better able to understand the feelings of others and there is better collaboration between the students as they have a liberty of thought.

5.5 Discussion on findings

Based on the data, we may deduce that few instructors in India have implemented Design Thinking into their curriculum since few are aware of what Design Thinking is. While some have heard it from co-workers, others have heard it from NEP 2020, and still others have heard the phrase design thinking through seminars or studies.

As a result, we might presume that certain professors in India appear to have a hazy comprehension of Design Thinking.

Despite the fact that some instructors are informed with Design Thinking, according to the study, only a few have attempted to incorporate it into their curriculum, which might be due to a variety of factors.

One of the reasons we may presume is the breadth of the curriculum, which varies depending on the board of study. Due to the extensive syllabus, teachers may find it challenging to include design thinking. Another aspect related to the syllabus is completion. Completion of the syllabus may be one barrier limiting instructors' ability to apply design thinking.

Another issue might be the uncertainty that the instructors are experiencing. They may be concerned about the method and results of implementing it into the curriculum.

Based on the responses, it is possible to conclude that educators are not completely aware of the nature of Design Thinking and how it should be implemented.

The educators believe that incorporating design thinking can transform the way any teaching is conducted, it can help students understand and comprehend better, critical thinking and problem-solving skills can be developed, but they also believe that there are many obstacles that stand in the way, one of the most common being a lack of time and another being a lack of guidelines. Some educators also believe that convincing pupils to perform the tasks assigned by the teacher might be tough, therefore adding design thinking into the curriculum is a challenging undertaking.

According to a study (Mukherjee D, Hasan K. K, Shah M, Reheman M, Nasrin M, Karim R (2022)), innovative educational strategies examine children's physical and psychological well-being and affect their activities to differentiate the impact of the classroom environment from other teaching-learning techniques. A design thinking technique was utilised to evaluate a child's creative thinking ability through focus group discussions.

Another research (McLaughlin JE, Chen E, Lake D, Guo W, Skywark ER, Chernik A, 2022) found that college graduates are increasingly expected to have the problem-finding, problem-framing, and problem-solving abilities required to deal with complex real-world circumstances. Understanding how DT is taught in higher education may help institutions promote learning and integrate their educational programmes with professional, personal, and civic expectations.

Noel L and Liu T (2022) conducted a study on Using Design Thinking to Create a New Education Paradigm for Elementary Level Children for Higher Student Engagement and Success, with the goal of analysing and synthesising current literature as well as conducting preliminary analyses to aid in the development of design thinking education interventions at the primary school level, which could lead to a paradigm shift in education. The study also revealed that, in addition to academic progress, other characteristics and abilities such as empathy, teamwork, and human-centeredness might be motivational elements that can be strengthened through design thinking approaches.

So, while educators are aware of the numerous benefits of Design Thinking, they are finding it difficult to overcome the problems that it brings.

With educators having just a hazy understanding of Design Thinking and only a few attempting to implement it into the curriculum, we can deduce that

educators need to learn more and go further into the concept of Design Thinking.

From the number of researches conducted on Design Thinking in India it can be seen that not a lot of educators/schools are aware about the concept of Design Thinking.

5.6 Suggestions

Design thinking, as a paradigm for reframing approaches and results, reconnects educators to their creativity and goals for assisting students in developing as profound thinkers and doers.

Design thinking is a human-centred approach to issue resolution that starts with creating empathy for individuals who are confronting a specific situation. It acts as a framework for defining challenges, empathising with people, creating prototypes of potential solutions, and refining those prototypes via repeated iterations until they have produced a viable solution to the difficulty at hand.

The recently announced National Education Policy (NEP) 2020 emphasises the importance of shifting the focus of the Indian education system away from test and rote learning and toward conceptual clarity, critical thinking, problem-solving, innovation, and creativity.

This is a wonderful step since India certainly needs innovative brains that can bring about huge changes and help India become a worldwide power. Creativity is one of the most significant human resources because it allows us to see beyond what is already there and create new ways of thinking.

Nurturing creativity in our children is thus an urgent requirement, and we must implement fundamental reforms in our educational system, particularly in the way instructors now teach and students learn.

While Design Thinking is being used in other nations, it is yet to become a topic of discussion in India. With recent educational system modifications, Design Thinking is steadily making its way into the Indian school system.

As more educators become aware of Design Thinking, there is an increasing desire to look deeper into the concept of Design Thinking and how it may be applied into the school and its curriculum.

The educators must be aware of the obstacles and benefits that it brings, as well as do research on what all areas and components may be addressed if Design Thinking is implemented.

As a result, in order to incorporate Design Thinking into the school curriculum, the educator must undergo extensive study and training. Some areas of research on Design Thinking could include:

- A comparative study of Design Thinking approaches in relation to various disciplines.
- A study of the effects of implementing Design Thinking techniques in educational institutions.
- A comparative study of Educational Institution operations with and without the implementation of Design Thinking approaches.
- A study of the Design Thinking processes in several boards.
- A comparative study on student performance with and without the integration of Design Thinking methodologies.

To undertake these studies, educators and schools must first be aware of the term Design Thinking and be willing to see and improve the teaching-learning processes. The educators must be willing to adapt the patterns and processes in order to assist students grasp topics holistically and gain various skills and abilities that will aid and prepare the students to face and live in the real world.

5.7 Conclusion

Throughout the research study, Design Thinking is considered as a concept that may aid in the transformation of the education system for the benefit of all parties concerned.

But it is truly the contribution of everyone who can push it ahead by learning about it, studying about it, and acting on their knowledge.

The desire to help students grow holistically, preparing them for facing and living in the real world, and preparing them to meet and overcome problems, is the first step toward a new approach to teaching and learning. Teachers must be prepared to help students in the right way by serving as facilitators and providing the necessary push and advice so that they may conquer the problems on their own.

The Design Thinking method fosters empathy among students. This will assist students in living and thinking about the community and the environment in

which they live, and in order for this to occur, educators must be prepared to use new and inventive ways to guide them in the right path.

Bibliography

Research Papers

Badke-Schaub, Petra & Cardoso, Carlos. (2010). Design thinking: A paradigm on its way from dilution to meaninglessness? Proceedings of the 8th Design Thinking Research Symposium (DTRS8).

Bhandari, A. Design Thinking: from Bibliometric Analysis to Content Analysis, Current Research Trends, and Future Research Directions. J Knowl Econ (2022).

Bhatnagar, Tigmanshu & Badke-Schaub, Petra. (2017). Design Thinking and Creative Problem Solving for Undergraduate Engineering Education in India: The Need and Relevance.

C. Parikh, K. Maddulety, CJ Meadows,
Improving creative ability of base of pyramid (BOP) students in India, Thinking Skills and Creativity, Volume 36, 2020,

Cara Wrigley, Genevieve Mosely, Martin Tomitsch,
Design Thinking Education: A Comparison of Massive Open Online Courses, She Ji: The Journal of Design, Economics, and Innovation, Volume 4, Issue 3, 2018

Danah Henriksen, Carmen Richardson, Rohit Mehta,
Design thinking: A creative approach to educational problems of practice, Thinking Skills and Creativity, Volume 26, 2017,

Debarshi Mukherjee & Khandakar Kamrul Hasan & Mahasweta Saha & Mokhlesur Rahman & Mahfuza Nasrin & Reazul Karim, 2022.
"Evolution of classrooms in primary education using a design thinking approach: the case of Rajshahi District of Bangladesh," International Journal of Knowledge and Learning, Inderscience Enterprises Ltd, vol. 15(2), pages 148-164.

Dulababu, Tapal. (2019). Design Thinking: Indispensable for Indian Business Schools.

G. Sarah (2021). Design Thinking in Practice: Research Methodology

Gavin Melles, Zaana Howard, Scott Thompson-Whiteside,
Teaching Design Thinking: Expanding Horizons in Design Education,
Procedia - Social and Behavioral Sciences, Volume 31, 2012,

Guaman-Quintanilla, Sharon & Everaert, Patricia & Chiluiza, Katherine & Valcke, Martin. (2022). Impact of design thinking in higher education: a multi-actor perspective on problem solving and creativity. International Journal of Technology and Design Education.

Kijima, R., Yang-Yoshihara, M. & Maekawa, M.S. Using design thinking to cultivate the next generation of female STEAM thinkers. IJ STEM Ed 8, 14 (2021).

Magistretti S, Dell'Era C, Verganti R, Bianchi M (2021). The contribution of Design Thinking to the R of R&D in technological innovation.

McLaughlin JE, Chen E, Lake D, Guo W, Skywark ER, et al. (2022) Design thinking teaching and learning in higher education: Experiences across four universities.

McLaughlin, J.E., Wolcott, M., Hubbard, D. et al. A qualitative review of the design thinking framework in health professions education. BMC Med Educ 19, 98 (2019). https://doi.org/10.1186/s12909-019-1528-8

Noel, Lesley-Ann & Liu, Tsailu. (2016). Using Design Thinking to create a new education paradigm for elementary level children for higher student engagement and success.

Panke, Stefanie. (2019). Design Thinking in Education: Perspectives, Opportunities and Challenges. Open Education Studies. 1. 281-306. 10.1515/edu-2019-0022.

Razzouk, Rim & Shute, Valerie. (2012). What Is Design Thinking and Why Is It Important?. Review of Educational Research. 82. 330-348. 10.3102/0034654312457429.

Retna, Kala S. Thinking about "Design Thinking": A Study of Teacher Experiences Asia Pacific Journal of Education, v36 suppl 1 p5-19 2016

Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., Lee, H. Y., O'Brien, J., Flint, K., Roberts, A., Trott, J., Greene, D., Walton, G. M., & Dweck, C. S. (2016). Using design thinking to improve

psychological interventions: The case of the growth mindset during the transition to high school. Journal of Educational Psychology, 108(3), 374–391.

Online References

- *https://www.interaction-design.org/literature/article/what-is-design-thinking-and-why-is-it-so-popular*
- *https://www.wework.com/ideas/professional-development/creativity-culture/what-is-design-thinking*
- *https://www.celt.iastate.edu/teaching/teaching-strategies/design-thinking/*
- *https://www.getsmarter.com/blog/market-trends/the-role-of-artificial-intelligence-in-the-future-of-education/*
- *https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-021-00271-6*
- *https://www.sciencedirect.com/science/article/pii/S2405872618300145*
- *https://www.sciencedirect.com/science/article/pii/S1877042811029648*
- *https://www.education.gov.in/sites/upload_files/mhrd/files/upload_document/npe.pdf*
- *https://en.wikipedia.org/wiki/*
- *National_Policy_on_Education#:~:text=In%201986%2C%20the%20government%20led,Scheduled%20Caste%20(SC)%20communities.*
- *https://onlineschoolsindia.in/school-guide/main-features-of-poa-1992-programme-of-action/*
- *https://en.wikipedia.org/wiki/National_Curriculum_Framework_2005*
- *https://ezyschooling.com/parenting/expert/design-thinking-for-education-conceptions-and-applications-in-teaching-and-learning*
- *https://idreamcareer.com/blog/design-thinking/#:~:text=Students%20acquiring%20design%20thinking%20skills,challenges%20of%20the%20coming%20future.*
- *https://psycnet.apa.org/doiLanding?doi=10.1037%2Fedu0000098*
- *https://www.sciencedirect.com/science/article/abs/pii/S187118711930183X*
- *https://www.inderscienceonline.com/doi/abs/10.1504/IJKL.2022.121997*
- *https://link.springer.com/article/10.1007/s13132-022-00920-3#citeas*
- *https://www.researchgate.net/publication/331022054_Design_Thinking_Indispensable_for_Indian_Business_Schools*
- *https://hbr.org/2018/09/why-design-thinking-works*
- *https://www.deccanherald.com/supplements/dh-education/introducing-design-thinking-in-schools-1060387.html*
- *https://timesofindia.indiatimes.com/home/education/news/schools-to-introduce-design-thinking-and-innovation-module-to-usher-creativity/articleshow/91578521.cms*