Impact of Structured Design Thinking on decision-making Ability in 21st Century Managers

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Abstract: *21st century calls on managers, who, have this crucial skill, called decision making. They must be ready to take decisions that are correct. However, the business domain is getting complex & unpredictable; which require more than before the skill to take informed decisions for complex problems to be sorted. And for this it is crucial that the young managers are able to take decisions out of various alternative by considering their implications, & thus choose the best alternative as their action to achieve their goals. And for this one requires a mindset which is a combination of critical thinking, problem-solving, & strategic planning skills. Taking the right decisions should also be aligned with organizational goals. This research paper lays stress on studying the impact of design thinking in cultivation of decision-making ability among the younger generation of managers who are undergoing management education such that they are absorbed by organizations across various sectors as a means of driving innovation & improving organizational performance. This study makes use of large data set employing quantitative research using Liker scale data analysis along with the paired sample t test intervention.*

Key Words: *Decision Making; Design Thinking; Management; Managers; Models; Stakeholders*

1. INTRODUCTION:

Design Thinking, which started in the 1960s **(SIMON, 1969)**, is a process that pays attention to human needs and experiences. It emphasizes with users, to define problems, generate ideas for creation of solutions, prototype the solutions and test them to get final stakeholder relevant solutions. It is growing in popularity due to generation of innovation through it and with a focus on resulting into user centric products and services. There are traditional designs, however, design thinking can change the way decisions are made in various business and organizations. And to get a holistic view of its strength it is necessary that various tools and techniques of the design methods are explored and also managers are trained with its principles. This research paper explores how design thinking enhances decision-making skills among the young managers who are currently in academics, reviewing relevant concepts and models, and presenting findings.

2. LITERATURE REVIEW:

Decision making makes use of knowledge in order to come down to different alternatives. It keeps into account various factors like risks, benefits, costs, probabilities, and preferences to come down to the most relevant and correct decision. The process of taking decisions is not just about making choices but it also involves complex strategic decisions to be taken which greatly depend upon internal factors like personal/individual values, emotions, and mental biases, along with as external factors like environmental conditions and the resources available.

By definition: The process of decision making makes use of identification & selection of choices, keeping in mind the values & preferences of the decision maker. It indicates that there are multiple choices available, & the aim is to not only identify a wide range of choices but also select/choose the one that aligns most effectively (Harris, 1980). As, it can be inferred from the definition and thoughts expressed by (Fülöp, 2005). Effective decision-making requires forecasting outcomes for each option and choosing the best one for the situation. This complex process involves various skills, handling feedback, balancing structure and creativity, resolving conflicts, and understanding products/services/systems/users. Decision-making also entails recognizing opportunities, learning from mistakes, valuing experience and intuition, and dealing with dilemmas/dissonance. Managers must develop these skills to navigate today's complex work environment.

DECISION MAKING MODELS

Several decision-making models and frameworks, such as balanced decision-making, bounded reasonableness, spontaneous decision-making, and behavioral decision-making, assist individuals in making better choices. In order to understand complex situations by highlighting key features/variables and providing a structured framework for analysis and decision-making. Models are developed by a thoughtful process, selecting relevant variables, identifying relationships among them, and creating a conceptual framework.

The BCG matrix, developed by the Boston Consulting Group, is a strategic tool that evaluates business units or product lines based on market share and growth, offering valuable investment insights (Morrison Alan W. R., 1991). Complementing this, the Rubber Band Model aids decision-making by acknowledging the psychological tension between desires and fears, encouraging individuals to identify what is pulling them toward or away from a choice to gain clarity and make value-based decisions. Similarly, the Consequence Model addresses decision-making under ambiguity, emphasizing that delaying decisions is itself a choice, and that boldness, clear communication, and action—despite limited information—are often more effective than indecision (Soren K. K., 2018). The Pareto Principle, or 80/20 rule, originally observed by Vilfredo Pareto, suggests that 80% of outcomes stem from 20% of causes and highlights the efficiency of focusing on the most impactful factors (Craft C. Ralph, 2002). Finally, the Long-Tail Model by Chris Anderson (2006) illustrates how digital markets have shifted toward niche consumption, with a significant portion of revenue emerging from the collective impact of low-volume products. The business strategies have been reshaped by this model which promotes diverse and smaller creators by use online platforms. It can be seen that these models offer a variety but also give complementary views on decision-making, strategies, and the market trends.

While decision-making models can support young managers, they may oversee the views of stakeholders, which results in taking decisions in isolation and hence they do not align with organizational goals. Managers should recognize these limitations and know when to involve others. Decision-making models provide structure but aren't one-size-fits-all. Effective decision-making requires adapting to context, combining individual judgment with collaboration, and considering the broader impact on stakeholders. Managers need to adapt their decision-making style based on the context, complexity, and impact of the decision at hand.

DESIGN THINKING

Design Thinking greatly depends on the process, a collaborative way of solving problems that democratizes decision-making. Unlike traditional top-down decision-making models, Design Thinking is participatory and decentralized, involving stakeholders in user research, ideation, and co-creation sessions. This leads to more effective and innovative solutions that better meet user and stakeholder needs. The co-founder of IDEO David Kelley, is credited with pioneering Design Thinking. He solidified the term "Design Thinking" to describe IDEO's approach, emphasizing that it involved multiple steps and principles for project execution. The CEO, Tim Brown, coined the term 'design thinking', outlining the steps in the process, and provided stories to help everyone, apply IDEO's methods (Johansson-Sköldberg et al., 2013; 2015). Design Thinking is recognized as a structured process, deriving its form from insights that help tackle unpredictable and complex problems, often referred to as "wicked problems," which seem to lack straightforward solutions said by (Brown D. , 2014). By employing the mindsets and methods commonly used by designers, Design Thinking enables the generation of innovative ideas, solutions, and choices that cater to user desires. Also, the approach aims to fulfill three essential conditions: desirability, feasibility, and viability. Design Thinking is deemed strategic in both management and learning contexts said by (Barry, 2007). It is influential, operative, and extensively accessible process that fosters innovation and can be effectively applied in both business and education. To solve managerial problems, Design Thinking employs creative tools, said by (Brown, 2008).

DECISION MAKING THROUGH DESIGN THINKING

Design Thinking can help develop decision-making skills by providing a structured framework that requires critical thinking, collaboration, & experimentation.

Empathy helps decision-makers to consider different perspectives & POVs, leading to more well-rounded decisions.

Define stage involves coming down to the right problem that the stakeholders are facing. Coming down to clubbing various problems of stakeholders, & zeroing down to one, requires decision making.

Ideation is the process of generating as many ideas as possible. This process can help develop decision-making skills by teaching individuals to consider as many ideas as possible to decide the top three ideas in the end.

Prototyping allows decision-makers to test their ideas & gather feedback from users. This feedback helps to refine the solution & make better decisions in implementation of the solution.

Testing: The process of iteration is performed ongoingly until the final solution is reached. This process allows decision-makers to continuously enhance their prototypes. Iterations help them in deciding the right solution.

3. OBJECTIVES:

Several discussions were conducted with students who underwent design thinking program as an academic subject. Questionnaires were made available to these students. And n basis of these value laden interviews the following hypothesis was proposed:

Hypothesis (HO1): Design Thinking process inculcates decision making skill among the management students, apart from using the traditional analytical skills.

4.METHODOLOGY :

In this study comprised of data coding such that there is accuracy in analysing the Likert scale data responses and this seemed to be very structured when the participants responses have to be analysed before and after the design thinking program. Number values like 1, 2, 3 and 4 were coded for "Strongly Agree", "Agree", "Disagree" and "Strongly Disagree" respectively. This helped in the quantitative evaluation of participants responses that changed over time. Clear analysis of shifts in attitude of participants could be found and analysed both considering the pre- and post-intervention surveys. In order to evaluate the differences in mean scores before and after the design thinking program a paired sample t test was employed, thus, giving meaningful insights into the impact of the design thinking program. By combining coding, t-tests, the study provided a comprehensive statistical understanding of the intervention's effectiveness and the broader dynamics within participant responses.

DATA ANALYSIS TECHNIQUES

Data analysis was the crucial step that brought about a distinct differentiation between unprocessed data and insightful conclusions. Choosing the right data analysis methods depended upon the data type, the questions generated and the actual goal of the study. To evaluate hypothesis, qualitative analysis was performed on group of students. Quantitative analysis techniques like inferential statistics, and descriptive statistics were also used.

QUANTITATIVE ANALYSIS

For this study there was a requirement of getting an objective, along with data that could be measured and also could be examined statically and henceforth quantitative research was employed. Also, because precise, accurate and measurable results were needed. Along with this the power of extrapolating the results to a broader population was one of its main advantages. The reliability and strength of the results were enhanced as it had the capacity to collect a broad range of data points. Also, quantitative analysis uses structured data collection tools, which are like questionnaires using Likert scale responses, and the paired sample t-test.

5. RESULTS :

LIKERT SCALE DATA ANALYSIS

As per the responses related to the development of decision-making skills, which were evaluated through a series of questions. Insights can be drawn from these responses upon how participants consider their decision-making skills over time, keeping mind the design thinking program that they underwent. The data can be analysed to identify trends in skill improvement, areas of strength, and potential challenges faced by participants. This approach dug deeper to develop an understanding towards how decision-making processes evolve along with how they are influenced by specific educational or training experiences.

Table 5.1 Counting all feedback of students for decision making

Response	Q1	Q3	Q4	Q5	Q6	Q7	Q9	Q10	Q12	Q13	Q16	Q17	Q19
Agree	487	325	600	319	331	481	425	275	544	487	438	594	588
Strongly Agree	0	375	100	381	369	113	219	375	156	163	263	56	113
Disagree	213	0	0	0	0	106	56	50	0	50	0	50	0
Strongly Disagree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	700	700	700	700	700	700	700	700	700	700	700	700	700

Table 5.2. Report of Likert scale data

QUESTIONS	AGREE (%)	STRONGLY AGREE (%)	DISAGREE (%)	STRONGLY DISAGREE (%)
Question 1	70%	0%	30%	0%
Question 3	46%	54%	0%	0%

Question 4	86%	14%	0%	0%
Question 5	46%	54%	0%	0%
Question 6	47%	53%	0%	0%
Question 7	69%	16%	15%	0%
Question 8	0%	100%	0%	0%
Question 9	61%	31%	8%	0%
Question 10	39%	54%	7%	0%
Question 12	78%	22%	0%	0%
Question 13	70%	23%	7%	0%
Question 16	63%	38%	0%	0%
Question 17	85%	8%	7%	0%
Question 19	84%	16%	0%	0%

Table 5.3 Inferences made from the answers given by respondents in the attainment of decision-making skill after the design thinking program

Question No	Questions	Condensed Inferences
Question 1	Is Data & Analytics, the primary focus when making decisions?	Data analytics is useful but not the sole basis for decisions.
Question 3	Open mindedness and adaptiveness are needed to take decisions.	Open-mindedness and adaptability enhance decision-making.
Question 4	Design thinking helps in taking decisions in complex situations by breaking down the problems?	Breaking down problems and iteration help in complex decisions.
Question 5	Prototyping allows quick testing and iteration of ideas and contribute to decision making in design thinking?	Prototyping supports fast testing and user-centered decisions.
Question 6	Feedback helps validate decisions and avoids risks in design thinking, in decision making?	Stakeholder feedback improves decisions and reduces risks.
Question 7	Embracing ambiguity and uncertainty in decision making is a key principle of decision making?	Embracing uncertainty strengthens decision-making.
Question 8	Observation in design thinking helps you in gaining hidden insights?	Observation provides insights; mixed responses suggest further qualitative exploration.
Question 9	In design thinking, iteration allows for continuous improvement and refinement of decisions contribute to decision making?	Iteration aids better decisions but views are divided.
Question 10	Design thinking encourages user-centric decision making by involving users in the process of decision-making and considering their requirements?	User involvement is essential; dissent needs further probing.
Question 12	Design thinking encourages informed decision making using research and data?	Research and data support informed decisions.
Question 13	Problem Articulation phase of Design thinking helps in deciding the core issue?	Problem articulation helps define core issues.
Question 16	After doing the program are you feeling enabled to consider multiple perspectives to take informed decisions?	Multiple perspectives aid decisions; further inquiry needed for dissenters.
Question 17	Exploration & Experimentation of design thinking helped you in taking decisions under complex situations during your academics?	Exploration and experimentation support decision-making in complex situations.
Question 19	Design thinking help managers develop decision-making ability by providing a systematic method to problem-solving?	A systematic process improves decision-making ability.

Table 5.4 Analysing Data for Answers In The Form Of Yes Or No

NO	QUESTIONS	INFERENCE	YES	NO	TOTAL
Question 2	DT encourages Decision Making	All Agree	336	0	336
Question 11	Ideation in DT involves generating multiple potential solutions	All Agree	336	0	336
Question 15	DT develops Decision Making through ideation phase	76% students agree, 23% students disagree	258	78	336
Question 18	DT helps me in my academics	92% students agree	312	24	336
Question 20	DT encourages multiple perspectives before a decision is made	All Agree	336	0	336
Question 21	DT promotes a systematic and structured approach to decision making	84% students agree, 16% students disagree	285	51	336
Question 22	DT emphasizes the gathering and analysing relevant information is necessary before making a decision	92% students agree, 8% disagree	312	24	336
Question 23	DT encourages to explore and evaluate different alternatives before settling on a decision	All Agree	336	0	336
Question 24	DT does not encourage iterative and collaborative decision-making processes	15% students agree, 85% students disagree	51	285	336
Question 25	DT does not facilitate a mindset of continuous improvement and learning from decisions made	15% students agree, 85% students disagree	51	285	336

PAIRED SAMPLE T TEST:

The set of questions as present in Annexure A (Table 5.5 – 5.10), were asked to the participants, these were the second set of data of 400 participants who did the design thinking program. The checking of decision-making skill among them before and after doing the design thinking program was calculated. The paired t-test (Table 5.9) confirmed a significant increase from pre (M = 1.57) to post (M = 3.53) intervention scores, $p < .001$.

INFERENCES

Hypothesis 1 (HO1): design thinking process inculcates decision making skills among the management students, apart from using the traditional analytical skills.

100% Agreement:
- Majority Agreement on Decision-Making: When using a step-by-step process, develops decision-making skills as understanding, observation, empathy, problem articulation, ideation & prototyping with testing are very well structured.
- Ideation Phase and Divergent Thinking: A divergent & creative approach to generating ideas is directly linked to effective decision-making as it enables managers to explore multiple alternatives.
- Importance of Data and its Analysis: The approach which is driven by data enhances the decision to be made by making informed choices
- Flexibility and Optimization in Decision-Making: Since design thinking is iterative in nature it bring in flexibility and optimization while solving problems. Managers need this adaptability when they take decisions. Correct confident decisions are made when they involve collaboration. This further supports the hypothesis.

SET 1: 93% - 100% Agreement: Let's examine how the results align with and prove the hypothesis:
- Majority Agreement on Decision-Making: Majority of students agree that when using a systematic process, develops decision-making skills as understanding, observation, empathy, problem articulation, ideation & prototyping with testing are very well structured. The agreement among the students on this aspect provides evidence that design thinking indeed contributes to enhancing decision-making abilities.

- Ideation Phase and Divergent Thinking: 100% students agree that ideation allows them to generate as many ideas as possible using the tools. A divergent & creative approach to generating ideas is directly linked to effective decision-making as it enables managers to explore multiple alternatives.
- Perspective of Stakeholders: 100% agreement towards considering perspectives of all stakeholders before taking decision is vital. This finding aligns with the principle of empathy and user-centricity, ensuring comprehensive and inclusive decision-making. Acknowledging diverse perspectives is crucial for informed and effective decision-making.
- Importance of Data and Analysis: Large number of students agree that design thinking places importance on gathering data and conducting analysis, through observation & empathy. This data-driven approach enhances the decision-making process by making informed choices based on insights.

6. ANALYSIS OF PRE AND POST OF THE VARIABLES
A set of questions asked to the participants before and after the design thinking program to check decision-making
Questions asked to the students to understand the development of the skill before and after doing the program as follows:
1.1 How good were you in taking decision before doing design thinking?
1.2 How good are you in taking decision after doing design thinking?
2.1 How good was your risk-taking ability in taking decisions before doing design thinking?
2.2 How good is your risk-taking ability in taking decisions after doing design thinking?
3.1 How effectively did you integrate user feedback into your decision-making process before using design thinking?
3.2 How effectively do you integrate user feedback into your decision-making process after using design thinking?
4.1 How would you rate your ability to make informed decisions using design thinking principles before undergoing design thinking?
4.2 How would you rate your ability to make informed decisions using design thinking principles after undergoing design thinking?

Data was collected from 700 students (300 in 2023–24 and 400 in 2024–25) across three management institutes.

Table 5.11 Attainment of the skill before and after doing the design thinking program.

Decision-Making Skills Before: Scores largely in 30–50%, indicating moderate confidence. After: Noticeable jump to 60–80%. Inference: Participants feel more empowered in their decision-making, likely due to user-centered and iterative thinking.
Risk-Taking in Decisions Before: Heavy lean toward lower risk comfort (20–40%). After: Balanced toward moderate to high levels (60–70%). Inference: Design thinking made participants more open to experimentation, prototyping, and failure as learning.
Integrating User Feedback Before: Many respondents stayed in lower-middle bands (40–50%). After: Surge in above 70%. Inference: Empathy and user-testing phases helped participants value and implement user feedback more effectively.
Informed Decision-Making Using Design Thinking Before: Average responses around 40–50%. After: Mostly above 60–70%. Inference: Participants gained clarity on how to use DT as a decision-making framework, beyond just a creative tool.

REPLICATION OF FINDINGS:
The validation of decision-making skills acquired by management students following their participation in the design thinking program was conducted through a comparison of two datasets: the original dataset 1and the new dataset 2. The section focused on the interpretations derived from the analysis of Dataset 2 concerning decision-making skills. It aimed to explore the key insights and patterns emerging from the data, highlighting how the design thinking program influenced the decision-making abilities of management students. By examining the responses in Dataset 2, this analysis

as given in ANNEXURE B (Table 5.12) provided a deeper understanding of the extent to which the program impacted students' decision-making processes and the factors contributing to these changes.

COMPARISON OF RESULTS OF THE LIKERT SCALE DATA:
Next a comparison was done between Dataset 1 and Dataset 2 on the Likert Scale. This was done to tind similarities and dissimilarities over a period of time. Insights could be gained that threw light on these differences in perceptions and attitude of students while taking decisions. By doing this comparison there was a clarity gained as how much the design thinking program is cultivating the decision-making skill. Detailed statistical values for paired sample t-tests are provided in Annexure B (Table 5.12). Paired sample t-tests for both datasets confirmed statistical significance in improvements across all indicators ($p < 0.001$). A summary of the paired sample t-test results for both datasets is presented in Table 5.2 as given below:

Table 5.14 Summary of Paired Sample T-Tests for Dataset 1 and Dataset 2

Dataset	Mean (Pre)	Mean (Post)	Std. Deviation	t-value	Sig. (2-tailed)
Dataset 1	1.57	3.53	0.68	20.834	0.000
Dataset 2	1.92	4.25	0.71	23.127	0.000

Supporting descriptive statistics are available on request

7. FINDINGS AFTER PERFORMING PAIRED SAMPLE T TEST ON 400 STUDENTS:
There is an increase in the mean score for decision-making skills from 1.57 (Pre) to 3.53 (Post) after the Design Thinking program. This indicates that students significantly improved their decision-making abilities post-intervention. The correlation between pre- and post-scores is negative and statistically significant ($r = -0.405$, $p < .001$). This means that students who initially scored lower tended to make greater improvements, showing a compensatory growth pattern—i.e., the program helped the lower scorers improve substantially. The average difference of -1.97 between pre- and post-program scores is statistically significant, as indicated by the very high t-value (-92.50) and $p < .001$. This confirms that the Design Thinking program had a significant positive effect on decision-making skills. The Cohen's d of -4.63 represents a very large effect size, which is greatly far exceeding the threshold for a large effect (0.80). This shows that the program had a very strong, practical impact on improving decision-making skills across the student population.
The Design Thinking program resulted in a highly significant and practically meaningful improvement in students' decision-making skills:
- Students' average scores jumped from 1.57 to 3.53.
- The statistical test confirms this is not due to chance ($p < .001$).
- The negative correlation suggests students who started with weaker decision-making saw the most gain.
- The effect size is exceptionally large, confirming deep and meaningful transformation.

8. FINDINGS AFTER PERFORMING PAIRED SAMPLE T TEST ON ALL 700 STUDENTS
Inferential statistics were applied to analyse the data, with a paired sample t-test to measure the changes in decision-making skill before and after the intervention. This statistical method allowed for a comparison of the means of the two related groups, providing insights `into whether the design thinking program had a substantial influence on enhancing decision-making abilities. The outcomes of the paired sample t-test offer a robust assessment of the program's effectiveness in improving this critical skill. The analysis revealed a significant improvement in participants' decision-making skills, with the mean score increasing from 2.61 (pre-intervention) to 3.16 (post-intervention). This indicates a notable enhancement in decision-making ability following the Design Thinking intervention. The mean difference of -0.550 further confirms this upward trend. Although the correlation between pre and post scores was weak and not statistically significant ($p = .281$), suggesting that individual improvements were independent and not consistently patterned, the overall change was highly significant. A p-value of less than .001 and a high absolute t-value of -14.511 both support the statistical strength of the findings. Additionally, Cohen's d of 0.548 indicates a moderate effect size, highlighting that the intervention had a meaningful and practical impact on developing decision-making skills among participants.

ALIGNMENT OF FINDINGS WITH THE HYPOTHESIS:
The results from the paired sample t-tests indicate significant improvements in the targeted skills among management students after engaging in the design thinking process: The analysis revealed a p-value of 1.27478638906213E-106= 0.00 for decision-making skills in Dataset 1 and 3.52365225362924E-203 = 0.00 in Dataset

2. These p-values indicate a significant improvement in decision-making skills, corroborating the hypothesis that the design thinking process cultivates decision-making abilities beyond traditional analytical methods.

9. OVERALL KEY FINDINGS
- Decision-making skills get developed as design thinking is a step-by-step process.
- Divergent thinking in ideation is a technique that develops decision-making skill when students have to choose the best of the ideas from a back of divergent ideas, or range of ideas.
- In order to take informed decisions, it is important to lay stress on data and analysis of the same, which design thinking supports.
- Iterative approach of design thinking develops flexibility and optimization which are needed to for decision-making.
- Enhances decision quality through teamwork and continuous improvement.
- Design Thinking develops decision-making skills through its step-by-step structure.
- Divergent thinking during ideation enhances the ability to choose the best ideas from a range of possibilities.
- Emphasis on data-driven decision-making supports informed judgments.
- Iterative processes foster flexibility and optimization in decision-making.
- Teamwork and continuous improvement enhance decision-making quality.

10. CONCLUSION:
This study confirms that Design Thinking significantly enhances decision-making skills among management students. Through quantitative analysis, including Likert scale responses and paired sample t-tests, a statistically significant improvement was observed in students' confidence and ability to make informed, user-centric, and strategic decisions. Design Thinking's core principles—empathy, ideation, prototyping, and iteration—enabled learners to navigate complex problems, embrace ambiguity, and apply data-driven insights, fostering skills essential for today's business environment. The consistency of findings across two academic datasets reinforces the validity and replicability of the intervention, highlighting Design Thinking as a robust educational framework. The key implications include that Design Thinking can strengthen decision-making across industries by promoting collaboration, stakeholder engagement, iterative feedback, and risk management. Its integration in management education bridges the gap between theory and practice, fostering leadership, innovation, and real-world problem-solving abilities.

11. LIMITATIONS:
The study has limitations that can affect the generalization and applications as the data is from certain number of colleges across India and not necessarily global. The short study duration limits insights into long-term impacts. Potential biases may arise from researchers' familiarity with Design Thinking, reliance on self-reported data, and lack of a control group. Addressing these challenges calls for curriculum updates aligned with emerging technologies, modular and flexible learning paths, global collaborations, virtual exchanges, mentorship programs, innovation events, sustainability-focused content, and social impact integration within the educational ecosystem.

12. RECOMMENDATIONS:
- Integrate Design Thinking Across Curriculum
- Promote Experiential Learning
- Focus on Industry Relevance
- Encourage Innovation through Design Pedagogy
- Invest in Faculty Development
- Enhance Institutional Support

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ANNEXURE A

Table 5.5 Questions asked before design thinking program

	Questions asked before design thinking program for decision making
1.1	I was able to decide easily, the topic I wished to work easily before doing design thinking
2.1	I was able to decide the issues of the organization to work upon before using design thinking
3.1	I was able to make use of my decision-making ability to bring about a difference to the organization before using design thinking
4.1	I was able to decide the solutions without understanding the organization, before doing design thinking
5.1	I was able to decide and come down to the root problem before using design thinking
6.1	I was able to take informed decisions before using design thinking
7.1	I was able to decide the best of the best ideas before using design thinking
8.1	I was able to take informed decisions, innovate and was creative before using design thinking
9.1	I used to understand the organization by using my decision-making ability and taking risks to solve their problems before using design thinking
	Questions asked after design thinking program
1.2	I am able to decide easily, the topic I wished to work easily after doing design thinking
2.2	I am able to decide the issues of the organization to work upon after using design thinking
3.2	I am able to make use of my decision-making ability to bring about a difference to the organization after using design thinking
4.2	I am able to decide the solutions by understanding the organization, after doing design thinking
5.2	I am able to decide and come down to the root problem after using design thinking
6.2	I am able to take informed decisions after using design thinking
7.2	I am able to decide the best of the best ideas after using design thinking
8.2	I am able to take informed decisions, innovate and am creative after using design thinking
9.2	I used to understand the organization by using my decision-making ability and taking risks to solve their problems before using design thinking

Table 5.6 Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	1.566666666666671	400	.230425046855825	.011521252342791
	Post	3.533333333333342	400	.276115886309954	.013805794315498

Table 5.7 Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre & Post	400	-.405	.000

Table 5.8 Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre – Post	-1.966666666666671	.425232202962642	.021261610148132	-2.008465446412102	-1.924867886921239	-92.498	399	.000

Table 5.9 Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% Confidence Interval	
					Lower	Upper
Pair 1	Pre - Post	Cohen's d	.425232202962642	-4.625	-4.960	-4.289
		Hedges' correction	.425632379663411	-4.621	-4.955	-4.285

ANNEXURE B

Table 5.12 Report of Likert scale data

QUESTION NO	AGREE (%)	STRONGLY AGREE (%)	DISAGREE (%)	STRONGLY DISAGREE (%)
QUESTION 1	36%	64%	0%	0%
QUESTION 3	36%	64%	0%	0%
QUESTION 4	36%	64%	0%	0%
QUESTION 5	36%	64%	0%	0%
QUESTION 6	36%	64%	0%	0%
QUESTION 7	36%	64%	0%	0%
QUESTION 9	36%	64%	0%	0%
QUESTION 10	36%	64%	0%	0%
QUESTION 12	36%	64%	0%	0%
QUESTION 13	36%	64%	0%	0%
QUESTION 16	36%	64%	0%	0%
QUESTION 17	36%	64%	0%	0%
QUESTION 19	36%	64%	0%	0%

Full details of interpretations and those drawn from Dataset 1 and Dataset 2 are available upon request