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Address for correspondence:
Shinde Tejas Tulshiram
Research Student, Mula Education Society, Shri Dnyaneshwar College, Newasa, Dist: Ahilyanagar
Email:
tejasshindepatil@gmail.com

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Assessing the Level of Design Thinking Awareness among Teachers: A Survey Study

Shinde Tejas Tulshiram[1], Dr. Shinde Sanjay Balu[2]
[1]Research Student, Mula Education Society, Shri Dnyaneshwar College, Newasa, Dist: Ahilyanagar
[2]Research Guide, Mula Education Society, Shri Dnyaneshwar College, Newasa, Dist: Ahilyanagar

Abstract

Purpose: *This paper examined the level of awareness among teachers about the concept of design thinking and investigated various challenges and opportunities for teachers and students. The main goals of this research are to enhance teachers' professional development, develop innovative and effective teaching methods, and foster a school culture of innovation, creativity, and experimentation, all of which should help improve student outcomes.*

Design/Methodology/Approach: *The researcher selected 160 respondents (teachers) from various educational institutions in Pune District. The researcher used a self-structured scale for primary data collection, and the purposive sampling method was used. The Google Forms technique was used for data collection through 160 respondents from various colleges.*

Major Findings: *Based on their demographic characteristics, the study's research revealed that there is a slight level of awareness regarding the concept of design thinking. The researcher discovered that art teachers had the least awareness of design thinking among all faculties. There was a small difference in awareness between male and female teachers. Additionally, teachers in urban areas were the most aware of design thinking, compared to those in semi-urban and rural areas.*

Practical Applications: *This study will be helpful for teachers, students, and government policymakers in increasing the level of awareness about design thinking and identifying various challenges and opportunities in design thinking. At the same time, the presented research will be useful for how the use of design thinking in the education sector can be increased through awareness.*

Originality: *The current study focused on design thinking and its level of awareness, perception and knowledge of the concept of design thinking among teachers of higher educational institutions in Pune district.*

Keywords: *Level of awareness, Perception, Design Thinking, Gender-Sensitive approaches, Nurture Continuous Learning etc.*

Introduction

Today's age is rapidly changing age. In this age rapidly changing educational background, teachers are expected to be innovative, adaptable, and responsive to the various needs of their students. Design thinking, a human-centered approach to problem-solving, has been recognized as a valuable tool for enhancing teaching practices, adopting creativity, and improving student outcomes. By embracing design thinking, teachers can develop unique solutions to complex educational challenges, create engaging learning experiences, and cultivate a culture of innovation in their classrooms. However, the extent to which teachers are aware of design thinking principles, processes, and practices remains unclear.

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While concept of design thinking has been widely adopted in various industries like as business professionals, Small and Medium-Sized Enterprises, Non-Profit Organizations etc. Integration into education has been slower, and its adoption varies widely among educators.

This knowledge gap raises important questions:

1. What is the awareness level of teachers about the concept of design thinking?
2. Do teacher understand how to apply the concept of design thinking to teaching profession?
3. Are teachers well equipped to foster a culture of innovation and creativity in their classrooms through the concept of design thinking?

The aims of this present study is to investigate the level of design thinking awareness among teachers, discovering their knowledge, attitudes, and practices related to design thinking. Through a survey-based approach, this research will provide perceptions into the current state of design thinking awareness among educators, identifying areas of strength and weakness. The findings of the research presented will aid in the development of professional development programs, resources and support systems to enhance teachers' design thinking abilities, which will ultimately contribute to improved teaching practices, student engagement and educational outcomes.

Review of Literature

(Panke, 2019) Discussed design thinking as a process and mindset for collaboratively finding solutions for wicked problems in a variety of educational settings. This article organizes case studies, reports, theoretical considerations, and other scholarly work to enhance our understanding of the goals, context, benefits, limitations, affordances, challenges, implications, and consequences of design thinking in education. It also systematically presents a variety of supporting information to understand the role of design thinking in education, enhance research dialogue and discussion of best practices, and outline immediate avenues for research and practice. A research was done by (Nur Hafizah Razali et.al, 2022) in Malaysia. The implementation of design thinking in the classroom is troubled by issues that both teachers and students must overcome. Time restrictions, lack of expertise, inadequate resources, and inadequate training are a few of the difficulties teachers encounter. Students struggle with teamwork, lack of originality, confusion, and dissatisfaction when it comes to design thinking. In order to overcome these obstacles, educators should be receptive to fresh and current knowledge so they won't feel compelled to introduce novel ideas to their students, like design thinking. Furthermore, design thinking has a significant influence on teachers' professional development. According to a study of (Foster, 2019) Design thinking provides a complementary approach to the logical problem-solving techniques usually stressed in business schools. This article includes understanding human needs related to the presented problem, redefining the problem using a human-centered approach, generating numerous ideas during brainstorming sessions, and adopting a practical approach for prototyping and testing. Business school instructors may perceive design thinking, a relatively new and complex multistep, and iterative process, to be beyond their capabilities or resource constraints. (Charles, 2022) Highlights the necessity of creating fresher, more approachable yet powerfully empathic ways and techniques. A scientific method called design thinking assists in producing prototypes that take into account creativity, visualization, design, and redesign of objects based on feedback, thereby providing workable answers to any technological or socioeconomic challenges.

According to study of (Qing Yu, 2024) Design thinking is becoming an innovative and popular teaching method. Recently, DT has been used as an unconventional method to develop skills of problem-solving, creativity, and innovation but its effects on student learning are unclear. (Deepa, 2020) Highlights the method of Design Thinking is nonlinear and iterative. To put it simply, this means that the design team reviews, challenges, and refines its initial hypotheses, understandings, and outcomes based on its ongoing findings. Design thinking facilitates the process of questioning the issue, the underlying assumptions, and the repercussions. (Liedtka, 2015) He investigated in his study Design thinking proves to be highly beneficial in tackling ambiguous challenges through human-centered problem-solving, generating ideas in brainstorming sessions, and adopting a practical approach for prototyping and testing. Continuous experimentation, such as concept and idea testing, prototyping, and sketching, is another aspect of Design Thinking. According to study of (Sahar Heydarabadi, 2019)

he investigated in his study demonstrated that the design thinking idea is a useful tool that, when applied correctly, may boost creativity in big businesses. Large businesses can benefit from the economic, functional, and social advantages of this method experimentation, sketching, prototyping, testing, and trying out concepts and ideas if they commit to the process of designing thinking over the long term and make the necessary organizational reforms. Additionally, many businesses will experience short-term rewards if design thinking is applied effectively at the level of products and services. A research was done by (Judy Matthews, 2017) in his study represents an early attempt to map out in detail some of the business programs in higher education that offer business and management students design thinking. For a long time, certain universities have provided services in this area, either directly or through partnerships with specialized programs.

Challenges for Design Thinking

(Nur Hafizah Razali et.al, 2022) The use of design thinking in education is becoming more widely accepted. Nonetheless, there are a number of difficulties and difficulties to be overcome. Therefore, the following discussion addresses the challenges of implementing design thinking in education for both students and teachers.

Table No.1. Challenges for Design Thinking

Challenges for Students	Challenges for Teachers
• Students will suffer from confusion and frustration • Students may face difficulties in learning design thinking. • Lack of creativity • lack of good ideas • Students may face teamwork challenges	• Lack of experience among teachers in the use of design thinking. • Lack of time (time constraints) to practice design thinking. • Lack of training. • Insufficient resources • Lack of Communication Between teachers and Students

Research Gaps

Few studies have specifically investigated teachers' awareness of design thinking, leaving a gap in understanding their knowledge, attitudes, and practices. Research has not fully examined how demographic characteristics (e.g., age, gender, teaching experience) influence design thinking awareness among teachers. There is a need for studies exploring design thinking awareness among teachers in various educational settings. Addressing these research gaps will provide a more comprehensive understanding of design thinking awareness among teachers, ultimately informing strategies to enhance teacher professional development and improve student learning outcomes.

Research Questions

1. What are the demographic characteristics of respondents (e.g., age, gender, teaching experience, subject area) who are more likely to be aware of design thinking principles and practices?
2. What is the current level of awareness of teachers about the concept of design thinking in Pune district especially Junnar, Ambegaon and Khed taluka?
3. How do teachers perceive the relevance and usefulness of design thinking in their teaching practices?
4. What are the challenges that avoid teachers from adopting design thinking in their classrooms?
5. Are there significant differences in design thinking awareness between teachers from different subject areas? (e.g. Science Commerce, Arts, BBA, and BCA etc.)

The above research questions will guide the researcher in this present research survey study and provide insights into the level of design thinking awareness among teachers, as well as their knowledge, attitudes, and practices related to design thinking.

Significance of the study

In recent times, design thinking has been seen as an important part of teaching and learning. (Wrigley, C., & Straker, K., 2017) Significance of the study are discussed below:

1. **Enhancing Teacher Professional Development:** With the help of the concept of design thinking awareness among teachers,

educators can develop targeted professional development programs to enhance teachers' skills and knowledge in design thinking.

2. **Improving Teaching Practices:** Design thinking can helpful for teachers for develop innovative and effective teaching methods, leading to improved student outcomes and engagement.
3. **Fostering a Culture of Innovation:** By developing design thinking awareness among teachers, schools can cultivate a culture of innovation, creativity, and experimentation.
4. **Informing Education Policy:** Informing Education Policy: The study's findings can inform education policy and decision-making, highlighting the need for design thinking integration in teacher education programs and curriculum development.
5. **Potential to Impact Student Learning:** By enhancing teachers' design thinking awareness, this study may ultimately impact student learning outcomes, as teachers develop more innovative and effective teaching methods. The study's findings will have practical implications for educators, policymakers, and researchers, ultimately contributing to the improvement of teaching practices and student outcomes.

Statement of Problem

Despite the growing recognition of design thinking as a valuable approach to innovation and problem-solving in education, there is a lack of understanding about the level of design thinking awareness among teachers. Teachers are expected to be innovative and adaptable, yet it is unclear whether they possess the necessary knowledge, attitudes, and practices to effectively integrate design thinking into their teaching methods. This knowledge gap raises concerns about the ability of teachers to prepare students for an increasingly complex and rapidly changing world. This statement of the problem highlights the need for a comprehensive understanding of design thinking awareness among teachers, which is essential for developing effective professional development programs and improving student learning outcomes.

Aim of the study: The main aim of the present study is "to assess the level of design thinking awareness among teachers in higher educational institutes in Pune district."

Objective of the study

1. To study the concept of design thinking.
2. To determine the level of design thinking knowledge among teachers.
3. To examine the attitudes of teachers towards design thinking.
4. To identify the demographic factors (e.g., age, gender, teaching experience, subject, area) that influence design thinking awareness among teachers.

By achieving these objectives, the study aims to provide a comprehensive understanding of design thinking awareness among teachers, ultimately informing strategies to enhance teacher professional development and improve student learning outcomes.

Hypotheses of the study

H_1: There is a significant difference in design thinking awareness among teachers based on their demographic characteristics. (Faculty, Gender, Area of Educational Institute, Age and teaching experience)

a. **H_1:** There is a significant difference in design thinking awareness among teachers based on their faculty.
b. **H_1:** There is a significant difference between male and female teachers about the awareness of design thinking.
c. **H_1:** There is a significant difference in design thinking awareness among teachers based on their area of educational institute.
d. **H_1:** There is a significant difference in design thinking awareness among teachers based on their age.
e. **H_1:** There is a significant difference in design thinking awareness among teachers based on their teaching experience.

Scope and Limitation of the Study

1. This study is restricted to Pune district of Maharashtra only.
2. The opinion of the respondents may not represent the whole population.
3. Only 160 respondents were included in this study.
4. The findings of this study is completely depend on the basis of Primary data given by the respondents, it is uncertain whether or not the respondents provided data.

Sampling and Sample Size

The final Scale was prepared using google forms and the study population consisted of

teachers in the Pune district. As it was very difficult to have a proper sampling frame hence, Purposive sampling method was used and questionnaire was sent to various faculty teachers through google forms. Researcher collected the data during July–August, 2024 from 160 teachers. A sample size of 160 is considered due to completeness of the questionnaire. Collected data was analyzed using Microsoft excel and Vassarstats software was used for hypotheses testing.

Data Analysis and Interpretation: This part is divided into two Parts A) Demographic characteristics of Teachers B) Primary data analysis. (Awareness Level)

Table No. 2. Demographic characteristics of Teachers and Data Analysis

Grouping Variable		Awareness					Total Freq.	%	Valid %	Cum %	Mean	X^2 Value
		NA	SWA	MA	HA	EA						
Faculty	Arts	12	16	02	01	00	31	19.4	19.4	19.4	1.7	39.84
	Commerce	31	40	07	03	01	82	51.3	51.3	70.6	1.8	
	Science	06	08	03	03	02	22	13.8	13.8	84.4	2.4	
	Professional	02	06	10	04	03	25	15.6	15.6	100	3.0	
	Total	**51**	**70**	**22**	**11**	**06**	**160**	**100**	**100**	---	2.1	
	Percentage	**31.9**	**43.8**	**13.8**	**06.9**	**03.8**	**100.0**	---	---	---	---	
	Cum. %	**34.4**	**83.8**	**95.0**	**98.8**	**100**	---	---	---	---	---	
Gender	Male	39	19	09	06	04	77	48.1	48.1	48.1	1.9	12.85
	Female	24	42	10	05	02	83	51.9	51.9	100	2.0	
	Total	**63**	**61**	**19**	**11**	**06**	**160**	100	**100**	---	2.0	
	Percentage	**39.4**	**38.1**	**11.9**	**06.9**	**03.7**	**100.0**	---	---	---	---	
	Cum.%	**39.4**	**77.5**	**89.4**	**96.3**	**100**	---	---	---	---	---	
Place	Rural	37	43	10	02	01	93	58.1	58.1	58.1	1.8	24.93
	Semi-Urban	08	14	12	02	01	37	23.1	23.1	81.3	2.3	
	Urban	05	09	10	04	02	30	18.8	18.8	100	2.6	
	Total	**50**	**66**	**32**	**08**	**04**	**160**	100	**100**	---	2.1	
	Percentage	**31.3**	**41.2**	**20.0**	**05.0**	**02.5**	**100**	---	---	---	---	
	Cum.%	**31.3**	**72.5**	**92.5**	**97.5**	**100**	---	---	---	---	---	
Age	21-30	18	21	06	02	01	48	30.0	30.0	30.0	1.9	7.14
	31-40	32	39	06	03	01	81	50.6	50.6	80.6	1.8	
	41-50	09	07	04	02	01	23	14.4	14.4	95.0	2.1	
	51-60	04	02	01	01	00	08	05.0	05.0	100	1.9	
	Total	**63**	**69**	**17**	**08**	**03**	**160**	100	**100**	---	1.9	
	Percentage	**39.4**	**43.1**	**10.6**	**05.0**	**01.9**	**100**	---	---	---	---	
	Cum.%	**39.4**	**82.5**	**93.1**	**98.1**	**100**	--	---	---	---	---	
Teaching Experience	00-10	33	43	08	02	01	87	54.4	54.4	54.4	1.8	11.07
	20-Nov	22	28	05	03	01	59	36.9	36.9	91.3	1.9	
	21-30	03	02	01	01	01	08	05.0	05.0	96.3	2.4	
	Above 30	02	02	01	01	00	06	03.8	03.8	100	2.2	
	Total	**60**	**75**	**15**	**07**	**03**	**160**	100	**100**	---	1.9	
	Percentage	**37.5**	**46.9**	**09.4**	**04.4**	**01.8**	**100**	---	---	---	---	
	Cum.%	**37.5**	**84.4**	**93.8**	**98.2**	**100**	---	---	---	---	---	

Above table No.2 display demographic characteristics and awareness level of teachers about the concept of design thinking. Commerce teachers tend to be more aware of design thinking, while Arts teachers tend to be less aware. Science teachers show a balanced distribution across awareness levels, while Professional teachers are more likely to be Moderately Aware. 34.4% of the teachers are Not at All Aware (NA) of design thinking and 83.8% of the teachers are either Not at All Aware (NA) or Somewhat Aware (SWA) of design thinking, indicating a moderate to low level of awareness. These results suggest that while there is some level of awareness among teachers.

39.4% of the teachers are Not at All Aware (NA) of design thinking, with male teachers accounting for a larger proportion. 77.5% of the teachers are either Not at All Aware (NA) or Somewhat Aware (SWA) of design thinking, indicating a moderate to low level of awareness. The results suggest that there are significant gender-based differences in design thinking awareness among teachers.31.3% of the teachers are Not at All Aware (NA) of design thinking, with rural teachers accounting for a larger proportion. 72.5% of the teachers are either Not at All Aware (NA) or Somewhat Aware (SWA) of design thinking, indicating a moderate to low level of awareness. The results suggest that there are significant location-based differences in design thinking awareness among teachers.39.4% of the teachers are Not at All Aware (NA) of design thinking, with the 21-30 age group accounting for the largest proportion. 82.5% of the teachers are either Not at All Aware (NA) or Somewhat Aware (SWA) of design thinking, indicating a moderate to low level of awareness. The results suggest that there is no significant age-based difference in design thinking awareness among teachers.

37.5% of the teachers are Not at All Aware (NA) of design thinking, with the 00-10 year's category accounting for the largest proportion. 84.4% of the teachers are either Not at All Aware (NA) or Somewhat Aware (SWA) of design thinking, indicating a moderate to low level of awareness. The results suggest that there is no significant teaching experience-based difference in design thinking awareness among teachers.

Hypotheses Testing

The researcher used Vassarstats software to run the chi-square test (Contingency Table) for testing hypotheses regarding the independent variables and dependent variables.

Table No. 3. Hypotheses Testing

Hypothesis	test	df	X^2 Value	P value	Comment
***H_1:* There is a significant difference in design thinking awareness among teachers based on their demographic characteristics.(Faculty, Gender, Area of Educational Institute, Age and teaching experience)**					
H_1: There is a significant difference in design thinking awareness among teachers based on their faculty.	Chi-square	12	39.84	0.000	**H_0: Rejected**
H_1: There is a significant difference between male and female teachers about the awareness of design thinking.	Chi-square	04	12.85	0.012	**H_0: Rejected**
H_1: There is a significant difference in design thinking awareness among teachers based on their area of educational institute.	Chi-square	08	24.93	0.001	**H_0: Rejected**
H_1: There is a significant difference in design thinking awareness among teachers based on their age.	Chi-square	12	7.14	0.848	**H_1: Rejected**
H_1: There is a significant difference in design thinking awareness among teachers based on their teaching experience.	Chi-square	12	11.07	0.522	**H_1: Rejected**

The Above table No.3 Shows the results of the first three hypotheses show that there are statistically significant differences in design thinking awareness level among teachers. based on their faculty (A), gender (B), and area of educational institute (C). The chi-square tests yielded significant p-values ($p < 0.05$) for all three hypotheses, leading to the rejection of the null hypotheses and the results of the hypotheses number 4 and 5 show that there are no statistically significant differences in design thinking awareness level among teachers based on their Age (D) and Teaching Experience. The chi-square tests generated significant p-values ($p > 0.05$) for all two hypotheses, leading to the rejection of the Alternative hypotheses. Thus, it is concluded that the difference between the awareness level of teachers according to their faculty, gender, and area of educational institute is significant and the difference between the awareness level of teachers based on their age and teaching experience of teachers is significant.

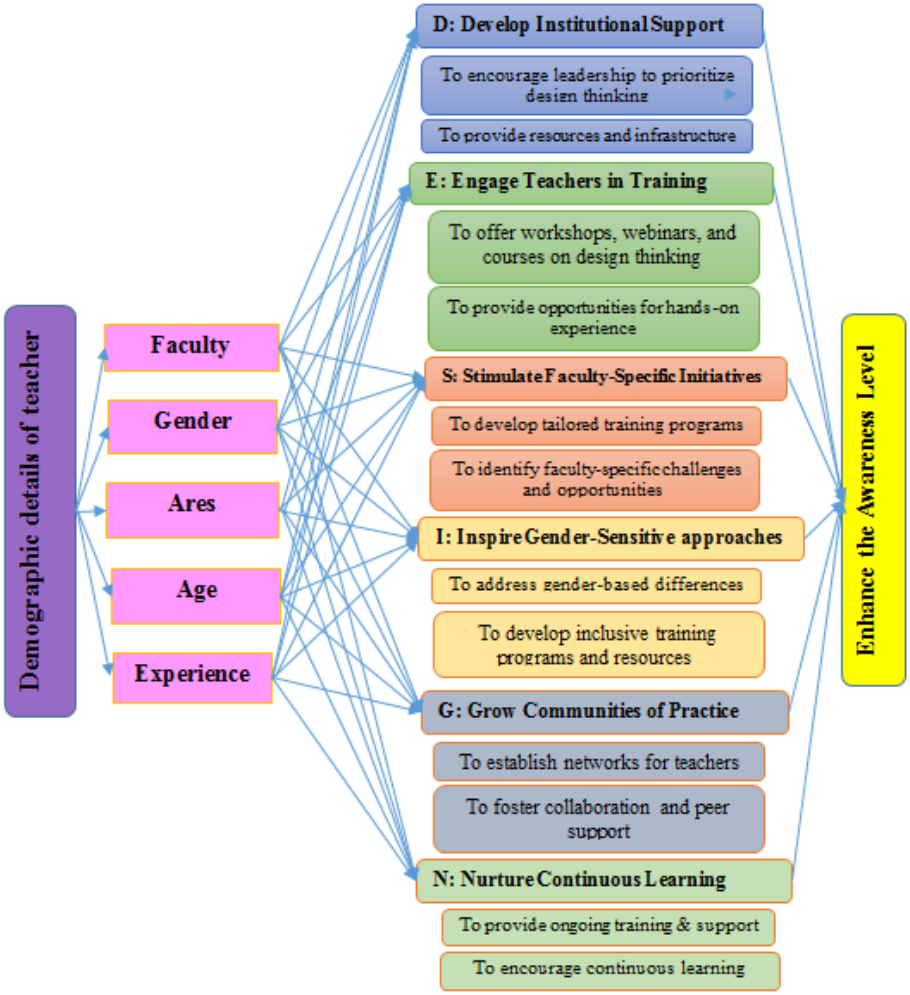
Major Findings

1. Researcher found that there is a significant difference in design thinking awareness among teachers based on their faculty but teachers in the Professional faculty have the highest level

of awareness, while those in the Arts faculty have the lowest level of awareness.

2. Researcher reveals that There is a slight difference in awareness level between male and female teachers about the of design thinking.
3. Researcher found that teachers from urban areas have the highest level of awareness about the concept of design thinking compare to semi-urban and rural area.
4. There is no significant difference in the concept of design thinking awareness among teachers based on their age, but teachers in the age group between 41 to 50 years have the highest level of awareness compared to other age group teachers.
5. There is no significant difference in the concept of design thinking awareness among teachers based on their teaching experience, but teachers experience in the 21 to 30 years have the highest level of awareness. Overall, the findings suggest that while there is a slight level of awareness about the concept of design thinking based on their demographic characteristics.

Practical Implications: The strength of the present research study is the proposed model to enhance the awareness level of design thinking among teachers.



By implementing these practical implications of proposed model educators and policymakers can enhance level of awareness, perception, knowledge about the concept of design thinking among teachers, ultimately improving teaching methods, practices and student learning outcomes.

Scope for Future Research

One of the few limitations of the study is the sampling method. In this study, Purposive sampling method was used to collect the data.

Being a non-probability sampling method, generalization of the result could be an issue and future researchers can make use of some probability sampling. Further researchers should attempt to make the research area more comprehensive by adding additional teachers.

Author's Contribution

Dr. Shinde Sanjay Balu conceived the idea and developed the research design to undertake the review study. Shinde Tejas Tulshiram did an extensive literature survey of existing studies referred to journals and eventually came up with the research design suitable to the study. Data was collected and analyzed by Shinde Tejas Tulshiram using google form and Vassarstats software.

Conflict of Interest

The author certifies that he has no affiliation with any institution or organization and has no financial or non-financial interest in the presented research article or literature.

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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