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Year-wise analysis of school responsiveness of school teachers towards NISHTHA 2.0 online in-service teacher education program

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Abstract

The present study aims to assess the responsiveness of school teachers to the 13-course module of the NISHTHA 2.0 online in-service teacher education program. This research employs a descriptive survey method. The study involved teachers from the Muzaffarpur district in Bihar, India, who participated from 2021 to 2024. Eight blocks (four from the eastern subdivision and four from the western) were randomly selected from a total of sixteen using the lottery method, and teachers from these blocks were chosen through cluster sampling. Data collection tools included a self-made inventory and semi-structured interviews. Percentage analysis and the t-test were used as primary statistical tools for analyzing quantitative data, while qualitative data from interviews were analyzed using thematic analysis. Notable differences were observed in enrollment and completion rates among the 13 courses in the NISHTHA 2.0 program, with overall participation declining over time. Each course recorded some level of responsiveness from school teachers, indicating that all modules engaged at least a portion of the target population, despite variations across years, blocks, and subjects. No course exceeded 50% enrollment in any year, suggesting staggered teacher participation over multiple years. This study contributes to the global understanding of professional development by offering valuable insights into the design and implementation of large-scale online in-service programs.

Keywords: Digital learning, DIKSHA, In-service teacher education, NISHTHA, Online professional development, Responsiveness, Secondary school teachers.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
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Contents

Contribution of this paper to the literature
This study is original in exploring the post-COVID transition to online in-service teacher training through the NISHTHA program on DIKSHA. With limited prior research in this area, it uniquely examines participation trends and digital engagement, addressing a critical gap in large-scale professional development within the Indian education system.

1. Introduction

Teachers are the most important pillars of education and play a vital role in the nation's development. Since teachers are regarded as the nation's builders, there ought to be competent teachers who can provide the nation's youth with a higher quality of education.

Since communication and technology are becoming increasingly important in society, technology must be utilized in education and incorporated into all its aspects. This includes using technology to enhance school planning, management, and administration; teaching, learning, and assessment procedures; teacher training; professional development; and accessibility for all residents.

The New Education Policy 2020 states that teachers have a responsibility to shape students' destinies and, consequently, the future of the country. Teachers must be empowered and inspired for the benefit of the nation and its pupils. In-service teacher education programs are crucial for motivating and empowering teachers by enhancing their prior expertise and skills.

With the help of Samagra Siksha, formerly known as Sarva Siksha Abhiyan, SCERTS has been focusing on teacher training over the past few years. The federal and state governments are continuously striving to enhance the teaching-learning process in teacher education programs. In 2019, Samagra Siksha introduced NISHTHA, or the National Initiative for School Heads and Teachers Holistic Advancement, a crucial in-person teacher-learning program.

The New Education Policy requires all teachers, including head teachers, to participate in at least 50 hours of ongoing professional development. The Ministry of Education, the Government of India, and state education departments started an online in-service teacher education program in 2020 to provide learning continuity across several digital platforms through NISHTHA using the DIKSHA application.

NCERT has planned to use the DIKSHA platform in other languages to continue the NISHTHA-integrated teacher training; the courses will include self-assessment, practice exercises, reflective activities, video links, and some learning materials. Teachers will also receive certificates upon completion of the courses.

The list of courses for the NISHTHA 2.0 program on DIKSHA for teachers serving as an in-service teacher education program is as follows:

1. Curriculum and inclusive classrooms, 2. Using ICT in education, evaluation, and learning, 3. School-based health and wellbeing, 4. Personal social qualities and holistic development, 5. Art-integrated learning, 6. Comprehension of secondary-stage students, 7. Concept and practice of school leadership, 8. Vocational education, 9. Gender-related issues in education, 10. School initiatives, 11. Toy based on pedagogy, 12. School-based assessment, 13. Pedagogies in Hindi, English, Urdu, Sanskrit, mathematics, science, and social science

Even if there is a video link attached for better comprehension of the course material, the DIKSHA app contains all the course details. The assessment is based on learning, and the certificate is awarded once the course is completed.

2. Review of Literature

1. Anju (2022) conducted a study on *An Analysis of In-Service Teacher Education Programmes in Higher Education.* The study aims to investigate the efficacy of in-service teacher education in Haryana's higher education system. A descriptive survey method was employed due to its nature. Professors, associate professors, and assistant professors from universities and colleges enrolled in in-service teacher education programmes comprised the study population. A multistage sampling procedure was used for sample selection. Initially, five districts were randomly selected from each of Haryana's six divisions. In the subsequent phase, four districts were randomly chosen. In the third phase, twenty administrators were randomly selected from the HRDC/ASC in the Haryana districts chosen at random. Data collection involved one checklist and two self-constructed questionnaires. Data analysis and interpretation were conducted using the percentage technique. The majority of participants (83.3%) reported that the In-Service Teacher Education Programme registration process was excellent. Additionally, 50% of participants indicated that the management of the parenting institute cooperated well and fairly.
2. Kalyani (2024) *the Role of NISHTHA in Enhancing Pedagogical Practices: An Empirical Investigation.* This study investigates how the National Initiative for School Heads and Teachers' Holistic Advancement (NISHTHA) program affects the modification and enhancement of instructional strategies in the classroom. This study examines how NISHTHA influences classroom practices, teacher professional development, and overall pedagogical efficacy. The study employed a mixed-methods approach, integrating quantitative analysis of participant surveys with qualitative insights from interviews and classroom observations. Results demonstrate how the program impacts student involvement, teacher attitudes, and teaching tactics.
3. Bhardwaj and Rathee (2024) *MOOC-Based In-Service Training for the Professional Development of Teachers in India.* The study was survey-based and used a questionnaire and group interviews to collect data from the Haryana government school teachers. A non-probability sampling technique was used. The results of the research indicate that teachers accept the initiative and expect that more such activities could be carried out in the future. Several teachers suggested utilizing a blended approach for teacher in-service training to improve the overall quality of the training, citing issues including limited communication options and poor internet connectivity.

Kanvaria and Dubey (2022) *DIKSHA, NISHTHA and CPD: Experiences and Perceptions of School Learning-Facilitators.* The article highlights that among the most well-known sectors, education is undergoing significant change. Since the pandemic has taken hold, integrating technology into teaching is the only remaining alternative. The current study emphasizes how technology is incorporated into learning facilitators' Continuous Professional Development (CPD). It also considers their opinions on online training. On the DIKSHA portal, the views of 20

government school learning facilitators enrolled in the NISHTHA integrated training program have been considered.

4. A questionnaire with both open-ended and rating scale-style questions was used to gather the data. Google Forms were utilized to collect responses. The answers reveal differing opinions about e-training among learning facilitators.
5. Uzunboylu (2007) conducted a study examining teachers' attitudes toward online education following their participation in an online in-service training program. The findings revealed that a majority of teachers held positive views about online learning, appreciating its flexibility and convenience compared to traditional face-to-face training. This positive attitude highlights the potential effectiveness of online programs in delivering professional development for teachers. However, the study also noted some challenges and mixed feelings among participants, indicating the need for continuous improvement in course design and delivery to better meet teachers' needs. This research underscores the growing acceptance of online education as a viable mode for teacher training and professional growth.

3. Research Gap

The National Education Policy 2020 states that basic literacy and numeracy, as well as a national resource bank, will be prepared and made available through the Digital Infrastructure of Knowledge Sharing and Access (DIKSHA). In-service training will help ensure that everyone is aware of environmental, safety, and occupational health regulations in schools. The researcher found that using the DIKSHA website to implement the NISHTHA in-service teacher education program online may present several difficulties. This study will identify various issues and potential solutions after evaluating and illustrating the current situation of in-service teacher education.

4. Research Objectives

1. To analyze the academic year-wise variations in school teachers' responsiveness towards the NISHTHA online in-service teacher education program (TEP).
2. To assess the year-wise differences in teacher engagement, enrollment, and course completion under the NISHTHA online program.
3. To examine the factors responsible for variations in school teachers' responsiveness to the NISHTHA online in-service teacher education program across different academic years.

5. Research Hypothesis

1. *There is a significant variation in school teachers' responsiveness towards the NISHTHA online in-service teacher education program across different academic years.*
2. *There is a significant difference in the responsiveness of school teachers regarding gender, experience, and teaching subjects.*

6. Method of the Study

The researcher has selected the descriptive survey method based on the nature of the problem and the objectives of the study.

7. Sample and Sampling Techniques

In the present study, eight blocks of Muzaffarpur district, Bihar, were randomly selected from sixteen blocks (divided into East and West subdivisions) using the lottery method. Four blocks were chosen from each subdivision: Bochahan, Mushahari (Urban and Rural), Sakra, and Minapur from the East; and Kanti, Kurhani, Marwan, and Saraiya from the West. In these blocks, the Rajkiya Madhyamik and Uchch Madhyamik schools operated by the Department of Education, Government of Bihar, were included in the sample. Teachers from these schools were selected using a cluster sampling method, resulting in a total sample of 394 secondary school teachers for the study.

Table 1 presents the gender-wise distribution of the sample and the number of schools selected from each block for the study.

Table 1. Sample used in the present study (gender wise/ number of schools in each block)..

S. No.	Names of selected blocks	Subdivision of the block	Number of schools	Number of teachers		
				Female	Male	Total
1.	Bochahan	East subdivision	6	10	16	26
2.	Mushahari urban	East sub-division	12	33	31	64
	Mushahari rural	East subdivision	8	13	18	31
3	Sakra	East sub-division	6	38	47	85
4	Minapur	East sub-division	6	17	17	34
5	Kanti	West sub-division	6	4	22	26
6.	Kurhani	West sub-division	8	16	28	44
7.	Marwan	West sub-division	9	28	30	58
8.	Saraiya	West sub-division	7	9	17	26
	Total		62	168	226	394

8. Research Tool

The NISHTHA 2.0 Online In-Service Education Course Module: School Teachers' Responsiveness Inventory was a self-developed tool created by the researcher. After consulting with experts, the researcher developed an inventory to achieve several goals: (1) to collect information about teachers' names, gender, subjects taught, experience, and educational background; (2) to record the block in which they completed the NISHTHA 2.0 course and the block where they are currently employed; and (3) to document teachers' enrollment year for each of the thirteen course modules, their course completion status, and the reasons behind course completion. The data from this inventory were also used during the analysis and interpretation phase, and further, percentages were calculated to analyze the data collected through this inventory. The researcher opted for a self-constructed tool due to the

limited availability of prior research specifically examining teachers' perceptions and responsiveness towards the program. Additionally, a semi-structured interview was held with the school teachers, during which they were posed a series of open-ended questions. These included inquiries about reasons for not enrolling in or completing certain courses, their level of responsiveness towards the NISHTHA 2.0 courses, and any challenges or problems they faced while accessing the courses on the DIKSHA app.

9. Research Procedure

The researcher initially developed a tool for collecting personal and professional information from school teachers for the NISHTHA 2.0 course modules. This inventory was converted into Google Forms and circulated via email and WhatsApp to secondary school teachers, encouraging them to complete and share the forms. Data were collected and stored in Excel. Although district-level data on NISHTHA 2.0 course completion for Bihar school teachers can be found in online repositories, the lack of block- and course-level scrutiny and year-by-year data makes them inadequate as secondary data sources for this study. To ensure the collection of honest and comprehensive details, the researcher personally visited the selected schools, engaging directly with teachers to gather relevant information regarding their responsiveness to the NISHTHA 2.0 courses, reasons for non-enrollment or non-completion, and challenges faced while using the DIKSHA app. After collecting sufficient responses, scoring was conducted, and the raw data were tabulated, analyzed, and interpreted using percentage analysis. Based on the study's hypothesis, conclusions were subsequently drawn. Throughout the analysis process, each hypothesis was tested and evaluated appropriately. Relevant tables were used to help consolidate the key hypotheses.

10. Statistical Techniques

The data collected for this study were analyzed using descriptive and inferential statistical techniques. To determine the distribution of school teachers across various categories, including gender, subject taught, and course completion rates for each year, a percentage analysis was utilized for the quantitative data collected from the inventory. The mean was calculated to understand the average teacher responsiveness and engagement levels with the NISHTHA 2.0 courses. Additionally, since the data represent the total number of courses completed by each participant, independent samples t-tests were used to compare the mean number of courses completed across groups such as gender, teaching experience (e.g., low vs. high), and subject taught (e.g., science vs. arts). This allowed the researcher to assess if significant differences existed in course completion levels between these groups. The use of these statistical methods enabled a comprehensive analysis of the collected data, highlighting significant patterns and relationships relevant to the study's objectives.

Table 2 presents the year-wise responsiveness of teachers, highlighting the level of engagement with the NISHTHA in-service teacher education program over the study period.

Table 2. Shows year-wise teachers' responsiveness.

Courses	Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
Course 1 Curriculum and an inclusive classroom	N 180	% 46%	N 87	% 22%	N 86	% 22%	N 16	% 4%	N 4	% 1%	N 22	% 6%
Course 2 Using ICT in education	185	47%	90	23%	84	22%	16	4%	2	1%	17	5%
Course 3 School-based health and wellbeing	170	43%	89	23%	84	22%	17	5%	7	2%	27	7%
Course 4 Personal social qualities holistic development	192	5%	88	23%	85	22%	16	4%	3	1%	17	5%
Course 5 Art-integrated learning	179	46%	88	22%	89	22%	16	4%	9	2%	13	3%
Course 6 Comprehension of secondary-stage students	170	44%	83	21%	82	21%	17	5%	18	5%	24	6%
Course 7 Concept and practice of school leadership	17	5%	67	17%	73	19%	14	4%	86	22%	137	35%
Course 8 Vocational education	178	46%	89	23%	90	23%	16	4%	7	2%	14	4%
Course 9 Gender-related issues in education	169	43%	88	23%	83	21%	19	5%	14	4%	21	5%
Course 10 School initiative	121	31%	79	20%	63	16%	17	5%	85	22%	29	7%
Course 11 toy based on pedagogy	19	5%	25	7%	14	4%	3	1%	213	54%	120	31%
Course 12 school-based assessment	179	46%	84	22%	84	22%	22	6%	21	6%	4	1%
Course 13 Subject specific pedagogy	118	30%	74	19%	86	22%	29	8%	36	10%	51	13%

Note: The percentage was calculated based on the number of participating teachers, as the variable in consideration is discrete; accordingly, the percentages have been presented in a rounded-off manner rather than in decimal points.

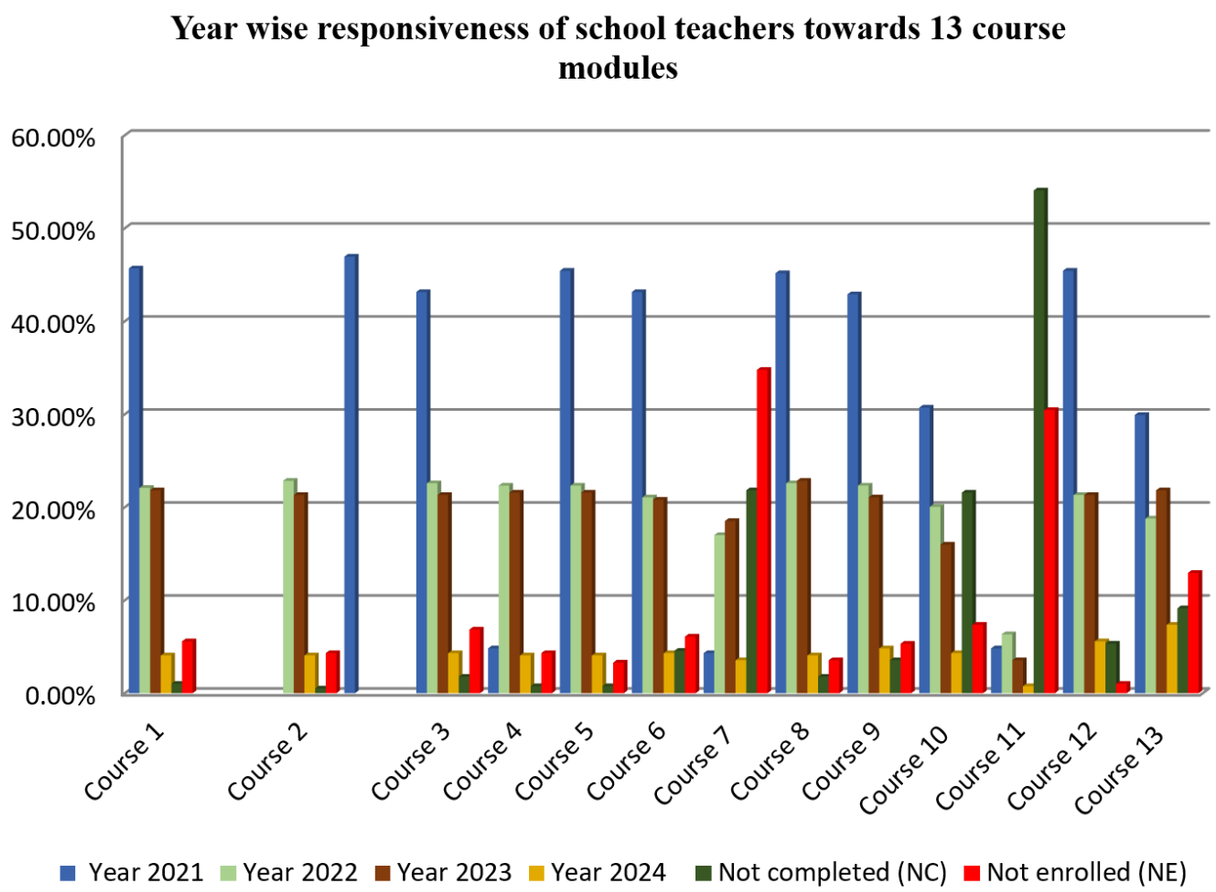

Figure 1. Illustrating course completion variations in different years.

Figure 1 illustrates the variations in course completion across different years, indicating changes in teacher participation in the NISHTHA modules over time.

11. Results

There are notable differences in secondary school teachers' responses to the 13 courses in the NISHTHA 2.0 online in-service teacher education program. High enrollment in all courses in 2021 indicates a significant initial interest in professional development, which may have been influenced by the COVID-19 pandemic's increased availability of time. Courses such as "Personal Social Qualities and Holistic Development" (192 participants) and "Using ICT in Education, Evaluation, and Learning" (185 participants) demonstrated the highest engagement, highlighting their relevance to instructional strategies. However, participation gradually declined over time, with a sharp decrease by 2024. For example, enrollment in "Curriculum and Inclusive Classroom" dropped from 180 in 2021 to just 16 in 2024, and 213 teachers enrolled in "Toy-Based Pedagogy" but did not complete the course. Teachers' challenges with time constraints and conflicting goals are further evidenced by the categories "NC" (enrolled but not completed) and "NE" (not enrolled).

The study of teacher responsiveness in the NISHTHA 2.0 online in-service teacher education program shows that overall participation has been decreasing over time, with significant variations in enrollment and completion rates among the 13 courses.

Course-Wise Analysis of the Responsiveness of Secondary School Teachers Across Different Years:

- *Course 1: Curriculum and Inclusive Classroom*

Table 3 presents the responsiveness of school teachers towards Course 1: Curriculum and the Inclusive Classroom, indicating their level of participation and engagement with the course.

Table 3. Shows the responsiveness of school teachers towards the course 1 curriculum and the inclusive classroom.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
180	46%	87	22%	86	22%	16	4%	4	1%	22	6%

Figure 2 illustrates the year-wise responsiveness of school teachers towards Course 1: Curriculum and the Inclusive Classroom, showing the distribution of participation over different academic years.

The data for Course 1: Curriculum and Inclusive Classroom in the NISHTHA 2.0 program reveals secondary school teachers' responsiveness from 2021 to 2024. Completion rates peaked in 2021 (45.68%), then sharply declined to 22.02% in 2022, 21.82% in 2023, and just 4.06% in 2024. Only 1.01% of teachers enrolled but did not complete the course (NC), and 5.58% did not enroll (NE), suggesting potential barriers or competing priorities. This trend indicates a gradual decline in engagement, raising questions about evolving teacher training needs.

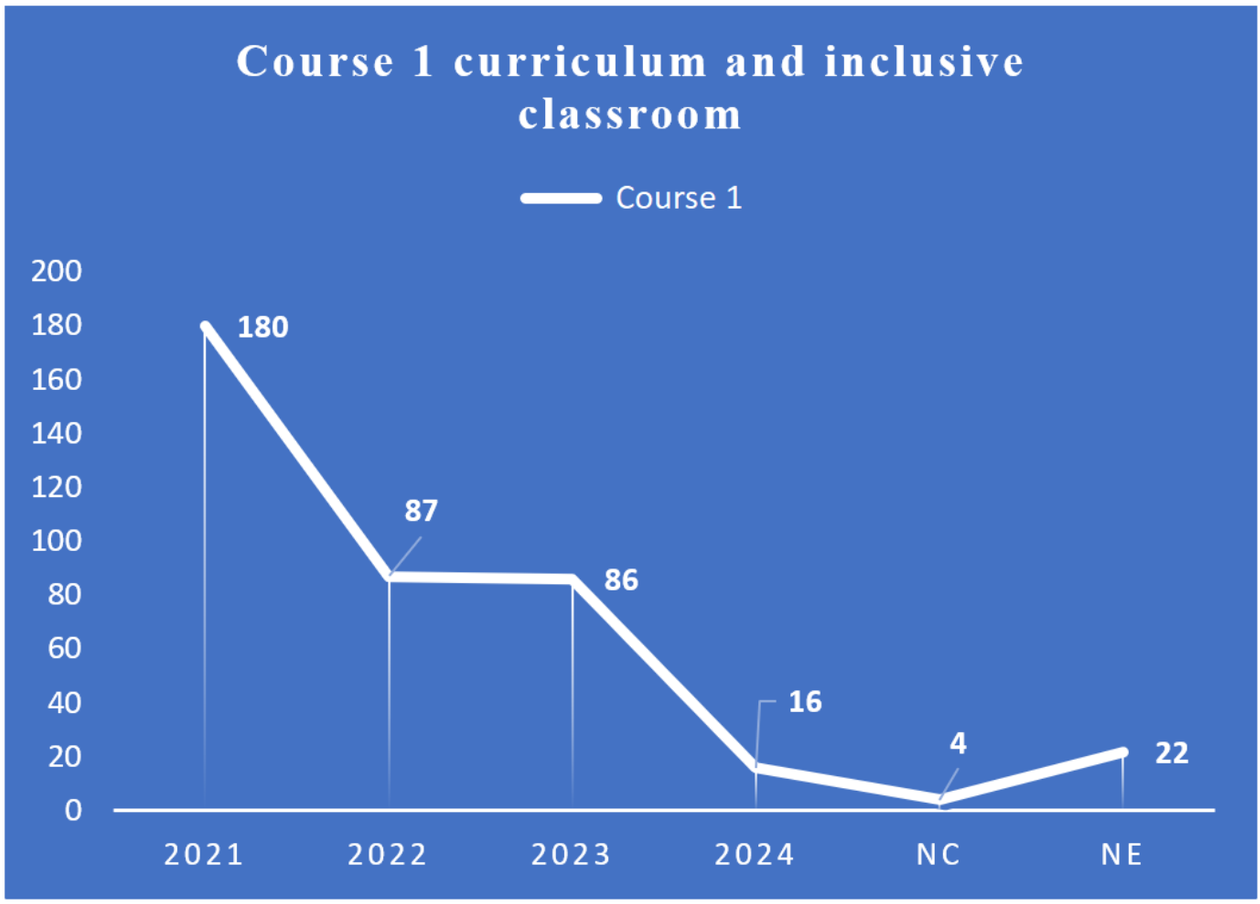

Figure 2. Indicating year-wise responsiveness toward course 1 curriculum and inclusive classroom.

- *Course 2: Using ICT in Education, Evaluation, and Learning*

Table 4 presents the year-wise responsiveness of teachers towards Course 2: Using ICT in Education, Evaluation, and Learning, highlighting their level of engagement across different academic years.

Table 4. Shows year-wise teachers' responsiveness for course 2 using ICT in education, evaluation, and learning.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
185	47%	90	23%	84	22%	16	4%	2	1%	17	5%

Figure 3 illustrates the year-wise responsiveness of teachers towards Course 2: Using ICT in Education, Evaluation, and Learning, depicting the variation in participation over the years.

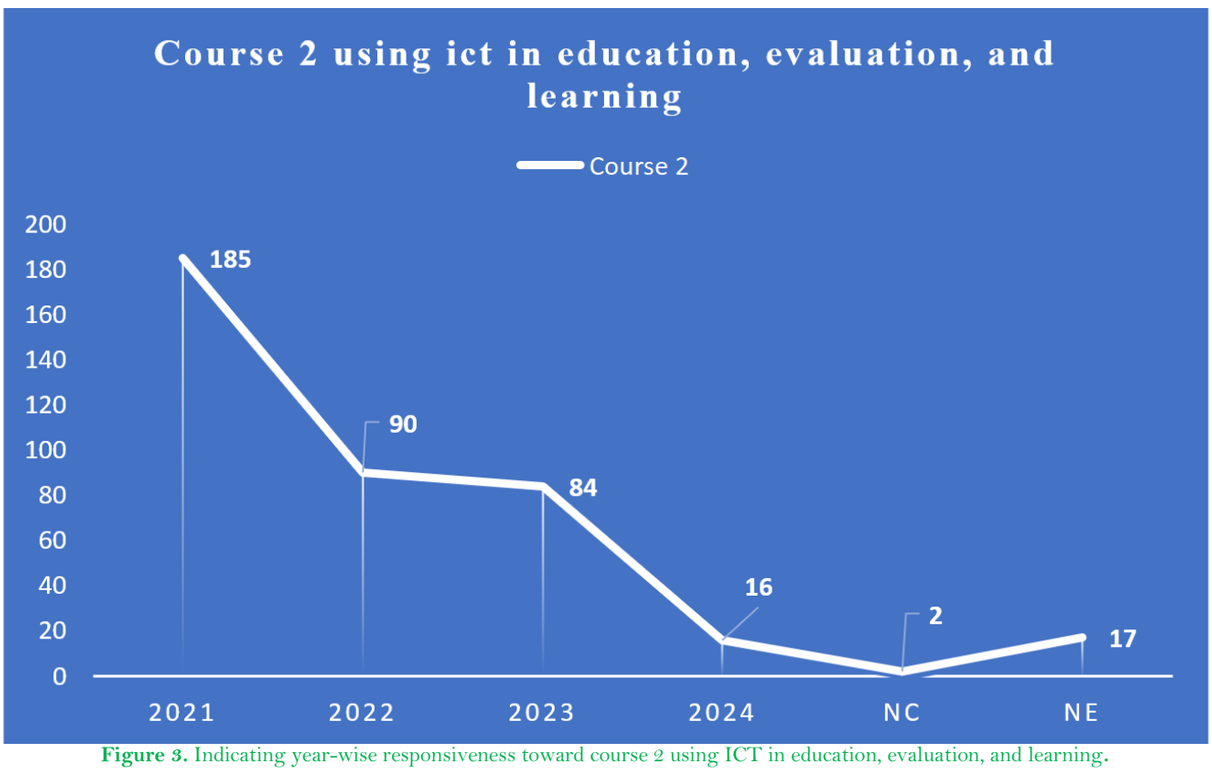

Figure 3. Indicating year-wise responsiveness toward course 2 using ICT in education, evaluation, and learning.

The graph for Course 2, "Using ICT in Education, Evaluation, and Learning," reveals a clear trend in teacher responsiveness. Participation peaked in 2021 with 46.95% of teachers completing the course, driven by the immediate relevance of ICT integration during the COVID-19 pandemic. However, participation declined significantly to 22.84% in 2022, 21.31% in 2023, and just 4.06% in 2024. The "NC" category (enrolled but not completed) remained low at 0.50%, while "NE".

- *Course 3: School-Based Health and Wellbeing*

Table 5 presents the year-wise responsiveness of teachers towards Course 3: School-Based Health and Wellbeing, highlighting their participation trends across different academic years.

Table 5. Shows year-wise teachers' responsiveness for course 3, school-based health and wellbeing.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
170	43%	89	23%	84	22%	17	5%	7	2%	27	7%

Figure 4 illustrates the year-wise responsiveness of teachers towards Course 3: School-Based Health and Wellbeing, showing the changes in participation across the academic years.

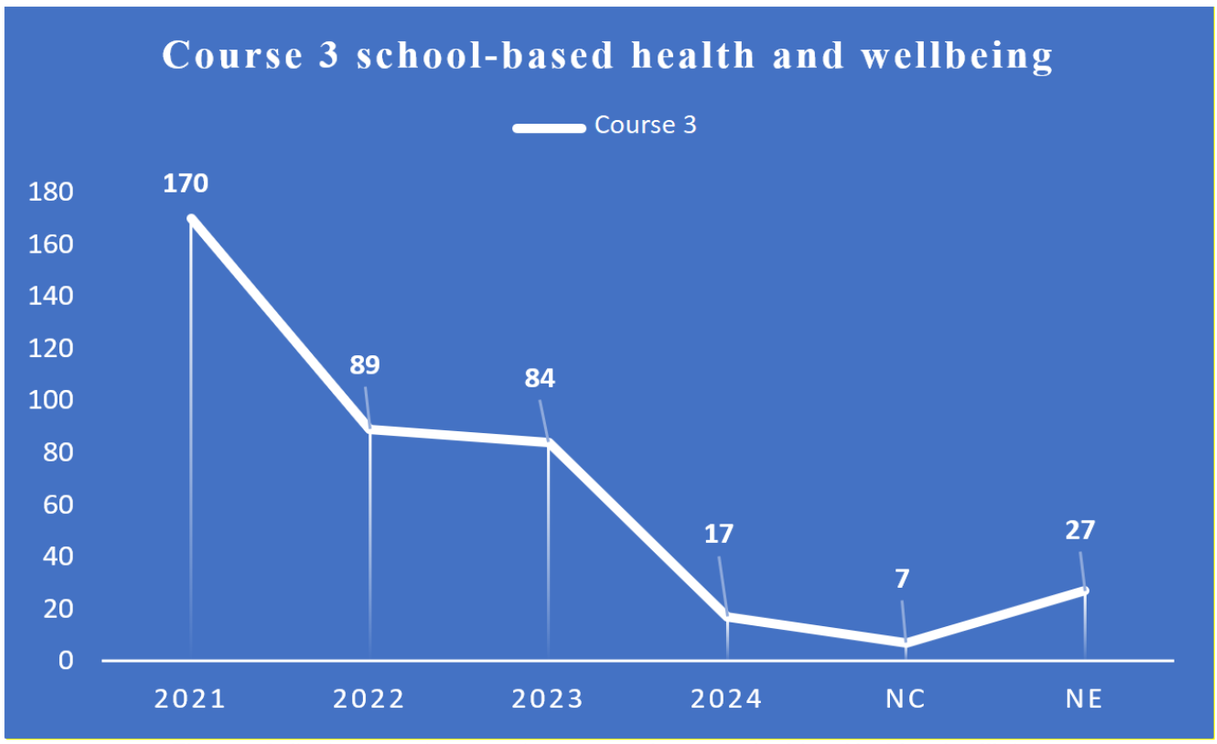

Figure 4. Indicating year-wise responsiveness toward course 3school-based health and wellbeing.

Course 3, "School-Based Health and Wellbeing," showed strong teacher participation in 2021 at 43.14%, but numbers declined sharply over the years, reaching just 4.31% in 2024. This drop suggests decreasing interest or ability to engage with the course. With some teachers not completing (1.77%) or not enrolling (6.85%), the trend indicates a need to reinforce the importance of health and well-being in schools to support a positive learning environment.

- *Course 4: Personal Social Qualities and Holistic Development*

Table 6 presents the year-wise responsiveness of teachers towards Course 4: Personal-Social Qualities and Holistic Development, highlighting patterns of participation over different academic years.

Table 6. Shows year-wise teachers' responsiveness for course 4 personal social qualities and holistic development.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
192	5%	88	23%	85	22%	16	4%	3	1%	17	5%

Figure 5 illustrates the year-wise responsiveness of teachers towards Course 4: Personal-Social Qualities and Holistic Development, indicating the variation in participation across different years.

Teacher engagement in Course 4, "Personal Social Qualities and Holistic Development," began with nearly half of the secondary school teachers enrolling in 2021. However, participation dropped significantly in 2022 and 2023, and by 2024, only a small fraction remained to complete the course. This decline is likely because most teachers had already completed it in the previous year. Additionally, a small percentage of teachers did not enroll at all, and an even smaller number enrolled but did not complete the course.

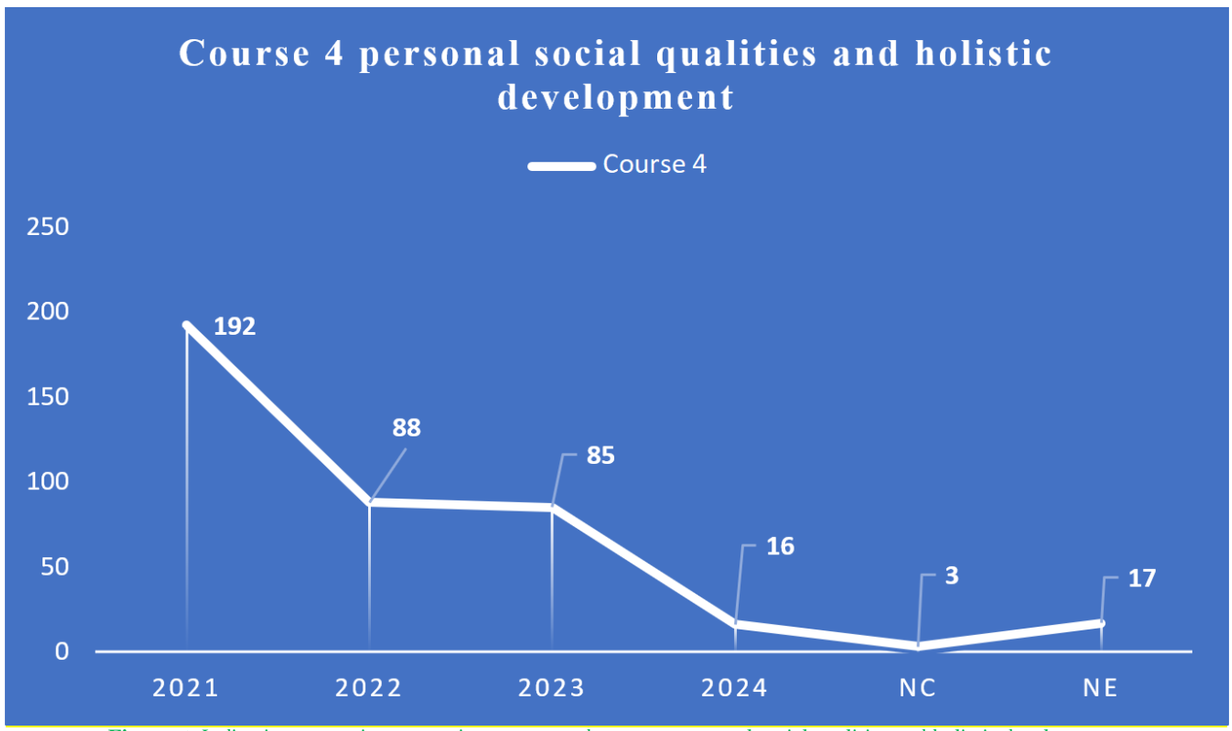

Figure 5. Indicating year-wise responsiveness toward course 4 personal social qualities and holistic development.

- *Course 5: Art-Integrated Learning*

Table 7 presents the year-wise responsiveness of teachers towards Course 5: Art-Integrated Learning, highlighting their participation across various academic years.

Table 7. Shows year-wise teachers' responsiveness for course 5 art-integrated learning.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
179	46%	88	22%	89	22%	16	4%	9	2%	13	3%

Figure 6 illustrates the year-wise responsiveness of teachers towards Course 5: Art-Integrated Learning, showing the trends in participation across different academic years.

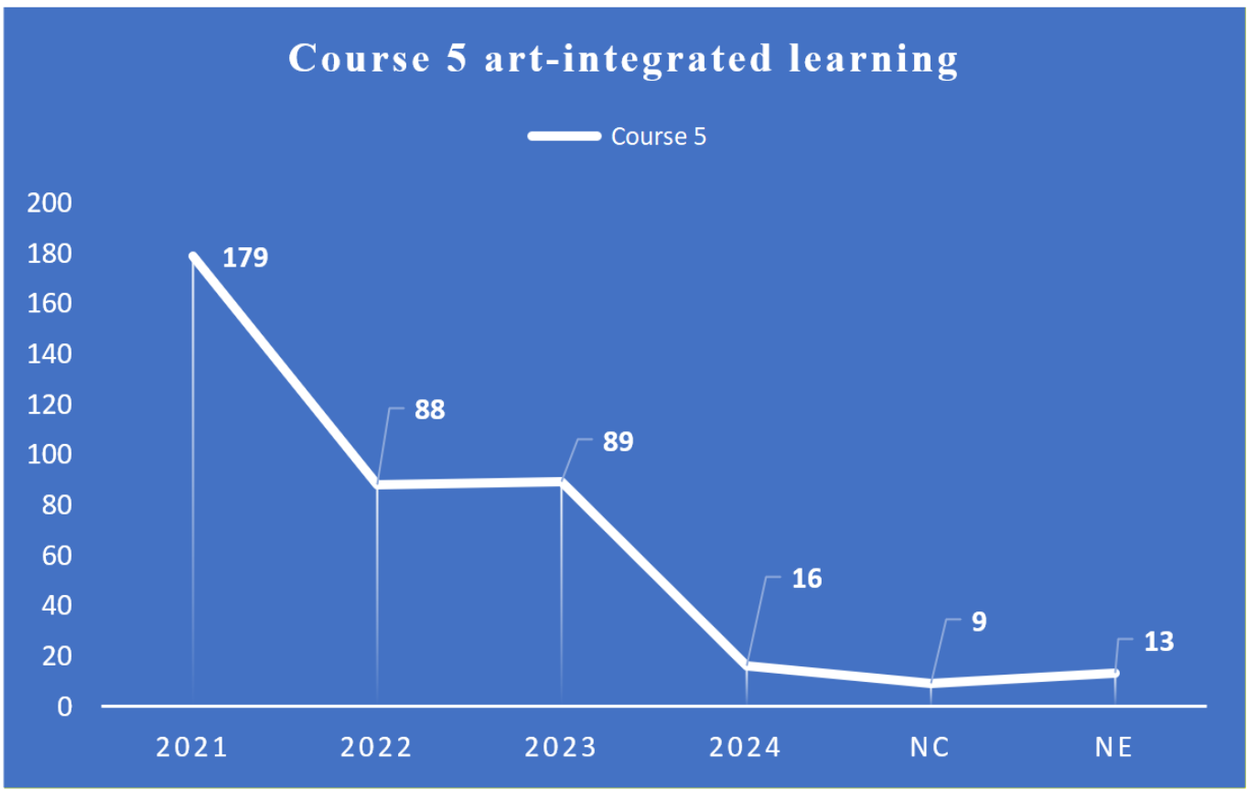

Figure 6. Indicates year-wise responsiveness toward course 5 art-integrated learning.

The data for Course 5: Art-Integrated Learning shows a fluctuating pattern of teacher participation over time. Interest in the course was initially high, with nearly half of the teachers enrolling in 2021, reflecting their enthusiasm for incorporating art into teaching practices. However, participation sharply decreased in 2022 and 2023, before dropping even further in 2024. This pattern suggests that while many teachers completed the course early on, interest or availability to continue with it declined in later years. A small percentage of teachers either chose not to enroll or started but did not finish the course.

- *Course 6: Comprehension of Secondary-Stage Students*

Table 8 presents the year-wise responsiveness of teachers towards Course 6: Comprehension of Secondary-Stage Students, highlighting their participation patterns over different academic years.

Table 8. Shows year-wise teachers' responsiveness course 6 comprehension of secondary-stage students.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
170	44%	83	21%	82	21%	17	5%	18	5%	24	6%

Figure 7 illustrates the year-wise responsiveness of teachers towards Course 6: Comprehension of Secondary-Stage Students, indicating changes in participation across academic years.

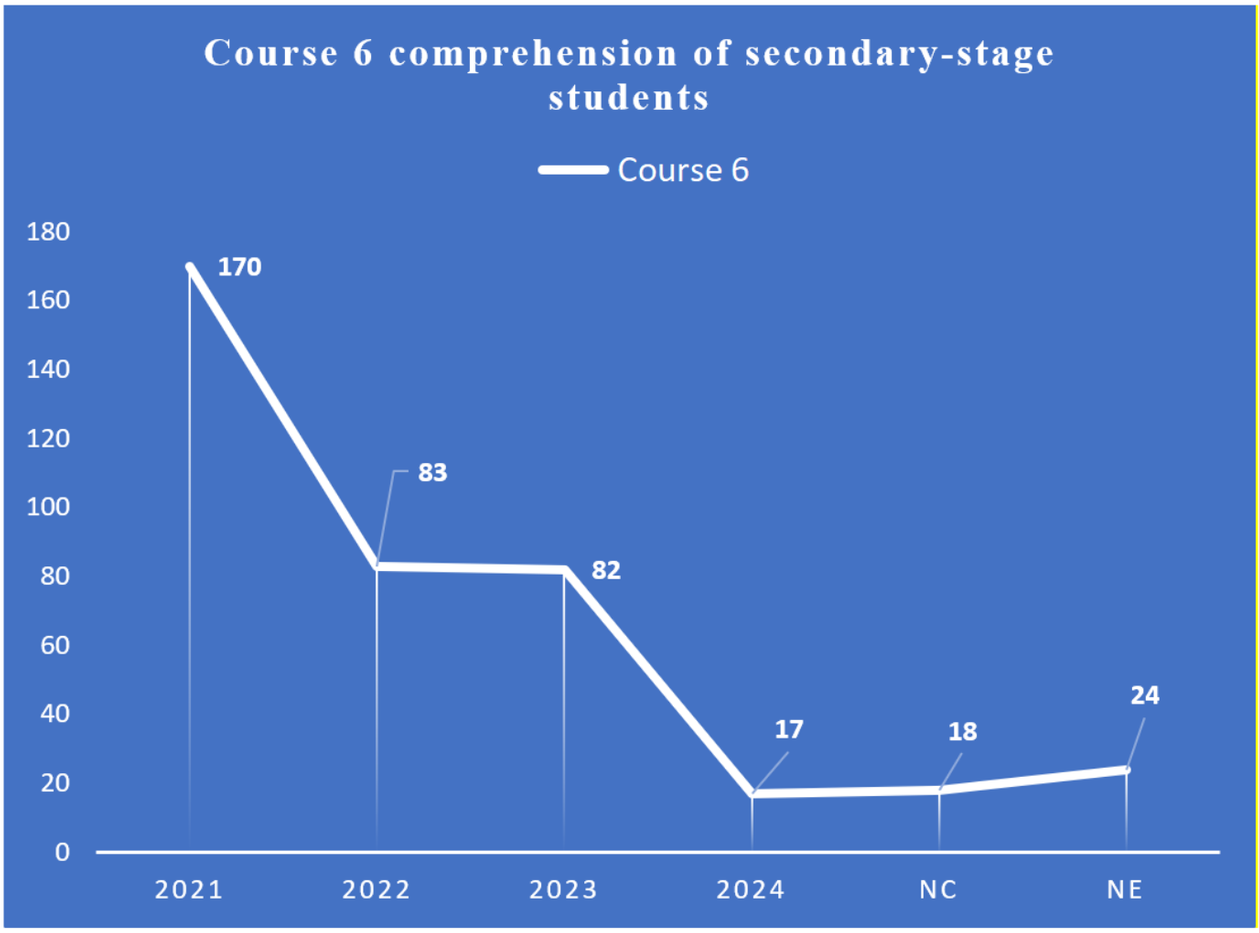

Figure 7. Indicating year-wise responsiveness toward course 6 comprehension of secondary-stage students.

Participation in Course 6: Comprehension of Secondary-Stage Students has steadily decreased since 2021, when interest was high. By 2024, very few teachers were enrolling, indicating declining engagement. A small percentage of teachers either did not enroll or did not complete the course.

- *Course 7: Concept and Practice of School Leadership*

Table 9 presents the year-wise responsiveness of teachers towards Course 7: Concept and Practice of School Leadership, highlighting their participation across different academic years.

Table 9. Shows year-wise teachers' responsiveness course 7 concept and practice of school leadership.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
17	5%	67	17%	73	19%	14	4%	86	22%	137	35%

Figure 8 illustrates the year-wise responsiveness of teachers towards Course 7: Concept and Practice of School Leadership, showing the variation in participation across academic years.

The data for Course 7: Concept and Practice of School Leadership shows fluctuating teacher engagement. Participation was low in 2021 but increased in 2022 and 2023, as teachers had limited course options remaining. By 2024, interest declined again, with only a few teachers completing the course. Many teachers either did not enroll or failed to complete it, highlighting inconsistent participation.

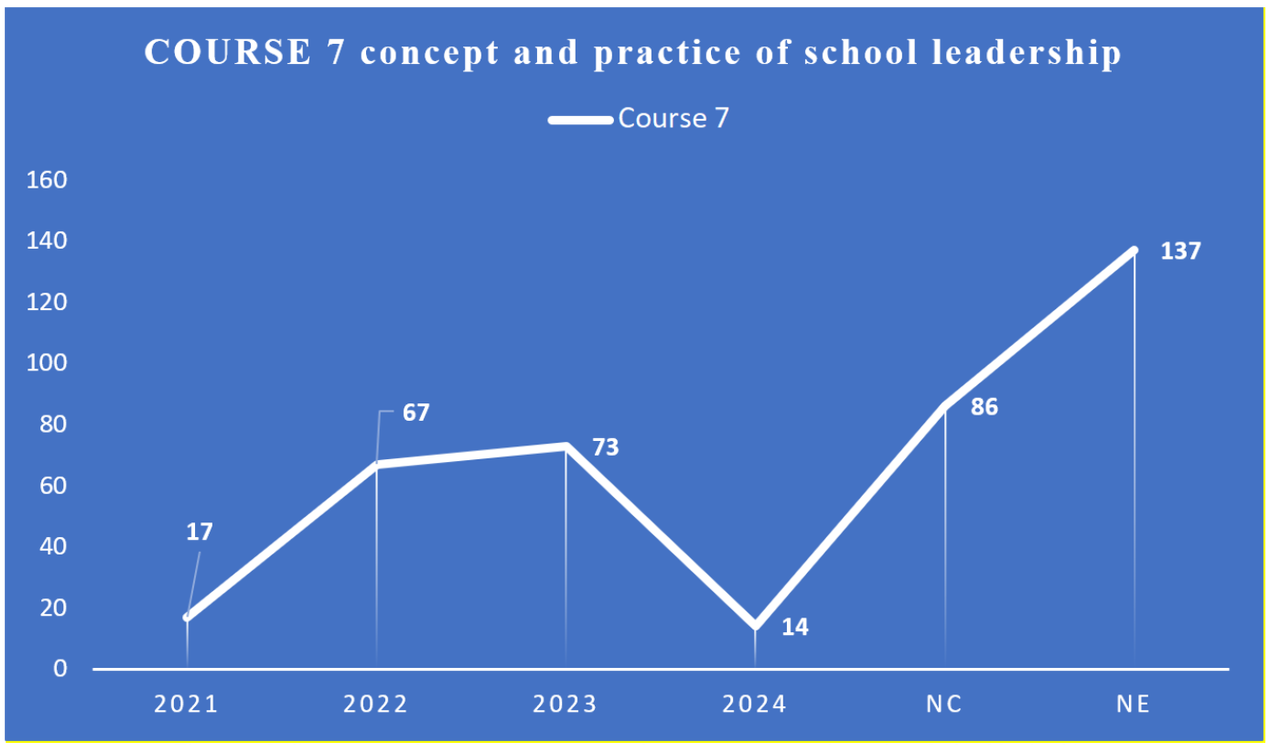

Figure 8. Indicates year-wise responsiveness toward course 7concept and practice of school leadership.

- *Course 8: Vocational Education*

Table 10 presents the year-wise responsiveness of teachers towards Course 8: Vocational Education, highlighting their participation trends across different academic years.

Table 10. Shows year-wise teachers' responsiveness course 8 vocational education.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
178	46%	89	23%	90	23%	16	4%	7	2%	14	4%

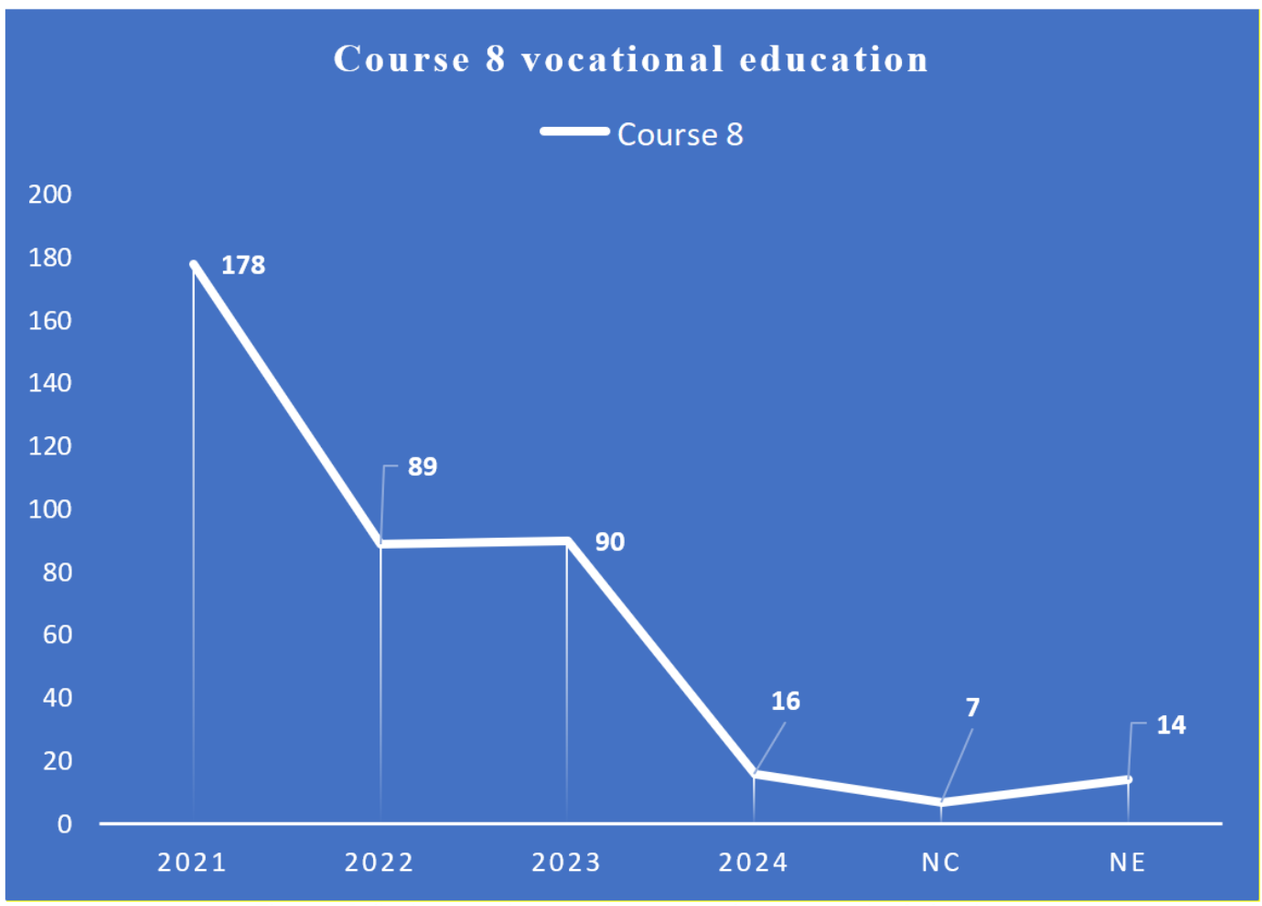

Figure 9. Indicating year-wise responsiveness toward course 8vocational education.

Figure 9 illustrates the year-wise responsiveness of teachers towards Course 8: Vocational Education, indicating variations in participation across academic years.

The data for Course 8: Vocational Education shows a steady decline in teacher participation. While nearly half of the teachers completed the course in 2021, participation dropped sharply in the following years. By 2024, only a

small fraction of teachers engaged with the course. Some teachers did not enroll or failed to complete it, suggesting a diminishing focus on vocational education.

- *Course 9: Gender-Related Issues in Education*

Table 11 presents the year-wise responsiveness of teachers towards Course 9: Gender-Related Issues in Education, highlighting participation patterns across different academic years.

Table 11. Shows year-wise teachers' responsiveness course 9 gender-related issues in education.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
169	43%	88	23%	83	21%	19	5%	14	4%	21	5%

Figure 10 illustrates the year-wise responsiveness of teachers towards Course 9: Gender-Related Issues in Education, showing the variation in participation over different academic years.

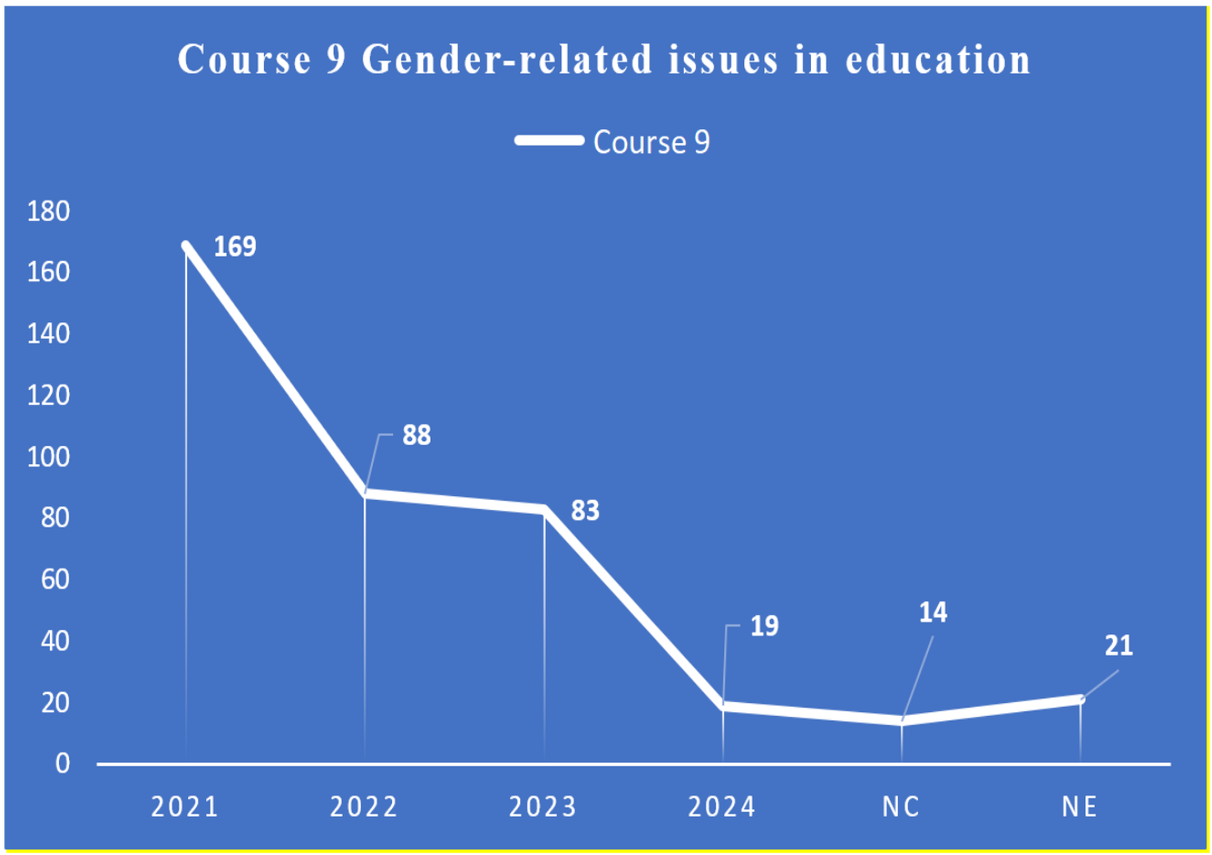

Figure 10. Indicates year-wise responsiveness toward course 9 gender-related issues in education.

The data for Course 9: Gender-Related Issues in Education shows a sharp decline in teacher participation. Strong engagement was observed in 2021, but it decreased significantly in subsequent years. By 2024, very few teachers enrolled, indicating reduced interest or priority. Some teachers either did not enroll or failed to complete the course, suggesting possible challenges to participation.

- *Course 10: School Initiative*

Table 12 presents the year-wise responsiveness of teachers towards Course 10: School Initiative, highlighting their participation trends across various academic years.

Table 12. Shows year-wise teachers' responsiveness course 10 school initiative.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
121	31%	79	20%	63	16%	17	5%	85	22%	29	7%

Figure 11 illustrates the year-wise responsiveness of teachers towards Course 10: School Initiative, indicating variations in participation across academic years.

Course 10: "School Initiative" shows a steady decline in teacher participation over the years, with significantly fewer teachers taking part each year from 2021 to 2024. Some teachers did not enroll at all, while a notable portion enrolled but did not complete the course, indicating issues with retention or competing priorities.

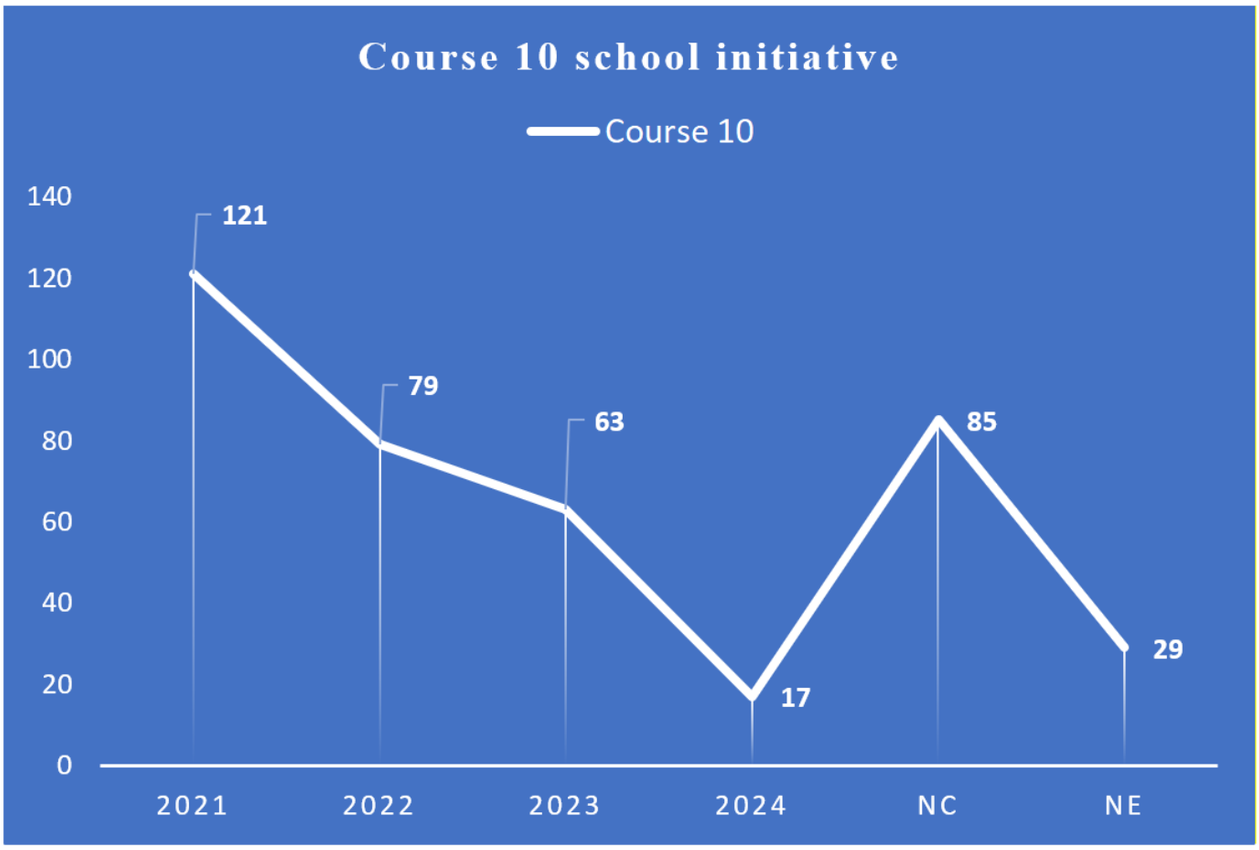

Figure 11. Indicates year-wise responsiveness toward course 10 school initiative.

- *Course 11: Toy-Based Pedagogy*

Table 13 presents the year-wise responsiveness of teachers towards Course 11: Toy-Based Pedagogy, highlighting participation patterns across different academic years.

Table 13. Shows year-wise teachers' responsiveness course 11 toy-based pedagogy.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
19	5%	25	7%	14	4%	3	1%	213	54%	120	31%

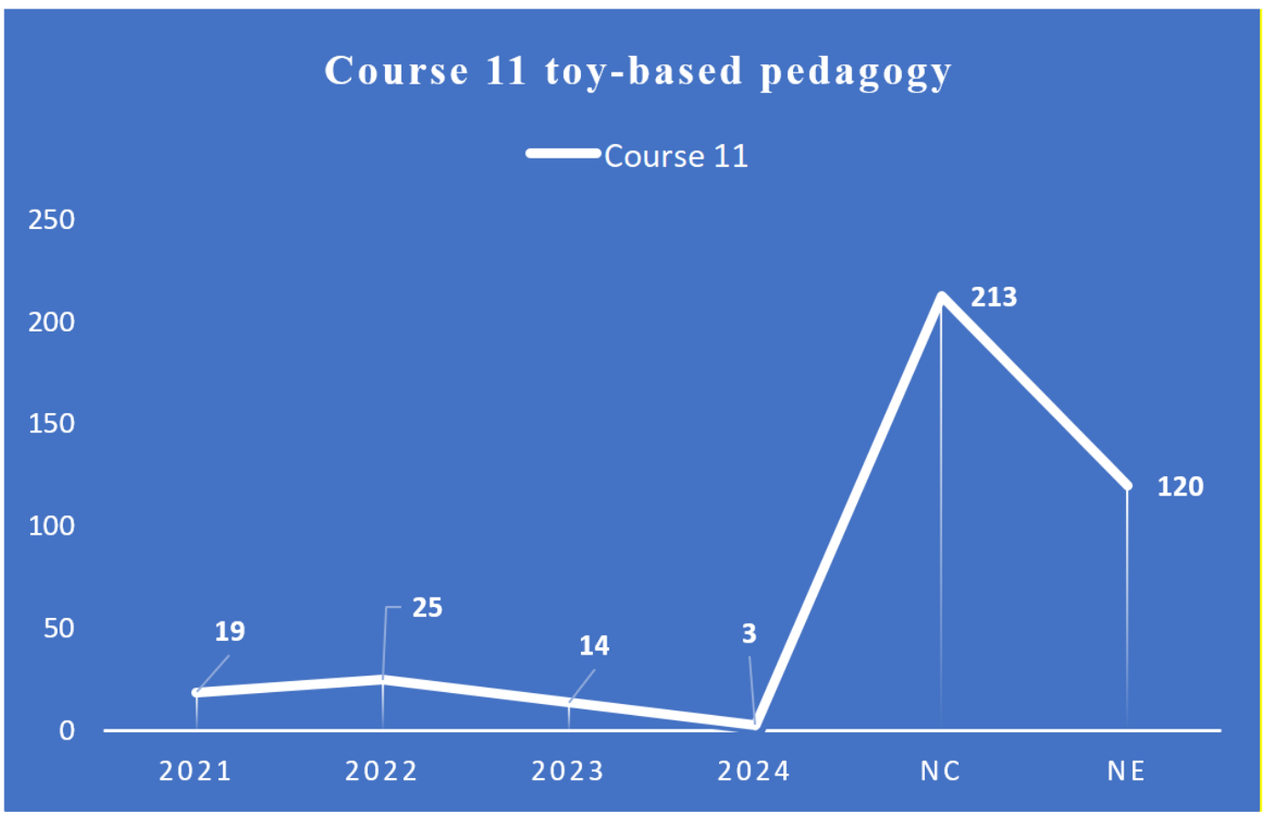

Figure 12. Indicating year-wise responsiveness toward course 11 toy-based pedagogy.

Figure 12 illustrates the year-wise responsiveness of teachers towards Course 11: Toy-Based Pedagogy, indicating changes in participation across academic years.

Teacher participation in Course 11: "Toy-Based Pedagogy" shows an uneven trend, with enrollment increasing in 2022 but then sharply declining by 2024. Many teachers enrolled but did not complete the course, while others

did not enroll at all. Since the course title indicates it is more relevant for elementary or primary school teachers, several secondary school teachers revealed during interviews that they found it less relevant to their professional context.

- *Course 12: School-based Assessment*

Table 14 presents the year-wise responsiveness of teachers towards Course 12: School-Based Assessment, highlighting participation trends across different academic years.

Table 14. Shows year-wise teachers' responsiveness course 12 school-based assessment.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
179	46%	84	22%	84	22%	22	6%	21	6%	4	1%

Figure 13 illustrates the year-wise responsiveness of teachers towards Course 12: School-Based Assessment, indicating variation in participation across academic years.

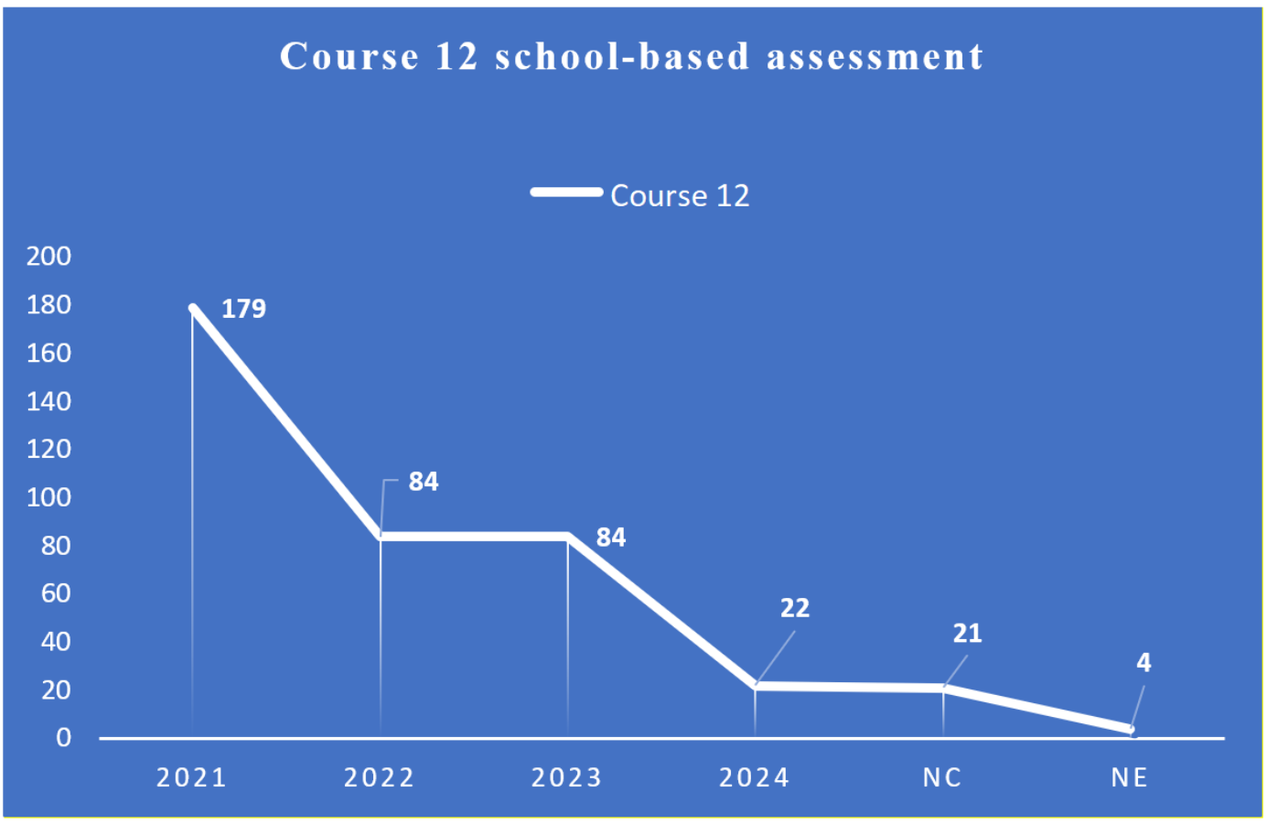

Figure 13. Indicating year-wise responsiveness toward course 12 school-based assessment.

Teacher participation in Course 12: "School-based Assessment" began with strong involvement in 2021 but declined significantly in subsequent years, with a sharp drop by 2024. A small number of teachers enrolled but did not complete the course, and very few did not enroll at all. Interestingly, several teachers shared that this course provided valuable guidance and practical support for school-based assessments. They highlighted that the video modules were especially relevant, offering clear, real-world examples that closely mirrored actual classroom evaluation practices. These resources not only enhanced their understanding of effective assessment strategies but also helped them apply these concepts in their daily teaching.

- *Course 13: Subject-specific pedagogy*

Table 15 presents the year-wise responsiveness of teachers towards Course 13: Subject-Specific Pedagogy, highlighting participation patterns across different academic years.

Table 15. Shows year-wise teachers' responsiveness course 13 subject specific pedagogy.

Year 2021		Year 2022		Year 2023		Year 2024		Not completed (NC)		Not enrolled (NE)	
N	%	N	%	N	%	N	%	N	%	N	%
118	30%	74	19%	86	22%	29	8%	36	10%	51	13%

Figure 14 illustrates the year-wise responsiveness of teachers towards Course 13: Subject-Specific Pedagogy, showing variations in participation across academic years.

Teacher participation in Course 13: *Pedagogy of Hindi/English/Urdu/Sanskrit/Mathematics/Science/Social Sciences* showed a fluctuating trend, with high initial enrollment in 2021 that declined in subsequent years. This decline is primarily because most teachers completed the course early on, reducing the need for new enrollments. Some teachers did not finish the course, while others chose not to enroll. Nevertheless, many teachers found the content informative and relevant to their subjects, often using the course videos as instructional support in their classrooms. They also reported that the course helped update their previous knowledge about the subjects they teach, thereby enhancing their teaching practices.

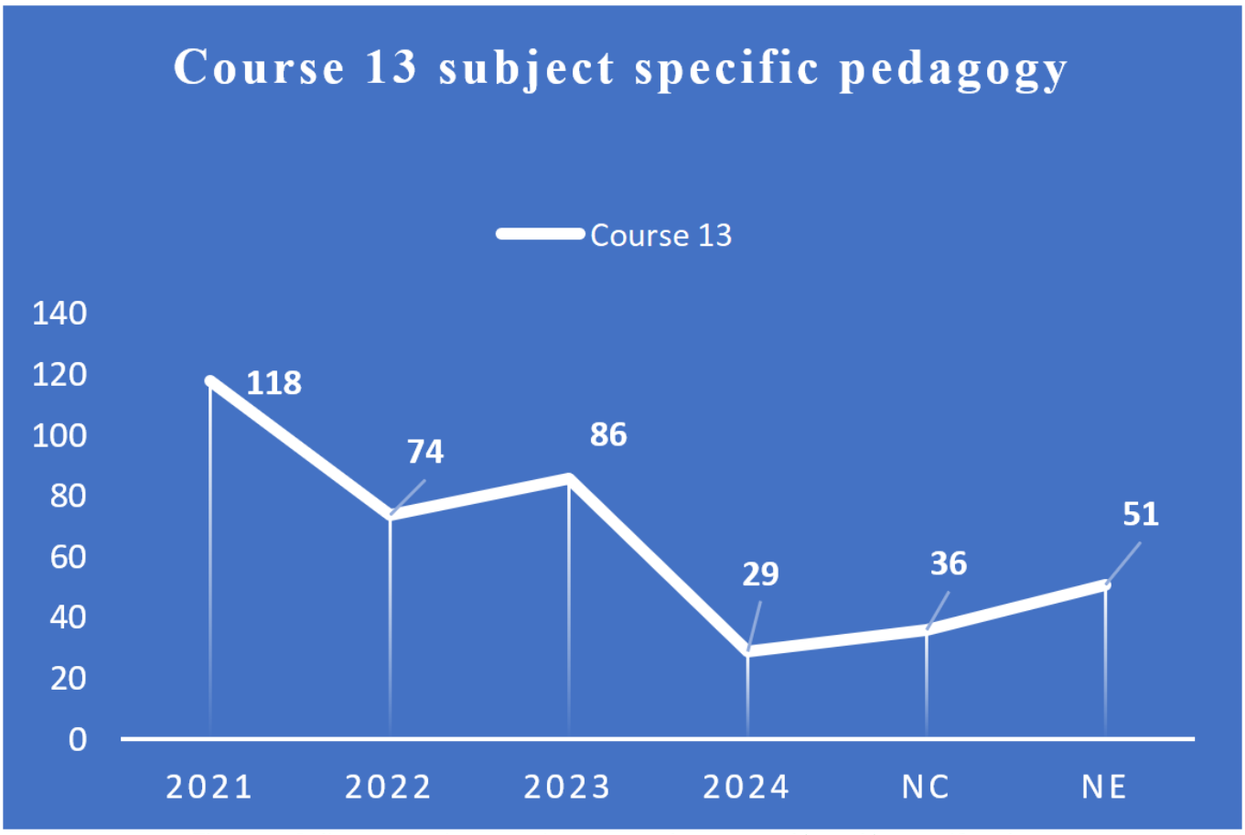

Figure 14. Indicates year-wise responsiveness toward course 13 subject subject-specific pedagogy.

During an interview, a Hindi teacher shared that this course significantly enhanced his knowledge of Hindi teaching. He appreciated the detailed pedagogy insights and teaching methods presented, particularly the storytelling approach emphasized in the video modules. This method helped him improve his Hindi language teaching techniques. He also noted that several other instructional strategies covered in the course were practical and contributed to enhancing his overall teaching effectiveness.

Analysis and presentation of data related to the comparison of the responsiveness of school teachers concerning gender, experience, and teaching subjects.

Analysis related to the comparison of the responsiveness of school teachers concerning gender:

Table 16 presents the year-wise number and percentage of male and female participants who completed the course each year, highlighting gender-wise completion trends over time.

Table 16. Presents the number of male and female participants who completed the course each year.

Year ⇒		2021		2022		2023		2024	
Gender		M	F	M	F	M	F	M	F
Course 1	N	106	74	49	38	50	36	9	7
	%	47%	44%	21%	22%	22%	21%	4%	4%
Course 2	N	104	81	51	39	48	36	10	6
	%	46%	48%	23%	23%	21%	16%	5%	4%
Course 3	N	94	76	50	39	50	34	10	7
	%	42%	45%	30%	23%	22%	20%	5%	4%
Course 4	N	109	83	50	38	49	36	10	6
	%	48%	51%	22%	22%	21%	22%	5%	4%
Course 5	N	101	78	49	39	51	38	10	6
	%	44%	47%	22%	23%	22%	23%	4%	3%
Course 6	N	97	73	46	37	49	33	10	7
	%	43%	44%	20%	22%	22%	20%	4%	3%
Course 7	N	8	9	38	29	42	31	10	4
	%	4%	5%	17%	13%	18%	18%	5%	2%
Course 8	N	102	76	50	39	49	41	10	6
	%	45%	45%	22%	23%	22%	25%	4%	3%
Course 9	N	95	74	49	39	46	37	12	7
	%	42%	44%	22%	23%	20%	22%	5%	4%
Course 10	N	71	50	48	31	33	30	11	6
	%	31%	30%	21%	18%	14%	18%	5%	4%
Course 11	N	9	10	11	14	8	6	2	1
	%	4%	6%	5%	8%	4%	4%	1%	1%
Course 12	N	105	74	47	37	47	37	14	8
	%	46%	44%	20%	22%	21%	22%	7%	5%
Course 13	N	74	44	40	34	49	37	18	11
	%	33%	26%	18%	20%	22%	22%	8%	6%

Table 17 presents the statistical data indicating significant differences between male and female participants in course completion across the years.

Table 17. Presents the statistical data for significant differences between males and females.

Gender	N	Mean	SD	Df	Table value	t- value	Level of significance
Male	226	10.4	1.82	392	1.964 (0.05 level) 2.58(0.01 level)	0.596	Not Significant at 0.5 and 0.1 levels
Female	168	10.5	1.59				

The results indicated that the t-value was 0.596 with 392 degrees of freedom, and the p-value was 0.552. Since the p-value exceeds the significance level of 0.05, the null hypothesis that there is no significant difference in the number of courses completed by male and female teachers cannot be rejected.

Analysis related to the comparison of the responsiveness of school teachers concerning experience (more experienced and less experienced).

More experienced—more than 10 years of teaching experience.

Less experienced- less than 10 years of experience.

Table 18 presents the year-wise responsiveness of more experienced and less experienced teachers, highlighting differences in their participation across various academic years.

Table 18. Presents the year-wise responsiveness of more experienced and less experienced teachers.

Year ➡		2021		2022		2023		2024	
Experience		ME	LE	ME	LE	ME	LE	ME	LE
Course 1	N	106	74	43	40	43	43	8	8
	%	49%	42%	20%	23%	20%	24%	4%	4%
Course 2	N	105	80	49	41	42	42	8	8
	%	49%	45%	23%	24%	20%	24%	4%	4%
Course 3	N	101	69	48	41	43	41	9	8
	%	47%	39%	22%	19%	20%	23%	19%	5%
Course 4	N	114	78	48	40	44	41	8	8
	%	53%	44%	22%	23%	20%	23%	4%	5%
Course 5	N	104	75	48	40	47	42	8	8
	%	48%	43%	22%	22%	21%	24%	4%	5%
Course 6	N	102	68	43	40	42	40	8	9
	%	47%	38%	20%	22%	20%	22%	4%	5%
Course 7	N	9	8	36	31	39	34	7	7
	%	5%	4%	16%	17%	18%	19%	3%	4%
Course 8	N	102	76	47	42	47	43	8	8
	%	47%	43%	21%	24%	26%	24%	4%	4%
Course 9	N	100	69	47	41	41	42	10	9
	%	46%	39%	22%	19%	23%	24%	5%	5%
Course 10	N	74	47	46	33	34	29	7	10
	%	34%	26%	21%	18%	16%	16%	3%	5%
Course 11	N	11	8	13	12	9	5	1	2
	%	5%	4%	6%	7%	4%	3%	1%	2%
Course 12	N	102	77	45	39	43	41	11	11
	%	47%	44%	21%	22%	20%	23%	5%	6%
Course 13	N	68	50	38	36	44	42	15	14
	%	31%	28%	18%	20%	20%	24%	7%	8%

Table 19 Presents the statistical data indicating significant differences in participation between more experienced and less experienced teachers over the years.

Table 19. Presents the statistical data for significant differences between more and less experienced.

Experience	N	Mean	SD	Df	Table value	t- value	Level of significance
More exp.	217	10.4	1.82	392	1.964 (0.05 level) 2.58(0.01 level)	0.574	Not Significant at 0.5 and 0.1 levels
Less exp.	177	10.5	1.59				

Findings indicate that the t-value was 0.574 with 392 degrees of freedom. The p-value was 0.568. Since the p-value exceeds the significance level of 0.05, the null hypothesis that *"There is no significant difference in the responsiveness of less experienced and more experienced school teachers toward the NISHTHA online in-service teacher education program (TEP)"* will be accepted.

Analysis related to the comparison of the responsiveness of school teachers concerning teaching subjects (arts and science).

Table 20 Presents the year-wise responsiveness of school teachers from Science and Arts backgrounds, highlighting subject-wise differences in participation over the academic years.

Table 20. Presents the year-wise responsiveness of Science and Arts teaching school teachers.

Year ➡		2021		2022		2023		2024	
Subject		Arts	Science	Arts	Science	Arts	Science	Arts	Science
Course 1	N	111	69	59	28	50	36	13	3
	%	45%	48%	24%	19%	20%	25%	5%	2%
Course 2	N	113	72	61	29	49	35	13	3
	%	45%	50%	24%	20%	20%	24%	5%	2%
Course 3	N	103	67	60	29	49	35	13	4
	%	41%	46%	24%	20%	20%	24%	5%	3%
Course 4	N	119	73	60	28	50	35	13	3
	%	48%	50%	24%	19%	20%	24%	5%	2%
Course 5	N	109	70	59	29	53	36	13	3
	%	44%	48%	24%	20%	21%	25%	5%	2%
Course 6	N	106	64	58	25	49	33	14	3
	%	43%	44%	23%	17%	20%	23%	6%	2%
Course 7	N	12	5	45	22	45	28	12	2
	%	5%	3%	18%	15%	18%	19%	5%	1%
Course 8	N	107	71	61	28	52	38	13	3
	%	43%	49%	24%	19%	21%	26%	5%	2%
Course 9	N	105	64	60	28	52	38	13	3
	%	42%	44%	24%	19%	21%	26%	5%	2%
Course 10	N	80	41	56	23	34	29	12	5
	%	32%	28%	22%	16%	14%	20%	5%	3%
Course 11	N	15	4	18	7	9	5	2	1
	%	6%	3%	7%	5%	4%	3%	1%	1%
Course 12	N	110	69	58	26	50	34	17	5
	%	44%	48%	23%	18%	20%	23%	7%	3%
Course 13	N	70	48	51	23	50	36	20	9
	%	28%	33%	20%	16%	20%	25%	8%	6%

Table 21 Presents the statistical data indicating significant differences in participation between Arts and Science teaching school teachers across the academic years.

Table 21. Presents the statistical data indicating significant differences in participation between Arts and Science teaching school teachers across the academic years.

Teaching subject	N	Mean	SD	Df	Table value	t- value	Level of significance
Arts	249	10.74	1.51	392	1.964 (0.05 level) 2.58(0.01 level)	2.059	Significant at the 0.5 level.
Science	145	10.38	1.92				

Findings indicate that the t-value was 2.059 with 392 degrees of freedom, and the p-value was 0.976. The calculated t-value (2.059) is greater than the critical value from the t-distribution table for df 392 at a significance level of 0.05.

So, the null hypothesis that *"There is no significant difference in the responsiveness of Arts and Science teaching school teachers towards the NISHTHA online in-service teacher education program (TEP)"* is rejected. This means that the data provides sufficient evidence to conclude that there is a statistically significant difference in the responsiveness of Arts and Science teachers towards the courses of the NISHTHA 2.0 program.

12. Major Findings and Discussions

1. Teacher participation in NISHTHA 2.0 courses increased significantly in 2021, indicating a high level of interest initially. This may be attributed to the COVID-19 pandemic, during which many schools were closed or operated online, providing teachers with more free time and flexibility. Teachers could access these online courses from home or at convenient times, facilitating their participation and completion. Additionally, the pandemic underscored the importance of adopting new teaching methods and integrating technology into lessons. NISHTHA 2.0 offered an opportunity for teachers to enhance their skills and prepare for the challenges of online and blended learning. However, as schools reopened and teachers resumed regular classes and duties, their available time for professional development decreased. This likely led to a decline in participation in subsequent years.
2. The number of teachers enrolled in NISHTHA 2.0 courses changed from year to year between 2021 and 2024. In 2021, the highest number of teachers participated, with Course 4 having the most completions. In the subsequent years (2022–2023), fewer teachers completed the courses, but Course 8 still maintained the highest completion rate among them. This indicates that although overall participation declined compared to 2021, Course 8 was particularly engaging or useful to teachers. By 2024, overall participation had decreased significantly. However, Course 13 still recorded the highest completion rate for that year, suggesting that despite fewer teachers enrolling, the course content continued to resonate with those who participated. Many teachers found the subject-specific modules in Course 13 especially useful for their classroom teaching, as they provided practical strategies, updated knowledge, and engaging video-based demonstrations. This demonstrates that even during periods of declining participation, courses offering relevant, actionable content can sustain teacher interest and commitment.
3. Many teachers completed most of the NISHTHA 2.0 courses in 2021, which was when the program first began. Because so many teachers had already completed the modules that year, fewer of them enrolled in or completed additional courses in subsequent years. This pattern suggests that the initial high participation may have been driven by teachers' motivation to complete the program early, especially when there was flexibility and encouragement.
4. No course in NISHTHA 2.0 had more than half of the teachers participating in any single year. This indicates that teachers' engagement was spread out over multiple courses and years. Participation

was likely influenced by several factors, including teachers' workload, school schedules, exam preparation periods, and personal commitments. Some teachers may also have chosen courses based on their subject area, professional needs, or perceived relevance, leading to uneven participation across different courses. This pattern suggests that, while teachers were interested in professional development, they had to balance these courses with their existing responsibilities. It highlights the need for future programs to be designed with more flexibility and support, ensuring that teachers can engage with courses at a pace and time that suits them. It also shows that making courses more tailored to teachers' subject areas and classroom challenges might encourage higher participation.

5. No course in the NISHTHA 2.0 program had zero participation, meaning every module attracted at least some teachers. This indicates that, despite differences in enrollment levels across years, locations, and subjects, each course held some value for a group of teachers. Even courses perceived as less relevant by many still engaged a segment of the teacher community. During interviews, a few teachers also revealed that participation in some courses was influenced by school principals who encouraged or even required teachers to complete certain modules. This compulsion helped ensure baseline engagement, especially in courses that teachers might not have chosen on their own.
6. The data showed no major difference in responsiveness between male and female teachers, teachers with more or less experience, and teachers from science or arts backgrounds. This means that gender, experience, or subject area did not affect their participation and engagement in the NISHTHA 2.0 courses. In a similar study, Uzunboylu (2007) found that after participating in an online in-service program, many teachers had positive attitudes toward online learning, suggesting its potential as an effective method of teacher training.
7. The NISHTHA 2.0 modules were designed in a standardized format to accommodate teachers from diverse backgrounds. This consistency helped ensure that teachers of various subjects, levels of experience, and locations could access and benefit from the courses. The modules covered themes relevant to all teachers, such as classroom management, assessment, and child-centered learning. The digital format was also user-friendly and flexible, making participation easier for everyone. This likely contributed to steady engagement across teacher groups. This approach demonstrates that professional development programs can be made more accessible and engaging by focusing on common themes and simple digital tools.
8. The decline in participation over time indicates a need for improved policies to maintain teachers' interest in professional development. Courses should be made more relevant and practical, focusing on real classroom challenges and tailored to the needs of teachers from various subjects and experience levels. Additionally, incentives could be introduced to motivate teachers to participate more actively. The government of Bihar and the central government should conduct regular surveys to monitor participation levels and assess teachers' enthusiasm for professional development. This feedback can help make programs more engaging and improve their content, ensuring teachers remain motivated to enhance their skills.
9. The name "Toy-Based Pedagogy" makes it sound more useful for teaching younger children. However, secondary teachers work with older students, so a name like "Activity-Based Pedagogy for Engaging Adolescents" or "Interactive and Experiential Learning Approaches" would make the course sound more relevant for them. These names suggest that the course will focus on teaching methods that help adolescents stay engaged, learn actively, and feel supported in their learning.
10. It is suggested that NISHTHA 2.0 introduce a dedicated course titled "Teacher as Counselor: Guidance and Counseling Skills for Adolescent Students" to address the needs of secondary-level students. Currently, the program does not have a specific course focusing on this crucial area. Such a course would equip teachers with the skills to support adolescents facing physical, mental, and emotional challenges, including guidance on academic choices and career planning. Teachers, as the first points of contact for students, could use these skills to create supportive environments and offer meaningful guidance. Establishing counseling cells in schools, as part of this initiative, would further strengthen the support system for students navigating the complexities of adolescence.

Online in-service teacher education programs like NISHTHA 2.0 play a crucial role in helping teachers stay updated with evolving teaching methods. They provide flexible, self-paced learning that allows teachers to improve their skills and knowledge without leaving their classrooms. These programs also make professional development accessible to teachers in remote areas, ensuring equity in training opportunities. By offering digital content and opportunities for collaboration, they encourage continuous improvement in teaching quality and student outcomes. However, many teachers interviewed during this study expressed a preference for in-service programs to be conducted offline, citing better engagement and interaction. Similar observations were made in the study by Jung (2001), which analyzed Korea's experience with online in-service teacher training. In that study, over 70% of respondents preferred online training for its flexibility and attractiveness. However, Jung also highlighted that online education was not yet the dominant mode of in-service training for Korea's more than 340,000 teachers, with many teacher education institutions still relying on commercial Internet Service Providers' networks to distribute materials and facilitate interaction. This suggests that while online learning is gaining traction, a blend of online and offline modes may be more effective in meeting teachers' professional development needs.

During interviews, some teachers shared that their low participation or responsiveness in the NISHTHA 2.0 courses was due to internet connectivity issues in remote areas. They mentioned that slow networks and poor internet access made it difficult to view course videos and complete modules. A few teachers also pointed out that they were not very tech-savvy and felt that, before introducing the courses, there should have been basic training on using digital platforms and devices. This observation is similar to findings in the study by Bhardwaj and Rathee (2024), which highlighted that MOOC-based in-service training in India faced challenges due to limited infrastructure and slow internet connectivity. Their research pointed out that although platforms like DIKSHA provided options to download course material, the large file sizes of high-definition videos made it difficult for teachers in low-connectivity areas to access and complete courses effectively (Chatterjee & Nath, 2015).

13. Conclusion

The NISHTHA 2.0 Online In-Service Teacher Education Program has emerged as a pivotal initiative in strengthening the professional development of school teachers across India. By providing structured, accessible,

and technology-driven training, the program has supported teachers in upgrading their pedagogical skills and adapting to modern classroom demands.

The findings of this study offer valuable insights into teacher responsiveness regarding various courses of the program; these insights reveal variations in engagement based on gender, teaching experience, and subject specialization.

References

Anju, R. (2022). *An analysis of in-service teacher education programmes in higher education.* Doctoral Dissertation, Chaudhary Charan Singh University, Meerut. Shodhganga.

Bhardwaj, K., & Rathee, N. (2024). MOOC-based in-service training for the professional development of teachers in India. *Indian Journal of Educational Technology, 6*(II), 305-317.

Chatterjee, P., & Nath, A. (2015). *Massive open online courses (MOOCs) in education—a case study in Indian context and vision to ubiquitous learning.* Paper presented at the MOOC, Innovation, and Technology in Education (MITE) (pp. 36–41). IEEE.

Jung, I. (2001). Issues and challenges of providing online in-service teacher training: Korea's experience. *International Review of Research in Open and Distributed Learning, 2*(1), 1-18.

Kalyani, L. K. (2024). The role of NISHTHA in enhancing pedagogical practices: An empirical investigation. *International Journal of Scientific Research in Modern Science and Technology, 3*(1), 34-40.

Kanvaria, V. K., & Dubey, V. (2022). DIKSHA, NISHTHA and CPD: Experiences and perceptions of school learning-facilitators. *Indian Journal of Educational Technology, 4*(II), 144-151.

Uzunboylu, H. (2007). *Teacher attitudes toward online education following an online in-service program.* Paper presented at the In International Journal on E-learning (Vol. 6, No. 2, pp. 267-277). Association for the Advancement of Computing in Education (AACE).

Hayes, N. (2021). *Doing psychological research, 2e.* McGraw-Hill Education (UK).

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning (Vol. 112, No. 1). New York: springer.

Government of India Spotlight on NISHTHA. https://www.india.gov.in/spotlight/ nishtha