

A Study on Techno-Pedagogical Skills of School Teachers

Neetu Singh¹, Rajat Mittal²

¹(NCERT Fellow), ²(Research Scholar)

Dayalbagh Educational Institute (Deemed to be University)

Abstract—The integration of digital technology into the teaching–learning process has become a crucial requirement in contemporary education. Teachers are expected not only to possess subject knowledge but also to effectively integrate technology with appropriate pedagogical strategies. Techno-pedagogical skills enable teachers to design, implement, and evaluate technology-supported learning experiences that enhance students’ understanding and engagement. The present study aims to examine the level of techno-pedagogical skills among school teachers and to analyze differences with respect to selected demographic variables such as gender, teaching experience, and frequency of technology usage. A normative survey method was adopted for the study. The sample comprised 200 school teachers selected through a simple random sampling technique. Data were collected using a standardized Techno-Pedagogical Skills Scale. Statistical techniques such as mean, standard deviation, and independent samples t-test were employed for data analysis. The findings revealed that school teachers possess a moderate level of techno-pedagogical skills. While no significant difference was found with respect to gender, significant differences were observed based on teaching experience and frequency of technology usage. The study highlights the need for systematic professional development programs to strengthen teachers’ techno-pedagogical competencies and promote effective technology integration in school education.

Keywords— Techno-Pedagogical Skills, TPACK, School Teachers, Educational Technology, Teaching Effectiveness

I. INTRODUCTION

The rapid advancement of information and communication technology has brought a paradigm shift in the educational system. Traditional teacher-centered instructional approaches are gradually being replaced by learner-centered, technology-supported teaching practices. In the present digital age, effective teaching requires a thoughtful and balanced integration of content knowledge, pedagogical

knowledge, and technological knowledge to address diverse learner needs.

Mishra and Koehler (2006) introduced the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the dynamic interaction among these three domains. According to this framework, effective teaching with technology is not merely about using digital tools but about understanding how technology can be meaningfully integrated with pedagogy and subject content to enhance learning outcomes.

Techno-pedagogical skills refer to teachers’ ability to plan, implement, and evaluate instruction using appropriate technological tools in alignment with pedagogical objectives. Teachers with strong techno-pedagogical skills can create interactive learning environments, address diverse learning needs, and promote higher-order thinking skills among students. Therefore, examining teachers’ techno-pedagogical skills has become an important area of educational research.

Need and Significance of the Study

In today’s technology-driven society, students are exposed to digital tools from an early age and expect innovative and engaging learning experiences. However, the effective integration of technology in classrooms largely depends on teachers’ techno-pedagogical competence. Previous research indicates that many teachers experience challenges in selecting appropriate technological tools, aligning them with pedagogical strategies, and using them effectively for instructional purposes in real classroom situations.

Despite the availability of technological resources in schools, their effective utilization remains limited due to inadequate training and lack of techno-pedagogical awareness among teachers. Hence, there is a strong need to assess the level of techno-pedagogical skills among school teachers and

identify the factors influencing these skills. The findings of the present study may help teacher educators, administrators, and policymakers design appropriate professional development programs and strengthen technology integration in school education.

Moreover, the significant influence of teaching experience on techno-pedagogical skills suggests that sustained engagement with classroom practices and continuous exposure to technology play a crucial role in skill development. Experienced teachers may develop better judgment in selecting and integrating technological tools in alignment with pedagogical goals. This highlights the importance of long-term professional development initiatives rather than one-time training programs.

Objectives of the Study

1. To study the level of techno-pedagogical skills among school teachers.
2. To examine the techno-pedagogical skills of school teachers with respect to:
 - Gender
 - Teaching experience
 - Frequency of technology usage in teaching

Hypotheses of the Study

H₁: School teachers possess a high level of techno-pedagogical skills.

H₂: There is no significant difference in the techno-pedagogical skills of school teachers with respect to selected demographic variables.

II. METHODOLOGY

The present study adopted a normative survey method, which is appropriate for describing and interpreting existing conditions related to teachers' techno-pedagogical skills.

Sample

The sample consisted of 200 school teachers working in government and private secondary schools. The teachers were selected using a simple random sampling technique to ensure representativeness of the population.

Tool Used

A Techno-Pedagogical Skills Scale consisting of 40 items was used for data collection. The scale was based on a five-point Likert format ranging from

Strongly Agree to Strongly Disagree. The items measured teachers' ability to integrate technology with instructional strategies and subject content.

Reliability and Validity of the Tool

The reliability of the tool was established using Cronbach's Alpha method, and the reliability coefficient was found to be 0.88, indicating high internal consistency. Content validity was ensured through expert review, and the items were refined based on their suggestions.

Statistical Techniques Used

The collected data were analyzed using Mean, Standard Deviation, and Independent Samples t-test.

III. RESULTS AND ANALYSIS

Table 1: Mean and Standard Deviation of Techno-Pedagogical Skills of School Teachers (N = 200)

Variable	N	Mean	SD
Techno-Pedagogical Skills	200	128.36	41.82

Interpretation: The mean score indicates that school teachers possess a moderate level of techno-pedagogical skills. Hence, the first hypothesis is rejected.

Table 2: Comparison of Techno-Pedagogical Skills with Respect to Gender

Gender	N	Mean	SD	t	p
Male	98	129.42	42.11	1.12	.264
Female	102	127.35	41.56		

Interpretation: The t-test result indicates no significant difference between male and female teachers in techno-pedagogical skills, $t(198) = 1.12$, $p > .05$.

Table 3: Comparison of Techno-Pedagogical Skills with Respect to Teaching Experience

Teaching Experience	N	Mean	SD	t	p
Below 10 years	110	122.68	39.84	5.96	.000*
Above 10 years	90	134.91	43.02		

Significant at 0.05 level

Interpretation: A significant difference was found between teachers with different levels of teaching experience, $t(198) = 5.96$, $p < .05$. Teachers with more experience showed higher techno-pedagogical skills.

Table 4: Comparison of Techno-Pedagogical Skills with Respect to Frequency of Technology Usage

Technology Usage	N	Mean	SD	t	p
Frequent	108	136.27	44.15	7.21	.000*
Rare	92	120.18	38.96		

Significant at 0.05 level

Interpretation: The result reveals a significant difference in techno-pedagogical skills based on frequency of technology usage, $t(198) = 7.21$, $p < .05$.

IV. DISCUSSION OF THE FINDINGS

The findings of the study indicate that school teachers possess a moderate level of techno-pedagogical skills, suggesting a need for further improvement. The absence of gender differences implies that both male and female teachers have similar exposure to and understanding of techno-pedagogical practices. However, significant differences based on teaching experience and frequency of technology usage highlight the importance of continuous practice and professional exposure in developing techno-pedagogical competence.

Teachers who frequently use technology tend to develop better skills in integrating digital tools with instructional strategies. These findings are consistent with earlier studies that emphasize experience and regular usage as key determinants of techno-pedagogical proficiency.

Educational Implications

1. Teacher education and training programs should emphasize techno-pedagogical skill development.
2. Regular in-service training and workshops should be organized to enhance teachers' technological competence.
3. Schools should provide adequate infrastructure and digital resources to promote effective technology integration.

V. CONCLUSION

The present study concludes that techno-pedagogical skills are essential for effective teaching in the digital age. Although school teachers demonstrate a moderate level of competence, targeted professional development programs and continuous exposure to

educational technologies can significantly enhance their techno-pedagogical effectiveness. Strengthening these skills will ultimately enhance the overall quality of teaching and learning in schools and support the effective implementation of technology-integrated educational practices.

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