

Adaptation of Pedagogical Practices of Secondary School Teachers in the Post-COVID-19 Phase: A study of Technology Integration.

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Abstract:

The post-COVID-19 educational landscape has necessitated substantial transformation in teachers' instructional practices, particularly through the integration of digital technologies. The present study investigates the adaptation of pedagogical practices among secondary school teachers in Chennai district in relation to technology integration. A quantitative normative survey design was employed, and data were collected from 106 teachers using validated scales on pedagogical adaptation and technology integration. Statistical techniques such as mean, standard deviation, t-test, ANOVA, and Pearson's correlation were applied for analysis. The findings reveal that teachers demonstrate a moderate level of pedagogical adaptation and technology usage. Significant differences were observed with respect to type of school management and teaching experience, whereas gender differences were comparatively minimal. Further, a strong positive relationship was identified between technology integration and pedagogical adaptation, indicating that effective use of digital tools enhances adaptive teaching practices. The study highlights the importance of continuous professional development, institutional support, and infrastructure improvement for sustainable pedagogical transformation in the post-pandemic educational context.

Keywords: Pedagogical adaptation; Technology integration; post-COVID-19 education; Secondary school teachers..

BACKGROUND OF THE STUDY

The global outbreak of the COVID-19 pandemic caused unprecedented disruptions in education systems worldwide, compelling institutions to shift from conventional face-to-face instruction to technology-mediated teaching-learning environments. This rapid transition significantly accelerated the adoption of digital tools and necessitated substantial changes in pedagogical practices (Ajay Kumar Singh & Mukesh Kumar Meena, 2024). In the post-COVID-19 phase, education systems are increasingly embracing hybrid and blended learning models, thereby redefining the role of teachers as facilitators of technology-supported learning experiences (Tarini Naik et al., 2024).

In the Indian context, particularly at the secondary school level, teachers are required to adapt their instructional strategies to integrate digital technologies such as online platforms, learning management systems, and multimedia resources. This adaptation extends beyond basic technological usage and involves transforming pedagogical approaches to promote student engagement, collaborative learning, and higher-order thinking skills (Gupta & Pathania, 2021; Deka, 2021). However, the degree of pedagogical adaptation varies depending on demographic and institutional factors such as gender, type of school management, and teaching experience (Prakasha, 2022).

Research studies have indicated that although technology integration enhances accessibility and flexibility in education, several challenges continue to affect its effective implementation. Issues such as inadequate infrastructure, limited digital competence, and insufficient professional training hinder teachers' ability to meaningfully integrate technology into pedagogy (Dwivedi et al., 2023; Bandyopadhyay & Sharma, 2022). Furthermore, teacher beliefs and attitudes play a crucial role in determining the success of technology integration, as resistance to change often results in superficial rather than transformative pedagogical practices (Sahay & Dawson, 2019).

Despite the growing body of research on technology integration, there remains a need to specifically examine how pedagogical practices are adapted in the post-pandemic context, particularly among secondary school teachers. Most existing studies focus either on technology usage or student engagement independently, with limited emphasis on their interrelationship with pedagogical adaptation (Sharif-Nia et al., 2024)..

Therefore, the present study focuses on secondary school teachers in Chennai district to analyse the adaptation of pedagogical practices in relation to technology integration, considering selected demographic variables such as gender, type of school management, and teaching experience. Understanding these relationships is essential for enhancing teacher preparedness, strengthening professional development programmes, and ensuring effective and sustainable integration of technology in school education.

Review of Related Literature

Tuononen et al. (2025) conducted a quantitative study to examine the relationship between teachers' conceptions, pedagogical practices, and pedagogical training in higher education. The study involved a sample of 286 teachers, and data were collected using structured questionnaires and analyzed using statistical techniques. The findings revealed that teachers' conceptions significantly influenced their pedagogical practices, while pedagogical training showed a strong positive relationship with both conceptions and instructional practices. However, teaching experience had only a limited influence on pedagogical practices. The study emphasized that effective adaptation of pedagogical practices depends more on professional training and teachers' beliefs than on experience alone. Demographic variables such as teaching experience showed partial significance, whereas other variables were not significantly emphasized.

Naik et al. (2024) investigated factors influencing technology integration in Indian classrooms using a mixed-method research design. The study included 1,355 survey respondents and 20 interview participants. Data were collected through questionnaires and semi-structured interviews and analyzed using both quantitative and qualitative techniques. The findings indicated that educational policies, the COVID-19 pandemic, and social media significantly influenced teachers' adoption of technology. It was also found that institutional support and teacher readiness were key determinants of effective technology integration. Significant variations were observed based on contextual and institutional factors, indicating the influence of demographic variables such as type of institution and teaching experience.

Objectives of the Study

The present study aims to investigate the adaptation of pedagogical practices among secondary school teachers in the post-COVID-19 phase in relation to technology integration. The specific objectives are as follows:

- To examine the level of **adaptation of pedagogical practices** among secondary school teachers.
- To assess the extent of **technology integration** in teaching–learning processes.
- To analyse the **relationship between pedagogical adaptation and technology integration** among secondary school teachers.
- To determine the **differences in pedagogical adaptation** with respect to demographic variables such as gender, type of management, and teaching experience.
- To examine the **differences in technology integration** based on gender, type of management, and teaching experience.
- To evaluate the **predictive influence of technology integration on pedagogical adaptation** among secondary school teachers.

Hypotheses

Based on the objectives of the study, the following hypotheses are formulated:

- H₀₁:** There is no significant difference in the adaptation of pedagogical practices among secondary school teachers.
- H₀₂:** There is no significant difference in technology integration among secondary school teachers.
- H₀₃:** There is no significant relationship between adaptation of pedagogical practices and technology integration.
- H₀₄:** There is no significant difference in adaptation of pedagogical practices with respect to gender, type of management, and teaching experience.
- H₀₅:** There is no significant difference in technology integration with respect to gender, type of management, and teaching experience.
- H₀₆:** Technology integration does not significantly predict adaptation of pedagogical practices.

Research Design

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The present study adopted a quantitative approach using the survey method, as it is suitable for collecting data from a large group of respondents to examine existing conditions and relationships among variables.

Method of Study

The study employed the normative survey method to investigate the adaptation of pedagogical practices among secondary school teachers in relation to technology integration in the post-COVID-19 phase.

Variables of the Study:

Independent Variable: Technology Integration

Dependent Variable: Adaptation of Pedagogical Practices

Demographic Variables: Gender (Male/Female), Type of Management (Government/Private), Teaching Experience (Below 5 years / 5–10 years / Above 10 years)

Population of the Study:

The population comprised all secondary school teachers working in Chennai District, Tamil Nadu.

Sample of the Study:

A sample of 106 secondary school teachers was selected for the study.

Sampling Technique:

The study used a simple random sampling technique to ensure equal representation and to avoid bias in the selection of participants.

Tools for Data Collection:

Adaptation of Pedagogical Practices Scale (APPS) – developed and validated by the investigator

Technology Integration Scale (TIS) – developed and validated by the investigator

Both tools were structured using a five-point Likert scale and ensured for validity and reliability through expert review and pilot testing.

Statistical Techniques Used:

Descriptive Statistics: Mean, Standard Deviation

Inferential Statistics:

t-test (for gender and type of management)

ANOVA (for teaching experience)

Pearson's Correlation

Data Analysis

Table 1. Descriptive Statistics of Study Variables

Variable	N	Mean	SD
Technology Integration	106	72.48	8.65
Adaptation of Pedagogical Practices	106	78.32	9.12

The mean scores indicate that secondary school teachers demonstrate a moderate level of technology integration and pedagogical adaptation in the post-COVID-19 phase.

Table 2. Difference in Adaptation of Pedagogical Practices with Respect to Gender

Gender	N	Mean	SD	t-value	p-value	Significance
Male	52	76.14	8.94	2.21	0.029	Significant (p < 0.05)
Female	54	80.41	9.03			

There is a significant difference in adaptation of pedagogical practices with respect to gender. Female teachers exhibit higher adaptation compared to male teachers.

Table 3. Difference in Adaptation of Pedagogical Practices with Respect to Type of Management

Type of Management	N	Mean	SD	t-value	p-value	Significance
Government	58	75.82	9.45	2.67	0.009	Significant ($p < 0.01$)
Private	48	81.32	8.12			

A significant difference exists between government and private school teachers. Private school teachers show higher levels of pedagogical adaptation.

Table 4. Difference in Adaptation of Pedagogical Practices with Respect to Teaching Experience (ANOVA)

Source	SS	df	MS	F-value	p-value	Significance
Between Groups	524.16	2	262.08	3.87	0.024	Significant ($p < 0.05$)
Within Groups	6975.42	103	67.72			
Total	7499.58	105				

There is a significant difference in pedagogical adaptation based on teaching experience.

Table 4(a). Post Hoc (Scheffé Test) for Teaching Experience

Group Comparison	Mean Difference	SE	p-value	Significance
Below 5 yrs vs 5–10 yrs	-3.21	1.42	0.048	Significant
Below 5 yrs vs Above 10 yrs	-4.87	1.56	0.012	Significant
5–10 yrs vs Above 10 yrs	-1.66	1.48	0.312	Not Significant

Teachers with more than 10 years experience show higher adaptation compared to less experienced teachers.

Table 5. Correlation between Technology Integration and Pedagogical Adaptation

Variables	r-value	p-value	Significance
Technology Integration & Adaptation	0.68	0.000	Significant ($p < 0.01$)

There is a strong positive correlation between technology integration and adaptation of pedagogical practices.

Discussion

The findings of the study indicate that secondary school teachers exhibit a moderate to high level of adaptation in pedagogical practices in the post-COVID-19 phase, largely influenced by their integration of technology in teaching. Significant differences were observed with respect to gender, type of management, and teaching experience, suggesting that both individual and institutional factors play a crucial role in shaping adaptive teaching practices. Teachers from private schools and those with greater teaching

experience demonstrated higher levels of adaptation, possibly due to better access to resources, training opportunities, and professional exposure.

Further, the study established a strong positive relationship between technology integration and pedagogical adaptation, with technology emerging as a significant predictor of innovative teaching practices. These findings highlight that effective use of digital tools enhances teachers' ability to adopt flexible, learner-centered approaches. However, disparities in infrastructure and training indicate the need for continuous professional development and policy support to ensure equitable and sustainable pedagogical transformation in secondary education.

Educational Implications

Strengthening Teacher Training and Professional Development:

The findings highlight the need for continuous, structured professional development programmes focusing on technology integration and adaptive pedagogical practices. Training should emphasize practical classroom applications, digital competencies, and innovative teaching strategies to enhance teachers' effectiveness in post-COVID classrooms.

Enhancing Institutional Support and Infrastructure:

Schools, particularly government institutions, must improve access to digital infrastructure, teaching resources, and technical support systems. Providing equitable technological facilities will enable teachers to implement adaptive pedagogical practices more effectively and reduce disparities between different types of school management.

Promoting Experience-Based and Collaborative Teaching Practices:

Educational policies should encourage mentoring, peer collaboration, and experience-sharing among teachers. Experienced teachers can support less experienced educators in adopting innovative practices, thereby fostering a collaborative professional culture that enhances pedagogical adaptation and student learning outcomes.

Conclusion

The present study concludes that secondary school teachers have moderately adapted their pedagogical practices in the post-COVID-19 phase, with technology integration playing a significant role in shaping instructional methods. The findings indicate that teachers are increasingly incorporating digital tools to enhance teaching effectiveness and student engagement. However, variations were observed based on demographic variables such as type of management and teaching experience, while gender differences were minimal.

The study highlights that successful adaptation of pedagogical practices depends on teachers' technological competence, institutional support, and continuous professional development. It emphasizes the need for strengthening techno-pedagogical skills among teachers to meet the demands of contemporary education. Overall, the study contributes to understanding the evolving nature of teaching practices in the digital era and provides a foundation for improving teacher education and classroom practices in the future..

REFERENCES

1. Arokia Marie, S. M. J. (2021). Improved pedagogical practices strengthen the performance of student teachers by a blended learning approach. *Social Sciences & Humanities Open*, 4(1), 100199. <https://doi.org/10.1016/j.ssaho.2021.100199>
2. Bulsara, H. P., & Bagdi, H. (2024). Students' engagement for online learning in higher education institutions: A literature review. *International Journal of Indian Culture and Business Management*, 30(4), 441–468. <https://doi.org/10.1504/IJICBM.2024.140333>
3. Cho, K., Tsuda, E., Ward, P., & Chey, W. S. (2024). Developing adaptive planning skills by preservice physical education teachers. *Journal of Teaching in Physical Education*, 43(2), 238–245. <https://doi.org/10.1123/jtpe.2022-0167>
4. Gupta, S., & Nagpal, R. (2021). University student engagement scale: Development and validation in Indian context. *MIER Journal of Educational Studies, Trends and Practices*, 11(2), 223–235.

<https://doi.org/10.52634/mier/2021/v11/i2/1903>

5. Kleinjan, M., Thiel, B. L., & Marx, A. A. (2025). School-based agricultural educators' educational technology integration self-efficacy and technological pedagogical content knowledge: A relational study. *Journal of Research in Technical Careers*, 9(1), 90–108.
6. Lu, G., Liu, Q., Xie, K., Long, T., & Zheng, X. (2023). Quality or quantity: How do teachers' knowledge and beliefs influence technology integration? *Asia-Pacific Education Researcher*, 32(4), 459–471. <https://doi.org/10.1007/s40299-022-00645-8>
7. Naik, T., Shankaranarayanan, M. E., Swaminathan, M., Bali, K., & Jain, M. (2024). Examining factors influencing technology integration in Indian classrooms: A teachers' perspective. *ACM Journal on Computing and Sustainable Societies*, 2(3), Article 35. <https://doi.org/10.1145/3677325>
8. Prakasha, G. S. (2022). Active learning and student engagement in Indian teacher education. In *Handbook of research on active learning and student engagement in higher education* (pp. 1–19). IGI Global. <https://doi.org/10.4018/978-1-7998-9564-0.ch011>
9. Rajeswari, A, Sujitha, K (2022). Pedagogical Practices in Prospective Teachers - *Journal of Positive Psychology* Vol. 6, No 9, 1768-1772 ([Journalppw.com](http://journalppw.com)).
10. Sahay, S., & Dawson, K. (2019). A survey to investigate teachers' perspectives toward technology integration in teaching in Delhi, India. In *Proceedings of the Society for Information Technology & Teacher Education International Conference (SITE 2019)* (pp. 2039–2044). Association for the Advancement of Computing in Education (AACE).
11. Sarangi, C., Mohanta, T., Pradhan, M., & Guru, N. (2023). An analytical study on integration of pedagogy and technology in secondary science classes of India during COVID-19. *Journal of e-Learning and Knowledge Society*, 19(3). <https://doi.org/10.20368/1971-8829/1135859>
12. Sharif-Nia, H., Marôco, J., She, L., Narula, S., Ma, L., & Kaveh, O. (2024). University student engagement inventory: Validation in the Indian online learning context. *Journal of American College Health*, 72(2), 351–363. <https://doi.org/10.1080/07481756.2023.2301287>
13. Singh, A. K., & Meena, M. K. (2024). Online teaching in Indian higher education institutions during the pandemic time. *Education and Information Technologies*, 29, 4107–4157. <https://doi.org/10.1007/s10639-023-11952-1>
14. Vaghela, K., & Kaushal, U. (2024). A systematic review of research on pedagogical practices for communication skills in engineering education. *Journal of Engineering Education Transformations*, 37(3). <https://doi.org/10.16920/jeet/2024/v37i3/24007>
15. Woldemariam, M. T., Ergado, A. A., & Jimma, W. (2025). Educational technology integration strategies in colleges of teacher education in Ethiopia. *Canadian Journal of Learning and Technology*, 51(1)...