



A STUDY OF THE TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) OF SCHOOL TEACHERS IN PATNA DISTRICT

Reena Ranjan

Research Scholar,

Usha Martin University, Ranchi, Jharkhand.

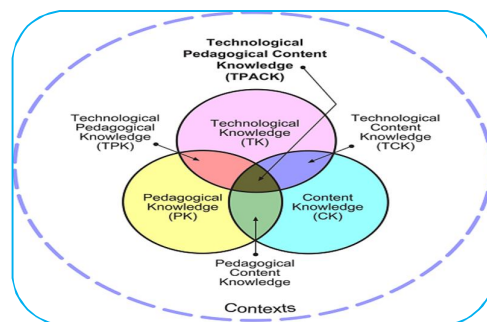
Prof. C.R.K. Murthy

(Supervisor)

Department of Education, Usha Martin University, Ranchi, Jharkhand.

ABSTRACT

The integration of Information and Communication Technology (ICT) in education has transformed traditional teaching practices and created new opportunities for enhancing student learning. In the digital era, teachers are expected to possess not only subject knowledge and pedagogical skills but also the ability to effectively integrate technology into classroom instruction. The Technological Pedagogical Content Knowledge (TPACK) framework, developed by Mishra and Koehler (2006), provides a comprehensive understanding of the knowledge required by teachers for effective technology integration. The present study aims to examine the TPACK of school teachers in Patna District. A descriptive survey method was employed, and a sample of 60 school teachers from government and private schools was selected through purposive sampling. Data were collected using a TPACK questionnaire. The findings indicate that teachers possess a moderate level of TPACK, with private school teachers demonstrating slightly higher technological competencies than government school teachers. The study highlights the need for continuous professional development programmes to strengthen teachers' technological and pedagogical competencies.



KEYWORDS: TPACK, Technology Integration, School Teachers, Patna District, Digital Pedagogy, ICT.

INTRODUCTION

Education in the twenty-first century is undergoing rapid transformation due to technological advancements. The emergence of digital tools, online learning platforms, smart classrooms, educational applications, and artificial intelligence has significantly influenced teaching and learning processes. The National Education Policy (NEP) 2020 also emphasizes the integration of technology in education to improve learning outcomes and prepare students for the digital age.

Teachers play a central role in the successful implementation of educational technology. However, merely providing technological resources is not sufficient. Teachers must possess the knowledge and skills necessary to integrate technology effectively into their teaching practices. This requirement has led researchers to explore frameworks that explain the knowledge needed for technology-enhanced teaching.

One of the most influential frameworks in this regard is the Technological Pedagogical Content Knowledge (TPACK) framework proposed by Mishra and Koehler (2006). TPACK extends Shulman's concept of Pedagogical Content Knowledge by incorporating technological knowledge as an essential component of effective teaching. According to this framework, effective teaching with technology requires an understanding of the relationships among technology, pedagogy, and content.

Patna District, being one of the major educational centers of Bihar, has witnessed increasing adoption of digital technologies in schools. Nevertheless, variations in technological infrastructure, teacher training opportunities, and school resources may influence teachers' technological pedagogical competencies. Therefore, it becomes important to assess the TPACK of school teachers in Patna District.

Conceptual Framework of TPACK

The TPACK framework consists of seven interrelated domains:

1. Content Knowledge (CK)

Knowledge of the subject matter that teachers teach.

2. Pedagogical Knowledge (PK)

Knowledge of teaching methods, classroom management, and instructional strategies.

3. Technological Knowledge (TK)

Knowledge of technological tools, software, hardware, and digital resources.

4. Pedagogical Content Knowledge (PCK)

Knowledge of how to teach specific content effectively.

5. Technological Content Knowledge (TCK)

Knowledge of how technology can support and transform subject content.

6. Technological Pedagogical Knowledge (TPK)

Knowledge of how teaching methods can change through the use of technology.

7. Technological Pedagogical Content Knowledge (TPACK)

The integration of technology, pedagogy, and content knowledge for effective teaching.

The TPACK model emphasizes that technology integration should not be viewed as an isolated skill but as a component integrated with pedagogy and content.

REVIEW OF RELATED LITERATURE

Mishra and Koehler (2006) introduced the TPACK framework and argued that effective teaching requires a dynamic interaction among technology, pedagogy, and content knowledge.

Koehler and Mishra (2009) emphasized that teachers must understand not only how technology works but also how it can be integrated into instructional practices to improve student learning.

Chai, Koh, and Tsai (2013) found that teachers who received technology-focused professional development demonstrated higher levels of TPACK and confidence in technology integration.

Archambault and Barnett (2010) reported that teachers often possess adequate pedagogical and content knowledge but face challenges in integrating technology effectively.

Studies conducted in India have highlighted that inadequate infrastructure, lack of training, and limited access to digital resources are major barriers to effective technology integration in schools. However, teachers who receive continuous professional development programmes show greater readiness for technology-enhanced teaching.

The review of literature indicates that TPACK plays a critical role in modern education and that teacher training is essential for strengthening technology integration competencies.

Rationale of the Study

Technology has become an indispensable component of education. The COVID-19 pandemic further demonstrated the importance of digital competencies among teachers. Although schools in Patna District have increasingly adopted digital tools, little empirical evidence is available regarding the technological pedagogical competencies of school teachers.

The present study seeks to assess teachers' TPACK and identify areas requiring improvement. The findings may contribute to the design of teacher training programmes and educational policies aimed at enhancing technology integration in schools.

Objectives of the Study

1. To assess the level of Technological Pedagogical Content Knowledge among school teachers in Patna District.
2. To compare the TPACK of government and private school teachers.
3. To identify strengths and weaknesses in different dimensions of TPACK.
4. To suggest measures for improving teachers' technopedagogical competencies.

Research Questions

1. What is the level of TPACK among school teachers in Patna District?
2. Is there any difference between government and private school teachers regarding TPACK?
3. Which dimensions of TPACK require further development?

Hypotheses

H₀₁

There is no significant difference in TPACK between government and private school teachers.

H₀₂

School teachers possess an average level of technological knowledge.

METHODOLOGY

Research Method

The present study employed the **Descriptive Survey Method**.

Population

The population consisted of all school teachers working in government and private schools of Patna District.

Sample

A sample of **60 teachers** was selected through purposive sampling.

Distribution of Sample

School Type	Number of Teachers
Government Schools	30
Private Schools	30
Total	60

Research Tool

A structured TPACK Questionnaire was used to collect data. The questionnaire consisted of items related to:

- Technological Knowledge (TK)
- Pedagogical Knowledge (PK)
- Content Knowledge (CK)
- Technological Pedagogical Knowledge (TPK)
- Technological Content Knowledge (TCK)

- Pedagogical Content Knowledge (PCK)
 - Technological Pedagogical Content Knowledge (TPACK)
- Responses were recorded on a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

Data Collection Procedure

Permission was obtained from school authorities. The questionnaire was administered personally and through online platforms. Teachers were informed about the purpose of the study, and confidentiality of responses was ensured.

Statistical Techniques

The collected data were analyzed using:

- Mean
- Percentage
- Standard Deviation
- Independent Sample t-test

Analysis and Interpretation of Data

Overall TPACK Scores

Category	Mean Score
Government Teachers	3.45
Private Teachers	3.72

The data indicate that private school teachers scored slightly higher than government school teachers in overall TPACK.

Technological Knowledge (TK)

School Type	Mean Score
Government	3.30
Private	3.80

Private school teachers demonstrated higher technological knowledge due to greater exposure to digital technologies and online teaching tools.

Pedagogical Knowledge (PK)

School Type	Mean Score
Government	4.10
Private	4.05

Both groups demonstrated strong pedagogical knowledge, indicating adequate teaching experience and classroom management skills.

Content Knowledge (CK)

School Type	Mean Score
Government	4.20
Private	4.15

Teachers from both groups showed high levels of content knowledge.

Interpretation

The findings suggest that while teachers possess strong pedagogical and content knowledge, technological competencies require further improvement. The results support previous studies indicating that technology integration remains a challenge despite increasing access to digital resources.

Major Findings

1. School teachers in Patna District possess a moderate level of TPACK.
2. Teachers exhibit strong pedagogical and content knowledge.
3. Technological knowledge is comparatively lower than pedagogical and content knowledge.
4. Private school teachers demonstrate slightly higher technological competencies than government school teachers.
5. Teachers who regularly use digital tools in teaching show better TPACK scores.
6. Lack of training and infrastructure are major barriers to technology integration.

Educational Implications

The findings of the study have several implications for educational practice:

For Teachers

- Continuous professional development programmes should be organized.
- Teachers should receive hands-on training in educational technologies.

For Schools

- Schools should improve technological infrastructure.
- Smart classrooms and internet facilities should be strengthened.

For Teacher Education Institutions

- TPACK should be integrated into pre-service teacher education programmes.
- Practical technology integration activities should be emphasized.

For Policymakers

- Policies should support digital literacy initiatives.
- Financial assistance should be provided for technological infrastructure.

CONCLUSION

The study reveals that school teachers in Patna District possess a moderate level of Technological Pedagogical Content Knowledge. While teachers demonstrate strong content and pedagogical knowledge, technological competencies require further enhancement. The difference observed between government and private school teachers highlights the influence of technological infrastructure and professional development opportunities. As educational institutions increasingly adopt digital technologies, strengthening teachers' TPACK becomes essential for improving teaching effectiveness and student learning outcomes. Continuous training, infrastructural support, and policy interventions can contribute significantly to the development of technopedagogical competencies among teachers.

REFERENCES

1. Archambault, L., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge.
2. Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge.
3. Koehler, M. J., & Mishra, P. (2009). What is Technological Pedagogical Content Knowledge (TPACK)?
4. Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, 108(6), 1017–1054.
5. National Education Policy (2020). Ministry of Education, Government of India.
6. Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching.