

The Awareness of Technological Pedagogical Content Knowledge (TPACK) for Quality Education among B.Ed. Colleges in Imphal Area: A Critical Study

Heigrujam Bandhan Singh¹, Taorem Surendra Singh²

¹M.Ed Student, D.M. College of Teacher Education, Imphal (Manipur).

²Asst. Prof (SS), D.M. College of Teacher Education, Imphal (Manipur).

Abstract

With the growing integration of technology in education, the TPACK framework serves as a crucial model for teacher training programmes. This paper critically examines and compares the level of awareness and application of TPACK among teacher trainees among B.Ed. Colleges, the challenges faced in its implementation, and its potential to improve the overall teaching-learning process. The study is based on a descriptive cum survey method conducted across selected B.Ed. colleges in Imphal, Manipur State, India with 120 trainees as sample constitute the population of the study during 2023-2024 session. Though the findings suggest that no differences in the level awareness of trainees. Practical implementation remains limited due to infrastructural challenges. The study highlights the need for structured training programmes to enhance TPACK integration for quality teacher education.

Keywords: Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge(CK), TPACK, Quality Teacher Education, B.Ed. Colleges, Teacher Trainees

Introduction

Technology is revolutionizing the education sector, and the integration of ICT tools in classrooms has become a necessity. The Technological Pedagogical Content Knowledge (TPACK) framework, introduced by Mishra & Koehler (2006), serves as a guiding model for integrating technology, pedagogy, and content knowledge into teacher education.

In the Imphal area, several B.Ed. colleges have started integrating ICT-based teaching strategies, yet there remains a gap in the effective application of TPACK. This study seeks to assess how well teacher trainees in these colleges understand and implement the TPACK framework in their teaching practices.

Understanding the TPACK Framework

TPACK is a multi-dimensional model consisting of seven components:

- **Technological Knowledge (TK):** It refers to how to use computer software and hardware presentation tools & other technologies used in educational contexts.
- **Content Knowledge (CK):** Subject expertise of teachers.



Figure 1: TPACK framework (Source: tpack.org,2021)
(Punya Mishra)

- **Pedagogical Knowledge (PK):** It refers to the set of skills teachers must develop and teacher's deeper knowledge about the processes and methods or techniques of teaching & learning. Effective teaching methodologies.
- **Pedagogical Content Knowledge (PCK):**
- It refers to the knowledge of the subject/topic, psychology of the learner, psychology of learning etc. are the important factors that determine the appropriate selection of the methods/techniques for teaching. For example: art, drama, puppetry, role play, nature rambling, field trips, laboratory method, project method etc. Blending pedagogy with subject matter.
- **Technological Content Knowledge (TCK):**
- It refers to an understanding of the manner in which technology and content influences one another. Teacher should be aware of the innovative technologies available in the global market for the effective transaction of the subject matter. Eg: Virtual Labs, Virtual field trips, e-library, educational softwares etc. How technology influences content delivery.
- **Technological Pedagogical Knowledge (TPK):** The interplay of technology and pedagogy. This includes knowing technological tools for appropriate pedagogical designs and strategies. For example, collaborative writing can take place with Google Docs or Google Meet instead of face-to-face meetings.
- **Technological Pedagogical Content Knowledge (TPACK):** It refers to a synthesised resource of Technological knowledge (TK), Content knowledge (CK), Pedagogical knowledge (PK), Pedagogical content knowledge (PCK), Technological content knowledge (TCK), Technological pedagogical knowledge (TPK) with a focus upon how technology can be uniquely crafted to meet pedagogical needs to teach certain content in specific contexts so as to ensure fruitful learning.

Justification:

TPACK strategy integrates the growing demand on the use of technology in the classroom. It provides equal importance to content, pedagogy and technology. TPACK helps the teacher to be up to date and knowledgeable with the curriculum and promote their professional development. It helps the students to work better through technology and become more engaged in their learning. The most recent technology like artificial intelligence, robotics, and the Internet of Things (IoT) will replace some human jobs in the future, therefore it is crucial for the trainees today to possess skills that will not be replaceable by the

technology. The meaningful integration of ICT in classrooms demands that teachers develop TPACK competencies specific to the subject matter being taught. The TPACK strategy helps teachers stay up-to-date, promotes professional development, engages students better through technology, and equips them with skills that cannot be easily replaced by future technologies like AI and robotics. This study will contribute to the existing literature by providing insights into the awareness of TPACK in these specific teacher education settings. Assessing and developing teacher candidates' pedagogical skills through a comprehensive understanding of TPACK integration is crucial for improving the quality of teacher preparation programmes.

Review of related literature:

The concept of TPACK was introduced by Punya Mishra and Matthew J. Koehler of Michigan State University developed the Technological Pedagogical Content Knowledge (TPACK) framework in 2006 as an extension of Shulman's (1986) notion of Pedagogical Content Knowledge (PCK).

1. Koehler, Mishra, and Yahya (2007) examined the development of TPACK through a design-based approach in a teacher education programme. Their findings indicated that pre-service teachers could develop a more profound understanding of the complex relationships among technology, pedagogy, and content through iterative design experiences.
2. The Practice of Technological Pedagogical Content Knowledge of Teacher Educators in Education Colleges in Myanmar; Win Thinzarkyaw, Assistant Lecturer, Department of Educational Theory, Yankin Education College, Yangon, Myanmar and PhD Candidate, School of Education, Central China Normal University, Wuhan, China.
3. Technological pedagogical content knowledge self-efficacy of pre-service science and mathematics teachers: A comparative study between two Zambian universities.
4. The Technological Pedagogical Content Knowledge Framework (Matthew J. Koehler , Punya Mishra , Kristen Kereluik , Tae Seob Shin , and Charles R. Graham).
5. A Study on Technological Pedagogical Content Knowledge Aptitude(TPACK) and Teaching Style Of B.Ed. Teacher Trainees: Mrs. B BHUVANA, Dr. G ARUMUGAM; Research Scholar Department of Education Annamalai University Annamalai Nagar; Associate Professor Department of Education Annamalai University Annamalai Nagar.
6. A Study on Technological Pedagogical and Content Knowledge among Teacher-Educators in Punjab Region, Nimisha Beri, Lalit Sharma.
7. "Techno-Pedagogical Competence Among Senior Secondary School Teachers: Does gender and stream background make any difference? A Post Covid-19 perspective" : Hilal Ahmad Malla, Mohammed Iqbal Mattoo, e-ISSN: 2582-9629, Article id-MERTM0202005, Vol.-2, Issue-2, Received: 23 May 2022, Revised: 28 Jun 2022, Accepted: 30 Jun 2022.
8. Enhancing B.Ed. Trainee Education Through ICT Integration: A Critical Study in Manipur: Dr. Taorem Surendra Singh, Asst. Professor (Senior Scale) Institute: D. M. College of Teacher Education, Manipur: Manipur University.

Statement of the problem:

The Awareness of Technological Pedagogical Content Knowledge (TPACK) for Quality Education among B.Ed. Colleges in Imphal Area: A Critical Study.

Objectives of the study:

1. To find out the overall level of awareness on TPACK among the trainees of B.Ed. Colleges in Imphal area.
2. To compare the level of awareness on TPACK between male and female trainees of B.Ed. colleges in Imphal area.
3. To find out suggestion in order to improve the level of awareness on TPACK among the trainees of B.Ed. colleges in Imphal.

Hypothesis of the study:

1. There is significant low level of overall awareness on TPACK among the trainees of B.Ed. colleges in Imphal area.
2. There is no significant difference in the level of awareness on TPACK among the male and female trainees of B.Ed. Colleges in Imphal area.

Methodology:

- Population and sample of the study: Random sampling technique was employed for gathering data. Population of 350 B.Ed trainees from DMCTE, Imphal and RKSDCTE, Imphal(Manipur, India) out of which 120 trainees taken as sample.
- Tool used: Self-made questionnaire are developed. It consists of 30 items with five responses, such as strongly agree, agree, neutral, disagree and strongly
- Procedures of administration and data collection: Systematically done with prior permission.
- Scoring procedure: Five-point Likert Scale was used to study the technological pedagogical and content knowledge (TPACK) competencies among teacher trainees in teacher training colleges at Imphal. The items of the tool content positive and negative statements. Hence, the scoring procedure as follows, 5- strongly agree, 4-agree, 3-neutral, 2- disagree and 1- strongly disagree for positive statement and reverse for negative statement.
- Statistical technique used: Mean and Standard Deviation, t-test, Percentage, Graphical representation

Delimitation of the study:

1. The study was limited to only two B.Ed. Colleges in Imphal urban area, namely:
 - D.M. College of Teacher Education(DMCTE), Imphal
 - R.K. Sanatombi Devi College of Education(RKSDCE), Imphal during the academic session of 2023-2024.
2. The study is limited only to the area of TPACK of B.Ed. trainees.
3. The study is limited to only 120 trainees of B.Ed. trainees, out of which 60 were from DMCTE and 60 from RSDCE.

Discussion and Analysis:

Hypothesis No. 1: There is no significant level of overall awareness on TPACK among the trainees of B.Ed. colleges in Imphal area.

Findings: The overall awareness level of TPACK among teacher trainees was found to be 81.19%.

Interpretation: Figure (a) shows that the 1st hypothesis constructed for testing “**There is no significant level of overall awareness on TPACK among the trainees of B.Ed. colleges in Imphal area.**” is

rejected as overall level of awareness on TPACK among the teacher trainees of B.Ed. Colleges in Imphal Area is found at 81.18%.

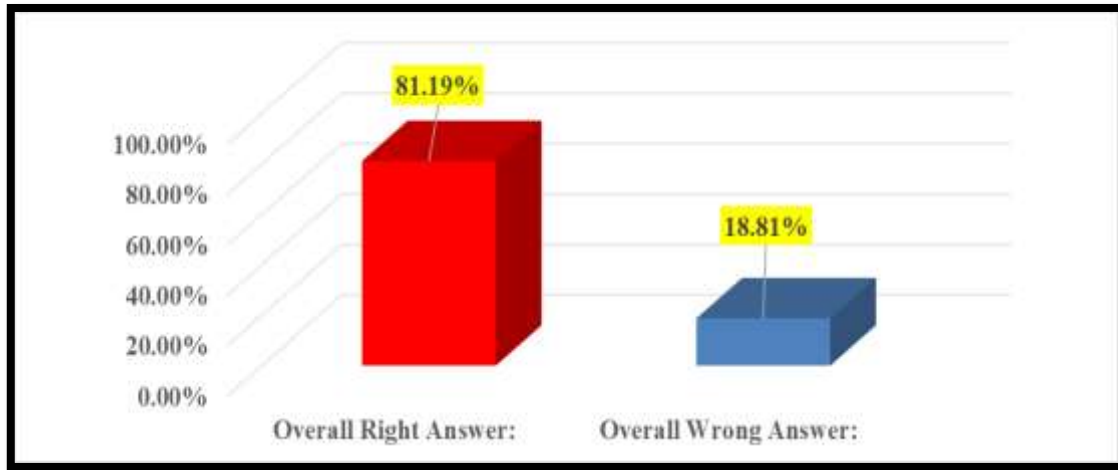


Figure (a): Showing overall awareness on TPACK among the trainees of B.Ed. Colleges in Imphal area.

Hypothesis No. 2: There is no significant difference in the level of awareness on TPACK among male and female trainees of B.Ed. colleges in Imphal area.

Findings: The mean awareness scores for male (114.72) and female (115.93) trainees showed minimal differences, with no statistical significance.

Interpretation:

Sl. No.	Gender	N	Mean	SD	SED	T- Value	df
1	Male	60	114.72	3.17	02.51	- 00.48	118
2	Female	60	115.93	3.17			
Remarks: Insignificant							

Table No.1: Showing the level of awareness on TPACK among the male and female trainees of B.Ed. Colleges in Imphal area.

It can be observed from the above table no. 1 that the level of awareness on TPACK among the male and female trainees of B.Ed Colleges in Imphal Area is found to have mean score of 114.72 and 115.93 with Standard Deviation of 3.17 each.

The ratio of the two mean scores comes out to be with Standard Error of 02.51 which is less than the level of significant at 0.05. Therefore the 2nd Hypothesis of the study that “**There is no significant difference in the level of awareness on TPACK among the male and female trainees of B.Ed. Colleges in Imphal area.**” is accepted as there is no difference in the level of awareness on TPACK among the male and female trainees of B.Ed. Colleges in Imphal area.

Main Findings:

1. **Overall Awareness of TPACK:** The awareness level among B.Ed. trainees in Imphal was found to

2. be **81.19%**, indicating a good understanding but with scope for improvement.
3. **Gender-Based Awareness:** No significant difference was found between male and female trainees, with an average awareness level of **95.60%**.

Educational Implications:

1. **Enhancing Resource Provision:** Government colleges should receive more updated technological tools and support.
2. **Strengthening Collaborative Efforts:** Institutions should promote teamwork and peer learning for better technology integration.
3. **Targeted Faculty Training:** More training programmes for faculty can enhance the use of TPACK in teaching.
4. **Improved Assessment Methods:** Evaluation strategies should encourage trainees to integrate technology effectively.

Suggestions for Further Study:

1. **Impact of TPACK on Student Outcomes:** Investigate how TPACK influences students' learning achievements.
2. **Longitudinal Study:** Assess long-term effects of TPACK training on teaching practices.
3. **Discipline-Specific TPACK Applications:** Explore how TPACK is implemented differently across subject areas.
4. **Technology Accessibility in Rural Areas:** Examine resource availability and technological challenges in rural B.Ed. colleges.
5. **Institutional Factors Affecting TPACK:** Study the impact of funding and management styles on TPACK implementation.
6. **Role of Faculty-Trainee Collaboration:** Analyze how collaboration enhances TPACK integration in teaching.
7. **Professional Development Models:** Evaluate different training approaches to improve TPACK awareness among educators.

Conclusion:

The study found a high overall awareness of TPACK (81.19%) among B.Ed. trainees in Imphal, with no significant differences between genders or academic streams. While trainees recognize the importance of technology in education, improvements are needed in faculty training, resource availability, and institutional support. Addressing these gaps will enhance technology integration in teacher education, ensuring future educators are well-prepared for digital learning environments. Further research should explore long-term impacts, discipline-specific applications, and institutional factors influencing TPACK adoption.

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