

# Technological Pedagogical Content Knowledge (TPACK) Competency among B.Ed Students

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## ARTICLE INFO ABSTRACT

Technological Pedagogical Content Knowledge (TPACK) is a framework highlighting the essential interplay between technology, pedagogy, and subject matter expertise in effective teaching. Educators possessing TPACK competency seamlessly integrate these three domains to enhance student learning experiences. This dynamic skill set empowers teachers to navigate the complex intersection of technology tools, pedagogical strategies, and subject-specific content, fostering a holistic approach to education. TPACK not only equips educators with the ability to leverage digital resources but also encourages thoughtful integration that aligns with curriculum goals. As education continually evolves in the digital era, TPACK stands as a crucial framework for educators striving to bridge technology and pedagogy within their instructional practices. This study analyses Technological Pedagogical Content Knowledge (TPACK) competency among B.Ed students, based on locale and stream of study. The sample selected was B. Ed. Students from various teacher education institutions in Thrissur and Palakkad districts of Kerala. TPACK Competency Scale was used to analyse the TPACK Competency level of B.Ed students. Percentage wise analysis and t – test were used to analyze the data. The results of the study indicated that there exists a difference in the mean scores of TPACK competency among B.Ed students based on locale and no significant difference based on stream of study.

## INTRODUCTION

The framework known as TPACK, or Technological Pedagogical Content Knowledge, places a strong emphasis on how Pedagogy, Content knowledge, and technology can be integrated in educational contexts. The TPACK framework acknowledges that technical proficiency and device access alone are not sufficient for successful technology integration. It emphasises how crucial it is to comprehend the interactions and influences of content knowledge, pedagogy, and technology. The Technological Pedagogical Content Knowledge emerges as a transformative paradigm in the field of education, and address the multifaceted challenges of integrating technology into teaching practices, TPACK encapsulates the belief that effective educators must possess a nuanced understanding not only of the subject matter they teach but also the pedagogical methods that engage learners and the technological tools that can enhance instruction.

Technological Pedagogical Content Knowledge (TPACK) serves as the foundation for effective teaching with technology, demanding a grasp of conceptual representation through technologies, the application of pedagogical methods that constructively use technology for content delivery, understanding the challenges and facilitators of concept learning, and the ability to leverage technology to address student difficulties. TPACK also encompasses knowledge about students' prior understanding and epistemological theories, acknowledging how technologies can be harnessed to build upon existing knowledge, fostering the development of new epistemologies or reinforcing established ones. In essence, TPACK underscores the comprehensive expertise required for educators to integrate technology into teaching, enhancing the learning experience through a understanding of technological, pedagogical, and content dimensions.

At its core, TPACK represents a holistic approach to educational practice, emphasizing the synergistic blend of these three key domains. Subject matter expertise alone is insufficient; educators must adeptly navigate the intersection of technology, pedagogy, and content knowledge to create dynamic and effective learning experiences. TPACK goes beyond a mere juxtaposition of these elements, fostering a deep integration that allows teachers to strategically leverage technology in alignment with both curriculum goals and pedagogical

strategies. In essence, TPACK is the compass guiding educators through the evolving landscape of education in the digital age.

### **NEED AND SIGNIFICANCE OF THE STUDY**

As education continues to evolve and embrace digital tools, TPACK stands as an indispensable framework, equipping educators to navigate the complexities of contemporary teaching and fostering a transformative synergy between technology, pedagogy, and content knowledge. It can also empower prospective teachers with the knowledge and skills to thoughtfully incorporate technology into their instructional practices while maintaining a solid foundation in pedagogical expertise and subject matter mastery. It can throw light into the emerging educational needs and technological exposure of students in diverse environments.

Tseng et al. (2020) reported a study on a critical review of research on Technological Pedagogical and Content Knowledge (TPACK) in language teaching, and the study revealed that effective interventions involve language teachers' understanding of the TPACK and the need for designing lessons collaboratively, and TPACK-informed language learning courses and platforms were perceived to be helpful and effective.

Graziano et al. (2017) conducted a study on TPACK Diagnostic Tool for Teacher Education Leaders, and found out that teacher education leaders have a responsibility to set detection, develop people, and redesign their teacher preparation programs into TPACK ready environments. Many researchers have predominantly focused on enhancing the effectiveness of technology integration among in-service teachers. However, it remains an overlooked reality that the assessment and assurance of Technological Pedagogical Content Knowledge (TPACK) competency in Bachelor of Education (B.Ed) students are imperative for adequately preparing teachers in the current era dominated by artificial intelligence and advanced technologies. This study endeavours to explore and ascertain if there exists a notable difference in TPACK competency among B.Ed students based on locale and stream of study.

### **OBJECTIVES OF THE STUDY**

1. To find out the level of TPACK competency among B Ed students in Palakkad and Thrissur Districts.
2. To study the significant difference if any, in the mean score of TPACK competencies among B Ed students based on
  - Locale
  - Stream of Study

### **HYPOTHESES OF THE STUDY**

1. There exists different levels of TPACK Competency among B Ed students in Palakkad and Thrissur Districts
2. There exists significant difference in the mean score of TPACK competencies among B Ed students in Palakkad and Thrissur Districts based on
  - Locale
  - Stream of Study

### **METHODOLOGY OF THE STUDY**

#### **Method**

Normative Survey method was adopted for the study.

#### **Sample**

The total sample for the present study consisted 400 B.Ed students of Palakkad and Thrissur districts. To obtain sample representatives of its population the investigator followed stratified sampling technique .

#### **Tool Used**

The tool used for data collection was TPACK Competency and standardized by the investigator.

#### **Statistical Techniques Used**

The statistical techniques used for this study included percentage wise analysis and t test.

## **RESULTS AND DISCUSSION**

For finding the level of TPACK Competency of B Ed students in Palakkad and Thrissur districts, they were classified into three groups, such as students having,

- 1) High level of TPACK Competency
- 2) Average level of TPACK Competency
- 3) Low level of TPACK Competency

The scores which are more than Mean + SD is categorized as students under high level of TPACK Competency and for students under low group as those who scored below Mean – SD and those who scored in between these two as students with average level of TPACK Competency as given in Table 1

Table 1

**Data and results of analysis of level of TPACK Competency of B Ed Students in Palakkad and Thrissur districts.**

TPACK Competency			
Group	Norms	N	%
High	$M + SD$ and above	82	20.5
Average	$M + SD$ to $M - SD$	272	68
Low	$M - SD$ and below	46	11.5
Total		400	100

From the table1 it is clear that 20.5 % B Ed Students fall into high level of TPACK Competency. 68 % B Ed students have shown average TPACK Competency. 11.5 % is falling into TPACK Competency. It was found that, for the whole sample, the majority come under average group. 68 % of students were showing average level of TPACK Competency. Thus the result pointed that there exists different levels of TPACK Competency among B Ed students in Palakkad and Thrissur districts. Therefore the hypothesis that states there exists different levels of TPACK Competency is accepted.

**The level of TPACK Competency among B Ed students in Palakkad and Thrissur Districts is graphically represented in the Figure 1.**

**Figure 1. Graphical representation of levels of TPACK Competency of B Ed students in Palakkad and Thrissur Districts.**

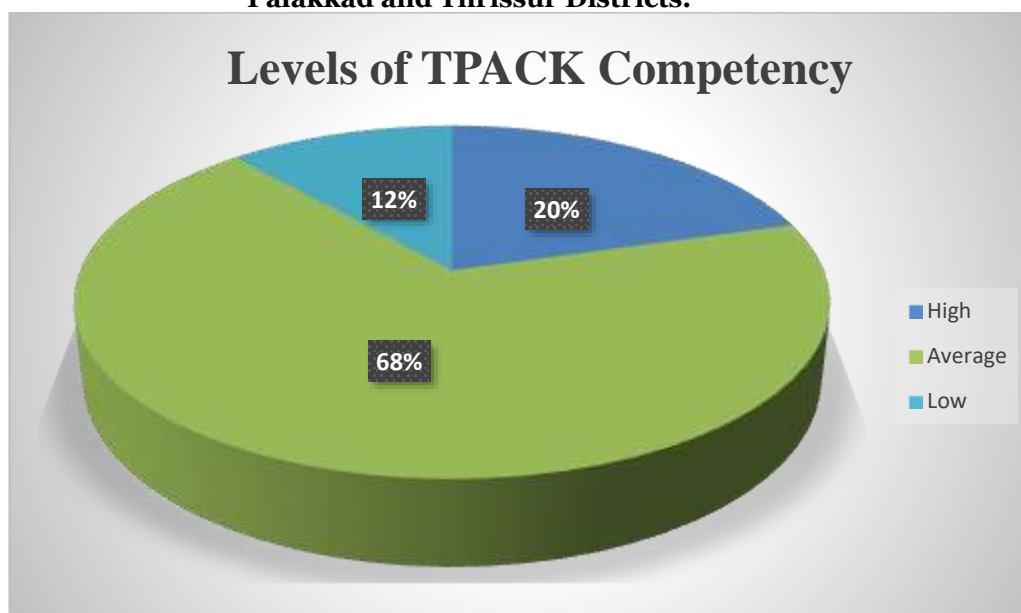


Figure 1 reveals that there exist different levels of TPACK Competency among B Ed students in Palakkad and Thrissur Districts.

The percentage analysis reveals that there existd high, average, and low levels of TPACK Competency among B Ed students.

**Comparison of mean scores of TPACK Competency B Ed students in Palakkad and Thrissur districts with respect to Locale.**

To find out whether there exist any significant difference in the mean scores of TPACK Competency of B Ed students on the basis of their locale, test of significance of difference ( $t - test$ ) was employed.

Data and result of mean scores of extent of TPACK Competencyon the sub sample based on locale are given in Table 2.

Variable	Locale	N	M	SD	$t$	Level of significance
TPACK Competency	Rural	197	195	25.8	19.9	< .001
	Urban	203	244	23.9		

**Data and results of the test of significance of mean difference in scores of the TPACK Competency among B.Ed students in Palakkad and Thrissur distrits on the basis of Local.**

From the Table 2 it is clear that the mean and standard deviation of TPACK Competency in rural students is 195 and 25.8. The mean and standard deviation of TPACK Competency in urban students is 244 and 23.9. The  $t$  value obtained for TPACK Competency is -19.9 and  $p < 0.05$ . That means there exists significant difference in the TPACK Competency of B Ed Students based on their locale. Comparing the mean values, it is clear that the urban B.Ed students possess higher level of TPACK Competency compared to rural students.

### Comparison of mean scores of TPACK Competency of B Ed Students with respect to Stream of Study.

To ascertain whether there exists any significant difference in the mean scores of TPACK Competency of B Ed students on the basis of their Stream of Study, test of significance of difference between means ( $t$  test) was employed.

Data and result of mean scores of extent of TPACK Competency on the sub sample based on Stream of Study are given below in Table 16.

Table 3

### Data and results of the test of significance mean difference in the scores of the TPACK Competency on the basis of Stream of study

Variable	Stream of Study	N	M	SD	$t$	Level of significance
TPACK Competency	Arts	191	221	36.3	0.758	0.449
	Science	209	219	34		

From the Table 18 it is clear that the mean and standard deviation of TPACK Competency in Arts students is 221 and 36.3. The mean and standard deviation of TPACK Competency in Science students is 219 and 34. The  $t$  value obtained for TPACK Competency is 0.758 and  $p$  value is 0.449 which is greater than 0.05. That means there exists no significant difference in the TPACK Competency B Ed students based on their Stream of Study.

### Discussion

From the result it is clear that there exist no significant difference in the TPACK Competency of B Ed students on the basis of their Stream of study.

### CONCLUSION

Study revealed that there exists different levels of TPACK Competency among B Ed students in Palakkad and Thrissur districts and majority of students were showing average level of TPACK Competency. Educational policymakers and institutions should devise targeted initiatives to enhance TPACK competency, fostering a more equitable and inclusive approach to teacher education. Significant difference is noted in the TPACK Competency of B Ed Students based on their locale and the urban B.Ed students possess higher level of TPACK Competency compared to rural students. So measures should be taken to enhance the TPACK Competency of rural students by providing access to technology, pedagogical training, and contextual challenges. These findings underscore the need for targeted interventions to address specific challenges faced by B.Ed. students. In essence, this study holds the key to refining teacher preparation programs, addressing regional disparities, and promoting effective technology integration in education, ultimately contributing to improved teaching practices and enhanced learning outcomes for students.

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