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A Study on Technological Pedagogical Content Knowledge (TPACK), Self-Efficacy and Teaching Competency of the B. Ed students

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ABSTRACT

Based on developments in the 21st century technology has become a large part of the classroom experience. Teachers need to have an understanding of how technology can be coordinated with pedagogy and content knowledge in order to integrate technology effectively into classroom instruction. Self-efficacy beliefs toward technology also play a key role in technology integration. It has been shown that the beliefs of a teacher are closely linked to the technologies that they use and the way in which they use them. More specifically, the beliefs of a teacher with regards to their technological pedagogical content knowledge (TPACK) are pivotal in terms of using technology in the classroom because belief about their capability to use technology is a powerful predictor of their potential technology use. The investigator adopted survey method for collecting thedata. For measuring Self efficacy investigator adopted self constructed 3 point scale, The investigator prepared and validated a scale to measure teaching style. The sample drawn from the population of students belongs to B.Ed., colleges in Chennai Tamil Nadu. The total number of sample was 300 students, 150 students were drawn from Arts major and 150 students were drawn from Science major. For analyzing the data, the investigator used Mean, SD, 't' Test and Pearson's Product Moment Correlation. The findings showed that the TPACK of teaching style and TPACK of self efficacy has no significant difference in gender, location and in knowledge of using computer. Hence, it is critical to measure pre-service teachers' self-efficacy beliefs toward TPACK in order to identify the factors that contribute to a teacher's use of technology in classroom instruction.

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1. INTRODUCTION

TPACK is an emergent form of knowledge that goes beyond all three "core" components (content, pedagogy, and technology). Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

By simultaneously integrating knowledge of technology, pedagogy and content, expert teachers bring TPACK into play any time they teach. Each situation presented to teachers is a unique combination of these three factors, and accordingly, there is no single technological solution that applies for every teacher, every course, or every view of teaching. Rather, solutions lie in the ability of a teacher to flexibly navigate the spaces defined by the three elements of content, pedagogy, and technology and the complex interactions among these elements in specific contexts. Ignoring the complexity inherent in each knowledge component or the complexities of the relationships among the components can lead to oversimplified solutions or failure. Thus, teachers need to develop fluency and cognitive flexibility not just in each of the key domains (T, P, and C), but also in the manner in which these domains and contextual parameters interrelate, so that they can construct effective solutions. This is the kind of deep, flexible, pragmatic, and nuanced understanding of teaching with technology we involved in considering TPACK as a professional knowledge construct.

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2. OPERATIONAL DEFINITION OF THE KEY TERMS USED

Technological, Pedagogical & Content Knowledge

It is the understanding of content (subject matter), what may be beneficial to learning (pedagogy), and the use of technology (ICT). Pedagogical, Content Knowledge & technological are the terms used to define the combination (TPACK). It entails more than merely incorporating ICT into existing methods. It requires a thorough understanding of how ICT may be utilized to process & access subject matter (TCK) as well as how to enhance & support the ICT learning (TPK) when used with the combination of PCK (Schmidt et al, 2009).

TPACK Aptitude

TPACK (Koehler & Mishra, 2009; Mishra & Koehler, 2006) addresses what instructors need to know in order to incorporate technology; it focuses on three primary components of teacher knowledge: pedagogy, content knowledge & technology. A group of symptoms or indicators of one's capacity to aquire skill & certain knowledge in a particular sector is defined as an aptitude. They are hidden potentials that emerge as a result of changes in the environment. They are undeveloped qualities and capabilities in specific areas. Aptitude is a specific, definite, unitary trait linked to professional achievement.

Self-Efficacy

Self-efficacy is characterized as a teacher's assessment of his or her capacity to attain desired learning results & student engagement, even with challenging or uninspired students (Bandura, 1997).

Teaching Competency

Teachers must have expertise in a wide-ranging array of competency in an especially complex environment where hundreds of critical decisions are required each day.

B.Ed., Trainees

Trainees of B.Ed. student instructors who have not yet started teaching.

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3. REVIEW OF LITERATURE

The purpose of the literature review was to obtain information from a wide range of source, therefore this chapter attempts to review the literature that the researcher believes are relevant to the study. In this study, the researcher looked at pre-service teacher educators' teaching strategies in terms of Self efficacy and Teaching competency of the B.Ed students Technological, Pedagogical, and Content Knowledge (TPACK).

Adalar, Hayati (2021) conducted a study on Social Studies Teacher Candidates' Self-Efficacy Beliefs for Technological Pedagogical Content Knowledge (TPACK). This study aims at examining social studies teacher candidates' self-efficacy beliefs for technological pedagogical content knowledge through multiple variables and presenting new perspectives for researchers and practitioners. A causal-comparative research design was adopted for this study. Among non-random sampling methods, convenience sampling was used to select participants. The sample of the study consists of 349 3rd and 4th year college students (teacher candidates) studying at three state universities in Turkey's Central Anatolia Region in the 2018-2019 academic year. The Technological Pedagogical Content Knowledge (TPACK) scale was used for collecting data in this study. T-test and one-way analysis of variance (ANOVA) was employed to analyze data. According to the obtained results, the social studies teacher candidates' self-efficacy beliefs for technological pedagogical content knowledge can be considered above average. No significant differences were found between participants' self-efficacy beliefs for TPACK and some independent variables such as gender, year in college, GPA score, personal computer ownership, and Instructional Technology and Material Development course score. On the other hand, it was determined that perceived technology competency and the use of content sharing platforms for professional purposes were important predictors for social studies teacher candidates' self-efficacy beliefs about TPACK.

Sari, Yunica Rhosiana; Drajati, Nur Arifah; So, Hyo-Jeong; Sumardi, Sumardi (2021) conducted a study on Enhancing EFL Teachers' Technological Pedagogical Content Knowledge (TPACK) Competence through Reflective Practice. This study examines how reflective practices can be an effective strategy in enhancing in-service teachers' Technological Pedagogical Content Knowledge (TPACK). The participants were two English

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teachers in high schools in Indonesia who designed and implemented technology-integrated lessons after participating in a professional development workshop. Data collected from their reflective journals and interviews were analyzed using thematic analysis. Findings from the interviews and teachers' reflective journal revealed three reflective practices: reflection in, on, and for action. Reflective practices helped the teachers to describe and articulate their own experiences in teaching, learn from enacted experiences in the classroom, and apply learned practices in subsequent teaching. This virtuous cycle indicates that reflective practice is an essential mechanism for EFL teachers to become proficient in integrating technology in their teaching practices.

4. OBJECTIVES

1. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on their Gender.

2. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on their Gender.

3. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Students Location.

4. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Students Location.

5. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Knowledge of using Computer.

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6. To find out significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Knowledge of using Computer.

5. METHOD AND PROCEDURE

The investigator adopted survey method for the present study. The investigator prepared and validated a scale to measure TPACK of Self efficacy and Teaching styles among B.Ed trainees. All the B.Ed students studying in college of education in Chennai District formed the population of the study. From the population, the investigator has chosen 300 B.Ed trainee students using simple random sampling technique. For analyzing the data, the investigator used Mean, SD and 't' Test.

6. HYPOTHESIS TESTING

NULL HYPOTHESIS – 1

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on their Gender.

TABLE -4.01

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on their Gender using mean scores.

VARIABLE	GENDER	N	MEAN	SD	t - value	L.S
(TPACK) of Self efficacy	MALE	25	41.28	6.919	0.186	NS
	FEMALE	25	41.60	5.132		

INFERENCE

From the above table, it is inferred that t- value (0.186) is lesser than the table value (1.96) at 0.05 level. The female mean score is 41.60 is better than Male mean score 41.28. Hence there is no significance difference between the Male and Female B.Ed students

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Technological Pedagogical Content Knowledge (TPACK) of Self efficacy mean scores. Therefore the above null hypothesis is accepted.

NULL HYPOTHESIS – 2

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on their Gender.

TABLE -4.02

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on their Gender using mean scores.

VARIABLE	GENDER	N	MEAN	SD	t - value	L.S
(TPACK) of Teaching competency	MALE	25	45.68	8.459	0.034	NS
	FEMALE	25	45.76	8.007		

INFERENCE

From the above table, it is inferred that t- value (0.034) is lesser than the table value (1.96) at 0.05 level. The female mean score is 45.76 is better than Male mean score 45.68. Hence there is no significance difference between the Male and Female B.Ed students Technological Pedagogical Content Knowledge (TPACK) of Teaching competency mean scores. Therefore the above null hypothesis is accepted.

NULL HYPOTHESIS – 3

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Students Location.

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TABLE -4.03

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Students Location using mean scores.

VARIABLE	LOCATION	N	MEAN	SD	t - value	L.S
(TPACK) of Self efficacy	RURAL	33	41.24	5.707	0.320	NS
	URBAN	17	41.82	6.784		

INFERENCE

From the above table, it is inferred that t- value (0.320) is lesser than the table value (1.96) at 0.05 level. The urban area mean score is 41.82 is better than rural area score 41.24. Hence there is no significance difference between the rural and urban area B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy mean scores. Therefore the above null hypothesis is accepted.

NULL HYPOTHESIS – 4

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Students Location.

TABLE -4.04

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Students Location using mean scores.

VARIABLE	LOCATION	N	MEAN	SD	t - value	L.S
(TPACK) of Teaching competency	RURAL	33	45.97	7.724	0.299	NS
	URBAN	17	45.24	9.155		

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INFERENCE

From the above table, it is inferred that t- value (0.299) is lesser than the table value (1.96) at 0.05 level. The rural area mean score is 45.97 is better than urban area mean score 45.24. Hence there is no significance difference between the rural and urban area B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency mean scores. Therefore the above null hypothesis is accepted.

NULL HYPOTHESIS – 5

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Knowledge of using Computer.

TABLE -4.05

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Knowledge of using Computer using mean scores.

VARIABLE	Knowledge of using Computer	N	MEAN	SD	t - value	L.S
(TPACK) of Self efficacy	Yes	46	41.37	6.180	0.277	NS
	No	4	42.25	4.500		

INFERENCE

From the above table, it is inferred that t- value (0.277) is lesser than the table value (1.96) at 0.05 level. The not using Computer Knowledge mean score is 42.25 is better than using Computer Knowledge mean score 41.37. Hence there is no significance difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Self efficacy based on Knowledge of using Computer mean scores. Therefore the above null hypothesis is accepted.

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NULL HYPOTHESIS – 6

There is no significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Knowledge of using Computer. **TABLE -4.06**

Table shows the significant difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Knowledge of using Computer using mean scores.

VARIABLE	Knowledge of using Computer	N	MEAN	SD	t - value	L.S
(TPACK) of Teaching competency	Yes	46	45.22	8.181	1.497	NS
	No	4	51.50	5.745		

INFERENCE

From the above table, it is inferred that t- value (1.497) is lesser than the table value (1.96) at 0.05 level. The not using Computer Knowledge mean score is 51.50 is better than using Computer Knowledge mean score 45.22. Hence there is no significance difference between the B.Ed students with respect to Technological Pedagogical Content Knowledge (TPACK) of Teaching competency based on Knowledge of using Computer mean scores. Therefore the above null hypothesis is accepted.

7. IMPLICATIONS OF THE TPACK FRAMEWORK

We have argued that teaching is a complex, ill-structured domain. Underlying this complexity, however, are three key components of teacher knowledge: understanding of content, understanding of teaching, and understanding of technology. The complexity of technology integration comes from an appreciation of the rich connections of knowledge among these three components and the complex ways in which these are applied in multifaceted and dynamic classroom contexts.

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Since the late 1960's a strand of educational research has aimed at understanding and explaining "how and why the observable activities of teachers' professional lives take on the forms and functions they do" (Clark & Petersen, 1986, p. 255; Jackson, 1968). A primary goal of this research is to understand the relationships between two key domains: (a) teacher thought processes and knowledge and (b) teachers' actions and their observable effects. The current work on the TPACK framework seeks to extend this tradition of research and scholarship by bringing technology integration into the kinds of knowledge that teachers need to consider when teaching. The TPACK framework seeks to assist the development of better techniques for discovering and describing how technology-related professional knowledge is implemented and instantiated in practice. By better describing the types of knowledge teachers need (in the form of content, pedagogy, technology, contexts and their interactions), educators are in a better position to understand the variance in levels of technology integration occurring.

In addition, the TPACK framework offers several possibilities for promoting research in teacher education, teacher professional development, and teachers' use of technology. It offers options for looking at a complex phenomenon like technology integration in ways that are now amenable to analysis and development. Moreover, it allows teachers, researchers, and teacher educators to move beyond oversimplified approaches that treat technology as an "add-on" instead to focus again, and in a more ecological way, upon the connections among technology, content, and pedagogy as they play out in classroom contexts.

8. EDUCATIONAL IMPLICATIONS

In an era of increasing accountability demands for teachers and student professional development will be the key to success in school reform initiatives as administrators struggle with improving the current teaching force. It is the contention of this paper that the framework of professional development for teachers should include self-efficacy as a theoretically sound focus of training designs aimed at improving teacher competence and by extension improving student outcomes. The changes necessary to promote meaningful and substantive educational improvement are both fundamental and systemic. Because change and reform in education continues to be atthe political forefront, new challenges are emerging

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for policy makers and administrators across the country. The substance and outcomes of many current teacher professional development opportunities have been soundly criticized suggesting the transformation of current patterns is a critical challenge (Feistritzer, 1999).

9. CONCLUSION

The findings showed that the TPACK of teaching style and TPACK of self efficacy has no significant difference in gender, location and in knowledge of using computer As a result, effective learning requires adaptive access to rich, efficient, and coordinated knowledge from a range of disciplines, such as learner thinking and learning, subject knowledge, and, as time goes on, information on technological advancement. TPACK of Self efficacy and Teaching style based on gender and location has no difference but using computers and having computer knowledge shows significant difference among B.Ed trainees.

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