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A STUDY ON TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK) OF PRE-SERVICE LANGUAGE TRAINEE TEACHERS OF BANKURA AND PURULIA DISTRICT OF WEST BENGAL

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Abstract: In this modern 21st century, Technological, Pedagogical and Content Knowledge (TPACK) has become a must knowledge domain for the teachers to cope up with the dynamic and multidimensional classroom situation. The present study aims to find out the difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district of West Bengal. It is a descriptive survey type research. Data for the present study has been collected from 120 pre-service language trainee teachers from randomly selected B.Ed. colleges of Bankura and Purulia districts of West Bengal, India using simple random sampling technique administering TPACK Survey Scale by Sahin (2011). The collected data is analysed using appropriate descriptive and inferential statistics in SPSS version 26. The result revealed that no significant difference has been there between Bankura and Purulia district of West Bengal in terms of male, female, rural and urban pre-service language trainee teachers.

Keywords: Technological Pedagogical and Content Knowledge (TPACK), Pedagogical Content Knowledge (PCK), pre-service trainee teachers, language, technology.

I. INTRODUCTION

The teaching and learning process must be innovative, dynamic, and multidimensional in the modern era of science and technology. And for this technology integration in teaching learning process is must. Not only teaching learning process but also all the education sector is now solely dependent upon technology (Gayen & Sen, 2021). In this 21st century teachers need to be aware of innovation's broader implications for speaking to material and differentiating amongst instructional techniques, in addition to its more technical components (Harris, Mishra & Koehler, 2009). Thus, there originates the concept of Technological, Pedagogical and Content Knowledge (TPACK) framework. The TPACK framework recently acknowledged that teaching is an extraordinarily complicated kind of problem-solving and critical thinking leveraging flexible and integrated learning (Shulman, 1986, 1987). In this context, Pedagogical Content Knowledge (PCK) is another crucial aspect of the learning process that results in TPACK (Sen & Samanta, 2015a, 2015b, 2015c, 2015d; Sen, 2016, 2022). This knowledge domain is very much crucial in learning the basic language skills namely listening, speaking, reading and writing (Ghosh, Gayen & Sen, 2021). The present study aims to compare the difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district of West Bengal.

II. LITERATURE REVIEW

Mahato and Sen (2023a) performed a study on TPACK and found that gender and location of institution have no role to play in TPACK of pre-service mathematics trainee teachers. Mahato and Sen (2023b) conducted a correlational study and found that context knowledge and attitude towards creative teaching have significant relationship with technological pedagogical and content knowledge (TPCK). Santos & Castro (2021) conducted a study and found that in terms of seven elements of TPACK, the knowledge of the pre-service teachers was very strong. They valued the educational technology tools of public schools as 'fairly adequate'. Agustini et al. (2019) performed a study on Competence on TPACK and the study showed that content knowledge and pedagogy content knowledge had high average among the different dimensions of TPACK likened to the others. Fabian et al. (2019) conducted a study and discovered that lecturers with high TPACK are accomplished of using diverse and collaborating learning activities. But TPACK didn't contrast in relations to subject area and persons with little training. The findings of a study performed by Ozudogru & Ozudogru (2019) indicated that there was a considerable disparity in the knowledge of TPACK components, with male teachers coming in first position and teaching experience and academic level being unimportant. The findings of a study conducted by Uslu (2018) indicated that TPCK, attitudes towards integrating technology into education, frequency of computer use, gender, seniority, length of computer use, technical support, and, above all, individual innovations are highly significant and have a direct or indirect

impact on technology integration. Bibi & Khan (2017) made a research that suggested that in each episode the knowledge domain remained varied that indicated the dynamic and responsive character of TPACK. Batiibwe et al. (2016) conducted a study on TPACK framework to find out the relationship of using ICT in pedagogy with different dimensions of TPACK. The study exposed TPACK's new positivist appearance in the context of ICT-enhanced instruction. A study by Yigit (2014) indicated that the more pre-service mathematics instructors engage in technologically focused sessions, the more proficient they will become in TPACK and the higher quality of mathematics they will be able to impart. Sahin et al. (2013) in their study discovered that there are important connections between the various TPACK model knowledge categories. The findings also revealed a highly significant correlation between preservice teachers' opinions about their own ability to use the internet for educational purposes and the knowledge elements of the TPACK model. Baran et al. (2011) performed a study on TPACK framework and revealed that it has provided enough opportunity for the technology researchers to interconnect more efficiently in their job. Koçoglu (2009) conducted a study and found that Pedagogical content knowledge (PCK) scored best in the CALL course with a percentage of 23%, while pedagogical knowledge (PK) scored lowest with a percentage of 5.1%. Also, it showed that the CALL course was really helpful for pre-service teachers in terms of enhancing their TPCK.

III. OBJECTIVES

1. To study the difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district.
2. To study the difference in TPACK between pre-service male language trainee teachers of Bankura and Purulia district.
3. To study the difference in TPACK between pre-service female language trainee teachers of Bankura and Purulia district.
4. To study the difference in TPACK between pre-service rural language trainee teachers of Bankura and Purulia district.
5. To study the difference in TPACK between pre-service urban language trainee teachers of Bankura and Purulia district.

IV. HYPOTHESES

$H_0$1 There is no significant difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district.
$H_0$2 There is no significant difference in TPACK between pre-service male language trainee teachers of Bankura and Purulia district.
$H_0$3 There is no significant difference in TPACK between pre-service female language trainee teachers of Bankura and Purulia district.
$H_0$4 There is no significant difference in TPACK between pre-service rural language trainee teachers of Bankura and Purulia district.
$H_0$5 There is no significant difference in TPACK between pre-service urban language trainee teachers of Bankura and Purulia district.

V. METHODOLOGY OF THE STUDY

a) **Method:** For the present study, the researchers have adopted descriptive survey type research.
b) **Population:** All the pre-service trainee teachers having language as method subject of Bankura and Purulia districts of West Bengal, India, have been considered as the population for the present study.
c) **Sample & Sampling Technique:** The data for the present study has been collected from 120 pre-service trainee teachers having language as method subject from randomly selected B.Ed. colleges of Bankura and Purulia districts of West Bengal, India using simple random sampling technique.
d) **Scale Used:** Researchers have used "TPACK Survey" by Sahin (2011) for the collection of data.
e) **Statistics Used:** For the present study, the researchers have used appropriate descriptive statistics like mean, standard deviation and inferential statistics like 't' test in SPSS version 26.

VI. RESULTS AND DISCUSSIONS

Table 1 Descriptive statistics along with 't' value of TPACK of Pre-service Language Trainee Teachers of Bankura and Purulia District of West Bengal

Pair of Comparison		N	M	SD	Md	df	Calculated 't' value	Critical 't' value	Remarks
1	Bankura	60	14.03	4.190	1.24	118	1.604	1.98 (0.05) & 2.63 (0.01)	Not Significant
	Purulia	60	15.27	4.234					
2	Bankura Male	17	15.35	5.123	1.65	31	1.101	2.04 (0.05) & 2.75 (0.01)	Not Significant
	Purulia Male	16	17.00	3.183					
3	Bankura Female	43	13.51	3.699	1.13	85	1.286	1.99 (0.05) & 2.64 (0.01)	Not Significant
	Purulia Female	44	14.64	4.420					
4	Bankura Rural	56	14.13	3.814	0.29	99	0.377	1.99 (0.05) & 2.63 (0.01)	Not Significant
	Purulia Rural	45	14.42	4.081					

5	Bankura Urban	04	12.75	8.732	5.05	17	1.795	2.11 (0.05) & 2.90 (0.01)	Not Significant
	Purulia Urban	15	17.80	3.745					

Hypothesis Testing 1: Table 1 shows that the mean score of TPACK of pre-service language trainee teachers of Bankura and Purulia district of West Bengal are 14.03 and 15.27 respectively with mean difference 1.24. The standard deviations are 4.190 and 4.234 respectively. The calculated 't' value is 1.604 which is less than that of critical 't' value [1.98 (for .05 level of significance) & 2.63 (for .01 level of significance)] for the degree of freedom 118. So, the calculated 't' value is not significant at 0.01 level of significance. Result revealed no significant difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district of West Bengal. So, the null hypothesis ($H_0$1) "There is no significant difference in TPACK between pre-service language trainee teachers of Bankura and Purulia district" is retained.

Hypothesis Testing 2: Table 1 shows that the mean score of TPACK of pre-service male language trainee teachers of Bankura and Purulia district of West Bengal are 15.35 and 17.00 respectively with mean difference 1.65. The standard deviations are 5.123 and 3.183 respectively. The calculated 't' value is 1.101 which is less than that of critical 't' value for the degree of freedom 31. So, the calculated 't' value is not significant at 0.01 level of significance. Result revealed no significant difference in TPACK between pre-service male language trainee teachers of Bankura and Purulia district of West Bengal. So, the null hypothesis ($H_0$2) "There is no significant difference in TPACK between pre-service male language trainee teachers of Bankura and Purulia district" is retained.

Hypothesis Testing 3: Table 1 shows that the mean score of TPACK of pre-service female language trainee teachers of Bankura and Purulia district of West Bengal are 13.51 and 14.64 respectively with mean difference 1.13. The standard deviations are 3.699 and 4.420 respectively. The calculated 't' value is 1.286 which is less than that of critical 't' value for the degree of freedom 85. So, the calculated 't' value is not significant at 0.01 level of significance. Result revealed no significant difference in TPACK between pre-service female language trainee teachers of Bankura and Purulia district of West Bengal. So, the null hypothesis ($H_0$3) "There is no significant difference in TPACK between pre-service female language trainee teachers of Bankura and Purulia district" is retained.

Hypothesis Testing 4: Table 1 shows that the mean score of TPACK of pre-service rural language trainee teachers of Bankura and Purulia district of West Bengal are 14.13 and 14.42 respectively with mean difference 0.29. The standard deviations are 3.814 and 4.081 respectively. The calculated 't' value is 0.377 which is less than that of critical 't' value for the degree of freedom 99. So, the calculated 't' value is not significant at 0.01 level of significance. Result revealed no significant difference in TPACK between pre-service rural language trainee teachers of Bankura and Purulia district of West Bengal. So, the null hypothesis ($H_0$4) "There is no significant difference in TPACK between pre-service rural language trainee teachers of Bankura and Purulia district" is retained.

Hypothesis Testing 5: Table 1 shows that the mean score of TPACK of pre-service urban language trainee teachers of Bankura and Purulia district of West Bengal are 12.75 and 17.80 respectively with mean difference 5.05. The standard deviations are 8.732 and 3.745 respectively. The calculated 't' value is 1,795 which is less than that of critical 't' value for the degree of freedom 17. So, the calculated 't' value is not significant at 0.01 level of significance. Result revealed no significant difference in TPACK between pre-service urban language trainee teachers of Bankura and Purulia district of West Bengal. So, the null hypothesis ($H_0$5) "There is no significant difference in TPACK between pre-service urban language trainee teachers of Bankura and Purulia district" is retained.

VII. MAJOR FINDINGS OF THE STUDY

The findings of the present study reveals that pre-service language trainee teachers of both Bankura and Purulia district possess equal Technological Pedagogical and Content Knowledge (TPACK). The comparison has been made between Bankura and Purulia district in terms of male, female, rural and urban pre-service language trainee teachers. But in all the cases no significant difference has been observed between them. Thus, it can be said that the levels of Technological Pedagogical and Content Knowledge (TPACK) of both Bankura and Purulia district are quite equivalent.

VIII. DISCUSSION OF THE RESULT

The findings indicates that the pre-service language trainee teachers of both Bankura and Purulia district possess equal amount of Technological Pedagogical and Content Knowledge (TPACK). Similar result has been observed by Cetin-Dindar et al. (2018) in their study on TPACK of pre-service chemistry teachers. But a significant difference in difference dimensions of TPACK has been observed by Can et al. (2017) in their study on TPACK of pre-service science teachers. Apau (2017) witnessed a statistically significant difference between the student teachers of TPACK preparedness in relation to gender. A study by Alzahrani (2014) on TPACK also found no significant relationship between the seven dimensions of TPACK. Though the present study reveals no significant difference in TPACK but a study by Altun and Akyildiz (2017) found significant difference in TPACK in relation to gender. Another study by Can, Dogru and Bayir (2017) found that gender plays significant role in TPACK. A recent study by Mahato and Sen (2023) also found that TPACK of pre-service Mathematics trainee teachers are not same in regard to gender and location of residence.

IX. CONCLUSIONS

So, at the end it can be said that as both Bankura and Purulia district is located in somewhat same geographical and cultural location, there exists no significant difference in Technological Pedagogical and Content Knowledge (TPACK) of pre-service language trainee teachers. As statistically no significant difference has been observed in TPACK, the level of Technological Pedagogical and Content Knowledge (TPACK) in both the districts are quite equivalent.

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