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INFLUENCE OF TECHNO – PEDAGOGICAL SKILLS ON PROFESSIONAL EFFECTIVENESS OF PROSPECTIVE TEACHERS

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ABSTRACT

The rapid advancement of technology has transformed the educational landscape, requiring teachers to develop techno-pedagogical skills to enhance their professional effectiveness. This study explores the influence of techno-pedagogical skills on the professional effectiveness of prospective teachers. It examines how proficiency in integrating technology with pedagogy influences on professional effectiveness. The sample was chosen by the investigator used a stratified random sampling. The study was taken in districts of Kanyakumari, Tamil Nadu. Data were collected through a standardized tool developed by John Lings V and Rexlin Jose G (2023) namely Lings-Rex Techno-Pedagogical Skills Assessment Scale (2023) and Lings-Rex Professional Effectiveness Assessment Scale (2023). The researcher used survey method. Collected data were analysed with help of mean, standard deviation, t test and regression analysis. The findings revealed a significant influence among techno-pedagogical skills and professional effectiveness, emphasizing the need for robust training programs that equip prospective teachers with digital literacy, instructional design, and adaptive teaching methodologies. The study underscores the importance of continuous professional development to ensure that prospective teachers can effectively leverage technology to foster meaningful learning experiences.

Keywords: Techno-Pedagogical Skills, Professional Effectiveness, Prospective Teachers, Digital Literacy, Teacher Training

1. INTRODUCTION

In the digital era, technology has transformed the education sector, significantly influencing teaching methodologies and instructional practices. The integration of technology in pedagogy, often referred to as techno-pedagogical skills, plays a vital role in enhancing the professional effectiveness of teachers. These skills involve the ability to use digital tools, multimedia resources, and e-learning platforms to create engaging and effective learning experiences (Mishra & Koehler, 2006). Prospective teachers, who are undergoing training to enter the teaching profession, must develop these competencies to meet the demands of modern education.

2. TECHNO-PEDAGOGICAL SKILLS AND PROFESSIONAL EFFECTIVENESS

Techno-pedagogical skills stem from the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the interplay of technology, pedagogy, and subject content knowledge in effective teaching (Koehler & Mishra, 2009). Research suggests that teachers with strong techno-pedagogical skills can better facilitate student-centered learning, improve engagement, and foster critical thinking (Sharma & Bansal, 2020). Moreover, the ability to integrate technology effectively has been linked to improved classroom management, assessment strategies, and instructional adaptability (Gurung & Rutledge, 2014).

Professional effectiveness in teaching is measured by a teacher's ability to deliver subject content efficiently, engage students meaningfully, and adapt instructional strategies to diverse learning needs (Darling-Hammond, 2017). As education increasingly incorporates digital tools, teachers who lack techno-pedagogical skills may struggle to maintain instructional effectiveness (Brown & Green, 2016). Thus, it is imperative for teacher education programs to incorporate training in digital competencies to ensure that prospective teachers are well-prepared for contemporary classrooms.

This study aims to explore the influence of techno-pedagogical skills on the professional effectiveness of prospective teachers. It seeks to understand how digital competencies influence teacher effectiveness, teaching effectiveness, student engagement, and instructional success. Additionally, the study identifies challenges faced by prospective teachers in acquiring and implementing these skills and suggests strategies for improving teacher training programs. By examining the relationship between techno-pedagogical skills and professional effectiveness, this research highlights the growing need for digital literacy and technological integration in teacher education. Enhancing these competencies in prospective teachers will not only improve their effectiveness but also contribute to the overall advancement of the education system in the digital age.

3. SIGNIFICANCE OF THE STUDY

The study on the influence of techno-pedagogical skills on the professional effectiveness of prospective teachers holds significant importance in the field of education. In the rapidly evolving digital era, integrating technology with pedagogy is essential for enhancing teaching-learning processes. This study aims to assess the impact of techno-pedagogical skills on the preparedness and effectiveness of prospective teachers. It will support the integration of technology in pedagogy, leading to more effective teaching practices and improved student learning experiences.

4. STATEMENT OF THE PROBLEM

Prospective teachers can use technology to assist effectively and efficiently achieving curriculum objectives. Technology can provide powerful environments eliciting modern views of learning. It depends on how teachers interpret the uses of tools and how they use them to transform the teaching learning processes. To effectively, serve modern students in a modern society, teachers at all levels and in all classes must provide students with exposure to the bare minimum of technology. Further, techno pedagogical skills in teaching contribute a lot towards professional effectiveness. This is the rationale for studying the techno-pedagogical skills on professional effectiveness of prospective teachers and the investigator has intended to study the "Influence of Techno – Pedagogical Skills on Professional Effectiveness of Prospective Teachers".

5. OBJECTIVES OF THE STUDY

1) The objectives of the current study are given below.
2) To find out the significant difference, if any, in the techno-pedagogical skills and professional effectiveness of prospective teachers with regard to gender, educational qualification, and pedagogy subject.
3) To find out impact among the techno-pedagogical skills and professional effectiveness of prospective teachers.

6. HYPOTHESIS OF THE STUDY

1) There is no significant difference between the techno-pedagogical skills of prospective teachers and gender of prospective teachers.
2) There is no significant difference between the techno-pedagogical skills of prospective teachers and educational qualification of prospective teachers.
3) There is no significant difference between the techno-pedagogical skills of prospective teachers and pedagogy subject of prospective teachers.
4) There is no significant difference between the professional effectiveness of prospective teachers and gender of prospective teachers.
5) There is no significant difference between the professional effectiveness of prospective teachers and educational qualification of prospective teachers.
6) There is no significant difference between the professional effectiveness of prospective teachers and pedagogy subject of prospective teachers.
7) There is no significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers.

7. METHODOLOGY

Method used in the present study

The method adopted in the present study is survey. The investigator used stratified random sampling technique for selecting the sample. The sample of the study is prospective teachers studying in the B.Ed. Colleges in Kanyakumari District affiliated to Tamil Nadu Teachers Education University, Chennai. The sample consisted of 1213 prospective teachers.

Tool used

Lings-Rex Techno-Pedagogical Skills Assessment Scale (2023) and Lings-Rex Professional Effectiveness Assessment Scale (2023) developed by John Lings and Dr. G.Rxlin Jose (2023). The investigator used test-retest method for establishing reliability of the tool.

Statistical techniques used

The data obtained was analysed by using appropriate statistical techniques like Arithmetic mean, Standard Deviation, t - test and Regression Analysis.

Data Analysis

Ho1: There is no significant difference between the techno-pedagogical skills of prospective teachers and gender of prospective teachers.

Table 1. Significance of difference in the techno-pedagogical skills of prospective teachers with regard to gender.

	Gender	N	Mean	SD	t - value	p - value
Techno – Pedagogical Skills	Male	134	110.51	24.009	4.534	0.000[S]
	Female	1079	101.36	21.794		

S - Significant at 5% level

It is inferred from the above table that the P value is lesser than 0.05 for techno-pedagogical skills of prospective teachers. It shows that there is a significant difference between the techno-pedagogical skills of prospective teachers and gender of prospective teachers.

Ho2: There is no significant difference between the techno-pedagogical skills of prospective teachers and educational qualification of prospective teachers.

Table 2. Significance of difference in the techno-pedagogical skills of prospective teachers with regard to educational qualification.

Variable	Educational Qualification	N	Mean	SD	t - value	p - value
Techno -Pedagogical Skills	U.G	732	101.52	21.055	1.645	0.100^{NS}
	P.G	481	103.67	23.861		

NS – Not Significant at 5% level

It is inferred from the above table that P value is greater than 0.05 for techno-pedagogical skills of prospective teachers. It shows that there is no significant difference between the techno-pedagogical skills of prospective teachers and educational qualification of prospective teachers.

Ho3: There is no significant difference between the techno-pedagogical skills of prospective teachers and pedagogy subject of prospective teachers.

Table 3. Significance of difference in the techno-pedagogical skills of prospective teachers with regard to pedagogy subject.

Variable	Pedagogy Subject	N	Mean	SD	t - value	p - value
Techno -Pedagogical Skills	Arts	518	103.99	22.364	2.189	0.029^{S}
	Science	695	101.17	22.060		

S - Significant at 5% level

It is inferred from the above table that P value is lesser than 0.05 for techno-pedagogical skills of prospective teachers. It shows that there is a significant difference between the techno-pedagogical skills of prospective teachers and pedagogy subject of prospective teachers.

Ho4: There is no significant difference between the professional effectiveness of prospective teachers and gender of prospective teachers.

Table 4. Significance of difference in the professional effectiveness of prospective teachers with regard to gender

Variable	Gender	N	Mean	SD	t - value	p - value
Professional Effectiveness	Male	134	129.98	13.043	4.386	0.000^{S}
	Female	1079	121.41	22.119		

S - Significant at 5% level

It is inferred from the above table that P value is lesser than 0.05 for professional effectiveness of prospective teachers It shows that there is a significant difference between the professional effectiveness of prospective teachers and gender of prospective teachers.

Ho5: There is no significant difference between the professional effectiveness of prospective teachers and educational qualification of prospective teachers.

Table 5. Significance of difference in the professional effectiveness of prospective teachers with regard to educational qualification.

Variable	Educational Qualification	N	Mean	SD	t - value	p - value
Professional Effectiveness	UG	732	121.54	21.737	1.638	0.102^{NS}
	PG	481	123.61	21.024		

S - Significant at 5% level *NS – Not Significant at 5% level*

It is inferred from the above table that P value is greater than 0.05 for professional effectiveness of prospective teachers. It shows that there is no significant difference between the professional effectiveness in general of prospective teachers and educational qualification of prospective teachers.

Ho6: There is no significant difference between the professional effectiveness of prospective teachers and pedagogy subject of prospective teachers.

Table 6. Significance of difference in the professional effectiveness of prospective teachers with regard to pedagogy subject

Variable	Pedagogy Subject	N	Mean	SD	t - value	p - value
Professional Effectiveness	Arts	518	122.45	22.320	0.123	0.902^{NS}
	Science	695	122.30	20.834		

NS – Not Significant at 5% level

It is inferred from the above table that P value is greater than 0.05 for professional effectiveness of prospective teachers. It shows that there is no significant difference between the professional effectiveness of prospective teachers and pedagogy subject of prospective teachers.

Ho7: There is no significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers.

Table 7. Regression analysis between, techno-pedagogical skills (Independent Variable) and professional effectiveness (Dependent Variable)

Model	Sum of squares	df	Mean square	R	R Square	F value	Sig
Regression	50046.650	1	50046.650	0.299^{a}	0.090	119.129	0.000^{b**}
Residual	508745.470	1211	420.104				
Total	558792.120	1212					

a. Dependent Variable: Professional Effectiveness

b. Predictors: (Constant), Techno Pedagogical Skills ***Significant at 1% level*

It is inferred from the table that p value (0.000) is less than 0.01 at 1% level of significance. Hence, the hypothesis, which states that there is no significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers is rejected at 1% level of significance. Therefore, it is concluded that there is significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers.

8. FINDINGS OF THE STUDY

1) Significant difference is found between the techno-pedagogical skills of prospective teachers and gender of prospective teachers.
2) No significant difference is found between the techno-pedagogical skills of prospective teachers and educational qualification of prospective teachers.
3) Significant difference is found between the techno-pedagogical skills of prospective teachers and pedagogy subject of prospective teachers.
4) Significant difference is found between the professional effectiveness of prospective teachers and gender of prospective teachers.
5) No significant difference is found between the professional effectiveness of prospective teachers and educational qualification of prospective teachers.
6) No significant difference is found between the professional effectiveness of prospective teachers and pedagogy subject of prospective subject.
7) Significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers.

9. INTERPRETATIONS OF THE STUDY

Based on the analysis, the results are interpreted and presented below.

There was a significant difference in techno-pedagogical skills of prospective teachers and gender of prospective teachers. The results indicate that gender may play a role in techno-pedagogical skill development. This difference could be influenced by various factors such as access to technology, confidence in technology use, and educational experiences. The findings highlight the need for targeted interventions and training programs to bridge the skill gap and promote equal opportunities for all individuals in technology-integrated pedagogy.

The findings related to techno-pedagogical skills of prospective teachers and educational qualification of prospective teachers revealed that there is no significant difference found in it. This suggests that educational qualification does not significantly impact techno-pedagogical skills.

There was a significant difference in techno-pedagogical skills of prospective teachers and pedagogy subject of prospective teachers. The arts pedagogy subject (Mean = 103.99) has a slightly higher Techno-Pedagogical Skills score than the science pedagogy subject (Mean = 101.17). The reason may be, Arts pedagogy subject prospective teachers may engage more with creative digital tools, multimedia, and interactive teaching methods, leading to slightly higher techno-pedagogical proficiency. Science pedagogy subject prospective teachers may rely more on traditional scientific methods and practical experiments, which might explain their comparatively lower scores. The result suggests that Science pedagogy subject prospective teachers may benefit from enhanced training in techno-pedagogical skills to bridge this gap.

There was a significant difference in professional effectiveness of B.Ed. trainees and gender of B.Ed. trainees. The findings revealed that, the higher professional effectiveness score for the male group is unlikely due to chance. The reason may be due to workplace norms often favor traditionally male B.Ed. trainees such as assertiveness, competitiveness, risk-taking, direct communication, and confidence in decision-making.

The findings related to professional effectiveness of B.Ed. trainees with regard to educational qualification and pedagogy subject revealed that there is no significant difference found in it. This suggest that, educational qualification and pedagogy subject does not significantly impact professional effectiveness of B.Ed. trainees.

The result of the regression analysis shows that there is significant influence of the techno-pedagogical skills on professional effectiveness of prospective teachers. Techno-pedagogical skills indicates a positive influence on the professional effectiveness. Although the regression model is statistically significant, only 9% of the variance in the dependent variable is explained by the independent variable. The correlation (R = 0.299) suggests a weak relationship. While the model is significant (p = 0.000), it may not be practically useful if you are looking for a strong predictive relationship. Finally, the techno-pedagogical skills does influence on professional effectiveness, but its impact is small.

This may be influenced by multiple factors like human behavior, wellness, experience, competency, school resources, and environmental conditions.

10. EDUCATIONAL IMPLICATIONS OF THE STUDY

The investigator suggests implications based on the findings related to techno-pedagogical skills, and professional effectiveness of prospective teachers.

- Teacher education institutions and teacher educators should explore individualized learning strategies to cater to different prospective teacher's needs.
- Special trainings related to Techno-pedagogical skills can organized for the Prospective teachers.
- Prospective teachers can be encouraged to actively participate in different technological orientation programs to develop their Techno-pedagogical skills.
- Policymakers should adopt a holistic strategy rather than focusing too much on one factor.
- Educational reforms should address multiple areas, such as: Teacher training and professional development, improved access to learning resources and technology, Enhancing student support services (mental health, mentorship programs).
- Teacher educators play a critical role in influencing prospective teachers performance beyond the studied variable. Teacher educators should focus on: Improving teaching methods (active learning, student-centered approaches), Encouraging student engagement and motivation in the learning process, Creating a positive and inclusive learning environment.

11. CONCLUSION

Techno-pedagogical skills are crucial for enhancing the professional effectiveness of prospective teachers. As technology continues to transform education, teachers must be equipped with the necessary digital competencies to create engaging, interactive, and personalized learning experiences. By addressing challenges such as resource limitations and lack of training, educational institutions can empower future educators to integrate technology seamlessly into their pedagogy. By equipping educators with the necessary digital competencies, educational institutions can foster an innovative and effective teaching-learning process. Integrating technology into pedagogy not only enhances instructional methodologies but also prepares teachers to meet the demands of modern education systems. Ultimately, the mastery of techno-pedagogical skills ensures that teachers remain adaptive, innovative, and effective in meeting the evolving needs of students in the digital era.

CONFLICT OF INTERESTS

None.

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