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Research Paper

Pupil Teachers' Self-Efficacy and Techno-Pedagogical Competence: A Correlation Study

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ABSTRACT

The objective of this research was to investigate whether or not there is any relationship between self-efficacy and techno- pedagogical competence among pupil teachers. The Techno-Pedagogical Competency Scale (2013), which developed by S. Rajashekhar and K. Sathiyaraj, and the Self -efficacy Scale (2001), which was developed by Tschannen Moran and A. Woolfolk Hoy, were used to test the Techno- Pedagogical Competence and Self – Efficacy of a total of two hundred pupil teachers. It was discovered that there is a significant positive correlation between both of the aforementioned abilities. Teachers that have a healthy sense of self efficacy have a wide variety of experiences under their belts and make use of a variety of instructional resources in their classroom practices.

Keywords: *Self-Efficacy, Techno-Pedagogical Competence*

In today's world, qualities like diplomacy and political insight, once considered vital for teachers during the times of Chanakya and Drona, are becoming quite uncommon. However, modern educators do not need to reach the same degree of skill in diplomacy and political awareness. This suggests that the values embraced by a teacher at one time may not necessarily coincide with those upheld by that teacher at another time. In the 21st-century educational context, it's now quite common to see students using mobile devices as they move through school hallways. It's frequent to witness children multitasking with technology during breaks or mealtimes, using one hand to browse their iPod playlist while texting friends or family with the other. As students are raised in digital environments, their preferences and expectations for learning reflect this reality, which places a greater obligation on educators to adjust their instructional strategies accordingly.

Modern classrooms are increasingly influenced by digital tools and platforms, requiring educators to have not only a strong understanding of the subject matter but also the skills to integrate technology into their teaching methods effectively. According to Lever-Duffy and McDonald (2008), school districts across the nation are allocating substantial financial resources towards the implementation of technology in classrooms, as well as providing

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training for staff members to effectively incorporate it into their teaching practices. Nevertheless, the successful execution of these initiatives often depends on the individual teacher's confidence and willingness to utilize digital tools in pedagogically effective ways.
According to the National Council of Teachers (2013), the skills to use technology effectively, the capability to interact with various information sources at once, and the ability to evaluate multimedia content while following ethical guidelines are vital qualities for those who wish to make a meaningful impact in today's global society. We live in a time often described as the Information Technology (IT) age. Hew and Brush (2007) indicate that educators often rationalize their choice not to use technology by pointing to a lack of specific technological expertise. There is a significant need for teachers to overcome their entrenched belief that they must acquire all knowledge at once and are exempt from the duty to remain engaged.

However, educators who take advantage of opportunities to improve their skills through professional development are much more likely to incorporate technology into their teaching practices than those who do not (Mueller et al., 2008). The importance of techno-pedagogy is viewed from various perspectives, such as promoting innovative techno-pedagogical strategies and evaluating online resources. This shift is also transforming the role of teachers from merely conveying information to becoming learning facilitators, guiding students in developing their own understanding and conceptualizing the subject matter (Chauhan, 2024).

Hence, there is a need for teachers to enhance their emphasis on technology in order to effectively prepare themselves for teaching students from the digital age and to adequately address the challenges present in the contemporary educational setting.

Techno-Pedagogical Competency

Techno-Pedagogical Competency refers to the aptitude and proficiency of teachers in utilising suitable and efficient technology to facilitate the teaching and learning process.
The development of a teacher's techno-pedagogical competency relies on three essential elements: content, pedagogy, and technology (Koehler & Mishra, 2009).

1. **Content:** Content refers to the subject matter or body of information that is intended to be acquired or imparted to students. Academic knowledge encompasses a range of factual information, conceptual frameworks, theories, and principles that are imparted and acquired through educational instruction, as instead of the skills of reading and writing.
2. **Technology:** The domain of technology encompasses the knowledge and skills required to effectively utilise computer software and hardware, such as the internet, digital video, and various common technologies like overhead projectors, interactive boards, and e-books, within the realm of education. This pertains to specific cognitive processes and operational methodologies associated with technology, tools, and their respective resources.
3. **Pedagogy:** Pedagogy refers to the comprehensive understanding of how the process of teaching and learning can be effectively altered and executed through the utilisation of diverse strategies, procedures, processes, and methods.

The understanding of these abilities aims to boost the efficiency and effectiveness of teaching and learning methods for professional growth through the integration of technology (Archambault & Crippen, 2009). This is because it can alleviate the pressures faced by

teachers and facilitate the development of a more profound understanding of the subject matter among students. Techno-pedagogical competency skills encompass a range of sub-skills, among which are basic technological skills- proficiency in utilising technology for the purpose of acquiring knowledge and fostering personal development, proficiency in utilising technology for the purpose of designing and organising instructional materials and curriculum, and proficiency in utilising technology to facilitate the delivery of lessons.

The Technology Acceptance Model (TAM) suggests that individuals' intentions to engage in technology-related behaviours are influenced by their perception of the ease of use and usefulness of the technology. As educators improve their ability to blend technology with teaching methods, their self-assurance grows, which in turn boosts their effectiveness in the classroom. The effectiveness of teachers in executing their roles is highly connected to their confidence in their ability to carry out their responsibilities and their proficiency with technology. It has been suggested that self-efficacy, considered one of the key factors influencing competent and impactful teaching, can clarify the variations in teachers' actions within the educational sphere and will provide significant insights into enhancing and comprehending teacher behaviors (Tschannen-Moran et al., 1998).

The concept of self-efficacy, as introduced by Albert Bandura within the framework of the social learning theory during the 1970s, has gained considerable prominence within the field of educational academia. Self-efficacy refers to an individual's belief in their ability to successfully execute the tasks or behaviours required to achieve a specific objective.

As stated by Tschannen-Moran *et al.* (1998), the concept of a teacher's self-efficacy within the educational environment can be described as the teacher's personal conviction in their ability to effectively plan and implement the necessary actions to successfully achieve a specific instructional objective within a specific educational context. The most prevalent aspects of teacher self-efficacy, according to researchers in the area, are self-efficacy for instructional tactics and self-efficacy for classroom management (Tschannen-Moran & Hoy, 2001). In actuality, teachers' self-efficacy is a key phenomena that may be considered as one of the factors that contribute to learning and effective teaching. It was discovered that teachers who reported having higher teacher self-efficacy also claimed to employ better teaching techniques (Holzberger & Prestele, 2021), which may have an impact on how well students perceive their instructors' quality of instruction and therefore increase student motivation and learning (Lauermann & Berger, 2021).

In fact, self-efficacy of teachers is a central phenomenon that can be seen as one of the contributors to the process of learning and effective teaching. It was found that teachers reporting higher teacher self-efficacy also reported using higher quality teaching strategies (Holzberger & Prestele, 2021), which in turn could lead to greater student motivation and learning through their effects on students' perceptions of teaching quality (Lauermann & Berger, 2021).

Given the increasing pressures on educators in technology-rich learning environments, it is crucial to examine the initial factors influencing teacher self-efficacy. Recognizing the importance of techno-pedagogical skills in developing this self-belief is vital to ensure that newly trained teachers are adequately prepared to provide high-quality, lasting instruction. Consequently, this study aims to investigate the relationship between teachers' techno-pedagogical competency and their self-efficacy, contributing to initiatives focused on improving teacher readiness and instructional effectiveness in modern classrooms.

Objective

1. To study the level of Techno-Pedagogical Competency of Pupil Teachers.
2. To study the level of Self-Efficacy of Pupil Teachers.
3. To study the relationship between Techno-Pedagogical Competency and Self – Efficacy of Pupil Teachers.

Sample

The population of the study consists of pre-service teachers enrolled in teacher education institutions in Agra City. A sample of 200 pre-service teachers from Agra City was selected using random sampling method.

Tools

The Techno-Pedagogical Competency Scale (2013), developed by S. Rajashekhar and K. Sathiyaraj, was used to assess the techno-pedagogical skills of pre-service teachers. This tool includes dimensions such as technology in teaching preparation, technology in enhancing motivation, technology in presentation, and technology in assessment. Mention reliability and validity.

To measure teachers' sense of self-efficacy, a scale designed by Tschannen Moran and A. Woolfolk Hoy (2001) was employed as it encompasses the parameters pertinent to the current study. This tool includes dimensions like efficacy for engaging students, efficacy for instructional methods, and efficacy for managing the classroom. Mention reliability and validity.

RESULTS

In order to achieve the objective of assessing the techno-pedagogical competency of pupil teachers**,** descriptive analysis was carried out. The competency scores were categorized into three levels: low**,** average**,** and high, based on the total scores obtained by the respondents. The analysis of the data revealed that 30% (60 pupil teachers) have low competency while 57.5% (115 pupil teachers) have average competency whereas only 12.5% (25pupil teachers) have high competency. The results also indicate that pupil teachers who possess greater techno-pedagogical skills are more inclined to incorporate diverse digital tools and methods—like graphic organizers, storyboards, infographics, and annotation techniques—into their teaching approaches. In contrast, pupil teachers with lower techno-pedagogical competency may struggle or might not have the ability to successfully integrate these tools, which could restrict the effectiveness and engagement of the teaching-learning experience.

Table 1: Level of Techno-Pedagogical Competency of Pupil Teachers

S. No	Level of Techno-Pedagogical Competency	Total Scores	Number of Pupil-Teachers	Percentage
1	Low	Below 118	60	30%
2	Average	118 to below 164	115	57.5%
3	High	164 & above	25	12.5%

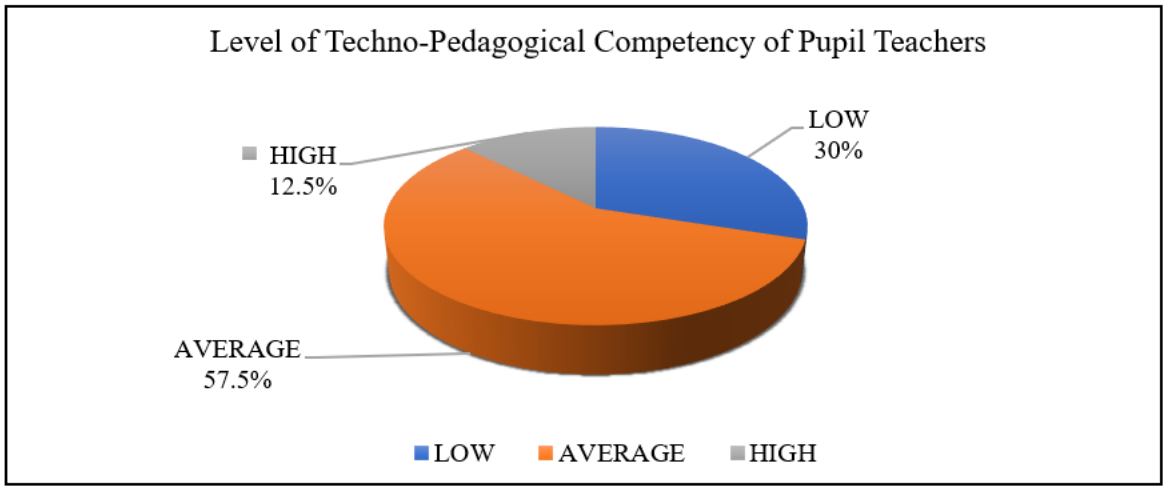

Figure 1 Percentage of levels of Techno-Pedagogical Competency of Pupil Teachers

To achieve the objective of determining the level of self-efficacy among pupil teachers, the total scores were categorized into three levels: low**,** average**,** and high and it was that 25% (50 pupil teachers) low self-efficacy while 58.5% (117pupil teachers) whereas only 16.5% (33 pupil teachers) have high efficacy. The results indicate that pupil teachers who possess high self-efficacy are more inclined to take the initiative, resilient and implement creative teaching strategies vice-versa pupil teachers with low self-efficacy may question their abilities, avoid challenging tasks and may resist in adopting new teaching methods.

Table 2: Level of Self- Efficacy of Pupil Teachers

S. No	**Level of Self-Efficacy**	**Total Scores**	**Number of Pupil-Teachers**	**Percentage**
1	Low	Below 103	50	25%
2	Average	103 to below 179	117	58.5%
3	High	179 & above	33	16.5%

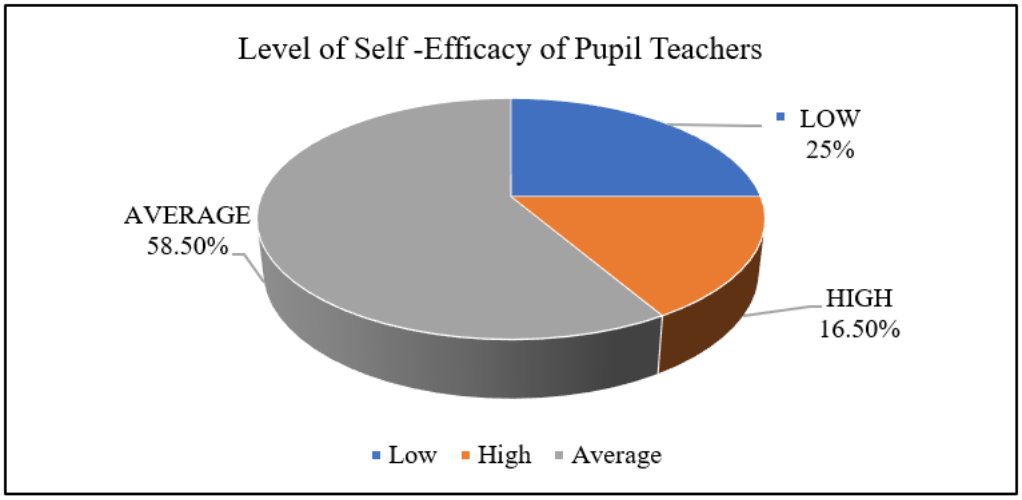

Figure 2 Percentage of levels of Self- Efficacy of Pupil Teachers

In order to assess the relationship between techno-pedagogical competency and self – efficacy of pupil teachers Pearson Coefficient of Correlation was computed by assessing the statistical significance through reference to the correlation table. Table 3 presents the

coefficient of correlation, indicating a strong positive relationship between the variables with a correlation coefficient of 0.721. The obtained value indicates a significant positive correlation between Techno-Pedagogical Competency and Self-Efficacy of Pupil Teachers. Therefore, the current study demonstrates a significant correlation at a high level of statistical significance.

Table 3: Showing Coefficient of Correlation Techno-Pedagogical Competency and Self-Efficacy of Pupil Teachers

Variables	Coefficient of correlation	Significance
Techno- Pedagogical Competency	0.721	.01
Self-Efficacy		

DISCUSSION

The results of the study offer important insights into the readiness of pupil teachers regarding two key areas of professional competence: Techno-Pedagogical Competency and Self-Efficacy. Both of these aspects are essential for effective teaching in an educational landscape increasingly influenced by technology. The findings indicate that most pupil teachers are categorized as having average competency levels—57.5% in techno-pedagogical skills and 58.5% in self-efficacy—showing that they possess a foundational but not yet proficient degree of professional readiness. A noteworthy portion of pupil teachers were found to have low competency levels: 30% in techno-pedagogical skills and 25% in self-efficacy. This implies that many future educators might lack both the confidence and the skills necessary to effectively integrate technology into their classroom instruction. Such shortcomings could be attributed to restricted digital exposure, limited access to contemporary teaching resources, or inadequate practical training within teacher education programs.

Only a minor percentage of pupil teachers showcased high competency levels—12.5% for techno-pedagogical skills and 16.5% for self-efficacy. These individuals likely belong to a group with heightened digital literacy, intrinsic motivation, or previous experience in learning environments that effectively utilize technology. As Bandura (1997) points out, self-efficacy develops through personal mastery experiences, observational learning, and social encouragement. Likewise, Mishra and Koehler (2006) suggest that achieving effective techno-pedagogical integration necessitates deliberate training based on the Technological Pedagogical Content Knowledge (TPACK) framework.

The results also indicate a positive correlation between the self-efficacy and their techno-pedagogical proficiency. Pre-service teachers who display higher self-efficacy are more inclined to showcase improved techno-pedagogical abilities, and the reverse holds true as well. This connection suggests that having a robust sense of self-efficacy may enhance one's ability to adapt and respond to the needs of modern classrooms. Teachers with strong self-efficacy are typically more driven to incorporate innovative teaching methods, including graphic organizers, storyboards, annotation tools, and word clouds, into their educational approaches. Nonetheless, these strategies demand a certain degree of techno-pedagogical proficiency to be executed effectively. Hence, it can be concluded that techno-pedagogical skills not only facilitate the application of contemporary educational tools but also enable teachers to tackle challenges in the teaching and learning process more efficiently. The mutual nature of this relationship highlights the necessity of fostering both self-efficacy and techno-pedagogical skills in teacher training programs.

CONCLUSION

It is imperative from the present research that teachers with high self efficacy possess a diverse range of experiences and utilise various resources in their instructional practises. The integration of technology in education has significantly enhanced the quality of teaching and fostered a more inquisitive learning environment. In order to effectively cultivate their students in accordance with the demands of a dynamic era, it is imperative for teachers to further develop their established techno-pedagogical competencies. This will enable them to utilise these competencies in a creative, resourceful, and efficient manner. In the context of a dynamic and intricate educational landscape, the integration of modern technological resources in pedagogy enhances students' comprehension and facilitates the teaching and learning experience. In order to effectively enhance the technological and pedagogical skills of teachers, it is essential for governments and higher education institutions to establish systematic approaches. This should be accompanied by the implementation of regulations pertaining to technology. Ultimately, it is vital to acknowledge that technology can never serve as a substitute for unique training. If teachers do not possess sufficient techno-pedagogical competencies, the utilisation of any electronic delivery system will not produce favourable outcomes.

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Conflict of Interest

The author(s) declared no conflict of interest.

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