Forum for Education Studies 2024, 2(2), 566.
https://doi.org/10.59400/fes.v2i2.566

Article

Techno-Pedagogical Competency among teachers in relation to their attitude towards teaching

Deepika Chauhan

Royal Institute of Science and Management, Sector-95, Gurgaon, Haryana 122505, India; mphft18deepika@gmail.com

CITATION

Chauhan D. Techno-Pedagogical Competency among teachers in relation to their attitude towards teaching. Forum for Education Studies. 2024; 2(2): 566. https://doi.org/10.59400/fes.v2i2.566

ARTICLE INFO

Received: 22 February 2024
Accepted: 3 April 2024
Available online: 25 April 2024

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Abstract: The purpose of this study is to determine the Techno-Pedagogical Competency and attitude towards teaching of teachers from selected colleges in Gurgaon District. A normative survey method was adopted in this stage. A sample of 190 teachers were selected from various colleges. The study found that the level of Techno-Pedagogical Competency and the teachers' possessed a favourable attitude towards teaching. Further, it was found that there exists a significant difference in Techno-Pedagogical Competency and attitude towards teaching mean score among teachers with respect to gender, locality, teaching experience, and type of institutions. Further, it can be revealed that there was a significant positive correlation between Techno-Pedagogical Competency and attitude towards teaching. Overall, this study provides valuable insights into the current state of Techno-Pedagogical Competency and attitude towards teaching among teachers in Gurgaon District. The findings suggest that the teachers in the region have a good grasp of using technology for pedagogical purposes and hold a positive outlook towards their teaching profession. The results also highlight the importance of considering demographic factors when analyzing teachers' competency and attitude.

Keywords: Techno-Pedagogy; attitude; teachers; future classroom; Gurgaon District

1. Introduction

The traditional methods of teaching and learning are adequate to enhance the teaching competencies of students. Techno-Pedagogy has the potential to be used as a supportive instrumental tool, enabling students to learn by doing or practicing. It can be possible for teachers to engage students. Although teachers are unfamiliar with the technological advancements that have entered education institutions, what matters is that they were implemented. Teachers in Karachi TTIs have a moderately favorable attitude toward the usage of ICTs, and also a study revealed that there is no significant difference in attitudes of teachers concerning gender, age, and experience, and the study assesses supportive conditions and hands-on training on the pedagogical use of ICT [1]. Teacher trainees had an unfavorable attitude toward teaching practices and no significant differences in attitudes between male and female student instructors, despite the fact that male student teacher trainees were more enthusiastic and fared significantly better than female teacher trainees [2]. School teachers have a positive attitude towards teaching [3]. Teachers should cultivate favorable attitudes to adopt and put these innovations into practice. Teachers' can change agents in the classroom and play a critical role in integrating technology into their teaching instruction. Teachers' good views regarding technology appear to be crucial, as attitudes are directly associated with usage and intentions for utilization. As a result, understanding teachers' attitudes toward using technology in the classroom is crucial to forecasting their future conduct in this area.

The need for techno-pedagogy is considered in many aspects, like supporting innovative techno-pedagogical approaches and assessing remote resources. It is also changing the role of the teacher from disseminator of information to learning facilitator by helping students to construct their own understanding and conceptualized subject matter. "Teachers are custodians of the nation's human capital, the guardians of the nation's youth, the keepers of the nation's most precious treasure, and the shapers of the nation's future [4]. It has given a new lift to the traditional classroom and changed drastically the pedagogy. Therefore, it is a felt need for the teachers to get familiarity with the application of recent technological principles and gadgets in their teaching in future classrooms. Finally, this study contributes to factors influencing Techno-Pedagogical Competency among teachers in relation to their attitude towards teaching, and it will allow us to learn about other potential factors influencing teachers' attitudes towards teaching in relation to Techno-Pedagogical Competency, on the basis of such factors as gender, locality, teaching experience, and frequency of the use of computers.

1.1. Operational definition of the key terms

Techno-Pedagogical Competency: The capability and efficiency of teacher educators to integrate the use of technology with content and subject matter properly and successfully in teaching—learning situations to enhance the performance of the teaching goals/task.

Attitude towards teaching: A hypothetical construct that represents a degree of favour or unfavour viewpoints towards teaching by teacher educators in the colleges of education and the teacher education programme is stated as attitude towards teaching in this investigation.

1.2. Objectives of the study

Finding the level of Techno-Pedagogical Competency and attitude towards teaching among the college teachers in Gurgaon District is the main objective of the study.

To find out the significance of differences, if any, in the Techno-Pedagogical Competency and attitude towards teaching mean score with respect to gender, locality, teaching experience, and type of institution are the specific objectives of the study.

1.3. Hypotheses of the study

Based on the above objectives, the following hypotheses are formulated for testing.

1) Techno-Pedagogical Competency and attitude towards teaching among college teachers of colleges is not in favour.
2) Techno-Pedagogical Competency and attitude towards teaching mean scores, with respect to gender, locality, teaching experience, and type of institutions, do not differ significantly.
3) There exists no significant relationship between Techno-Pedagogical Competency and attitude towards teaching among college teachers.

2. Methodology

2.1. Data collection

In this study, the normative survey technique method has been used. A sample of 190 college teachers was selected from various colleges of arts and science in Gurgaon District by using stratified random sampling technique.

2.2. Sampling design

The current study was conducted for a population of 200 college teachers selected from various colleges of arts and science in Gurgaon District by using stratified random sampling technique. Finally, the investigator received responses from 190 teachers. Randomization was done to select the final sample by the lottery method.

2.3. Tools

The investigator has used a standardized tool named the Techno-Pedagogical Competency Scale, which was constructed and validated by Sathiyaraj and Rajasekar [5] and revalidated by the investigator, and an attitude towards teaching scale developed by the investigator. Both scales consist of 40 statements, and each statement consists of five alternatives, viz., always, sometimes, uncertain, rarely, and never, with a weight of 5, 4, 3, 2, 1, and also put a mark of a tick in the box of alternative that is suitable for the response provided by the teachers. These data were taken into account for analysing the data. Mean, standard deviation, *t*-test, and ANOVA have been used for the purpose of data analysis to the test of degree association.

3. Results

As revealed by **Table 1**, the mean Techno-Pedagogical Competency score of the whole sample is 153.99 against the maximum obtainable score of 207, and the attitude towards teaching score of the whole sample is 160.42 against the maximum obtainable score of 205. This indicates the Techno-Pedagogical Competency and attitude towards teaching of teachers are average. It can be inferred that the techno-pedagogical competency and attitude towards teaching college teachers are found to be at an average level.

Table 1. Mean and standard deviation of the whole sample's Techno-Pedagogical Competency and attitude towards teaching scores.

Variables	No. of teachers	Maximum obtainable score	Mean	Standard deviation
Techno-Pedagogical Competency	190	207	153.99	26.66
Attitude towards teaching	190	205	160.42	9.82

Table 2 presents the Techno-Pedagogical Competency and attitude towards teaching scores of the college teachers in three categories. As many as 18 teachers, i.e., 9.42%, have low Techno-Pedagogical Competency; 83.68% of the sample, i.e., 159 college teachers, have an average level of Techno-Pedagogical Competency; 6.84%, i.e., 13 college teachers, have a high level of Techno-Pedagogical Competency; and 18 teachers, i.e., 9.47%, have a low attitude towards teaching.

80.52% of the sample, i.e., 153 college teachers, have an average level of attitude towards teaching, and 10%, i.e., 19 college teachers, have a high level of attitude towards teaching out of 190 college teachers.

Table 2. Techno-Pedagogical Competency and attitude towards teaching range scores of the college teachers.

Variables	Level	Range of scores	Number of teachers	Percentage
Techno-Pedagogical Competency	Low	0–18	18	9.42%
	Average	19–177	159	83.68%
	High	178–190	13	6.84%
Attitude towards teaching	Low	0–18	18	9.47%
	Average	19–171	153	80.52%
	High	172–190	19	10%

The details in **Table 3** show that calculated 't' values of 0.649, 0.308, and 0.947 are less than the table value of 1.97, corresponding at the 0.05 level of significance. It is inferred that there is no significant difference between the Techno-Pedagogical Competency of college teachers with respect to gender, locality, and teaching experience. Hence, the null hypothesis is accepted. Therefore, it can be concluded that the teachers do not differ significantly in techno-pedagogical competency mean score with respect to gender, locality, and teaching experience.

Table 3. Comparison between mean scores of Techno-Pedagogical Competency of college teachers with respect to their gender, locality and teaching experience.

Variables	Sub variables	*N*	Mean	SD	DF	'*t*' value
Gender	Male	97	155.23	27.01	188	0.649
	Female	93	152.71	26.38		
Locality	Rural	45	155.07	34.14	188	0.308
	Urban	145	153.66	24.01		
Teaching experience	Below 10 years	142	152.93	27.50	188	0.947
	Above 10 years	48	157.15	24.02		

Not significant at 0.05 level.

As seen in **Table 4,** the computed value of *F* (1.27) is not significant at the 0.05 level of significance. Hence the framed null hypothesis is not rejected. This establishes that the college teachers do not vary in type of institutions. For a better understanding, the mean techno-pedagogical scores of college teachers, sub-grouped on the basis of type of institutions, are presented in **Table 5,** and it is found that the mean scores of types of institutions—government, private, and aided—are 149.44, 153.87, and 161.04, respectively. Further, it can be seen that the mean scores of the aided college are higher than those of their counterparts. Therefore, it can be concluded that the aided college teachers are better than their counterparts in Techno-Pedagogical Competency.

Table 4. ANOVA table, showing the significance differences among the Techno-Pedagogical Competency score of types of institutions.

Source of variance	Sum of squares	Degree of freedom	Mean square	'*F*' ratio
Between groups	1809.30	2	904.65	1.27
Within groups	132,581.69	187	708.99	

Not significant at 0.05 level.

Table 5. Techno-Pedagogical Competency scores of the college teachers, with respect to type of institutions.

Type of institution	*N*	Mean
Government	32	149.44
Private	135	153.87
Aided	23	161.04

Since the **Table 6** calculated '*t*' values 1.50, 0.519, and 1.72 are less than the table value 1.97, corresponding at the 0.05 level of significance. It is inferred that there is no significant difference between the attitudes towards teaching of college teachers with respect to gender, locality, and teaching experience. Hence, the null hypothesis is accepted. Therefore, it can be concluded that the teachers do not differ significantly in attitude towards teaching mean score with respect to gender, locality, and teaching experience.

Table 6. Comparison between mean scores of attitude towards teaching of college teachers with respect to their gender, locality and teaching experience.

Variables	Sub variables	*N*	Mean	SD	DF	'*t*' value
Gender	Male	97	160.19	9.60	188	1.50
	Female	93	157.92	11.02		
Locality	Rural	45	158.38	7.64	188	0.519
	Urban	145	159.30	11.07		
Teaching experience	Below 10 years	142	158.33	10.07	188	1.72
	Above 10 years	48	161.29	10.97		

Not significant at 0.05 level.

As seen in **Table 7**, the computed value of *F* (0.078) is not significant at the 0.05 level of significance. Hence the framed null hypothesis is not rejected. This establishes that the college teachers do not vary in type of institutions. For a better understanding, the mean attitude towards teaching scores of college teachers, sub-grouped on the basis of type of institutions, is presented in **Table 8**, and it is revealed that the mean scores of types of institutions—government, private, and aided—are 159.50, 158.89, and 159.61, respectively. Further, it can be seen that the mean scores of the aided college are slightly higher than those of their counterparts.

Table 7. ANOVA table, showing the significance differences among the attitude towards teaching score of types of institutions.

Source of variance	Sum of squares	Degree of freedom	Mean square	'*F*' ratio
Between groups	17.004	2	8.50	0.078
Within groups	20,258.81	187	108.33	

Not significant at 0.05 level.

Table 8. Attitude towards teaching scores of the college teachers, with respect of type of institution.

Type of institution	*N*	Mean
Government	32	159.50
Private	135	158.89
Aided	23	159.61

From **Table 9**, it can be observed that the obtained '*r*' value (0.0.44) indicates a positive correlation. The computed '*r*' value is significant at 0.05 levels. Hence, the framed null hypothesis is rejected, and it's concluded that there exists a significant relationship between Techno-Pedagogical Competency and attitude towards teaching among college teachers.

Table 9. Correlation between the Techno-Pedagogical Competency and attitude towards teaching among college teachers.

Variable	*N*	Mean	SD	'*r*' value	
Techno-Pedagogical Competency	190	153.99	26.22	0.044	**Significant**
Attitude towards teaching	190	160.42	9.82		

4. Discussion

The findings presented in the previous sections are discussed here in the light of the findings of the earlier researchers for better understanding and deeper insights:

The present study found that the majority of instructors had moderate levels of Techno-Pedagogical Competency, and teachers from urban areas had higher levels because urban and rural schools had different facilities. Academic achievements of pupils and teachers' technological pedagogical proficiency are connected [6]. Technology can never replace effective instruction. No computerized presentation system can produce effective outcomes without teachers who are proficient in technology-enhanced learning [7]. The use of technological pedagogical knowledge and subject-matter understanding will help students grow and achieve more, which will keep teachers engaged and inspired [8]. New tech can never take the place of good instruction. The only way a digital presentation can be successful is if the teachers are tech-savvy educators [9]. Teachers of science and art who use technology in the classroom do not significantly differ in their techno-pedagogical abilities. The epidemic is to be accountable for this after that. It is believed that information and communication technology (ICT) can assist schools in adjusting to the shift from sector to knowledge. It is also viewed as a tool for implementing, reinforcing, and supporting educational innovations in accordance with the requirements of the digital age [10].

5. Conclusion

From the findings, it has been sensitized that the teachers who are using technology in their teaching have favourable attitude at a moderate level. The difference in terms of demographic variables also stated that there is no difference between each other. Consequently, the average teacher has the more positive attitude he or she develops toward teaching. Furthermore, additional elements such as experience, training, and skill development might influence the attitudes of aspiring teachers, whether postgraduate or graduate. So, more research about teacher's attitudes should be conducted, and education environments should be redesigned to get a more favourable attitude of college teachers toward using technology in teaching. One of the most effective teachers brings a variety of experiences and resource materials to the classroom. Creative educators are needed in today's environment for teaching and learning. Thus, in order to ensure that the technological teaching technique has a positive attitude, it is required to further develop the instructor's professional teaching abilities. The cross-method of meta teaching might depend primarily on the technological instructional strategies.

6. Recommendations

According to the study results, it was found that the Techno-Pedagogical Competency and attitude towards teaching were at a moderate level, so the use of technology should be promoted from the bottom up so that teachers can become familiar with the use of technology in their teaching. It is essential to minimize the barriers to adopting new technologies in order to enhance Techno-Pedagogical Competency, and training should be provided to teachers for enhancing their high attitude towards teaching by holding workshops for them. A healthy and effective communication should be developed between teachers and learners, and the important thing is that teachers should be awarded for their work to enhance their attitude towards the teaching profession. Therefore, as a teacher, they will be required not only to acquire proficiency in the planning of the content delivery but also to have good use of technology in their classroom with a positive attitude towards teaching.

- Below 10 years of teaching experience, teacher educators had low techno-pedagogical competency. Therefore, a special orientation and refresher courses on Techno-Pedagogical practices should be arranged for the teacher educators by UGC—Human Resource Development Centers of various universities.
- Teachers today must go beyond simply imparting knowledge to their students; instead, they must be very creative and seek to illustrate concepts in such a way that students can utilize in their everyday lives because knowledge can now be obtained via web resources.
- Teacher education institutions should arrange periodic training for their teacher educators on how to use digital technologies and other gadgets that will help them to teach better for student teachers.
- Government institution teacher educators were low in techno-pedagogical competency. It is recommended that colleges of education and their administration should organize workshops to update the technological knowledge and concentrate more on the enhancement of teachers' techno-pedagogical competency and self-efficacy to strengthen their teaching and to ensure high-quality teaching in the future classroom.

Conflict of interest: The author declares no conflict of interest.

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