

(RESEARCH ARTICLE)



Exploring the Techno-Pedagogical Competency of Senior Secondary School Teachers.

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Abstract

This study aimed to investigate the awareness of senior secondary school teachers towards techno-pedagogical competency skills, which are essential for effectively integrating technology into classroom practices. The study hypothesized that there would be no significant difference in the mean scores of senior secondary school teachers' awareness towards technology in preparing for teaching, providing motivation, presentation, evaluation, and techno-pedagogical competency. The researcher used a descriptive survey method, and a sample of 100 senior secondary

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school teachers from the North West district of Delhi was randomly selected. The Techno-pedagogical competency scale developed by S. Rajashekhar and K. Sathiyaraj (2020) was used to collect data. The statistical technique of 't' test was used to analyze the data. The findings of the study can be used to provide insights into the current level of techno-pedagogical competency skills among senior secondary school teachers and identify areas that need improvement to enhance teaching and learning outcomes.

Introduction

The knowledge, abilities, and attitudes instructors require to successfully incorporate technology into their classroom practices are referred to as "techno-pedagogical competency skills." Given the growing significance of technology in the classroom, it is essential that instructors have the techno-pedagogical competency abilities necessary to improve the caliber of both teaching and learning. These abilities include knowing how to choose, create, and apply suitable technology tools to support teaching and learning objectives as well as being able to assess these tools' efficacy. To effectively engage and excite students in the digital age, teachers also need to be skilled in digital communication, content development, and collaboration. For instructors to successfully use technology into their teaching practice, they must possess the necessary techno-pedagogical competency skills. To make sure that it improves learning outcomes rather than detracting from them, instructors must critically evaluate how technology is used in the classroom. Examining the efficiency, suitability, and moral implications of employing technology in education is part of critical analysis. Teachers that possess techno-pedagogical competency are better able to evaluate how technology is used in their classrooms. It is the application of technology to learning and teaching

circumstances. Teachers successfully combine pedagogy and technology in the classroom by using that skill. Teachers' that are adept at integrating technology into their lessons might involve students from around the globe. The most recent theories of online learning, such as LMS, MOOCs, and MOODLE, are the result of the development of techno-pedagogical knowledge. These theories are the best illustrations of the integration of technical knowledge into pedagogy. In techno-pedagogy, there are three knowledge domains: content, pedagogy, and technology.

Significance of the Study

In today's educational system, the demand for techno-pedagogical competency skills is essential. When technology is used effectively in the classroom, students' learning is greatly improved. Teachers may design immersive and interesting learning experiences that encourage critical thinking and active learning by utilizing technology resources like interactive software, multimedia content, and virtual simulations. Thanks to technology, students now have easy access to a wealth of data and materials that weren't previously available. Teachers that possess the necessary techno-pedagogical competency abilities can instruct students on how to find, assess, and use information from a variety of sources using technology. Because technology is so pervasive nowadays, students must acquire the abilities required to function well in a digital setting. Teachers can aid students in preparing for the job, where technology is used in a variety of tasks, by teaching them how to use it in the classroom. With the help of technology, students may connect and work with classmates and professionals from all around the world. Teachers that possess technological pedagogical competency skills are able to design and facilitate global learning activities that advance cultural knowledge and understanding. In conclusion,

techno-pedagogical competency skills are essential for teachers to create a modern and engaging learning environment that prepares students for the challenges of the digital age.

Review of the related Literature

Gloria and Benjamin (2014) concluded in their article that Learn to teach and teach to learn are two goals of teacher education. According to recent research, teacher education changes that create more closely linked programmes with coursework on both learning and teaching result in more effective teachers who are also more likely to enroll and remain in the profession. The development of teachers' capacities to evaluate instruction from the perspective of students who bring a variety of experiences and frames of reference to the classroom is a significant contribution made by teacher education. While teacher educators and training graduates are becoming more familiar with information and communication technology (ICT) outcomes, it is crucial to note that they still possess the knowledge or abilities necessary to incorporate those technologies into their teaching practices. The significance of teaching teachers' technological pedagogical skills is discussed and detailed in this work. **Thakur (2015)** concluded in his research that one of the main determining factors for the hybrid meta-teaching method is techno-pedagogy. In the last two decades, higher education systems all around the world have incorporated advancements in techno-pedagogical skills. Some of the hurdles that cause underachievement, student disaffection, and educational exclusion can be removed through the use of techno-pedagogical skills. However, a quick glance around reveals that this potential is not being fully utilized in the majority of schools and institutions across the nation. A study of the current situation reveals a number of factors that have been preventing the integration of technology in the higher

educational sector, despite the fact that planning and implementing initiatives to improve the role of techno-pedagogical skills in higher education have received priority. **Sathya and Venkateshwaran (2018)** studied the techno-pedagogical abilities of B.Ed. students in the Salem district of Tamil Nadu State are examined in terms of gender and kind of institutions. For the study, 300 B.Ed. students from government and self-finance colleges are chosen at random. T-test is used to analyze the data. Results showed that there are no gender or institution-related differences in the techno-pedagogical skills of B.Ed. students. **Sibichen (2018)** carried out a study to determine the technological pedagogical abilities of secondary teacher education students. The study used the survey method. The findings show that graduate and post-graduate secondary teacher education students differ significantly in their abilities to implement instructional strategy and direction. The findings also show that there is a considerable difference in learning, evaluating, and techno-pedagogical skills between secondary teacher education students who have taken computer courses and those who have not. **Ali (2018)** conducted in his article that people all over the world rely extensively on technology in every aspect of their daily lives in the twenty-first century. As part of today's knowledge-based culture, students are increasingly using technology to find information. Therefore, if the lecture approach is regularly used in the classroom as the process of teaching and learning will become monotonous. So as to enhance the learning outcome, it is expected of the teachers to integrate technology into the design of the teaching-learning environment. Teachers can use electronic resources to motivate students, prepare lessons, present information, carry out evaluations, and create engaging lesson plans. **Habib (2018)** attempted to analyze how senior secondary school teachers' technological pedagogical proficiency affects their effectiveness as teachers. On a sample of 400 senior secondary school teachers, including 220 men and 180

women, correlation, t-test, and ANOVA were used. The study used two different kinds of data collection tools: the Teacher's Techno-pedagogical Competency Scale (TTPCS-RSSR), created by Dr. Rajeshkar and K. Sathiyaraj in 2017, and the (TES -KU), produced by Dr. Umme Kulsum in 2017. The association between senior secondary school teachers' techno-pedagogical ability and their effectiveness as teachers was shown to be both positive and substantial. Teacher effectiveness and techno-pedagogical proficiency demonstrated a direct and proportional relationship. Compared to senior secondary school teachers with lower levels of techno-pedagogical ability, those with greater levels tend to have better levels of teacher effectiveness. **Jia Prakash and Hooda (2018)** attempted to compare the technological pedagogical proficiency of instructors in public vs. private schools in the state of Haryana. A sample of 200 teachers from higher secondary schools in the state of Haryana was chosen at random from 20 public schools and 20 private schools for the current study. A descriptive survey method was also used. Results indicate that private higher secondary school instructors have higher mean values for technological pedagogical ability than do government higher secondary school teachers. Urban government and private higher secondary school teachers have greater technological pedagogical skills than rural government and private higher secondary school teachers. **Kumar (2018)** concluded in his article that technological pedagogical abilities are highly helpful in making the teaching and learning process enjoyable since it would transform the way teachers engage with students in noticeable ways. Although technological pedagogy is a boon to teaching and learning, it is a fact that the stakeholders do not fully utilize the benefits of these abilities. There are numerous factors at play in this illness. Some significant obstacles in this respect include instructors' lack of awareness of technological pedagogical abilities, their unfavourable attitudes, a lack of ICT resources in schools, and a lack of time. Being one of

the fundamental requirements for practicing, absence of teachers' expertise of technological pedagogy deserves special attention. **Anand (2019)** discussed the technological pedagogical abilities of faculty members who work in higher education. Using the Teacher's Techno-Pedagogical Competency Scale (TTPCS), which Rajsekar and Sathiyaraj developed in 2013, the data was gathered from 40 faculty members who were chosen at random from the scientific and social science departments of Visva-Bharati in Santiniketan, West Bengal. The study's concluded that the faculty members had above-average technological pedagogical competence. Additionally, it was discovered that there are no appreciable differences in faculty members' Techno-Pedagogical Competency between male and female, as well as between science and social science. According to a study, professors should use platforms like SWAYAM and NPTEL to keep themselves and their students informed. **Gurua and beura (2019)** attempted to assess the technological and pedagogical proficiency of instructors in higher secondary schools in connection to scientific students' academic progress. This study is descriptive in nature. The survey model was employed during the process. This study intends to determine whether there is a statistically significant association between the academic performance in science of higher secondary school pupils and the techno-pedagogical proficiency of their teachers in terms of some characteristics like gender and location. One hundred teachers and one hundred pupils from the Cuttack district participated in the study. The majority of instructors had moderate levels of techno-pedagogical proficiency, according to the study's findings, and teachers who worked in urban areas had higher levels of techno-pedagogical proficiency than those who worked in rural areas. **Senturk (2019)** aimed to look at the connection between teacher candidates' technological pedagogical content knowledge and their propensity for lifelong learning. The correlational survey model served as the foundation for the study's design. 271

senior teacher candidates at Ondokuz May University's Education Faculty who are enrolled for the 2018–2019 academic year are the study's participants. The study employed a method of deliberate sampling. Finding shows that while there is no significant gender difference for teacher candidates' Techno-Pedagogical Education Competency and its sub-dimensions, there is a significant gender difference for their Lifelong Learning Tendency. **Sindhvani (2019)** attempted to examine senior secondary school teachers' technological pedagogical proficiency in connection to their gender, academic stream, and teaching experience. The descriptive survey method was employed for this exact reason. 160 senior secondary teachers from C.B.S.E. schools, both male and female, who taught in the arts and sciences, were chosen as a sample. The data was analyzed using the mean, standard deviation, t-test, and three-way ANOVA. Regarding gender, stream, and years of teaching experience, there are clear variances in the techno-pedagogical ability of teachers. **Palanisamy et al (2020)** concluded that in order to improve society and human resources, education is crucial. Only if they are organized in a professional, innovative, and effective manner to apply technical skills to grow pupils in demand of changing times can teacher educators and undergraduates perform a good job. Innovative technology that can improve student engagement must also be able to be adapted by teacher educators and their graduates. In our fast-paced environment, educating with contemporary technological tools improves student knowledge and the teaching and learning process. The smart classroom is a one-stop shop for students who need support with their writing, technical research, or both. The current educational system should promote the use of this new phrase. **Asab et al (2021)** remarked that the most effective teachers bring a variety of experiences and resource materials to the classroom. Innovative educators are essential in today's environment for teaching and learning. Technology has improved education and increased the

rigour of instruction. So that the technical teaching method has a positive attitude, it is required to further develop the lecturer's technical teaching skills. The technical teaching method may be the primary option for the cross-method of meta-teaching. The advancement of technical teaching abilities has been taken into account in the higher education framework around the world over the last twenty years. **Baregama (2021)** aimed to assess secondary school teachers' technological pedagogical content proficiency in regard to English and Science Subjects. To determine the teachers' technological pedagogical subject competency, this study used a descriptive survey method. 600 secondary school teachers from the Tonk district make up the study's sample. The sample is chosen using a straightforward random sampling method. An internally devised TPCC Scale was created to determine the techno-pedagogical content competency. Mean, standard deviation, and t-test calculations were made for the data analysis. The study's findings showed that there is no significant difference in secondary school teachers' technological content competency, but there is a significant difference between urban and rural secondary school teachers' technological content competency in relation to English and science subjects. **Amaludheen (2021)** conducted a study on a convenience sample of 168 elementary teachers from 84 schools in the State of Kerala, India, spanning all 14 districts. The study makes use of a normative survey method. The research tool is the Techno-pedagogical Competency Scale (TPCS), which the investigator created and standardized. The study found that the techno-pedagogical proficiency of elementary teachers is low. There is no discernible difference in elementary school teachers' technological pedagogical proficiency according to their years of experience. Depending on the management style they have, primary school instructors have Significantly Different Techno-pedagogical Competencies. **Qurasi and Jan (2022)** explored to evaluate the techno-pedagogical proficiency of Kashmiri

secondary school instructors from both private and public schools. This study employed a quantitative, descriptive, and comparative survey research design. A sample of 600 secondary school teachers (347 private and 253 public) was chosen. The specimen was selected from 85 secondary schools (45 private and 40 public) in Srinagar (Urban) and Baramulla (Rural) districts of Kashmir using the stratified proportionate random sampling approach. Rajasekar and Sathiyaraj's (2013) Teacher's Techno-Pedagogical Competence Scale was utilized for data gathering. On the measure of technological pedagogical competence, a considerable gap between Kashmir's private and public secondary school instructors was discovered. **Roy (2022)** concluded that teachers should be aware of the varied requirements for using technology in teaching and learning. The only constant in our constantly changing world is change. Progress is impossible without adapting to changing conditions. The paradigm for teaching and learning needs to adapt as a result of advances in science and technology, and those that do so will benefit. Technology has a noticeable impact on the education sector and is viewed as a god in disguise because it is assisting in removing the obstacles that are present in the technique of instruction at even the most basic levels of education. **Singh and Gupta (2022)** concluded that A key determining component in the composite meta-teaching approach is techno-pedagogy. Techno-pedagogical developments have been incorporated into educational institutions all around the world over the past number of years. Techno-pedagogical competences can be used to overcome some of the barriers that cause academic failure, learner discontent, and educational marginalization. However, it is clear from looking outside that practically all institutions and organizations across the nation are unable to succeed. **Kumari and Rani (2023)** concluded that apart from content knowledge Along with good topic understanding, technological pedagogical abilities are crucial for effective output in regard to e-learning.

However, there are a number of difficulties for teacher educators in this respect, but with the aid of appropriate technological pedagogical abilities, they may reduce these difficulties, which further contributes to high-quality education.

Statement of the Problem

“Techno-Pedagogical Competency of Senior Secondary School Teachers”

Operational Definitions of the termed used Techno-Pedagogical Competency The capacity and knowledge of teachers to use required technology in the classroom successfully and appropriately is known as techno-pedagogical competency. In the current study, "Techno-Pedagogical Competence" refers to the responses' results on the Rajasekar and Sathiyaraj (2020) Teacher's Techno-Pedagogical Competence Scale (ITPCS).

Senior Secondary School Teachers: In the current study, senior secondary school teachers refer to those teachers who are teaching to 11th and 12th class students in either Private or Government senior secondary schools of Delhi.

Objective of the Study: To compare the significant difference between the mean scores of senior secondary school teachers on their awareness towards techno pedagogical competency with respect to their gender, locality and types of school management.

Hypotheses of the Study

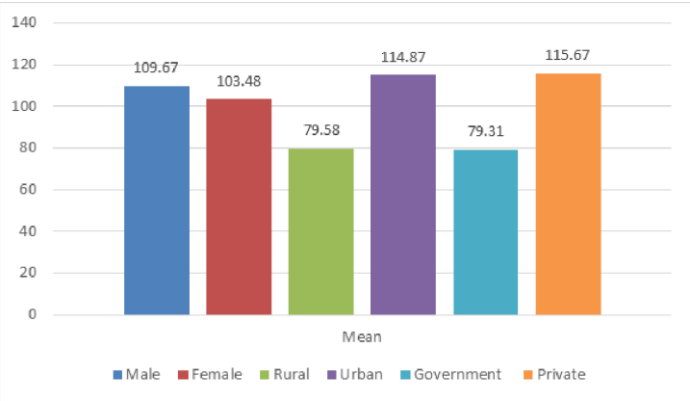
1. There is no significant difference between the mean scores of male and female senior secondary school teachers on their awareness towards techno pedagogical competency.
2. There is no significant difference between the mean scores of rural and urban senior secondary school teachers on their awareness towards techno pedagogical competency.

3. There is no significant difference between the mean scores of government and private senior secondary school teachers on their awareness towards techno pedagogical competency.

Research Methodology: The researcher used descriptive survey method in the present study. Sample of the present study was randomly selected from 100 senior secondary school teachers from North West district of Delhi. Teachers’ techno-pedagogical competency scale was used standardized by S. Rajashekhar and K.Sathiyaraj (2020). The scale has 40 statements, each of which has five possibilities, Always, Sometimes, Rarely, and Never, with weights of 5, 4, 3, 2, and 1. ‘t’ test was used as statistical technique.

Comparison of Mean scores of Techno-Pedagogical Competency of Senior Secondary School Students with respect to their Gender, locality and Types of School Management.

Group	N	Mean	SD	't' Valu e	Level of Significant
Male	50	109.67	21.43	1.34	Not Significant at 0.05 level of significance
Female	50	103.48	24.59		
Rural	37	79.58	27.52	5.23	Significant at 0.01 level of significance
Urban	63	114.87	23.91		
Government	50	79.31	29.53	7.04	Significant at 0.01 level of significance
Private	50	115.67	21.47		



Histogram depicting mean scores of male-female, rural- urban and government - private senior secondary school teachers towards techno-pedagogical competency

H1:It is clear from the table 1 and graph that the estimated t-value, which is 1.34, is less than the critical t-value, which is 1.96 at the 0.05 level with df 98. It shows that there are no appreciable differences in the mean Techno-Pedagogical Competence ratings between male and female senior secondary school teachers. Accordingly, the proposed hypothesis that "There is no significant difference between the mean scores of male and female senior secondary school teachers on their awareness towards techno pedagogical competency" is accepted. Additionally, the mean score for male senior secondary school teachers (M=109.67) is marginally higher than the mean score for female senior secondary school teachers (M=103.48), indicating that male senior secondary school teachers have higher Techno-Pedagogical Competency than female senior secondary school teachers. The difference in mean Techno-Pedagogical Competence scores between male and female senior secondary school teachers may be due to a number of variables, including training, experience, and access to technology resources. In contrast to female instructors, men teachers may have received greater training or exposure to technology-related courses or

programmes, which may have contributed to their higher levels of Techno-Pedagogical Competence. Additionally, the degree of Techno-Pedagogical Competence among male and female teachers may have been impacted by variations in access to technological resources including computers, software, and internet connectivity. However, it is challenging to reach any firm conclusions in the absence of sufficient details.

H2: It is clear from the table 1 and graph that the estimated t-value, which is 5.23, is higher than the critical t-value, which is 2.61 at the 0.05 level with df 98. It shows that there is appreciable differences in the mean Techno-Pedagogical Competence ratings between rural and urban senior secondary school teachers. Accordingly, the proposed hypothesis that "There is no significant difference between the mean scores of rural and urban senior secondary school teachers on their awareness towards techno pedagogical competency" is rejected. Additionally, the mean score for urban senior secondary school teachers ($M=114.87$) is marginally higher than the mean score for rural senior secondary school teachers ($M=79.58$), indicating that urban senior secondary school teachers have higher Techno-Pedagogical Competency than rural senior secondary school teachers. The accessibility and availability of resources and technology may be a factor in this discrepancy. Compared to rural areas, urban areas typically have better access to resources and a more developed technological infrastructure. Urban instructors may have additional opportunity to grow and improve their techno-pedagogical competence as a result of this. Another factor might be the caliber of instruction and preparation given to instructors. Urban schools may have better-funded and more sophisticated teacher training programmes, which may lead to teachers in urban schools having greater Techno-Pedagogical Competence than those in rural schools. Overall, the large gap in Techno-Pedagogical Competence between rural and urban senior

secondary school teachers is shown by the significant disparity in mean scores between the two groups. This can be accomplished by giving all teachers, regardless of their location, equal chances and access to resources and training programmes. H3: It is clear from the table 1 and graph that the estimated t-value, which is 7.04, is higher than the critical t-value, which is 2.61 at the 0.05 level with df 98. It shows that there is appreciable differences in the mean Techno-Pedagogical Competence ratings between government and private senior secondary school teachers. Accordingly, the proposed hypothesis that "There is no significant difference between the mean scores of government and private senior secondary school teachers on their awareness towards techno pedagogical competency" is rejected. Additionally, the mean score for private senior secondary school teachers ($M=115.67$) is marginally higher than the mean score for government senior secondary school teachers ($M=79.31$), indicating that private senior secondary school teachers have higher Techno-Pedagogical Competency than government senior secondary school teachers. The amount of financing and resources available to private schools in comparison to public schools may be one cause for this discrepancy. Private schools frequently receive greater funding and have more funds available to spend on technology and teacher training programmes. This could give private school teachers greater opportunity than government school teachers to grow and improve their techno-pedagogical competence. Another factor might be the caliber of programmes for professional development and teacher preparation. Compared to government schools, private schools may offer more sophisticated and focused teacher training programmes. Because of this, private school teachers might possess greater techno-pedagogical competence than teachers in public schools. Overall, the notable disparity in mean scores between government and private senior secondary school instructors emphasizes the necessity for government schools to

increase their investments in technology and teacher training programmes in order to enhance the Techno-Pedagogical Competence of their faculty. The pupils at government schools who will benefit from the enhanced teaching techniques will also gain from this, in addition to the teachers.

Conclusion

In order to determine whether there was any gender-based disparities in senior secondary school teachers' Techno-Pedagogical Competency. There was no discernible difference in the mean scores between male and female teachers. However, although not significantly, the mean score for male teachers was marginally higher than that for female teachers. Therefore, it cannot be said that men are much better qualified as instructors than women. These results imply that male and female senior secondary school instructors are equally aware of and knowledgeable about techno-pedagogical competence, a critical component of successful instruction in the contemporary digital era. However rural and urban as well as government and private senior secondary school teachers were found statistically differ significantly.

Recommendations

On the basis of the study's findings, the following suggestions can be made:

1. Rural senior secondary school teachers scored worse than their urban counterparts, it is advised that training programmes be created and put into place to raise their techno-pedagogical competency. These training programmes, which could take the shape of workshops, seminars, or online courses, should be geared towards giving instructors the knowledge and abilities they need to successfully incorporate technology into their classrooms.

2. To facilitate the incorporation of technology in teaching and learning, rural senior secondary schools should be given access to sufficient resources including computers, the internet, and other digital tools. Rural instructors will be better able to provide their students with high-quality instruction thanks to this improvement in their techno-pedagogical competency.
3. To share best practices in integrating technology into teaching and learning, collaboration across senior secondary public and private schools could be promoted. All senior secondary school teachers' total Techno-Pedagogical Competence will increase as a result of this.
4. Efforts should be made to encourage more female teachers to enroll in training programmes and incorporate technology into their teaching, notwithstanding the non-significant difference in Techno-Pedagogical Competence scores between male and female senior secondary school teachers. This will support the advancement of equity and gender balance in the teaching profession.

References

5. Ali.,M.(2018). Techno-pedagogical competency of teachers: an area of concern in the 21st century higher education. *Review of Research*.7(11).1-5
6. Anand, S. (2019).Techno pedagogical competency of faculty members: The resent need of higher education. *Journal of Current Science*. Page 60-66
7. Asad ,M.M;; Kanwal Aftab , Fahad Sherwani , Prathamesh Churi , Antonio-José' Moreno-Guerrero , and Bahar Pourshahian (2021).Techno-Pedagogical Skills for 21st Century Digital Classrooms: An Extensive Literature Review. *Education Research International* Volume 2021, Article ID 8160084, 12 pages <https://doi.org/10.1155/2021/8160084>

8. Beragama, S. (2021). A Study of Techno-Pedagogical Content Competency of Secondary School Teachers in Relation to English & Science Subject of Tonk District. *Remarking An Analisation*. 6(9).
9. Eylem Yalcin Incik & Cenk Akay (2017). A Comprehensive Analysis on Technopedagogical Education Competency and Technology Perception of Pre-service Teachers: Relation, Levels and Views. *Contemporary Educational Technology*, 2017, 8(3), 232-248.
10. Habib, H. (2019). Impact of Techno-pedagogical Competency on Teacher Effectiveness of Senior Secondary School Teachers. *Journal of Emerging Technologies and Innovative Research (JETIR)*, 5(6). www.jetir.org
11. Infusion Of Techno Pedagogy In Elementary Teacher Education Curriculum: Perspectives And Challenges Leema K M, Dr. T. Mohamed Saleem(2017). *IOSR Journal Of Humanities And Social Science (IOSR-JHSS)* Volume 22, Issue 1, Ver. 1 (January 2017) PP 06-10 e-ISSN: 2279-0837, p-ISSN: 2279-0845.
12. Jai Prakash and Hooda(2019) a study of techno-pedagogical competency of government & private schools of Haryana state. *International Journal of Current Advanced Research* : P: 2319-6505, DOI: <http://dx.doi.org/10.2>
13. Jiménez Sierra ÁA, Ortega Iglesias JM, Cabero-Almenara J and Palacios-Rodríguez A (2023) Development of the teacher's technological pedagogical content knowledge (TPACK) from the Lesson Study: A systematic review. *Front. Educ.* 8:1078913. doi: 10.3389/feduc.2023.1078913
14. [f/TP%20Competency%20Reviews/feduc-08-1078913.pdf](#)
15. Kamaludheen K.T. (2021). An Investigation Into The Technopedagogical Competency Of Elementary School Teachers . *Tnteu International Journal of Educational Research*.2(2).page n038-49.

16. Kumar, P.(2018) A Study of Techno - Pedagogical skills of Secondary school Hindi teachers working in Kerala .*IJARIIIE*. 4(1).
17. Kumari, P. and Rani (2019). Techno-Pedagogical Skills of Teacher Educators with Special Reference to E-Learning .*International Journal for Research in Applied Science & Engineering Technology (IJRASET)* Volume 10 Issue IV Apr 2022- Available at www.ijraset.com
18. Musaraf Ali. (2019)Techno-Pedagogical Competency Of Teachers: An Area Of Concern In The 21st Century Higher Education.
19. Nibedita Guru and Mihir Kumar Beur(2019). Techno-pedagogical competency of higher secondary school teachers in relation to students' academic achievement in science . *International Journal of Applied Research*
20. Qurashi, G. U. D., & Jan, T. (2022). Techno-pedagogical competence of private and government secondary school teachers of Kashmir- A comparative study. *International Journal of Indian Psychology*, 10(3), 944-953.