Infusion of Techno-Pedagogy during Covid-19: Teachers' perspective

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ABSTRACT: Through the emergence of digital technologies the whole world has seen a technological momentum where the physical presence has become unnecessary and the e-platform acts as a representative to transfer ideas, informations, thoughts etc. Present Educators are also believed that modern technologies can advance and shape educational goals to meet the needs of the present time. Now in Covid-19 situation when the total education system has break down, institutions have been all closed since March,2020 the requirement of technological skills of the teachers have come to the front as the online teaching occurs to be the only measure for impart lesson. So this study wanted to assess the journey of teachers from pedagogy to techno-pedagogy, importance of techno-pedagogical knowledge for teachers, role of teachers and the challenges related to techno-pedagogical practices in Covid 19. Some probable measures of using techno-pedagogy more effectively are also trying to suggest here for the development of teachers' techno-pedagogic skills amidst Covid-19 situation.

KEYWORDS: Techno-Pedagogy, Teacher, Covid-19

I. INTRODUCTION

Tagore defines, "Education is that which does not merely give us information but makes our life in harmony with all existence". Various modern technologies have brought a revolution in the field of education to meet the needs of the 21st century. The progression of science and technology and their usage has resulted in rich dividends in almost all matters relating to the organization and management of educational processes and products. In the report of the XII five year plan (2011), mentioned that "Information and Communication Technology is a mission mode project to provide connectivity, valuable content and low cost computing devices to all the Institutions of higher learning in the country.'' The New Education Policy (2020) suggests the formation of National Educational Technology Forum (NETF) to provide a platform for the free exchange of ideas on the use of technology to enhance

learning, assessment, planning, administration among the different universities. A paradigm shift from the traditional chalk-and-talk teaching methodology to digitizing the pedagogical approach has been seen in the educational arena. It opines that such a transformation is not only increasing the potentiality of the teachers but also needs to keep on updating both their skills and knowledge to meet the challenges of future lives. Now in Covid 19 pandemic, a teacher has to be technologically well equipped so that he/she can use it with his/her own pedagogy in online teaching platforms. Thus the researcher felt that the necessity to infusing of Techno pedagogic knowledge and skills in education amidst covid-19 situation is one of the important field needs to be explored for developing awareness and positive attitude among teachers and students perspective towards Techno-pedagogical competency.

II.   REVIEW OF LITERATURE

Beaudin and Hadden (2004) noticed that techno-pedagogical skill foster the students for further development, attainment of learning outcomes and maintain the context of designing resources through the use of ICT by the teachers. So, techno-pedagogy method was a essential component of teacher education. Benjamin and Gloria (2014) shows that technological knowledge and skills are facilitated both teacher educators and trainees. Thakur, N. (2015) mentioned in his paper about the integrated usage of Technologies with Pedagogy so that the both teacher and pupils became well aware about the use of technology towards shaping educational needs. Chattopadhyay, A.(2020) reviewed the importance of Techno-pedagogical skills of a language teacher which helps them to transact their teaching following the path of pedagogy as well as technology. Isaeva, R. (2020) revealed the importance of using technology during Covid 19 situation in modern educational system and how educational institutes of Azerbaijan tried to deals with the fresh system. Patrinos, H. & Shmis, T. (2020) propounded about the significance of technology for mitigating the impact of Covid19 on the education sectors of Central Asia and Europe.

III.   CONCEPTUAL FRAMEWORK

1.   TECHNO-PEDAGOGY

Present education system is very much familiarized with the term Pedagogy and techno-pedagogy. 'Pedagogy' refers to the science and art of teaching. Generally, it is described as the act of teaching. Pedagogy deals with how knowledge and skills are imparted in an educational context, and it considers the interactions during learning environments. On the other hand, 'Techno-pedagogy' refers to the art of teaching with the help of modern technologies to improve the academic performance of the students. It is the hybrid way of teaching where ICT is being used for every aspect of teaching-learning process. In techno pedagogy, there are three areas of knowledge, namely: content, pedagogy, and technology. Content is the subject matter that is to be taught. Technology encompasses modern technologies such as a computer, Internet, digital video and commonplace technologies including overhead projectors, blackboards, and books. Pedagogy describes the collected practices, processes, strategies, procedures, and methods of teaching and learning.

2.   Covid 19 Situation

This is a disease caused by a new strain of Corona virus. 'Co stands for Corona, VI stands for Virus and D stands for Disease.' This particular disease was named to as '2019 Novel Corona virus or 2019 nCoV.' Bodily or physical distance now becomes the only means to get rid of that. So formal face to face system of education has now switched over to online platforms.

IV.   OBJECTIVES OF THE STUDY

i)   To understand the change over process from Pedagogy to Techno-pedagogy and teacher as techno-pedagogue.

ii)   To explore the role of the teachers who possess Techno-pedagogical skills.

iii)   To explore the uses and significance of Techno-pedagogy for teaching in Covid-19 situation.

iv)   To find out the inconveniences related to Techno-pedagogical practices and possible ways to using the Techno-pedagogy more effective during Covid-19.

V.   METHODOLOGY

The collection and analysis of data in this study is based on the purely qualitative approach. A descriptive Analytic method is used on the basis of the information obtained from the several secondary sources like Articles, Journals, Theses, E-Books, Expert opinion, and websites etc.

VI.   THE JOURNEY FROM PEDAGOGY TO TECHNO-PEDAGOGY

 In ancient schools of Indian education, generally in Ashrama/gurukul knowledge passed through lecture method or oral transaction from the guru to his pupils. Education was constrained to only a particular class of people inherited generationally. The only source of knowledge was Vedas: Vedic hymns and texts. The key feature of the education system was transformation of old age tradition from generation to generation. In medieval period education was totally restricted by religious theology and practises (Islamic theology and philosophy). The medium of instruction became changed only, from Sanskrit to Arabic and Persian. But again education primarily focused on similar kind of approach for teaching. But everything must had to change with the flow and flux of time.

With the hand of Behaviourism, Cognitivism, Constructivism etc. became the system of education changed a lot. Furnished the Pedagogic concept of Education came to the forefront through the hands of Pestalozzi. There was a shift over from teacher centralism to student centralism. This new approach of education gave birth to new teaching-learning theories and ideas and there came the concept of Art and Science of teaching known as Pedagogy. Shulman (1986) recommended that 'the emphases on teachers' subject matter knowledge and pedagogy were being treated as mutually exclusive. He also empathized that teacher education programs should essentially combine both of these two fields.

In 21st century with the advent of Technology a new revaluation came in the arena of educational field. Now-a-days most educationists and researchers agree, technology is a significant and potentially capable educational tool. Teachers' pedagogical skills in classroom application got are not completed without the

support of technology in present days. The role of teachers is very significant in all phases of Technology use in the pedagogy especially for higher level of education. Teachers are required to decide how to make, manage and organise the appropriate educational application of technological tools in the effective teaching-learning process. Teachers also use technological tools to produce high-quality teaching materials which are stimulated and develop interest among students in their learning. All this is possible because of the teachers have possessed Techno pedagogical skills (Ali, 2018).

The techno-pedagogical skills are the competency of the teachers to make use of technology successfully in all the aspects of pedagogy. Techno-pedagogical skills are generally the extension of Shulman's Pedagogical skill with the addition of Technology. The areas or skills it covers within its own arena are-
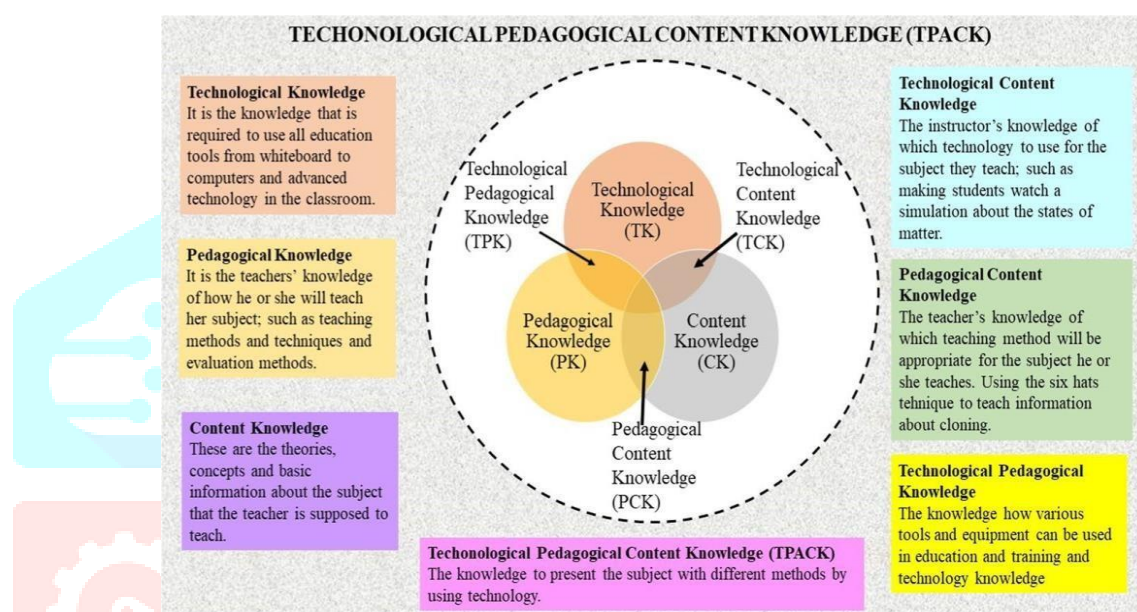

Fig. 1. **The Dimension of Techno-pedagogical Content Knowledge Approach**

(Re-organised by Cam.S.S. & Koc,G,E,2019 from Misra,P. & Koehler M.J.,2009)

Benjamin and Gloria (2014) recommended that teachers can play a vital role for nurture the students as per the demand of changing times with the help of effective uses of techno-pedagogy. Use of e-learning contents, Electronic Dictionary, online Teaching –learning materials became very useful for techno-pedagogical teaching-learning activities. Koushlesh, & Yadav (2015) mentioned in his book about that the techno-pedagogical competency promotes an integrative perspective to encourages the manipulation of existing information and the creation of authentic products rather than the regurgitation. It assists the teachers to create a technology-supported learning environment. Also, the competency of techno pedagogy has a positive effect on every teacher's innovative skills and critical thinking abilities (Yildiz, 2017). In covid-19 situation, Basilaia, G. & Kvavadze, D. (2020) studied about the improvement of teaching-learning environment with the advent of the online learning sources like Zoom, Google Meet and also described the importance of teachers' pedagogical skill in this respect.

Therefore, from the above discussion it is recognised that techno-pedagogy is the key component of teaching process in present days. Similarly, a sound shift over from pedagogy to techno-pedagogy and teacher as guru to techno-pedagouge are being noticed in a spontaneous way.

VII.   ROLE OF THE TECHNO-PEDAGOGICALLY SKILLED TEACHERS

Teachers can play a significant role in teaching-learning process with developing their techno-pedagogical skills. The 'Faculty of Education' of the university lethbridge was already successful to creating an innovative environment for students learning to explore technology and devise inventive and meaningful approaches to incorporate technology into their future classroom (Clifford, Friesen, and Lock 2004). Basically, techno-pedagogical skill is the competency of teachers to incorporate technological theories and practises into the pedagogy. Beaudin and Hadden (2004) mentioned some essential developing manners of techno-pedagogically skilled teachers like Meta-teaching, technology exposure, and critical reflection over the teaching-learning situations etc. Sondhiya (2015) recommended that teachers who use different types of technologies tend to practice more "constructivist" pedagogies. The significant role of teachers who possess Techno pedagogical skill is to imbibe modern multi-media for the current teaching-learning process. Therefore, students are able to use multiple sensory modalities and pay more attention to their lessons and propound all the practical aspect of theoretical knowledge into the teaching-learning situation by introducing various types of modern technology (Ali, 2018). Different roles of techno-pedagogue or techno-pedagogic teachers are to-

❖ Enrich students and persons related to education by collecting more recent information associated with the same discipline to be taught by using the e-learning.

❖ Inspire students to utilize the latest Information Communication Technological tools for increasing the level of student-student & student-teacher interaction inside and beyond the classroom.

❖ Assist to build practical knowledge among the students so that they can enthusiastically involve in the teaching-learning circumstances and become conscious about the relevance of their learning to the natural world.

❖ Provide quality learning material that is sequentially structured and fulfil with up to date information.

❖ Encourage the students to ask their queries and develop new ideas or research tendencies through introducing different types of technology.

❖ Represent the contents to the students more comprehensibly by exploring different dimensions through innovative technologies.

❖ Collect, organize record and report information about students' performance through using technology.

❖ Develop programs and tools to evaluate student projects, assignments etc. including word processing, PowerPoint, spreadsheet, database etc.

So, it can be said that teachers with techno-pedagogic skills plays an importance role to create a collaborative and co-operative learning environments for teaching and learning practises more effective.

VIII. USES AND SIGNIFICANCE OF TECHNO-PEDAGOGY IN COVID-19 PERIOD

Present day the whole world as well as India has brought a revolutionary change in each and every sector including education also for Covid 19 situation. The formal institutions of education have been all closed since March, 2020. The entire arrangement of education becomes topsy-turvy in the face of uncertainty. Existing talk and chalk method of knowledge practises has changed to a digital platform where physical distance remain the key point to be safe and healthy. Now-a-days there is the only pathway of communication is the use of technology. Therefore, the act of practising knowledge and teaching process remaining continue in virtual world. Online Teaching-learning platform is the only blessing for pupils and teachers to occur interaction with each others. Therefore teachers have to be technologically well capable so that they can use it with their own pedagogy. Realizing this Human resource development centres under UGC in India has instantly launched on online faculty development programs for all the teachers of different universities, colleges and schools (Ahmed, 2020). But before the pandemic ICT based blended teaching-learning already introduced in early 21 centuries in India.

The main use of different techno-pedagogical skill of faculties is to more effectively cultivating teaching-learning process in higher education (Vajargah, Jahani and Azadmanesh, 2010). The significance can be mentioned as different aspects relating to role of different techno-pedagogical skills, such as it assists to-develop linguistic abilities, improve teaching learning process, design to develop study materials, invent multi-grade instruction, boost to plan specific pedagogy, facilitate to Distance Education through online-learning, support to guidance and counselling for career opportunity, encourage auto learning ability, increase enrolment, improve examination process, support for research activities, stimulate for cognitive learning, improvement of life skills, build aesthetic sensibility, contributes for Special Education, encourage to improve students' mental health etc (Thakur, 2015). Techno-pedagogy can assist in improving the equity of education, fostering universal access to education, promoting the delivery of effective teaching and pedagogy, teachers' professional development and more quality education management, governance and administration. Study materials also can plan and develop using techno-pedagogy. The linguistic abilities and research activities can be urbanized through techno-pedagogical skills. The teacher who develops techno-pedagogic skills may be a multi tasking personality and will be highly respected by the students. Other uses of techno-pedagogic skill include the improvement of life skills among themselves and in the students, augmentation of enrolment and examination processes and strengthening of the cognitive learning (Vijaya, 2017). Techno-pedagogical competency is an important capability of the teachers that imparting knowledge to the students in a meaningful way (Ali, 2018).

 The shift from face-to-face lectures to virtual classes is the only probable solution. Undeniably, academic institutions would not be able to transform all of their institutional curricula and programs into online format overnight. Distance, scale, and personalized teaching-learning process are the three chief

challenges for virtual teaching (Dhawan, 2020). Liguori & Winkler (2020) suggested that innovative technological solutions by academic institutions can only help us deal with this pandemic situation. Different stakeholders of public and private academic institutions already enjoyed large companies' online learning tools such as Google Meet, Zoom, Edtech, Webex etc. and also described improvements of teaching learning atmosphere (Basilaia et al., 2020). Teachers with techno-pedagogical competency also can give well directed guidance to the students into this lockdown situation and counselling for their future careers and they can also encourage auto-learning ability of the students by directing the students towards MOODLE, MOOC and various online courses (Chattopadhyay, 2020). The government of India and different stakeholders of education have explored the existence of virtual access to learning by adopting different technologies during COVID-19 pandemic (Jena, 2020).

Therefore, present study reveals that technology based scientific pedagogical approach or techno-pedagogy is an unconditionally requirement for teachers in rest Covid epoch. The importance of Techno-pedagogical skills for teachers' would help them to transact their teaching following the path of pedagogy as well as technology.

IX. INCONVENIENCES OF USING TECHNO-PEDAGOGICAL PRACTICES IN PRESENT SCENARIO

There have so many problems to practicing techno-pedagogy in Indian educational environment. From the side of the accessing ICTs in education, Tinio (2003) noticed that women have less access to ICTs and less opportunity for ICT-related training compared to men. It also mentioned that there is not a definite formula for determining the optimal level of ICT integration in the system of education. In addition to he stated, why the use of ICTs are very essential to teacher and how exactly they can use ICTs betterment for teaching and anxiety of teacher over being replaced by technology can hinder to ICT adoption in teaching-learning process. Desai and More (2014) elaborated some ICT Integration related problems their study entitled by "Barriers to Successful ICT Integration into Teaching-Learning Environment", such as calamity of teacher confidence, proficiency, enthusiasm to change and poor technological perception etc. Some common challenges to using techno-pedagogy specially in higher education are related to infrastructure, accessibility of ICT tools, language, content develops and pedagogical design, cost of ICTs use and capability building of teachers, experts, administrators, Technical support personnel etc (Thakur, 2015). Beside this, level of anxiety and passive attitude towards using new instructional technologies in teaching which are play an important role to obstruct the techno-pedagogical practices (Sathiyaraj & Rajsekar, 2015). Ali, M. (2018) mentioned that application of new technologies is very time-consuming to underlie the teachers' Pedagogical approaches in teaching-learning.

As the pandemic has made online platform of teaching that the only surviving mode to teach the pupils, every teachers needs to know how successfully used techno-pedagogy in learning situation. Several researches discuss about the online learning and different uses of techno-pedagogy for the act of teaching

in pandemic. Online-learning has certain limitations in the form that it can slow down the communication from educators to learner and vis-à-vis. Both pupils and teachers can face many technical difficulties that hamper and slow-down the whole teaching–learning programs (Favale et al., 2020). Virtual learning creates an imbalance due to inadequate compatibility of techno-pedagogical skills, psychological knowledge to learning, time management, low learners capability and confidence level, distraction, frustration, anxiety, confusion (Dhawan, 2020). Problems related to using this respect also noticed. Present online system of education has affected the differently-abled pupils, does not fulfil the educational needs (Ahmed, 2020).

So, It can be acknowledged that techno-pedagogy improves hybrid learning rather than simple education especially in higher education and all levels of education in general but there are a number of challenges, such as: (i) poor infrastructure of ICT to practising Techno-pedagogical skills, (ii) Poor awareness of practising techno-pedagogical skill services, (iii) Teachers with lack Techno-pedagogical skills, (iv) Lack of incentives and regular training of teachers, (v) Infrequent capability on English language and E-content, (vi) Obstacle of using different software, (vii) Inadequate techno-pedagogical resources, (viii) Shortfall of coordination among the teachers, students, departments and students-home, (ix) Frequent power outages and fluctuations, and (x) Deficiency of Research and Developmental aspects etc.

X.   *SUGGESTIVE WAYS TO USING THE TECHNO-PEDAGOGY MORE EFFECTIVELY*

Despite the complexities described above, there are also possible ways to meet the challenges of using techno-pedagogy through ICT at all the levels of education. 'All the teachers training institutions should share the techno-pedagogical mechanism and develop the basic technical skills of the teachers during the training programme and also make sure that trainees set pedagogical objectives before technological ones' (Gloria & Benjamin, 2014). Application of technology with pedagogy consists of four typical processes (Structuring, Executing, Evaluation and Finalizing) that executed by a teacher while going through all the teaching-learning processes, with the combination of technology a teacher must express his teaching skills (Majella, F. 2017). Ali, M (2018) suggested that 'all the teachers must build up their technical knowledge and competency along with the content knowledge and pedagogic knowledge which will be assist to know about the nature of technology, how to utilize a variety of technologies in the teaching-learning process, and the effect of ICT on pupils' academic performance. He also guide that the training institution of teachers should play of the essence role in developing techno-pedagogical skills among the teachers'. Chattopadhyay, A. (2020) suggested some possible measures to enhanced the techno-pedagogical skills of language teachers such as enrichment of English language for global platform, awareness of online contents, organise online workshops, computer assisting language training, familiarised with uses of different inventive tools etc.

Virtual education is responding to globalization in present lockdown days. Innovative uses of techno-pedagogy potentially solve the problems related to all teaching-learning. Further, to way-out from facing challenges related to techno-pedagogical practices in Covid-19, there is need to- (i) expand adequate

infrastructure for using Techno-pedagogical skills, (ii) arranging online debate, webinars and conference for budding Techno-Pedagogy, (iii) using E-books, E-contents and online library, (iv) increase competence on English language (for global communication) and online learning, (v) improvement of parents' technological skills, (v) melt the crisis of teachers with techno-pedagogical skills, (vi) provide incentives of teachers to hybrid practices of teaching, (vii) exploration on research and development, (viii) aware of existing social networking sites, (ix) accomplishment of problem related to using software, (x) develop eternal techno-pedagogical supportive resources, (xi) improve virtual coordination among the departments to students-home, (xii) enrich Teacher Education related online activities with techno-pedagogical assistance, (xiii) access more Computer Based Learning Resources Management Systems, (xiv) construct and development of educational web pages, (xv) boost publicity about existing ICT services, and (xvi) increase awareness of existing techno-pedagogical services among the teachers and build up a positive attitude towards using new technologies among teachers.

XI. CONCLUSION

Everything in our nature changes with the passage of time. This change cannot be identified by drawing sectional lines rather it's is a continuous process where everything changes automatically. In the field of education, the old gurukul system changes into a formal schooling system, this change also affects the act of teaching, interaction process and students role in teaching-learning process. Ancient tradition of lecture method and one sided teacher centric education system transforms into the student centric system of education where interaction becomes the key of teaching. Here comes the knowledge of pedagogy considered as the Art and Science of Teaching and after that the term 'Techno-pedagogy' seems to be existed in the educational scenario. Present in Covid-19 circumstances when the system of education is in trouble, there is a systematic tendency towards the Technology used in education. The inclination and opportunity of teachers to use techno pedagogy has also increased. Through hydride approach of meta-teaching, techno-pedagogical exposure and critical reflection, teachers can enhance their pursuits on a never ending developmental journey. Therefore teachers should be well aware about the uses of advent the different technologies while transferring lessons to his/her pupils through a journey of virtual world.

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