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Original Research Article

A NEW ERA OF EDUCATION: BLENDED LEARNING AND THE DEVELOPING TECHNO-PEDAGOGICAL SKILLS AMONG B.ED. STUDENT-TEACHERS

*** Vaishali Patil ,**

*Assistant Professor, Guru Nanak College of Education and Research Bhandup (west), Mumbai, Maharashtra.

Abstract:

The National Education Policy (NEP) 2020 emphasizes integrating technology in education, particularly through blended learning in higher education. This study investigates the effectiveness of a Blended Learning Course in developing Techno-pedagogical skills among B.Ed. student-teachers at the University of Mumbai. The study involved 87 First Year B.Ed. student-teachers, with 44 in the control group and 43 in the experimental group. The experimental group received treatment, and pre-test and post-test assessments showed significant improvement in Techno-pedagogical Skills.ω2 estimated value for variable Techno-pedagogical Skills is 22.61%. Major finding indicated the Blended-Learning Course has maximum effect on the development of the Techno-pedagogical Skills among B.Ed. Student-teachers. (Magnitude 1.8).

Key-Words: *Blended learning Course, Techno-pedagogical Skills.*

Introduction:

In the digital era, teachers must be proficient in using technology to deliver content effectively in their classrooms. However, mere technological adoption is insufficient; integration of technology with education is crucial for impactful change in the education process.

The National Education Policy (NEP) 2020 emphasizes the extensive use of technology in teaching and learning, aiming to overcome language barriers, enhance access, and improve education planning and management.In this digital age, the fusion of technology and pedagogy gives rise to techno-pedagogical skills, which are essential for educators. Techno-pedagogy involves the integration of various digital technologies and pedagogical approaches, offering new opportunities to enhance learning environments.

Techno-pedagogical Skills:

TPACK stands for Technological Pedagogical Content Knowledge. Punya Mishra and Matthew J. Koehler introduced the TPACK framework. TPACK, coined by Mishra and Koehler, outlines the essential knowledge teachers need for effective tech-integrated teaching: technological (TK), pedagogical (PK), and content (CK) knowledge. TPK within TPACK focuses on how teaching changes with technology, understanding the pedagogical uses of various tools. This framework highlights the dynamic relationship between technology, pedagogy, and content in education.

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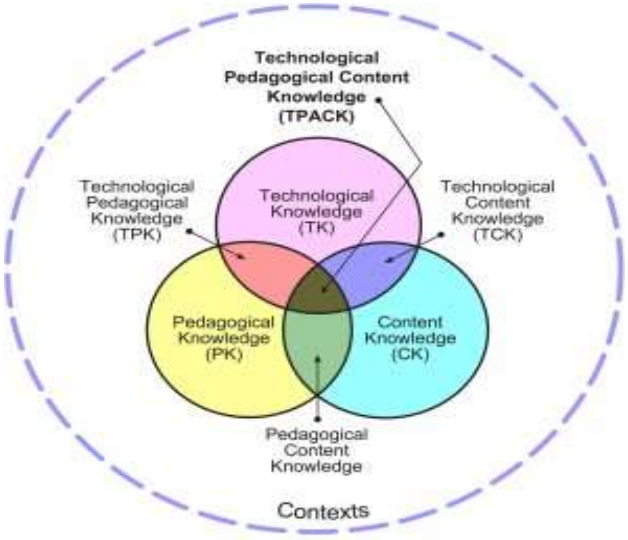
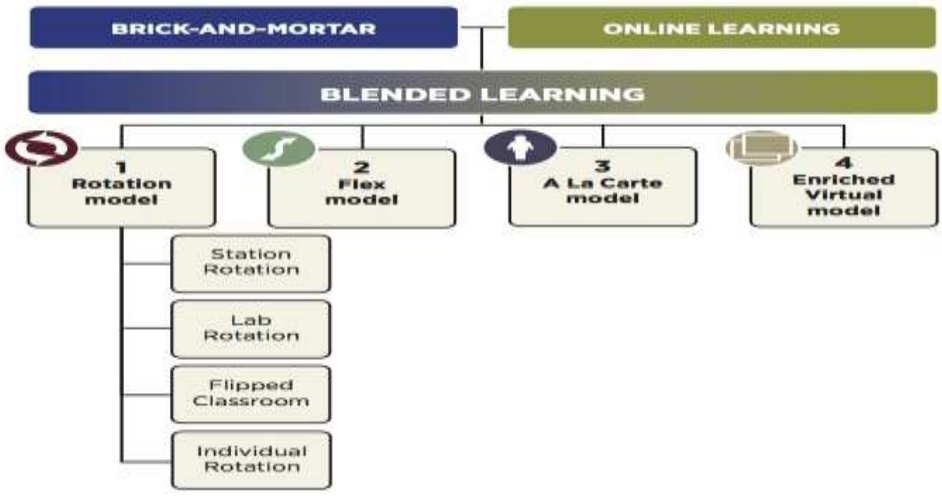


Figure1: Koehler&Mishra(2009)TPaCK Model image ©2012 by tpack.org[3]

Blended Learning:

The educational landscape is witnessing a surge in technological innovations that are shaping the teaching and learning environment. Extensive research indicates a growing adoption of blended learning across all levels of education. Blended learning is recognized as a modern and innovative approach to learning that addresses various challenges such as the knowledge explosion, increasing educational demands, and overcrowded lectures. It significantly enhances learning effectiveness, saves time, reduces the cost of education and training, enables flexible learning opportunities, and integrates simulations, practical events, and exercises.

Graham (2013) defines blended learning systems as a combination of face-to-face instruction with computer-mediated instruction. Various models of blended learning exist, offering institutions flexibility in designing their educational approaches.



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Need of the Study:

The Ministry of Human Resource Development (MHRD) identified a shortage of teachers in some schools in 2017. Integrating technology into education can bridge this gap and provide access to quality education. The MHRD has initiated e-learning initiatives, including the development of Massive Online Open Courses (MOOCs) under the 'Digital India' Initiative to provide learning opportunities across the country.

The National Education Policy 2020 emphasizes the use of blended learning models, combining face-to-face and digital learning. The University Grants Commission (UGC) has drafted guidelines for 'blended teaching' in universities and colleges, allowing up to 40 percent of any course to be taught online.

Given these government initiatives in e-learning, student-teachers, need to be equipped with the skills to integrate technology into teaching. This study aims to develop these techno-pedagogical skills among student-teachers.

This study is significant as it examines the effectiveness of blended learning strategies in teacher education, which is fundamental to all education. It aims to train student-teachers in using modern hardware and software effectively to engage learners.

Objectives of the Study:

1. To develop Blended Learning Course based on ADDIE model of Instructional for the F.Y.B.Ed. Student-Teachers of the experimental group to develop Techno-pedagogical Skills.
2. To study and compare pre-test scores of the Techno-pedagogical Skills among B.Ed. Student-teachers in terms of
   a) Technology usage skills for knowledge acquisition
   b) Technology usage skills for planning and preparing a lesson plan
   c) Technology usage skills for computer-mediated communication
   d) Technology usage skills in assessment of the experimental and control groups
3. To study and compare post-test scores of the Techno-pedagogical skills among B.Ed. Student-teachers in terms of
   a) Technology usage skills for knowledge acquisition
   b) Technology usage skills for planning and a preparing lesson plan
   c) Technology usage skills for computer-mediated communication
   d) Technology usage skills in assessment of the experimental and control groups.
4. To study the gain scores of teachers' Techno-pedagogical Skills experimental and control groups.
5. To estimate the effect size of the treatment on the experimental group for teachers' Techno-pedagogical Skills.

Hypothesis:

1.There is no significant difference in pre-test score of the Techno-pedagogical Skills among B.Ed. Student-teachers in terms of
   a) Technology usage skills for knowledge acquisition
   b) Technology usage skills for planning and preparing a lesson plan

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c) Technology usage skills for computer-mediated communication
d) Technology usage skills in assessment of the experimental and control groups.

2. There is no significant difference between post-test scores of the Techno-pedagogical Skills among B.Ed. Student-teachers in terms of
   a) Technology usage skills for knowledge acquisition
   b) Technology usage skills for planning and preparing a lesson plan
   c) Technology usage skills for computer-mediated communication
   d) Technology usage skills in assessment of the experimental and control groups.
4. There is no significance difference in gain scores of Techno-pedagogical Skills for the Experimental and control groups.

Method:

For the present study, the researcher has used the Quasi-Experimental design with 'Pre-test, Post-Test Parallel Groups Design' was employed to check the effectiveness of the developed course. Treatment was given to the experimental group and no treatment to the control group. The difference of the mean of the pre-test, post-test scores were tested for statistical significance for both experimental and control groups.

Sample:

A purposive random sampling technique was used for selecting F.Y.B.Ed. Student- teachers pursuing the 2 years B.Ed. program in Mumbai University. The sample selected consisted same socioeconomic status and same computer ability. The total sample was 87 Student-teachers, 43 in the experimental group and 44 Student-teachers in the control group.

Tool:

The researcher developed a tool to assess the impact of a Blended Learning Course on B.Ed. student-teachers' Techno-pedagogical Skills. The tool included dimensions such as Technology Usage Skill for Knowledge Acquisition, Technology Usage Skill for Planning and Preparing Lesson Plans, Technology Usage Skill for Computer-Mediated Communication, and Technology Usage Skill in Assessment.

The reliability of the tool was established using the Split-half method, resulting in a high reliability index of 0.91, indicating strong internal consistency. Additionally, Cronbach's Alpha was calculated to be 0.91, further confirming the tool's reliability.

The Blended Learning Course was developed using the Moodle Learning Management System and was hosted on a website called 'Blended Learning India'. Content validity was ensured through expert evaluation. Care was taken to ensure the validity and reliability of the tool.

Results and Interpretation:

In this study Techno-pedagogical Skill includes Technology usages skill for knowledge acquisition technology usages skill for planning and preparing a lesson plan, technology usages skill for computer mediate communication, technology usages skill in assessment.

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Testing of Hypothesis 1:

Hypothesis 1 states that there is no significant difference in the pre-test scores of the Techno-pedagogical Skills among B.Ed. Student-teachers in terms of

a) Technology usage skills for knowledge acquisition
b) Technology usage skills for planning and preparing the lesson plans
c) Technology usage skills for computer-mediated communication
d) Technology usage skills in assessment of the experimental and control groups

Technique used: t-test

Variables: Dimensions of Techno-pedagogical Skills

Table 1 gives the difference in pre-test scores of the Student- teachers' dimensions Techno-pedagogical Skills experimental and control group.

Table 1

Differences in the Pre-test Scores of the Student-teachers'on the Basis of Dimensions of Techno-pedagogical Skills for Experimental and Control Groups

Dimensions	Group	N	Mean	df	SD	t-ratio	p-value	Level of Significance
Technology usage skills for knowledge acquisition	Experimental	43	59.54	85	3.99	1.2	0.23	NS
	Control	44	62.62		7.05			
Technology usage skills for planning and preparing lesson plan	Experimental	43	61.18		5.5	2.56	0.10	NS
	Control	44	55.58		4.21			
Technology usage skills for computer-mediated communication	Experimental	43	57.36		3.65	0.08	0.33	NS
	Control	44	57.19		3.32			
Technology usage skillsin assessment	Experimental	43	59.61		4.3	0.14	0.88	NS
	Control	44	59.63		4			

S=Significant, NS=Not Significant

Findings and Conclusion:

From table 1, the differences in the pre-test scores of the Student- teachers' Techno-pedagogical skills on the basis of dimensions of experimental group and control group obtained p-value is greater than 0.01 Hence the null hypothesis is accepted. Therefore, it can be concluded that there is no significant difference in the pre-test scores of experimental and the control groups on the basis of dimensions of Techno-pedagogical Skills. Pre-test mean scores of dimensions of Techno-pedagogical skills are close to each other of experimental and control Groups.

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Testing Of Hypothesis 2:

Hypothesis 2 states that there is no significant difference in the post-test scores for Techno-pedagogical skills among B.Ed. Student-teachers in terms of

a) Technology usage skills for knowledge acquisition
b) Technology usage skills for planning and preparing a lesson plan
c) Technology usage skills for computer-mediated communication
d) Technology usage skills in assessment for the experimental and control groups

Technique used: t-test

Variables: Dimensions of Techno-pedagogical Skills

Table 2 gives the difference in the post-test scores for dimensions of Techno-pedagogical skills among B.Ed. Student-teachers for the experimental and control groups.

Table 2

Differences in the Post-test Scores of the B.Ed. Student –teachers'on the Basis of Dimensions Techno-pedagogical Skills of Experimental and Control Groups

S=Significant, NS=Not Significant

Findings and Conclusion:

Dimensions	Group	N	Mean	df	SD	t-ratio	p-value	Level of Significance
Technology usage skillsfor knowledge acquisition	Experimental	43	74.7	85	4.61	6.1	0.000*	S
	Control	44	63.77		3.32			
Technology usage skillsfor planning and preparing lesson plan	Experimental	43	83.56		5.5	6.47	0.000*	S
	Control	44	66.18		6.63			
Technology usage skillsfor computer-mediated communication	Experimental	43	81.25		3.78	8.13	0.000*	S
	Control	44	62.05		4.13			
Technology usage skillsin assessment	Experimental	43	83.97		3.81	5.18	0.000*	S
	Control	44	71.44		4.27			

From table 2, for differences in the post-test scores of the B.Ed. student-teachers' Techno-pedagogical skills on the basis of dimensions of experimental group and control group obtained p-value are lesser than 0.01 is

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significant for all dimensions. Hence the null hypothesis is rejected for the said dimensions. Therefore it can be concluded that there is a significant difference in the post-test scores of the B.Ed. student-teachers' Techno-pedagogical skills on the basis of all dimensions.

Testing of Hypothesis 3:

Hypothesis 3: There is no significant difference in gain scores of Techno-pedagogical Skills for the control group.

Table 3

Difference in the Gain Scores of Techno-pedagogical Skills for Experimental and Control Groups

Variable	Group	N	Pre Test Scores	Post Test Scores	Gain Scores	Gain Scores SD	t-ratio	p-value	Level of Significance
Techno-pedagogical Skills	Experimental	43	141.04	176.46	35.39	19.34	5.14	0.000**	S
	Control	44	138.9	151.45	12.55	21.99			

Table-3 Indicates the difference in the gain scores of Techno-pedagogical Skills for experimental and control groups in an obtained p-value for Techno-pedagogical is less than 0.01 is significant. Hence the null hypothesis is rejected. Therefore, it can be concluded that there is a significant difference in gain scores of Techno-pedagogical Skills. Gain scores of Techno-pedagogical Skills indicate that the experimental group has obtained higher scores in the Techno-pedagogical Skills as compared to the control group.

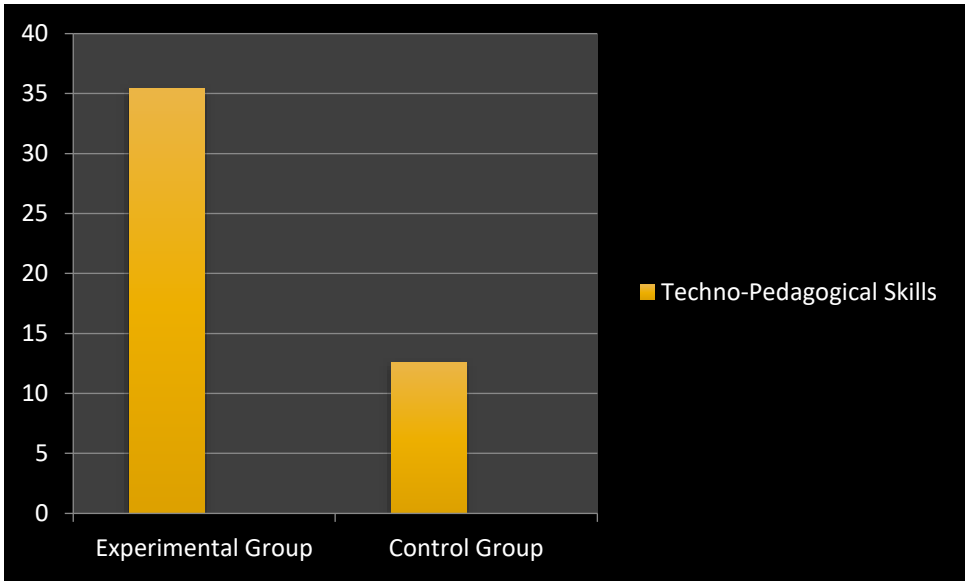

Figure 1:Gain Scores of Techno-pedagogical Skills for Experimental and Control Groups

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Table 4

ω^2Estimated Value for Techno-pedagogical Skills

Variable	t-ratio of Gain Scores	ω^2	100 ω^2
Techno-pedagogical Skills	5.14	0.2261	22.61%

From table 4 it can be said that ω^2 estimated value for variable Techno-pedagogical Skills is 22.61%.

Figure 2 shows the piechart of the proportion of variance in gain score of Techno-pedagogical Skills due to Blended Learning Course.

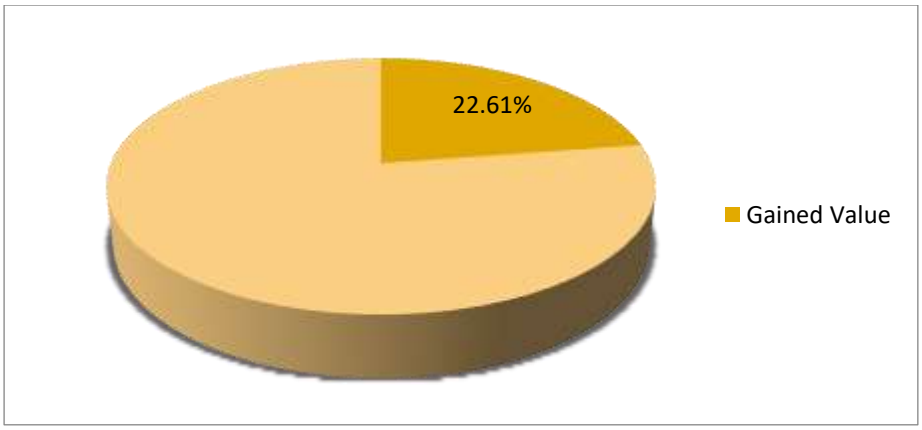

Figure 2

Pie Chart of Proportion of Variance in Gain Score of Techno-pedagogical Skills due to Blended Learning Course.

From figure 2 it can be inferred that the contribution of Blended Learning Course in the development of Techno-pedagogical Skills is 22.61%. .

Table 5

Effect Size of the Treatment on the Experimental Group for Techno-pedagogical Skills

Variable	Mean of Post-test Experimental Group	Mean of Post test Control Group	SD of Control Group	Magnitude	Effect size
Techno-pedagogical Skills	176.46	151.45	13.81	1.8	Maximum Effect

Table-5 indicates that the treatment has maximum effect on the experimental group in the development of Techno-pedagogical Skills as per Wolf's criterion. This shows that the Blended-Learning Course has maximum effect on the development of the Techno-pedagogical Skills among B.Ed. Student-teachers.

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Discussion:

1. It can be seen that before the treatment, there is no difference in the Techno-pedagogical Skills dimensions between the experimental and control groups of B.Ed. student-teachers. This confirms that both groups are similar in Techno-pedagogical Skills dimensions before the implementation of the treatment (Blended Learning Course).
2. The experimental group's Techno-pedagogical Skills improved significantly compared to the control group after the treatment. This improvement is likely due to the diverse range of activities included in the Moodle-based Blended Learning Course, such as face-to-face online teaching, demonstrations, learning material, interactive videos, quizzes, discussion forums, mind maps, group and individual assignments, badges, and progress tracking. These activities provided ample opportunities for B.Ed. student-teachers to enhance their skills.
3. The ω2 estimated value for Techno-pedagogical Skills is 22.61%, indicating that the Blended Learning Course effectively developed these skills. The treatment had the maximum effect on the experimental group, as per Wolf's criterion, demonstrating that the course significantly enhanced Techno-pedagogical Skills among B.Ed. student-teachers.
4. An effective blended learning environment is essential for innovative pedagogy. Educational institutions should adopt robust learning management systems with high-speed internet. Blended learning is transforming higher education and will impact school education and industrial training. Teachers need training in blended learning to use it effectively. Teacher-educators shape student-teachers to use technology in teaching, requiring comprehensive training. Institutions should improve coordination among departments for idea sharing.

To conclude, the Blended learning Course was found to be effective for Techno-pedagogical Skills. Therefore, it can be stated here that the significant difference in the post-test establishes the fact that Blended learning helps a student-teacher to develop Techno-pedagogical Skills effectively. The National Education Policy (NEP) 2020 highlights the importance of implementing blended learning in higher education. This approach will pave the way for the future of higher education in India, offering innovative and effective learning methods.

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