Effect of Blended Learning Strategy on Learning Outcomein Educational Psychologyof Pre-Service Teachers of B.Ed. Programme

ABSTRACT

Aim: The key aim of this study is to investigate the effect of blended learning strategy on learning outcome in Educational Psychology of pre-service teachers of 2-yearB.Ed. programme.

Methods:A quasi-experimental, pretest-posttestnon-equivalent control group design was employed. Only one state university located in Kolkata city was selectedthrough simple random sampling. The sample for this study was comprised of 92 pre-service teachers available in second semester of 2-year B.Ed. programme in 2020 running under the Department of Education of that university. The two units of B.Ed. programme were assigned randomly as experimental group (N=48) and control group (N=44) respectively. For collecting the data, a learning outcome test with a reliability coefficient0.82 developed and standardised by the investigator was used. For analysing the data, one-way ANCOVA and 2×2 factorial design ANCOVA were applied.

Results: The findingsdemonstrated that the experimental group learners achieved higher learning outcome in comparison to the control group learners. Further, findings of this study also showed that there was no significant effect of interaction between treatment and gender onlearning outcome in Education Psychology, when their pre-learning outcome was considered as a covariate.

Conclusion: Blended learning strategy was found to be superior than the conventional method.Outcomes of this study can be implemented in improving the competency level of the learners in different teacher education programmes.

Keywords: Blended Learning Strategy, Learning Outcome, Educational Psychology, Pre-Service Teachers, Teacher Education

1. INTRODUCTION

According to National Education Policy (NEP) 2020 undoubtedly offers an unprecedented opportunity to modernize India's education system and pedagogical practices. The need to ensure better learning outcomes and prepare students for the challenges of the 21st century skill has been explicitly stated and prioritized in NEP 2020, which makes blended strategies the solution in the context of improve the learning outcomes of students and provide the flexibility in teaching learning environment. The modern approach to education requires from educators to think outside the box and identify the innovative methods to make learning as effective as possible. Blended learning is one of the suitable instructional strategies to achieve this goal, as it combines traditional classroom instruction with a variety of online resources. This approach well-suited for B.Ed. students, as it allows tailored addressing the diversity of learner needs and creating a more dynamic learning environment. As

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future educators, B.Ed. candidates hold the key to shaping the next generation of learners (Kintu et al, 2017). Understanding how blended learning strategies influence their learning outcomes is essential for informing evidence-based pedagogical practices within teacher training programs (Khan et al, 2014). Deivamand Devaki (2015) demonstrated that blended learning approach is more effective than conventional teaching method in educational psychology. Dhanaraj and Sivakumar (2016) reported that academic achievement in educational psychology of B.Ed. students is more influenced with blended learning approach rather than traditional approach.Ceylan Kesici (2017) showed that blended learning approach significantly improved students' academic achievement. Moreover, the transformative potential of blended learning extends beyond individual classrooms. In a rapidly evolving digital landscape, teacher educators have the opportunities for using technology to meet the diverse needs of learners (Lalima &Dangwal, 2017). Ginaya et.al (2018) investigated the effect of blended learning on students' speaking ability in a vocational college. The outcome showed that blended learning effect students speaking ability and motivation rather than conventional instructions. Recently, Alsalhi et.al (2019) reported that using blended learning approach achievement in science at the secondary level was found to be better than that through the conventional method.

Further The COVID-19 pandemic has further underscored the importance of blended learning, as many educational institutions were forced to shift to online or hybrid models of instruction (Hodges et al., 2020). This shift has highlighted the need for educators to be proficient towards the use of technologies in education.Çiftçi (2020) reported that the effect of blended learning on achievement in socil studies was observed to be more successful than face-to-face mode. Nachimuthu (2020) demonstrated that blended learning is more effective in learning Botany in comparison to conventional method. Revathi &Nachimuthu(2020) noted that blended learning instructional approach was more effective for physics for undergraduate students than the conventional approach.

Marie (2021) showed that employing blended learning approach is more effective than the traditional technique for teaching physical science. Aziz (2021) demonstrated that learning methods for improving students' performance in the electrochemistry.Aiyedun and Adam (2022) showed that blended learning methods greatly boost students' achievement and retention in science. Makkar and Sharma (2022) revealed that the use of blended learning greatly raised the achievement of secondary students. Tong et al. (2022) observed that blended learning boosted student interactions with teachers while improving students' academic achievement, self-study abilities, and learning attitudes. Jibril et.al.(2022) noticed that when students in educational institutes are exposed to blended learning teaching methods, their performance gets improved. Further, Han (2023) found positive correlation between the effectiveness of blended learning and students' learning achievement. Zhang et al. (2023) observed that children learned more, performed better on classroom assessments, and were motivated to study because of blended learning. Biswas (2023) found that adolescents' utilization of blended learning correlated positively with their academic performance. The results of this gender-based study revealed that blended learning was favorably connected with female pupils. Singh (2023) showed that students who studied in a blended mode were more effective than those who studied traditionally.Sia et al. (2023) reported that in Aian countries, the readiness of educators undergoes transition from online to blended mode after the pandemic period.Nayak et al. (2024) found a positive

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correlation between blended learning strategy and the academic achievement in social science at the secondary stage of their learning.Phakamach and Panjarattanakorn (2024) demonstrated that blended learning digital system performed required performance for graduate students. Recently, Tao et al. (2024) observed that teaching English at the undergraduate lvel through blended mode is effective in comparison to the conventional method.

Hence, based on the rationale, it is evident that very limited studies have been conducted to ensure learning outcomes in educational psychology using blended learning strategy for pre-service teachers of 2-year B.Ed. programme.In this study, efforts have been given to ascertain whether or not blended learning strategy has a beneficial impact on learning outcome in educational psychology of pre-service teachersof 2-year B.Ed. programme. An important unit namely 'Understanding Teaching' from the 'Learning and Teaching' textbook for the second semester of 2-year B.Ed. programme in West Bengal in accordance with the curriculum framework of National Council of Teacher Education (NCTE) was taken for experimentation as per the urgent need and interest of the learners, as most of them face difficulties in understanding the concepts associated in that unit and their applications in real situations.

Objectives

(i) To compare the adjusted mean scores of learning outcomes in educational psychology of pre-service teachers taught using blended learning strategy and the conventional method by considering their pre-learning outcome as a covariate.

(ii) To study the effect of treatment, gender and their interaction on learning outcome in educational psychology of pre-service teachers by considering their pre-learning outcome as a covariate.

Hypotheses

(i) There is no significant difference in the adjusted mean scores of learning outcomes in educational psychology of pre-service teachers taught using blended learning strategy and the conventional method when their pre-learning outcome is considered as a covariate.

(ii) There is no significant effect of treatment, gender and their interaction on learning outcome in educational psychology of pre-service teachers by considering their pre-learning outcome as a covariate.

2. METHODS OF THE STUDY

2.1 Design: A quasi-experimental pretest-posttest non-equivalent control group design was used in the present study. Treatment with two levels blended learning strategyconventional method is taken as an independent variable, and learning outcomes as the dependent variable. Gender was considered as moderator variable.

2.2 Population and Sample

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2.2.1 Population: All pre-service teachers enrolled in 2 year Bachelor of Education (B.Ed.) programme in the Department of Education of State Universities located in Kolkata city of West Bengal was considered as population for this study.

2.2.2 Sample: Only one state university located in Kolkata city was selected through random sampling. For this study, 92 pre-service teachers of second semester available in 2 year Bachelor of Education (B.Ed.) programme in the Department of Education of Aliah University, Kolkata in 2024was considered as sample.There weretwo units in 2 year B.Ed. programme. Intact units / classeswere selected for balancing the individual differences when both the groups are compared. The pre-service teachers of intact groups were randomly assigned as experimental group and control group. Group wise and gender-wise description of the sample has been given in Table 1.

Table 1: Description of the sample

Sl. No.	Group	Gender		Total
		Male	Female	
1.	Experimental	24	24	48
2.	Control	18	26	44
	Total	42	50	92

From Table 1, it is evident that the 48pre-service teachers inexperimental group and 44 in the control group were taken for experimentation.

2.3 Tool used for the data collection

For collecting data, a learning outcome test developed and standardized by the researcher was used. Initially, learning outcome test on 'Understanding Teaching' from the 'Learning and Teaching' textbook for the second semester of 2-year B.Ed. comprised of 32 multiple-choice items was constructed. After item analysis, 25 items were retained. Reliability coefficient of the test was computed using split-half method and was found to be 0.82. Further, opinions collected from three subject experts were incorporated to validate the test. Finally, the learning outcome test comprised of 25 multiple-choice items, having four options with one mark for each correct answer and zero for each wrong answer was used.

2.4 Procedure of data collection

The experiment was carried out in three different phases as mentioned below.

2.4.1 Pre-experimental phase: Official permission from the authority was taken by the investigator. Both groups were initially pretested by using the learning outcome test.

2.4.2 Experimental phase: After the pretest, both the groups were taught the same unit for 4 weeks at the rate of 2 periods each of 1 hour in a week taken from the syllabus ofeducational psychology for 2-year B.Ed. programme using two different methods of instruction. The experimental group learners were taught through blended learning strategy whereas the control group learners were taught the same unit using conventional method. To encourage their students to actively participate in class and

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interact with one another, the researcher created a congenial learning environment throughout the experimentation period of ten weeks.

2.4.3 Post-experimental phase: Following the intervention, the same set of questions as used in pretest was administered again inposttest on both the groups. Finally, the effectiveness of blended learning strategy in terms of learning outcomes in educational psychology was evaluated by comparing the scores of pre-service teachers in the experimental group with those of the control group.

2.5 Statistical Techniques used for the data analysis: Statistical techniques, namely an independent samples t-test and one-way analysis of covariance (ANCOVA), were employed through "the Statistical Package for Social Science (IBM SPSS Statistics, Version 21)" and interpretation was done accordingly.

3 RESULTS AND DISCUSSION

3.1 Results

Assumptions for normality of the data were verified and the data were found to be normal. Hence, parametric statistical techniques were applied to analyze the data. Objective-wise result b and interpretation has been give below:

Objective (i): For acquiring thisobjective, the data were analyzed using one-way ANCOVA and the results are given below in Table 2:

Table 2: Results of a one-way ANCOVA for learning outcomes of pre-service teachers in educational psychology while assuming their pre-learning outcomes as a covariate

Source of Variance	df	$SS_{Y.X}$	$M\ SS_{Y.X}$	$F_{Y.X}$-- Value	Remark	Effect size (η_p^2)
Treatment	1	647.05	647.05	72.22	$p < 0.01$	0.448
Error	89	797.36	8.96			
Total	91	1556.91				

Table 2 shows that the adjusted F-Value is 72.22, indicating statistical significance at the df = 1 /89 level of 0.01.It demonstrates that there is a significant difference in adjusted mean scores of learning outcome of pre-service teachers taught using blended learning strategy and the conventional method when their pre-learning outcome is considered as a covariate. As a result, the null hypothesis that pre-service teachers taught using blended learning strategy and the conventional method have similar adjusted mean scores for learning outcomes in educational psychology is rejected. Hence, it can be said that learning outcome in educational psychology of pre-service teachers taught through blended learning strategy was found to be higher in comparison to that obtained through conventional method.Further, from Table 2, the value of the effect size for the treatment is 0.448, which signifies that 44.8% of variances can be explained by the independent variable. In order to know which groups' adjusted mean scores differ significantly, the data were further analysed with the help of an independent t-test, and the results are given in Table 3.

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Table 3: Group-wise comparison of adjusted mean scores of learning outcome in educational psychology of pre-service teachers

Group	Adjusted mean	Standard Error	t value	Remark
Experimental group	17.67	0.43	8.7	p <0.01
Control group	12.31	0.45		

Table 3 indicates that the t value is 8.7, which is significant at the 0.01 level with df =90. It implies that the learning outcomes of experimental group and the conventional group differ significantly. Further, the adjusted mean score of learning outcome of pre-service teachers taught through blended learning strategy is 17.67, which is significantly higher than that of students taught using the conventional method, whose adjusted mean score of learning outcome is 12.31when considering pre-learning outcome as a covariate. Learning outcome in educational psychology of pre-service teachers taught through blending learning strategywas found to be significantly higher in comparison to that with the conventional method.

Objective (ii): For acquiring this objective,the data were analyzed using 2X2 factorial design ANCOVA and the results are given in Table 4.

Table4: Summary of 2×2 factorial design ANCOVA of learning outcome in educational psychology of pre-service teachers by considering their pre-learning outcome as a covariate

Source of variance	df	SS_{YX}	MSS_{YX}	F_{YX}--	Remark
Treatment (A)	1	615.53	615.53	68.78	p<0.01
Gender (B)	1	4.94	4.94	0.56	ns
A×B	1	13.56	13.56	1.52	ns
Error	87	778.54	8.95		
Total	91				

ns = not significant

From Table 4, the adjusted F value of treatment is 68.78 which is significant at 0.01 level with df=1/87. This indicates that the treatment through blended learning strategy is effective in comparison to its counterpart which is similar as interpreted in Table 2.

Further from Table 4, it is evident that for gender the adjusted F value is 0.56, which is not significant. This implies that there is no significant difference in the adjusted mean scores of learning outcome in educational psychology of male and female pre-service teachers when their pre-learning outcome is considered as a covariate. Hence, the null hypothesis that there is no significant difference in the adjusted mean scores of learning outcome in educational psychology of male and female pre-service teachers when pre-learning outcome is considered as a covariate is not rejected. Thus, it can be said that learning outcome in educational psychology of pre-service teachers was found to be independent on gender when pre-learning outcome is considered as a covariate.

Furthermore, from Table 4, it is seen that the adjusted Fvalue for the interaction of treatment and gender on learning outcome of pre-service teachers is 1.52, which is also not significant. It indicates

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that there is no significant interaction between treatment and genderon learning outcome of pre-service teachers in educational psychology whentheir pre-learning outcome is considered as a covariate. Thus, the null hypothesis that there is no significant interaction between treatment and gender on learning outcome in educational psychology of pre-service teachers by considering their pre-learning outcome as a covariate is not rejected. Thus, it can be said that the interaction between treatment and gender was found to be independent on learning outcome in educational psychology of pre-service teachers when their pre-learning outcome is considered as a covariate.

3.2 Discussion

Researchers pointed out that students in the experimental group benefited significantly from treatment, as evidenced by a significant difference in mean scores between the experimental and control groups. These findings are consistent with the earlier studies (Sia et al. 2023;Selvakumar & Shivkumar, 2019;Alsahi, et.al 2019; Ceylan &kesici, 2017). Further, findings of this study also demonstrated that using blended learning strategy, both male and female pre0service teachers benefitted equally. These findings are consistent with the earlier studies (Nayak et al. 2024; Gómez-Rey et al. 2016; Voet et al. 2017). These studies highlight that the flexible and interactive nature of blended learning can cater to diverse learning needs and preferences, contributing to balanced academic performance across gender.

3.3 Limitations

This study was limited to:

(i) Pre-service teachers of 2-year B.Ed. programme of Aliah University, Kolkata.

(ii) The syllabus of 'Teaching for Learning' course of2-year B.Ed. programme

(iii) Self-developed learning outcome test.

(iv) Self-developed instructional materials for blended learning strategy.

3.4 Educational implication

According to the findings of this study, blended learning strategy was shown to be the most crucial indicators of learners' ability to learn. Teacher educators may be encouraged to teach the various concepts by using blended learning strategy. The training of teachers to apply blended learning strategy appropriately during the teaching-learning process might be given by organising seminars, workshops, and conferences, as well as through educational and government agencies, curriculum developers, and planners and developers.

4. CONCLUSION

In this study, the effect of blended learning strategy on learning outcome in educational psychology of pre-service teachers of 2 year B.Ed. programme was investigated. Results of the study revealed that blended learning strategy was found to be more effective than the conventional method in improving learning outcome in educational psychology of pre-service teachers of 2-year B.Ed. programme.

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Psychology of instruction 2-year B.Ed. programme is comprised of difficult tasks due to the high level of content and higher thinking skills required to truly grasp the concepts. This can be made easier through the appropriate use of blended learning strategy. Pre0-service teachers benefittedsignificantly fromblended learning strategy because it helps them learn, understand, apply, and retain complex concepts. Further, blended learning strategy made a substantial difference in how effectively pre-service teachers learned the understanding of teaching unit. Thus, blended learning strategy might be implemented by the teacher educatorsduring the teaching-learning process for the better understanding of other units of educational psychology.

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