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Exploring the Effect of Blended Learning on Academic achievement of B.Ed. trainees: An Experimental Study in the Garhwal region

Rashmi Nautiyal[1*], Prashant Dabral[1] and Geeta Khanduri[2]

[1]*Department of Education, H.N.B. Garhwal University (A Central University) B G R Campus Pauri , Garhwal Uttarakhand - 246001 (India).*
[2]*Department of Education , H.N.B. Garhwal University (A Central University) Birla Campus Srinagar Garhwal -246174 Uttarakhand (India).*

*Corresponding Author's email Id: rashminautiyal9@gmail.com

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Abstract: Modern education necessitates innovative methods for effective learning, with blended learning being a suitable instructional strategy that combines traditional classroom instruction with online resources. The main objective of this study is to examine the effect of blended learning on the academic achievement of B.Ed. trainees. The research method involved a true experimental design with a pre-post control group. Simple random sampling technique was used to select one campus (Srinagar Campus) from the three campuses (Srinagar, Tehri and Pauri) of HNBGU Garhwal University. 82 trainees of B.Ed. first semester of the two-year programme were chosen from this campus. Two groups of these trainees were randomly assigned as the experimental group (n = 41) and the control group (n = 41). Data were collected using the academic achievement test, which was developed and standardized by the investigator and yielded a reliability coefficient of 0.89. The result indicates that B.Ed. trainees who were instructed through blended methods outperformed those who learned through traditional pedagogy. The study highlights the need for educational institutions to invest in comprehensive blended learning programs. Future research should focus on exploring long-term impacts and identifying best practices for effective implementation.

Keywords: Blended learning; Academic achievement**;** B.Ed. trainees**;** Experimental Study**.**

Introduction

Education is crucial for human development and achieving "education for all" requires accessibility, equity and quality. Blended learning, an innovative approach that combines traditional teaching methods with technology, aims to enhance independent learning and encourage curiosity and creativity. This integration combine's traditional teaching with web-based online approaches, media, e-learning tools and various pedagogical approaches to create a more effective and accessible learning environment. Traditional teaching is a method where the teacher controls the learning process, focusing on face to face interaction with students. It develops essential skills like cooperation, communication, self-confidence and motivation. The teacher serves as both a source of knowledge and a guide, using various instructional methods like lectures and practical exercises. Classroom teaching, a centuries-old method with refined teaching style and structure, offers numerous benefits not found in online learning (Xu and Jaggars 2016).

Online education, originating from distance education in the 1990s, enables active interaction between teachers and students using tools like video conferencing, online whiteboards and real-time collaboration. This approach improves learning quality and flexibility, allowing students to learn at their own pace from any location and facilitating knowledge exchange through social networking sites. Web-based instruction allows students to access many universities and courses offered electronically (Salcedo 2010). Technological advances in education have made online education an important option for learners looking for quality programs, making it an accessible option for business professionals, underprivileged classes and stay-at-home parents. The attractiveness of distance education is fueled by its flexibility, accessibility, program options and time efficiency, as noted by Wladis et al (2015).

Blended learning is a teaching method that combines online educational content with live classroom instruction. The blended learning approach combines traditional in-person teaching with technology-based instruction (Wang 2011). It includes a variety of activities such as face-to-face classroom sessions, live e-learning, self-paced study, synchronous online meetings and asynchronous self-guided learning (Graham 2013). The approach incorporates various resources like audio, videos, brainstorming activities, online assignments, problem-solving-based learning, team learning, quizzes, reflective exercises, case studies, simulations, video conferencing and other classroom activities to enhance the teaching and learning process. By integrating these diverse teaching methods, better learning outcomes can be achieved while ensuring active participation from learners. E learning enhances the quality of teaching and learning through the use of technology (Musdalifa et al 2021).

The study by Anthony (2024) highlights the importance of blended learning in teacher education, highlighting its potential to enhance students' knowledge, problem-solving, critical thinking and creativity. The findings suggest that students' acceptance of blended learning significantly impacts their performance, offering valuable insights for improving educational integration. Shivashankar's (2011) study on blended learning in science teaching for B.Ed. level students found that integrating e-learning with traditional face-to-face teaching was effective. The study used an experimental design and a pre-post-test equivalent group format, revealing that blended learning is a crucial and effective approach for enhancing academic achievement.

Research Hypothesis:

1. There is no significant difference between the pre-test academic achievement of B.Ed. trainees of the control group and experimental group.
2. There is no significant difference between the post-test academic achievement of B.Ed. trainees of the control group and experimental group.

Material and methods

The present study investigates the impact of blended learning on the academic achievement of B.Ed. trainees using a true experimental design as followed by Ridwan (2021). Birla campus Srinagar was selected randomly from the three campuses (Srinagar campus, Tehri campus and Pauri Campus) of Hemvati Nandan Bahuguna Garhwal Central University in Uttarakhand. A sample of 82 B.Ed. trainees was selected from the Dept. of Education, Birla Campus Srinagar. All the selected trainees were then equally divided into two groups (experimental and control group) as done in the study of Shreekala .E (2016). The experimental group was given instruction with a blended learning program, while the control group was taught by traditional methods on the subject "Childhood and Growing up" for 45 working days. The same approach was adopted by Kazu et al (2014). The researcher developed an achievement test on the subject “Childhood and growing up”. After item analysis, 41 items were retained and the test's reliability coefficient was 0.89. Five subject experts' opinions were also included to validate the test. The test, consisting of 41 multiple-choice items with four options, was administered to both groups as a pre-test and post-test.

Procedure of Experiment:

The experiment was conducted in three different phases (pre-experimental phase, experimental phase and post-experimental phase) as mentioned below in Fig: 1.

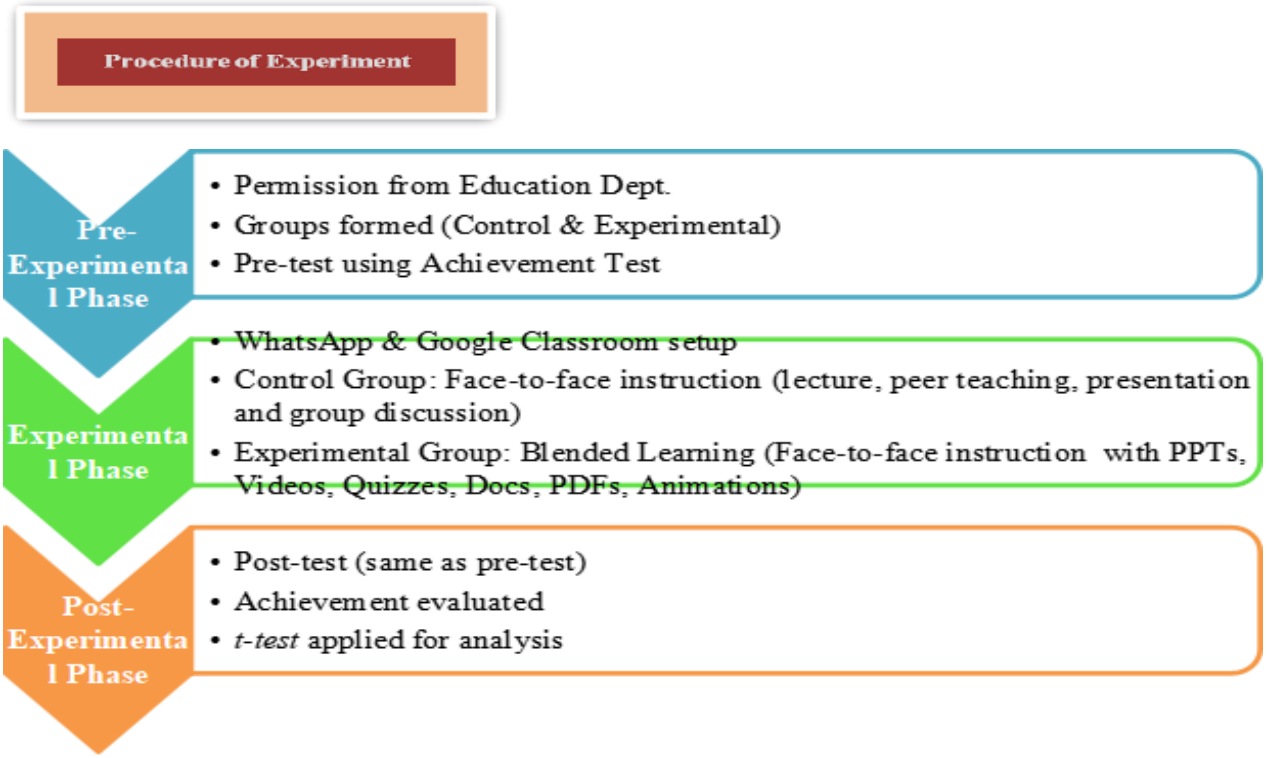

Fig. 1: Procedure of experiment

Results and Discussion

Hypothesis 1- There is no significant difference between the pre-test academic achievement of B.Ed. trainees of the control group and experimental group.

Table 1- Comparison of pre-test academic achievement scores of B.Ed. trainees of control group and experimental group

	Group	N	Mean	SD	DF	t-value	Sig(2-Tails)
Pre-test	**Control Group**	41	14.41	2.64	80	1.25	0.22 (Not Significant)
	Experimental Group	41	15.12	2.49			

Table 1 indicates that the pre-test means for the control groups and experimental are 14.41 and 15.12, respectively, with standard deviations of 2.64 and 2.49. The experimental group's pre-test achievement scores are higher than the achievement score of control group. With Df = 80, the computed t-value = 1.25 is less than the table value at the 0.05 level of significance. Thus, the null hypothesis, which states, "There is no significant difference between the pre-test academic achievement of B.Ed. trainees of the control group and experimental group," is accepted.

Hypothesis 2 - There is no significant difference between the post-test academic achievement of B.Ed. trainees of the control group and experimental group

Table 2- Comparison of Post-test academic achievement scores of B.Ed. trainees of control group and experimental group

	Group	N	Mean	SD	DF	t –value	Sig(2-Tails)
Post Test	**Control Group**	41	26.02	3.39	80	6.68	0.00 (Significant)
	Experimental Group	41	30.66	2.86			

Table 2 indicates that the post-test means for the control group and experimental group are 26.02 and 30.66 respectively, with standard deviations of 3.39 and 2.86. The experimental group's post-test achievement scores are higher than the achievement score of control group. With Df = 80, the computed t-value = 6.68 is more than the table value at the 0.05 level of significance. Thus, the null hypothesis, which states, "There is no significant difference between the post-test academic achievement of B.Ed. trainees of the control group and experimental group," is not accepted.

Effect size analysis of post-tests of academic achievement

Table 3- Effect size of posttest of achievement test of control and experimental group

Test	Group	Df	t-value	Size Effect(r)	Level
Post-test of achievement test	**Control Group**	80	6.68	**≈ 0.60**	**Large effect**
	Experimental Group				

In Table 3, the effect size was calculated on experimental and control group to determine the level of effect size (r) and effect size analysis was done using the formula $r^2 = t^2 / t^2 + Df$. According to Cohen

(1988), large effect size typically 0.5 greater, moderate generally around 0.3 to 0.5 and small effect size typically less than 0.1. In the present study, the value of Size Effect was obtained as 0.60 which indicates large effect size.

Conclusion

Blended learning is considered the most effective teaching method as it encourages student participation and gives learners control over their education, allowing them to choose when they want to learn. Teachers should, therefore, incorporate blended learning strategies in the classroom. The present study examined the impact of blended learning on the academic performance of B.Ed. trainees in the Garhwal region. The findings reveals that the experimental group (exposed to blended learning) significantly outperformed the control group (traditional methods). This suggests that blended learning enhances the academic achievement of B.Ed. trainees. Additionally, the results indicate that blended learning fosters a more engaging and flexible learning environment, which is particularly advantageous in geographically diverse and resource-limited areas like the Garhwal region. The effectiveness of blended learning programs in enhancing teaching and learning is supported by various studies, including those conducted by Ahmed (2011), Osguthorpe and Graham (2003), Lim and Morris (2009) and Utami (2018). These studies show that blended learning enhances academic performance, social interaction, teaching strategies and cost-effectiveness while supporting student-centered education. In accordance with the National Education Policy 2020, the University Grants Commission has published a concept note on blended learning aimed at improving student satisfaction, learning outcomes and access to knowledge. The finding of the study suggests that teacher-education institutions should integrate blended learning into their curriculum and provide regular training for digital proficiency. It is also suggested to ensure adequate ICT infrastructure and localized digital content, particularly in rural and hilly areas.

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