The Effectiveness of Blended Learning Approach on Students' Academic Performance: A Quasi-Experiment Study

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Abstract

The study explored the effectiveness of blended learning on students' academic performance in grade IX history subjects. A total of 51 students of grade IX participated in the study. The study employed a quasi-experiment approach. The study conducted an independent sample t-test, Wilcoxon Signed Rank Test, and one-way ANOVA test. The results of the study revealed that the blended learning approach (experiment group, M = 15.2, SD = 1.3) was more effective than the traditional learning approach (control group, M = 12.8, SD = 2.6) with a significant mean difference between these two groups ($p = .000$, $p < .05$). Thus, it can be concluded that blended learning approach was effective in increasing students' academic performance in history subject.

It is recommended that a blended learning approach be carried out in schools to improve students' academic performance. Further, the present study focused only on students of grade IX, a study may be carried out across schools to get a deep understanding of the subject.

Keywords: *Academic performance, Blended learning, Effectiveness, ICT technology*

Introduction

The global COVID-19 pandemic has catalyzed significant shifts in various aspects of life, including the way people work, learn, and interact. With the necessity of physical distancing measures, traditional modes of in-person education have swiftly transitioned to online platforms (Tong et al., 2022). This rapid adaptation has prompted educators worldwide to reassess pedagogical approaches, particularly with a focus on leveraging technology to enhance student engagement and learning outcomes.

Among the strategies that have gained traction is the blended learning approach, which integrates both face-to-face and online learning modalities through the utilization of Information and Communication Technologies (ICT). Extensive research has underscored the positive impact of blended learning on student academic performance (Prinsloo & Van Rooyen, 2007; Al-Qahtani & Higgins, 2013). Blended learning environments offer flexibility and interactivity, catering to diverse learning styles and preferences while fostering the development of essential 21st-century skills (Zurita et al., 2015; Hensley, 2020; Hadiyanto, 2021).

However, the efficacy of blended learning in the context of Bhutanese education remains relatively unexplored. Bhutan's educational landscape presents unique challenges and priorities, notably the emphasis on academic performance as the primary criterion for progression (Dorji & Lhamo, 2022). Concerns have been raised regarding the alignment of traditional assessment methods with the evolving demands for competency-based skills, as evidenced by the performance statistics in common examinations (BCSEA, 2023).

Given the limited research within the Bhutanese context, this study aims to investigate the effectiveness of blended learning on academic performance among Bhutanese students. Adopting a quasi-experimental design, this research endeavors to bridge the gap in the literature by examining the impact of blended learning strategies on students' attainment of 21st-century competencies within Bhutan's educational framework. Through rigorous analysis and empirical inquiry, this study seeks to inform educational practices and policy-making in Bhutan, contributing to the ongoing discourse on innovative approaches to teaching and learning in the digital age.

Aim and Objective

To explore the effectiveness of the blended learning approach in the academic performance of students in history subject.

Research Question

How does the implementation of a blended learning approach impact students' overall academic performance?

Sub-questions

- How effective is blended learning in Bhutanese classrooms especially in history subjects?

- What specific factors within the blended learning environment contribute to variations in students' academic outcomes?

Literature Review

The literature on blended learning consistently highlights its effectiveness in enhancing students' academic performance across various educational levels. Ayob et al. (2020) underscore the potential of blended learning as an effective pedagogical approach, emphasizing its integration of both face-to-face and online learning components. This sentiment is echoed by Indrapangastuti et al. (2021) and Ceylan & Kesici (2017), who found empirical evidence supporting the positive impact of blended learning on student academic outcomes.

Further corroborating these findings, Kazu and Demirkol (2014) conducted a study specifically focusing on the Effect of the Blended Learning Environment Model on High School Students' Academic Achievement. Their research revealed that students exposed to blended learning environments demonstrated higher academic success compared to those in traditional settings, indicating the potential of blended learning to elevate student performance.

Moreover, Li and Wang (2022) provided additional support for the efficacy of blended learning, highlighting its significant improvement in students' academic performance compared to traditional face-to-face approaches. Beyond academic achievement, the benefits of blended learning extend to the acquisition of conceptual skills and the creation of positive learning environments, as noted by Bazelais and Doleck (2018).

Blended learning's effectiveness transcends educational levels, as evidenced by studies involving primary school students. Khader (2016) reported positive outcomes for third-grade students, indicating that blended learning can be beneficial across diverse age groups.

Student preferences further endorse the efficacy of blended learning, with Kiviniemi (2014) finding that students generally favor blended learning over traditional approaches. This preference is reinforced by Boyle et al. (2002) and Ayob (2020), who observed a notable increase in pass rates and positive attitudes toward blended learning among students.

However, Wong et al. (2014) highlighted divergent views, indicating strong support for face-to-face learning methods despite positive perceptions of blended learning. This underscores the importance of considering diverse perspectives and preferences in educational contexts.

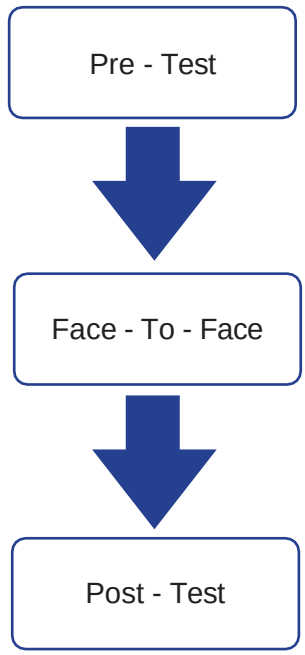
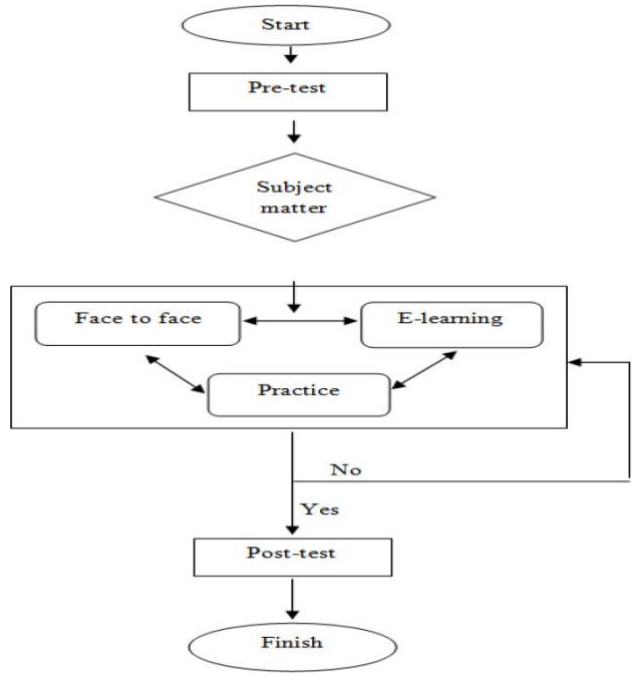
Overall, the literature provides compelling evidence for the effectiveness of blended learning across various educational levels, from primary school to college. These findings lay the groundwork for investigating the applicability of blended learning in Bhutanese educational settings, prompting further exploration into its potential impact on students' academic performance and learning outcomes.

Methodology

This study used a quasi-experimental design with a control group and an experimental group to compare how well the experimental and control group developed their understanding of the concepts taught. While the control group received traditional instruction, the experimental group was taught utilizing a blended learning approach as described in Figure 1. This investigation took place over 2 weeks in April month of 2023. The study used the following learning approach to implement the study, which was adopted from Indrapangastuti et al. (2021)

Figure 1

Info-graphics on the Research Approach

<table>
<tr><th>Control group</th><th>Experimental group</th></tr>
<tr><td> 
</td><td> 

Adopted from Indrapangastuti et al. (2021)</td></tr>
</table>

Participants

The population of this study was students of Gaselo Higher Secondary School. The research sample involved 51 ninth-grade students in the 2023 academic year, of which 27 students were in the experimental group and 24 in the control group. The sampling technique used in this study was purposive random sampling where the students were purposefully divided randomly.

Data Collection

For the pre-test data, students conducted a test to check their understanding of the topic "Azhi Kezang Choden". Specifically, the test evaluates students' basic competence with the understanding of the topic before it was taught. After, the pre-test, a blended learning approach (e-resources) was incorporated for the experiment group, and traditional methods of teaching and learning were incorporated for the control group. The control group was taught in a traditional way where the teacher lectured and students listened. Whereas in the experiment group, the teacher taught the lesson face-to-face, the teacher then used e-resources (YouTube search and internet browsing) and then provided some opportunities for practice with the help of some online quizzes. The incorporated methods were practiced for 2 weeks and after that, a post-test was conducted to check whether there was any difference from the pre-test.

Data Analysis

The results were analyzed using descriptive statistics with the Statistical Package for Social Sciences (SPSS-22). A Shapiro-Wilk Test was performed to check the normality of the data. Followed by an independent sample t-test to determine any significant differences in the mean scores between the experimental and the control group. In the end, the Wilcoxon Signed-ranked test and ANOVA test were performed to validate the above result.

Hypothesis:

H0 = No significant difference in the mean scores between the control and experiment groups

H1 = There is a significant difference in the mean scores between the control and experiment groups.

Findings and Discussion

This section synthesizes the research findings with relevant theoretical frameworks and literature to offer new insights, recommendations, or avenues for further exploration within the field of education. It is a crucial component that bridges the gap between data collection and the generation of knowledge, fostering scholarly dialogue and advancing the understanding of educational phenomena.

Firstly, a Shapiro-Wilk Test was conducted to assess the normality of a dataset, which helps the researchers to determine whether their data meets the assumptions of a parametric statistical test, thereby ensuring the validity of their analyses and conclusions (Tim, 2024).

Table 1

Test of Normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre_test	.109	51	.182	.975	51	.359
Post_test	.238	51	.000	.842	51	.000

A Shapiro-Wilk Test found that the significance value of the Shapiro-Wilk Test for Pre_test was 0.359 which is greater than 0.05, so the Pre_test data was normal. However, the Shapiro-Wilk Test for Post_test indicated that the data was not normal (sig. 0.00 < 0.05). Thus, the test of normality indicated that there was a difference in the scores of the experiment and control group.

Next, an independent sample t-test was conducted to find the mean score differences between the experiment and control group.

Table 2

Group Statistics

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Score	1	27	15.2407	1.26621	.24368
	2	24	12.8125	2.60773	.53230

Table 3

Independent Sample t-test

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Score	Equal variances assumed	11.831	.001	4.305	49	.000	2.42824	.56407	1.29470	3.56178
	Equal variances not assumed			4.148	32.392	.000	2.42824	.58543	1.23633	3.62015

An independent sample t-test was conducted to determine if the blended learning approach was more effective in increasing student's academic achievement than the traditional face-to-face approach. The results showed that the scores of the control group were less than the experiment group. The results showed that the scores of the control group (M = 12.8, SD = 2.6) were lower than the scores of the experiment group (M = 15.2, SD = 1.3). The p-value is .000 which is less than .05, so the difference between the scores of the experiment and the control group was significant. Thus, it can be concluded that the blended learning approach was more effective than the traditional face-to-face learning approach in boosting students' academic performance. Li and Wang (2022) also mentioned that blended learning can significantly improve students' academic performance compared to the traditional face-to-face approach.

Further, the Wilcoxon Signed Rank Test was conducted to validate the above results.

Table 4

Hypothesis Test

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between Exp_post_test and Con_post_test equals 0.	Related-Samples Wilcoxon Signed Rank Test	.000	Reject the null hypothesis

Asymptotic significances are displayed. The significance level is .05

Table 5

Wilcoxon Signed Rank Test

Test Statisticsa	
	Con_post_test - Exp_post_test
Z	-3.536b
Asymp. Sig. (2-tailed)	.000

The Wilcoxon Signed Rank Test revealed that there was a significant difference ($Z = -3.536$, $p < 0.001$) between the scores of the experiment group compared to the control group. Thus, the null hypothesis was rejected, and the blended learning approach proved to be effective in helping students perform well in academics. The result was in line with Ceylan and Kesici (2017) that blended learning helps students in their academic performance.

Further, a one-way ANOVA was conducted to support the Wilcoxon Signed Rank Test and found the following results.

Table 6

Descriptive Statistics

Descriptive								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	27	15.2407	1.26621	.24368	14.7398	15.7416	12.00	17.00
2	24	12.8125	2.60773	.53230	11.7114	13.9136	6.00	16.00
Total	51	14.0980	2.33671	.32720	13.4408	14.7552	6.00	17.00

Table 7

ANOVA Test

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	74.918	1	74.918	18.532	.000
Within Groups	198.091	49	4.043		
Total	273.010	50			

The ANOVA results revealed there was a significant difference in mean scores

of the experiment group and control group with the $p < .05$ [$F(1, 49) = 18.532$, $p = 0.000$]. This is an indication that the blended learning approach was effective as stated by Boyle et al., (2002) and Ayob (2020).

Thus, after conducting an independent sample t-test, Wilcoxon Signed Rank Test, and one-way ANOVA test, the study rejects the null hypothesis. The results of the study revealed that the blended learning approach (experiment group, $M = 15.2$, $SD = 1.3$) was more effective than the traditional learning approach (control group, $M = 12.8$, $SD = 2.6$) with a significant mean difference between these two methods ($p = .000$, $p < .05$). Finally, it can be concluded that the blended learning approach was more effective than the traditional face-to-face learning approach in boosting students' academic learning. The findings of the study were in line with the findings of Indrapangastuti et al., 2021; Ceylan & Kesici, 2017; Kazu & Demirkol, 2014; Bazelais & Doleck, 2018; Khader, 2016; Kiviniemi, 2014, that blended learning improves the academic performance of the students and students also prefer blended learning approach over traditional learning approach.

Conclusion and Recommendations

The study's comprehensive investigation unveiled compelling evidence supporting the efficacy of integrating ICT technology tools, such as YouTube and internet browsing, within a blended learning framework alongside traditional face-to-face instruction. This innovative pedagogical approach emerged as markedly superior to the conventional method of instruction in fostering students' academic performance.

The robustness of these findings was bolstered by the meticulous application of three distinct descriptive statistical analyses utilizing SPSS-22. Across all measures, the results consistently demonstrated significant disparities between the control and experiment groups, with p-values falling below the conventional threshold of 0.05. This stringent validation process reaffirmed the reliability and validity of the study's outcomes.

Furthermore, the congruence between this study's findings and existing research corroborated the robustness of the conclusions drawn. As noted in the literature review, numerous scholars have documented similar trends, underscoring the effectiveness of blended learning strategies in enhancing student academic achievement. This alignment with established research serves to further fortify the credibility of the study's results.

In light of these compelling findings, educators are encouraged to embrace the blended learning approach, integrating technology seamlessly into the teaching and learning process. By harnessing the power of ICT tools within a blended learning paradigm, instructors can create dynamic, engaging learning environments that cater to diverse learning styles and preferences, ultimately fostering greater academic success among students.

Moreover, while this study focused specifically on grade IX students, the implications extend beyond this demographic. Given the promising outcomes observed, future research endeavors could explore the applicability and efficacy of blended learning strategies across various educational contexts and grade levels. By conducting similar studies across a broader spectrum of schools and student populations, a more nuanced understanding of the subject matter can be attained, paving the way for informed pedagogical practices and educational policy decisions.

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Appendix

ID	Group	Pre-Test	Post-Test
S1	Experiment	8.5	15
S2	Experiment	11	15
S3	Experiment	9.5	15
S4	Experiment	13.5	16
S5	Experiment	5	14
S6	Experiment	12.5	16
S7	Experiment	13.5	16
S8	Experiment	16	15
S9	Experiment	9.5	15
S10	Experiment	9	16
S11	Experiment	12.5	16
S12	Experiment	12	16.5
S13	Experiment	5	13
S14	Experiment	12.5	14
S15	Experiment	7.5	16
S16	Experiment	14	16
S17	Experiment	12.5	16
S18	Experiment	13	16
S19	Experiment	9	15
S20	Experiment	13.5	16
S21	Experiment	14	17
S22	Experiment	9.5	12
S23	Experiment	8.5	16
S24	Experiment	11	16
S25	Experiment	14.5	16
S26	Experiment	7.5	12
S27	Experiment	8.5	15
S28	Control	11.5	15

S29	Control	10	13
S30	Control	7.5	9
S31	Control	9.5	10.5
S32	Control	9	10
S33	Control	13.5	15
S34	Control	12.5	12.5
S35	Control	8.5	14.5
S36	Control	10	12
S37	Control	12.5	14
S38	Control	9	12
S39	Control	11	16
S40	Control	8.5	15
S41	Control	11.5	16
S42	Control	13.5	13
S43	Control	14	15
S44	Control	8.5	14
S45	Control	11.5	16
S46	Control	15	15
S47	Control	10	10
S48	Control	10.5	11.5
S49	Control	11.5	9.5
S50	Control	6	6
S51	Control	7	13