Impact of Blended Learning on Academic Achievement among Sr. secondary School of Commerce Education

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Abstract: *The present research investigates the impact of the station rotation model of blended learning on the academic performance of senior secondary school students in the field of Commerce. The primary objective of the study was to assess the effectiveness of blended learning compared to traditional teaching methods in enhancing students' academic outcomes. A pre-test–post-test experimental design and multistage sampling technique was employed. A total of 40 senior secondary students were selected and equally divided into two groups: 20 students in the blended learning group and 20 in the traditional learning group. The blended learning group received instruction through a combination of face-to-face classroom teaching and online learning activities structured within the station rotation model, while the traditional group was taught using conventional lecture-based methods. The intervention was carried out over a period of 18 days, during which the blended learning group engaged in interactive modules, digital resources, peer collaboration, and self-paced online tasks. Statistical analysis of the pre-test and post-test scores indicated a significant improvement in the academic performance of students exposed to the blended learning model in comparison to those taught through traditional methods. Additionally, the pre-test scores of both groups were found to be statistically similar, establishing the reliability of the experimental comparison. The results support the efficacy of blended learning in enhancing student engagement, critical thinking, and conceptual understanding in Commerce at the senior secondary level. They also suggest its potential as a transformative instructional strategy for improving academic outcomes and incorporating new technologies to further enhance the learning process.*

Key Words: *Blended Learning, Station Rotation Model, Academic Achievement.*

1. INTRODUCTION

Education is the process of gaining knowledge, skills, values, and attitudes through various learning modalities. It is the systematic and intentional process of fostering growth and learning, commonly through formal institutions such as schools, colleges, and universities but more frequently through informal ones such as home, community, and workplace. Since industrialization, perhaps the most attractive line of work of the post-independence period has been the pursuit of a business degree. With certainty, most of the Education Commissions formed in India since independence to study higher education have advocated that the overall objective of commerce education is to provide students with a comprehensive acquaintance with the many functional areas of business so they can be best prepared for vocation in the field of trade, commerce, and industry. For the future student community, commerce education has reached a powerful position **(Bansal,2017)**.

In the beginning, school education was provided through conventional methods of teaching. The conventional method of teaching is one where knowledge or information is conveyed by a teacher in a classroom setting through lectures. In this type of method, the teacher acts as the sender and the students as receivers who are supposed to memorize the information. This is a purely teacher-oriented method, with the teacher being the sole source of knowledge.

The largest challenge that any teacher has to overcome is holding the attention of the students, and conveying ideas in a manner that it remains with them well after they have departed the classroom. For this to occur, classroom experience should be redefined and innovative concepts that enhance learning methods used in teaching should be adopted **(Kalyani and Rajsekaran,2018)**. The new innovative teaching methods require that no single teaching method

is sufficient for effective learning and teaching of a concept or subject-matter. A group of teaching methods could be used as a teaching method to guarantee effective teaching and learning **(Modebelu and Duvie,2012).**

Innovative instructional strategies include multiple forms of instruction strategies. Owing to the importance of e-learning during the Covid-19 pandemic and the long-term value of traditional classroom teaching, the adoption of blended instructional strategies has increased significantly in recent years.

1.1 BLENDED LEARNING

The most straightforward definition of the term blended learning is using the conventional methods of classroom instruction alongside the implementation of online learning for the very same students covering the very same content in the very same course. That is to say, blended learning is a term that can be used to describe the practice of offering instruction and learning experiences through some sort of both face-to-face and technology-mediated learning **(Cleveland-Innes and Wilton,2018).** The phenomenon of blended learning cannot be specifically defined because various scholars place varying content into the term, though all of re searchers hold that blended learning is an integrated learning experience which is controlled and guided by the teacher whether it is in the form of face-to-face contact or his virtual presence. (**Bryan & Volchenkova,2016**)

A 2011 report by Horn and Staker, The Rise of K-12 Blended Learning, described a typology of six models of blended learning. In a subsequent **2012 report, Classifying K-12 Blended Learning, Staker and Horn** revised that typology and eliminated two of the six models, creating a typology of four general models of blended learning.
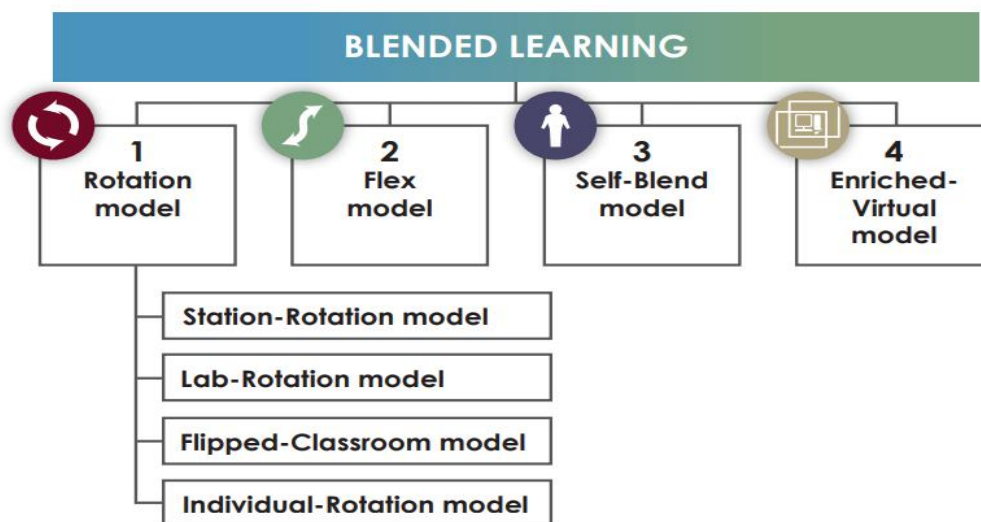
Source: Classifying K-12 Blended Learning by Heather Staker and Michael B. Horn (2012)

2. LITERATURE REVIEW OF THE STUDY

Sachithanandam and Raju (2019) found that interest in studying commerce among higher secondary school and college students is increasing. The study involved 850 students from 20 schools and used a validated tool called the 'Achievement Test in Commerce'. The results showed average achievement in commerce, with no significant differences in academic achievement based on gender, locality, or family type. **Bouilheres et al. (2020)** conducted a study on blended learning among second-year undergraduate students in Business & Management and Science & Technology schools. The research found that blended learning positively impacts students' perceptions of learning experiences and increases engagement with peers, lecturers, and content. **Sharma and Sharma (2020)** studied the impact of blended learning on English achievement in IX graders in Jalandhar city. The study involved 100 students from two schools, divided into experimental and control groups. The study used tools like an achievement test, instructional material, and self-efficacy scale. The experiment was conducted in four phases, including administration, teaching, and post-test. The results showed that blended learning was more effective than conventional teaching, with significant differences for high, average, and low self-efficacy students. The blended learning strategy was found to be more effective than conventional teaching. A study by **Sony (2020)** examined the impact of traditional and smart classroom teaching on academic achievement in 40 students from Shafi Muslim High School in Darbhanga, Bihar, India. The results showed a significant correlation between intelligence and academic achievement, with the smart classroom group showing higher pre-test mean scores. **Alamri (2021)** conducted a study at the University level in Saudi Arabia, focusing on the

relationship between blended project-based learning and student behavioural intention to use and academic achievement. The study involved 80 undergraduate students and used a quantitative approach. A questionnaire was administered to students, and the data was analysed using Structural Equation Modelling-Smart PLS. The results showed a significant relationship between the blended project-based learning approach, perceived self-efficacy, enjoyment, usefulness, and behavioural intention to use, suggesting that it increases students' behavioural intention to use it. **Suprabha and Subramonian (2021)** found that blended learning is more effective than constructivist teaching in developing the attitudes of Commerce students. The study involved 80 students from a Govt. Higher Secondary School in Cheruthuruthy, Thrissur, and divided them into an experimental and control group. The Attitude scale was used to assess the effectiveness of the blended learning strategy. The results showed a significant difference in post-test scores of attitude towards learning between the experimental and control groups, suggesting that blended learning is more effective in developing students' attitudes.

Critical thinking abilities can be greatly impacted by the station rotation learning model. Compared to students who use traditional learning models, those who use this model have better critical thinking abilities. The average post-test score of students in the experimental class is higher than that of the control group, demonstrating this **(Oktarianto et al.,2023)**. According to the study's findings, students who were taught reading comprehension using the Station Rotation Model (SRM) of the Blended Learning Model (BLM) and those who were taught using the lecture method (LM) had significantly different mean scores **(Ogude and Chukweggu,2019)**

The studies collectively indicates that Modern teaching approaches like blended learning and smart classrooms are more effective than traditional methods in enhancing students' academic performance, engagement, self-efficacy, and critical thinking skills. Blended learning positively influences students' perceptions, increases interaction with peers and instructors, and fosters a more effective learning environment. Project-based and station rotation models improve comprehension and problem-solving abilities. Integrating technology and interactive strategies leads to better educational outcomes.

3. JUSTIFICATION OF THE STUDY

Senior secondary education should prioritize experiential learning and self-learning for knowledge production, rather than just conceptual information. Teachers should be aware of the best learning outcomes for students, aiming to develop independent thought, articulation, and abstract thinking. The National Education Policy 2020 emphasizes 21st-century skills to prepare students for success in modern marketplaces and the internet age. Commerce education focuses on understanding retail, wholesale, import, export trades, port industry, transportation, insurance, warehousing, money, banking, finance, and mercantile agencies. The effectiveness of educational programs is determined by the presentation and delivery methods used. Blended learning, an innovative teaching technique that combines digital learning resources with traditional classroom teaching methods, has become more popular in the educational field after the Covid-19outbreak.

The station rotation model is an effective blended learning approach that combines online activities, teacher-directed stations, and learning stations using alternative teaching strategies like project-based learning or collaboration. Students are split up into groups and allocated to different learning stations based on the teacher's directions **(Nisa and Mubarok, 2018)** The study aims to investigate the efficacy of blended learning in senior secondary school commerce education using the station rotation model.

4. OBJECTIVES OF THE STUDY
4.1. A comparative study of the effects of blended teaching and traditional teaching on the academic achievement of commerce students at the higher secondary level.

5. HYPOTHESIS OF THIS STUDY
5.1. There is positive impact of blended Learning on commerce Students at the higher secondary level.
5.2. There is no significant difference between pre-test and post-test of academic achievement of students in the traditional learning group.
5.3. There is no significant difference between the pre-test of academic achievement of students in the blended learning group and those in the traditional learning group.
5.4. There is a significant difference between the post-test of academic achievement of students in the blended learning group and those in the traditional learning group.

6. RESEARCH METHOD OF THE STUDY

Experimental method was used by the researcher. This method works best when establishing a cause-and-effect link is the goal; in this instance, assessing if blended learning affects students' academic performance more than traditional learning does. The researcher employed the pre-test–post-test design of experimental research method.

## 7. SAMPLING : **Multistage Sampling** used by researcher in this study.

8. FINDINGS AND ANALYSIS

H1: There is positive impact of blended Learning on commerce Students at the higher secondary level.
TABLE:1

Test	N	Mean	SD	t-Value	df	Level of Significance	Result
Pre-test	20	14.50	2.911	38.775	19	0.05	accepted
Post-test	20	26.85	3.014				

Value of t at 0.05 level =	1.729
Value of t at 0.01 level =	2.539
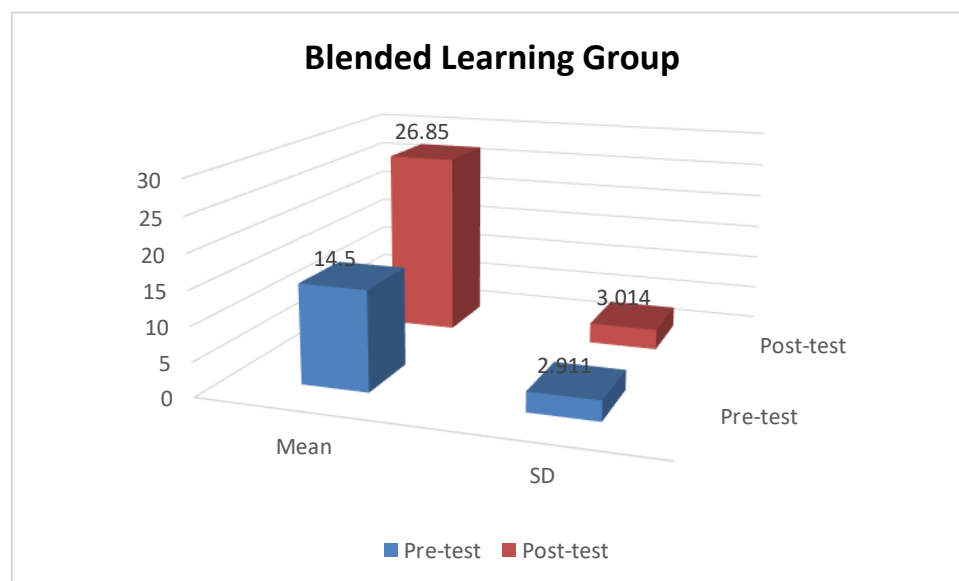
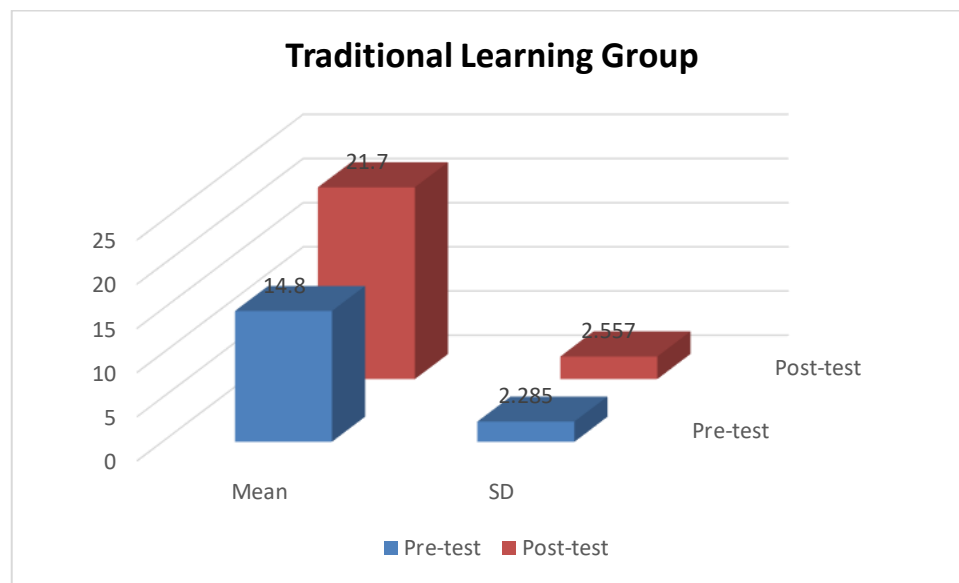

Table 1 shows that the mean score of students in the blended learning group on the pre-test is **14.50** with a standard deviation of **2.911**, whereas the mean score on the post-test is **26.85** with a standard deviation of **3.014**. By calculating the t-test using the mean and standard deviation, the **t-value** was found to be **38.775**. The critical value at the 0.05 significance level with **19 degrees of freedom (n-1)** is **1.729**. Since the calculated t-value is greater than the critical value, the hypothesis is accepted, indicating that **blended learning has a positive impact on the academic performance of Commerce students at the higher secondary level**.

H0: There is no significant difference between pre-test and post-test of academic achievement of students in the traditional learning group.
TABLE:2

Test	N	Mean	SD	t-Value	df	Level of Significance	Result
Pre-test	20	14.80	2.285	23.136	19	0.05	not accepted
Post-test	20	21.70	2.557				

|	
Value of t at 0.05 level =	2.093
Value of t at 0.01 level =	2.861

Table 2 shows that the mean score of the students in the pre-test is **14.80** with a standard deviation of **2.285**, while the mean score in the post-test is **21.70** with a standard deviation of **2.557**. By calculating the t-test using the mean and standard deviation, the **t-value** was found to be **23.136**. The critical value at the 0.05 level of significance with **19 degrees of freedom (20–1)** is **2.093**. Since the calculated t-value is greater than the critical value, the hypothesis is rejected, suggesting that there is a **significant difference between the pre-test and post-test scores of the traditional learning group of Commerce students at the higher secondary level**.

Value of t at 0.05 level =	2.024
Value of t at 0.01 level =	2.711

H0: There is no significant difference between the pre-test of academic achievements of students in the blended learning group and those in the traditional learning group.

TABLE:3

Group	N	Mean	SD	t-Value	df	Level of Significance	Result
Blended Learning Group	20	14.50	2.911	0.363	38	0.05	accepted
Traditional Learning Group	20	14.80	2.285				
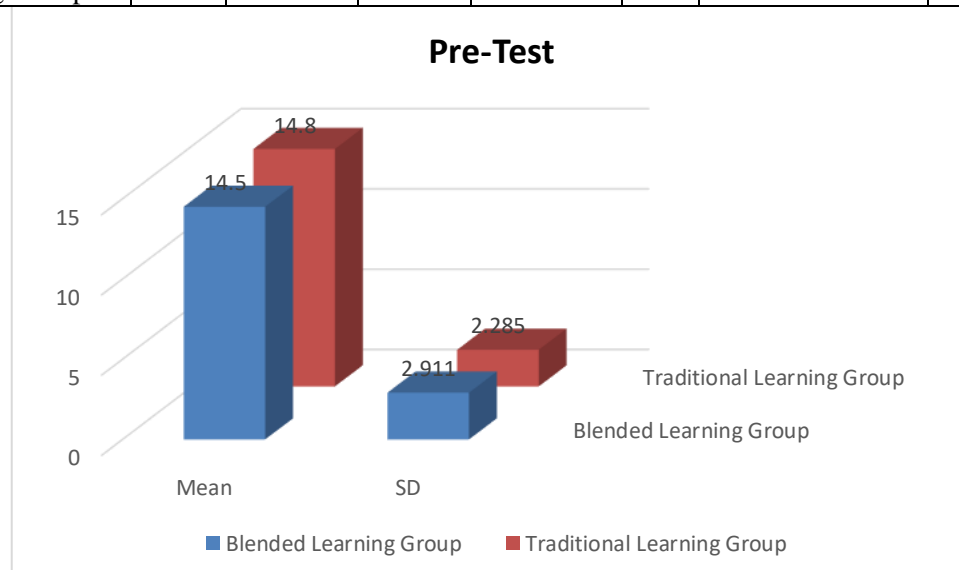
Table 3 shows that the difference in pre-test scores between the blended learning and traditional learning student groups. According to the table, the mean pre-test score of the blended learning group is **14.50** with a standard deviation of **2.911**,
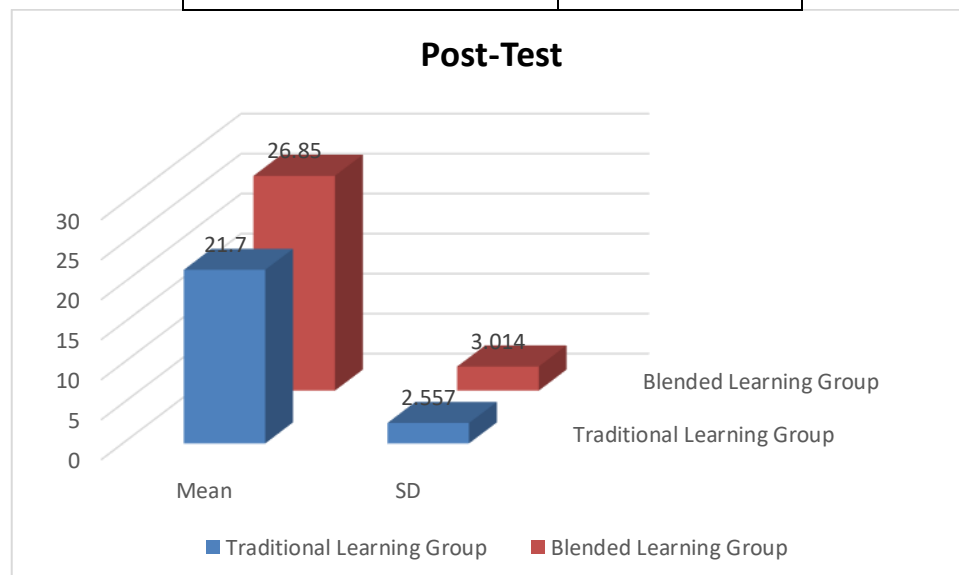
while the mean pre-test score of the traditional learning group is **14.80** with a standard deviation of **2.285**. Using the t-test calculated from the means and standard deviations, the **t-value** was found to be **0.363**. The critical t-value at the 0.05 significance level with **38 degrees of freedom (20 + 20 − 2)** is **2.024**. Since the calculated t-value is less than the critical value, the hypothesis is accepted, indicating that there is **no significant difference in the academic achievement in the pre-test between the blended learning group and the traditional learning group**.

H1: There is a significant difference between the post-test of academic achievement of students in the blended learning group and those in the traditional learning group.

TABLE:4

Group	N	Mean	SD	t-Value	df	Level of Significance	Result
Blended Learning Group	20	26.85	3.014	5.828	38	0.05	accepted
Traditional Learning Group	20	21.7	2.557				

Value of t at 0.05 level =	2.024
Value of t at 0.01 level =	2.711

Post-Test

Table 4 displays the comparison of post-test scores between the blended learning and traditional learning student groups. According to the table, the mean score for the blended learning group is **26.85** with a standard deviation of **3.014**, while the mean score for the traditional learning group is **21.70** with a standard deviation of **2.557**. Using the means and standard deviations, the **t-test** value was calculated to be **5.828**. The critical t-value at the 0.05 level of significance with **38 degrees of freedom (20 + 20 − 2)** is **2.024**. Since the calculated t-value is greater than the critical value, the hypothesis is accepted, indicating that there is a **significant difference in academic achievement between the blended learning group and the traditional learning group**.

9. DISCUSSION

The literature review in the study sets a robust conceptual and empirical basis for the exploration of how blended learning affects student performance. Previous studies, as noted in the works by **Bouilheres et al. (2020), Sharma and Sharma (2020), and Suprabha and Subramonian (2021)**, all point to the superiority of blended learning over conventional pedagogy in boosting student interest, academic performance, and self-perceived efficacy. These findings are reinforced very strongly by the results of the current study, which showed a statistically significant difference in improvement in the post-test performance of students in the blended learning group over those in the traditional group. Application of the station rotation model, supported by researchers such as **Nisa and Mubarok (2018) and Oktarianto et al. (2023)**, was a core element of this research's teaching design and was found to be effective in encouraging deeper learning, as indicated by the high increase in academic achievement scores. Additionally, the literature's focus on heightened student engagement and motivation through blended strategies corroborates the observed classroom dynamics and enhanced

conceptual understanding experienced during the intervention period. The statistical equivalence among the pre-test scores of both groups, similarly documented in the literature as a methodological necessity for equitable comparisons, also lends support to the experimental findings. Together, the examined studies and the present research findings align to attest that blended learning, more so through systematic models such as station rotation, presents a better, enjoyable, and even educational classroom alternative to conventional instructional practices within senior secondary commerce education.

The four hypotheses tested in this study were carefully structured to assess the effectiveness of blended learning as compared to traditional teaching methods on commerce students at the higher secondary level. The first hypothesis, which examined whether blended learning had a positive impact on students' academic achievement, was accepted. This is due to the significant improvement observed in students' performance after being exposed to the blended learning environment, which likely fostered greater engagement, interactivity, and conceptual understanding through its integration of digital tools and face-to-face instruction. The second hypothesis, which assumed no significant difference between the pre-test and post-test scores of the traditional learning group, was rejected. This rejection was logical because students in the traditional group did show academic improvement after receiving instruction, even though the method was conventional. The improvement occurred because the students were exposed to the curriculum content during the intervention, which naturally led to better post-test scores, though the progress was relatively modest compared to the blended learning group. The third hypothesis, which proposed that there would be no significant difference between the pre-test scores of the blended and traditional groups, was accepted. This indicates that both groups started at a comparable academic level, thereby ensuring the internal validity and fairness of the experimental comparison. The fourth hypothesis, which suggested a significant difference in post-test scores between the blended and traditional learning groups, was accepted. This clearly reflects that the instructional approach used in the blended learning group was more effective in enhancing academic achievement than the traditional method. The structure and results of these hypotheses collectively validate that while traditional methods may still support learning to an extent, blended learning offers a more impactful, equitable, and engaging pathway to academic success.

10. CONCLUSION

The results of all four hypotheses collectively highlight the **superiority of blended learning over traditional methods** in terms of enhancing academic achievement among higher secondary commerce students. While both instructional methods led to improvement, **blended learning proved to be significantly more impactful**, offering a flexible, engaging, and learner-centred environment. The study suggests that adopting blended learning in educational settings can play a vital role in promoting deeper understanding, retention, and application of knowledge.

11. FUTURE SUGGESTIONS

• Examine how blended learning influences students' cognitive load as compared to traditional instruction and how it affects their capacity for processing and retaining information.
• Discuss how blended learning affects students' motivation, self-regulated learning abilities, and time management in relation to traditional classroom learning.
• Discuss the gamification, simulation, and interactive content roles in blended learning for business education and their effects on student engagement and academic performance.
• Research the psychological dimensions of blended learning, e.g., student stress, anxiety, and adaptability to technology-supported learning environments.
• Carry out subject-specific research to identify if blended learning is better suited for theoretical subjects such as Business Studies or practical subjects such as Accounting and Economics.

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