Assessing the Role of Institutional Infrastructure in Shaping Attitudes toward Blended Learning: Evidence from Undergraduate Colleges

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Abstract

Blended Learning has emerged as a transformative approach in higher education by integrating face-to-face instruction with digital learning environments to enhance flexibility, accessibility, and learner engagement. The present study examines the role of institutional infrastructure in shaping the attitudes of students and teachers toward blended learning in undergraduate colleges affiliated with the University of Calcutta. Adopting a descriptive survey method, data were collected through stratified random sampling from selected colleges across four districts of West Bengal. Standardized attitude scales and interview schedules were used as tools, with reliability confirmed through Cronbach's Alpha. Statistical analysis using the Chi-square test revealed a significant relationship between infrastructural facilities and stakeholders' attitudes. The findings indicate that institutions with well-developed infrastructure, including reliable internet connectivity, access to digital devices, and technical support, foster more favourable attitudes toward blended learning among both students and teachers. Conversely, inadequate infrastructural conditions lead to less positive perceptions and hinder effective implementation. The study concludes that institutional infrastructure is a critical factor in ensuring the successful adoption and sustainability of blended learning and highlights the need for strengthening technological resources in higher education institutions.

Keywords: Blended Learning, Institutional Infrastructure, Students' Attitude, Teachers' Attitude, Higher Education

1. Introduction

The increasing integration of digital technologies in higher education has significantly reshaped traditional pedagogical practices, leading to the emergence of more flexible and learner-centred instructional approaches. Among these, Blended Learning has gained considerable attention as it combines face-to-face classroom interaction with online learning environments to create a more dynamic and interactive learning experience. This approach not only enhances accessibility and flexibility but also encourages active participation, collaboration, and self-paced learning among students (Singh & Reed, 2001; Hrastinski, 2019). As institutions strive to meet the evolving demands of twenty-first-century education, blended learning is increasingly being adopted as a viable and sustainable model. However, the successful implementation of blended learning is largely dependent on the infrastructural readiness of educational institutions. Infrastructure in this context encompasses not only physical facilities but also digital resources such as reliable internet connectivity, availability of devices, learning management systems, and technical support services. These elements are essential for ensuring seamless integration between online and offline modes of instruction. Studies have shown that institutions with adequate technological infrastructure are more effective in implementing blended learning and tend to foster higher levels of engagement and satisfaction among learners (Moskal, Dziuban, & Hartman, 2013; Broadbent, 2017). In contrast, inadequate infrastructure often results in technical disruptions, limited accessibility, and reduced participation, thereby affecting the overall learning experience.

The challenge of infrastructural disparity is particularly evident in the context of Indian higher education, where institutions vary widely in terms of technological preparedness and resource availability. While various national initiatives have promoted the use of digital learning platforms and innovative teaching methods, many colleges continue to face constraints such as poor internet connectivity, lack of digital devices, and insufficient institutional support. These challenges not only hinder the effective implementation of blended learning but also influence the attitudes and readiness of both teachers and students (Bansal, 2020; Jena, 2020). As a result, the potential benefits of blended learning cannot be fully realized in such settings. Given this scenario, it becomes essential to examine the infrastructural conditions of educational institutions and their role in facilitating blended learning. Understanding how infrastructure influences the attitudes of key stakeholders can provide valuable insights for improving teaching–learning processes and promoting the effective adoption of blended learning strategies. Therefore, the present study focuses on undergraduate colleges affiliated with the University of Calcutta, aiming to assess their infrastructural readiness and explore its impact on students' and teachers' attitudes toward blended learning. This study is expected to contribute to the existing literature by providing context-specific evidence and offering practical implications for enhancing the quality and effectiveness of blended learning in higher education.

2. Review of related literature

Blended Learning has been widely recognized as a transformative approach in higher education, combining the strengths of face-to-face and online learning environments to enhance flexibility and learner engagement. A substantial body of literature consistently emphasizes that the effectiveness of blended learning is closely dependent on institutional infrastructure and technological readiness. In this regard, Garrison and Kanuka (2004) argue that the successful integration of blended learning requires strong institutional support and adequate technological infrastructure, without which its transformative potential cannot be fully realized. Similarly, Graham (2006) identifies infrastructure, including access to digital tools and reliable internet connectivity, as a fundamental component influencing the design and effectiveness of blended learning systems.

Further supporting this perspective, Porter et al. (2016) demonstrate that the adoption and implementation of blended learning in higher education institutions are significantly influenced by technological capacity and organizational support. Their findings indicate that institutions with well-developed infrastructure tend to exhibit more favourable attitudes among both students and teachers.

In a related study, Al-Azawei, Parslow, and Lundqvist (2016) highlight that learners' readiness and attitudes toward blended learning are strongly shaped by accessibility to technological resources, suggesting that increased exposure to digital tools enhances engagement, confidence, and acceptance.

However, the literature also reveals notable challenges in contexts where infrastructural facilities are inadequate. Panda and Mishra (2007), in their study on e-learning in a mega open university, identify poor internet connectivity, lack of technical support, and limited access to digital resources as major barriers to effective implementation. Similarly, Kaur (2013) points out that despite the pedagogical advantages of blended learning, its success remains contingent upon the availability of adequate infrastructure and institutional support, particularly in developing countries where resource constraints are prevalent.

Overall, the reviewed studies present a coherent and corroborative understanding that infrastructure is a critical determinant of the success and acceptance of blended learning. Adequate infrastructural facilities not only facilitate effective teaching–learning processes but also foster positive attitudes among stakeholders, whereas infrastructural deficiencies hinder adoption and reduce the overall effectiveness of blended learning environments. Despite this consensus, there remains a need for localized empirical studies to examine how infrastructural conditions influence stakeholders' attitudes in specific institutional contexts.

Despite the extensive body of literature highlighting the importance of infrastructure in the successful implementation of blended learning, most existing studies are broad in scope and focus primarily on general higher education contexts or e-learning adoption at a macro level. There is a noticeable lack of region-specific empirical research, particularly in the context of undergraduate colleges affiliated with the University of Calcutta. Moreover, limited studies have simultaneously examined the influence of infrastructural conditions on both students' and teachers' attitudes toward blended learning. This indicates a clear research gap in understanding the localized realities of infrastructural readiness and its impact on stakeholders within specific institutional settings. In this context, the present study assumes significant importance as it attempts to bridge this gap by providing an empirical investigation into the infrastructural conditions of selected colleges and their role in shaping attitudes toward blended learning. The findings of the study are expected to contribute to the existing literature while also offering practical insights for policymakers, administrators, and educational institutions to improve infrastructural facilities and promote the effective adoption of blended learning in higher education.

3. Research objective

To examine the present infrastructural condition of the undergraduate colleges affiliated to University of Calcutta for adopting blended learning.

4. Research Hypothesis

H01 Infrastructural facilities have no impact on the attitude of the teachers towards blended learning at undergraduate level.

H02 Infrastructural facilities have no impact on the attitude of the students towards blended learning at undergraduate level.

5. Research Methodology

To examine the infrastructural conditions of undergraduate colleges affiliated with the University of Calcutta for the adoption of Blended Learning. To achieve this objective, a systematic research methodology was adopted as described below:

5.1. Research design

The study followed a descriptive survey method. This design was considered appropriate to collect data from the large group of respondents and analysing their responses.

5.2. Population

In this research the population consist of undergraduate students, teachers and administrators of the undergraduate colleges affiliated to the University of Calcutta, West Bengal, India.

5.3. Sample and sampling technique

A stratified random sampling technique was adopted to draw samples from the population. Out of 38 colleges affiliated with the University of Calcutta offering the selected subjects Botany, Chemistry, History, and Bengali only 12 colleges were randomly selected from four districts, namely Howrah, Hooghly, Kolkata, and South 24 Parganas. Among these, two (2) colleges were selected from Howrah, two (2) from Hooghly, three (3) from South 24 Parganas, and five (5) from Kolkata using the lottery method of random sampling. From each selected college, four (4) teachers and six (6) students were chosen from each department to constitute the sample for the study.

5.4. Tools used in the study

The study employed the following tools for the collection of relevant data.

1. Attitude Scale for Teachers & for Students towards blended learning at undergraduate level. (32 items)
2. Interview Schedule for Principal/ Vice-Principal/ Teacher-in-charge regarding infrastructural support as provided by the institution in implementing blended learning at undergraduate level.

5.5. Reliability and Validity of the tools

The reliability of the attitude scale was checked by using Cronbach's Alpha and the value was found to be 0.819 and 0.840 for the attitude scale of students and teachers respectively. The result indicated that the internal consistency of the attitude scale is very high. The validity of both tools was ensured through the Delphi technique, wherein the tools were finalized based on the reports of experts.

6. Analysis and interpretation of data

The data have been systematically analysed and interpreted to highlight significant patterns, which are presented as results in the following section.

6.1. Infrastructure of the college for practicing blended learning

To understand the available infrastructural conditions of the colleges affiliated to the University of Calcutta for practicing blended learning at undergraduate level, a questionnaire was prepared by the researcher to collect the relevant infrastructure related information from the head of the institution.

Table.1. ***Distribution of the colleges according to the infrastructural condition of the college for practicing blended learning***

Number of Colleges	Infrastructural Facility of the Colleges
3	Good
5	Average
3	Poor

Colleges were classified into three categories as Good, Average and Poor, depending on the infrastructural facilities available at the colleges. Interestingly it was noted that three colleges each fall under good and poor category while 5 colleges were found to belong average category.

6.2. Comparison between the attitude of students and the infrastructural facilities of the colleges

To assess the impact of infrastructural facilities on students' attitude, a median test was conducted, and the result has been presented in **Table.2.**

Table.2. ***Chi Square for comparison between the attitude of students and the infrastructural facilities of the colleges***

	Students Attitude			
Infrastructural Condition of The Colleges		**Below Median (%)**	**Above Median (%)**	**Total (%)**
	Good	26	46	72 (27.27)
	Average	50	70	120 (45.45)
	Poor	51	21	72 (27.27)
	Total	127 (48.11)	137 (51.89)	264 (100)
Chi Square	21.03	** Null hypothesis is rejected at 0.05 level of significance.*		
Df	2			

**Significant at 0.05 level of significance.*

Chi Square value for Comparison between the Attitude of Students and the Infrastructural Facilities of the Colleges is shown in **Table.2.** and it is found that the value (21.03) is not significant at 0.05 level. In this connection, the null hypothesis **$H_0$1** "There is no significant difference between the students' attitude and the infrastructural facilities of the colleges."is rejected at 0.05 level of significance. It is also observed from **Table.2.** that, out of 72 respondents who informed that the infrastructural condition of their respective colleges was quite good, approximately 37 percent of students were found to be in the below median category. This means when the infrastructural condition of the college is good majority of the respondents expressed highly favorable attitude towards blended learning at undergraduate level. While a significant percentage of respondents expressed in the other way around i.e., despite having good infrastructural facilities near about 36 percent students expressed not so favorable attitude towards blended learning. In case of colleges having average infrastructural facilities, it was found that approximately 42 percent of respondents expressed highly supportive attitude towards blended learning. In case of colleges having poor infrastructural facilities, it was found that remarkably majority of the respondents approximately 71 percent of students expressed not so supportive attitude while only 29 percent student showed positive attitude. The findings clearly show that student's attitude and infrastructural facilities of the college for implementing blended learning is related to one another. When the infrastructural condition is good the attitude of the students is also good and when the infrastructural facilities are not in good condition for implementing blended learning then the attitude is also not good towards blended learning.

6.3. Comparison between the attitude of teachers and the infrastructural facilities of the colleges

A median test was conducted to evaluate the impact of infrastructural facilities on students' attitude, and the results were presented in **Table.3.**

Table.3. ***Chi Square for the comparison between the attitude of teachers and the infrastructural facilities of the colleges***

	Teachers Attitude			
Infrastructural Condition of The Colleges		**Below Median (%)**	**Above Median (%)**	**Total (%)**
	Good	13	35	48 (27.27)
	Average	42	38	80 (45.45)
	Poor	29	19	48 (27.27)
	Total	84 (47.23)	92 (52.27)	176 (100)
Chi Square	12.03	** Null hypothesis is rejected at 0.05 level of significance.*		
Df	2			

** Significant at 0.05 level of significance.*

C*hi Square value for comparison between the attitude of students and the infrastructural facilities of the colleges* is shown in the **Table.3.** revealed that **$H_0$2:** "There is no significant difference between the Teachers' attitude and the infrastructural facilities of the colleges" is rejected at 0.05 level of significance. The Chi Square result (12.03) identified that there is a significant difference between the teachers' attitude and infrastructural facilities of the college. Out of 48 respondents who informed that the infrastructural condition of their respective colleges was quite good, approximately 27 percent of teachers were found to be in the below median category. This means when the infrastructural condition of the college is good majority of the respondents expressed highly favorable attitude towards blended learning at undergraduate level. While a significant percentage of respondents expressed in the other way around i.e., despite having good infrastructural facilities only 27 percent of students expressed not so supportive attitude towards blended learning. In case of the colleges having average infrastructural facilities, it was found that approximately 53 percent of teachers expressed not so favorable attitude towards blended learning. In case of colleges having poor infrastructural facilities, it was found that remarkably majority of the respondents, approximately 60 percent of students, expressed not so supportive attitude while nearly 38 percent teachers showed highly favorable attitude towards blended learning. The findings clearly show that student's attitude and infrastructural facilities of the college for implementing blended learning is related to one another. When the infrastructural conditions are good the attitude of the teachers is also good and when the infrastructural facilities are not in good condition for implementing blended learning then the attitude is also not good towards blended learning.

7. Major Findings of the study

Based on the analysis and interpretation of the data, the major findings of the study are outlined as follows:

7.1. Infrastructural facility of the colleges and the students' attitude towards BL

1. A significant relationship was found between the infrastructural facility of the colleges and the attitude of students towards blended learning.
2. Good infrastructural facility and technological exposure influence students' attitude in a more favorable manner and poor infrastructural condition of the colleges influences the students' attitude in a less favorable way.
3. The result also showed that colleges having good infrastructural conditions have more favorable students' attitude towards blended learning and the colleges have average and poor infrastructural conditions have less favorable students' attitude towards blended learning.

7.2. Infrastructural facility of the colleges and the teachers' attitude towards BL

1. A significant relationship was found between the infrastructural facilities of the colleges in developing positive attitude among the teachers.
2. It was noted that good infrastructural facility of the colleges and better technological exposure influences teachers' attitude in a more favourable way. In the same way poor infrastructural conditions and less technological exposure of the teachers at the colleges influence the teachers' attitude in a less favourable way.

8. Discussion and Conclusion

Infrastructure plays a crucial role in the adoption of any mode of instruction at all levels of education. When the teaching–learning process involves a blend of online and face-to-face modes, the infrastructural condition of the institution becomes even more significant for the effective implementation of such instructional techniques. The present study aimed to explore how infrastructural conditions impact students' and teachers' attitudes toward Blended Learning. The findings clearly indicate that adequate technological exposure and strong infrastructure foster a higher level of positive attitude toward blended learning among both students and teachers. In contrast, institutions with average or poor infrastructure tend to exhibit less favourable perceptions toward this mode of learning.

These findings are in strong agreement with previous studies. Garrison and Kanuka (2004) highlight that the success of blended learning largely depends on institutional preparedness, particularly in terms of technological infrastructure and support. Similarly, Graham (2006) emphasizes that access to appropriate technological resources is a fundamental requirement for the effective functioning of blended learning systems. The present study also aligns with Porter et al. (2016), who found that institutions with better technological capacity and support systems demonstrate more successful adoption and more positive stakeholder attitudes toward blended learning.

Furthermore, the findings are supported by Al-Azawei, Parslow, and Lundqvist (2016), who argue that students' readiness and attitudes toward blended learning are significantly influenced by the availability and accessibility of digital tools and infrastructure. In the Indian higher education context, P blended learning anda and Mishra (2007) identified inadequate infrastructure and limited technological access as major barriers to the effective implementation of e-learning and blended learning practices. Kaur (2013) also emphasizes that without proper infrastructural support, the potential benefits of blended learning cannot be fully realized, leading to reduced motivation and less positive attitudes among users.

Thus, both the discussion and conclusion of the present study converge on the understanding that infrastructure is a determining factor in shaping attitudes toward blended learning. Strong infrastructural facilities not only ensure the smooth execution of blended instructional strategies but also enhance confidence, engagement, and acceptance

among students and teachers. On the other hand, inadequate infrastructure limits exposure, creates barriers to access, and results in less favourable attitudes.

In conclusion, for the effective adoption and sustainability of blended learning in higher education, it is essential for institutions to prioritize the development of robust technological infrastructure, including reliable internet connectivity, digital devices, and technical support systems. Strengthening these aspects will not only improve the quality of teaching–learning processes but also promote a more positive and receptive attitude toward blended learning among all stakeholders.

References

Porter, W. W., Graham, C. R., Spring, K. A., & Welch, K. R. (2016). *Computers & Education*, 75, 185–195.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95–105. https://doi.org/10.1016/j.iheduc.2004.02.001

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In Bonk, C. J., & Graham, C. R. (Eds.), *The Handbook of Blended Learning*. https://www.researchgate.net/publication/242282026

Porter, W. W., Graham, C. R., Spring, K. A., & Welch, K. R. (2016). Blended learning in higher education: Institutional adoption and implementation. *Computers & Education*, 75, 185–195. https://doi.org/10.1016/j.compedu.2014.02.011

Al-Azawei, A., Parslow, P., & Lundqvist, K. (2016). Investigating the effect of learning styles in a blended e-learning system. *Computers in Human Behavior*, 63, 143–158. https://doi.org/10.1016/j.chb.2016.05.024

Panda, S., & Mishra, S. (2007). E-learning in a mega open university: Faculty attitude, barriers and motivators. *Educational Media International*, 44(4), 323–338. https://doi.org/10.1080/09523980701680854

Kaur, M. (2013). Blended learning—Its challenges and future. *Procedia - Social and Behavioral Sciences*, 93, 612–617. https://doi.org/10.1016/j.sbspro.2013.09.248

Bansal, S. (2020). Impact of COVID-19 on higher education in India. *International Journal of Advanced Science and Technology, 29*(9), 134–141.

Broadbent, J. (2017). Comparing online and blended learners' self-regulated learning strategies and academic performance. *The Internet and Higher Education, 33*, 24–32. https://doi.org/10.1016/j.iheduc.2017.01.004

Hrastinski, S. (2019). What do we mean by blended learning? *TechTrends, 63*(5), 564–569. https://doi.org/10.1007/s11528-019-00375-5

Jena, P. K. (2020). Impact of pandemic COVID-19 on education in India. *International Journal of Current Research, 12*(7), 12582–12586.

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *The Internet and Higher Education, 18*, 15–23. https://doi.org/10.1016/j.iheduc.2012.12.001

Singh, H., & Reed, C. (2001). *A white paper: Achieving success with blended learning*. Centra Software.