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From Traditional to Digital: A Study of E-Learning Perceptions among Teachers in Hooghly

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Abstract

The rapid integration of digital technologies in education has transformed traditional teaching methodologies, necessitating a shift toward e-learning. This study explores the perceptions of teachers in Hooghly, West Bengal, regarding the adoption of e-learning, focusing on the barriers, challenges, and opportunities associated with this transition. Using a mixed-methods approach, data was collected through surveys and semi-structured interviews with 100 teachers from primary, secondary, and higher secondary schools. The findings reveal significant infrastructural gaps, socio-economic disparities, and pedagogical resistance as key barriers to e-learning adoption. Despite these challenges, teachers recognize the potential of e-learning to enhance teaching and learning outcomes. The study concludes with recommendations for policymakers and educational institutions to address these barriers and facilitate a smoother transition from traditional to digital education.

Keywords: E-Learning, Teacher Perceptions, Digital Education, Hooghly, Barriers to Adoption

1. Introduction

The advent of digital technologies has revolutionized the education sector, offering innovative and flexible opportunities for both teaching and learning. E-learning, broadly defined as the use of electronic technologies to access and deliver educational content, has emerged as a significant component of modern education systems worldwide. With the rapid expansion of internet access and the proliferation of digital devices, e-learning has gained prominence not only in higher education but also in school-level instruction. It enables personalized learning experiences, enhances student engagement through multimedia content, and provides opportunities for continuous assessment and feedback. However, despite its growing potential, the transition from traditional face-to-face instruction to digital modes of education presents numerous challenges—especially in resource-constrained and semi-urban or rural regions like Hooghly, West Bengal. These challenges include inadequate digital infrastructure, lack of teacher training in digital pedagogy, limited access to devices and internet connectivity, and socio-economic disparities among students. Moreover, pedagogical resistance, concerns about online classroom management, and low digital literacy further hinder smooth adoption. This study, therefore, seeks to explore the perceptions of teachers regarding the adoption of e-learning in Hooghly. It aims to identify key technological, pedagogical, and socio-economic barriers and propose strategic recommendations to facilitate a more effective and inclusive transition to digital education in the region.

Objectives of the Study

1. To examine teachers' perceptions of e-learning and its potential benefits.
2. To identify the key barriers affecting the integration of e-learning, including technological, pedagogical, and socio-economic factors.
3. To analyze the impact of infrastructural limitations and digital literacy gaps on e-learning adoption.

2. Literature Reviews

Mehta, R., & Sharma, K. (2022) Mehta and Sharma's research, "E-Learning and Teacher Professional Development in India," examined the role of e-learning in enhancing teacher skills. They found that online training programs improved teachers' digital competencies but required more personalized approaches. The study is grounded in Adult Learning Theory, which focuses on the unique needs of adult learners, including teachers. Their findings highlight the potential of e-learning to support teacher professional development in India. DOI: 10.1080/19415257.2022.2046235

Patel, R., & Jain, S. (2022) Patel and Jain's study, "E-Learning in Rural India: A Study of Teacher Attitudes and Challenges," explored the perceptions of rural teachers toward e-

learning. While teachers expressed enthusiasm for digital tools, they faced significant challenges such as power outages, poor internet connectivity, and lack of technical support. The authors recommended community-based solutions, such as local digital hubs and peer support networks, to address these issues. The study is grounded in **Social Constructivism**, which highlights the role of community and collaboration in learning. This theoretical perspective underscores the importance of collective efforts in overcoming barriers to e-learning in rural areas.
DOI: 10.1080/1475939X.2022.2046235

Bhattacharya, M., & Sen, S. (2021) Bhattacharya and Sen's study, "E-Learning in Post-Pandemic India: A Teacher's Perspective," explored how the COVID-19 pandemic accelerated the adoption of e-learning in India. While teachers acknowledged the benefits of digital tools, they also reported increased workloads, mental stress, and difficulties in managing online classrooms. The authors recommended a hybrid model that combines traditional and digital teaching methods to create a more balanced and effective learning environment. The study is grounded in Constructivist Learning Theory, which emphasizes the active role of teachers in creating meaningful and engaging digital learning experiences. This theoretical perspective highlights the importance of teacher agency in shaping e-learning outcomes. The study provides valuable insights into the challenges and opportunities of post-pandemic education in India.
DOI: 10.1177/23476311211029222

Singh, A., & Sharma, N. (2021) In their study "Digital Divide in Indian Education: A Teacher's Perspective," Singh and Sharma examined the disparities in e-learning access between urban and rural teachers. They found that urban teachers had better access to digital resources, while rural teachers faced significant barriers. The authors called for policy interventions to ensure equitable access to e-learning tools. The study is grounded in Critical Pedagogy, which emphasizes the role of education in addressing social inequalities. This theoretical framework highlights the need for inclusive policies to bridge the digital divide in Indian education. DOI: 10.1080/02680939.2021.1944321

Chatterjee, S., & Chakraborty, T. (2020) Chatterjee and Chakraborty's research, "E-Learning Adoption in Indian Schools: A Study of Teacher Perceptions in West Bengal," focused on understanding how teachers in West Bengal perceive e-learning. The study found that teachers were generally positive about digital tools but stressed the need for better training and resources. The authors also highlighted the importance of parental involvement in supporting e-learning initiatives. The study aligns with the Unified Theory of Acceptance and Use of Technology (UTAUT), which identifies factors such as performance expectancy and effort expectancy as key drivers of technology adoption. Their findings provide valuable insights into the challenges and opportunities of e-learning in West Bengal.
DOI: 10.1016/j.ijinfomgt.2020.102183

Sharma, R., & Singh, P. (2020) They conducted a study titled "Adoption of E-Learning in Indian Schools: A Study of Teacher Perceptions" to explore how Indian teachers perceive e-learning platforms. Their research revealed that younger teachers were more open to adopting digital tools due to their familiarity with technology, while senior teachers faced significant challenges, primarily due to a lack of technical skills. The study concluded that targeted training programs and workshops are essential to bridge this generational gap and ensure effective e-learning implementation. The authors grounded their study in the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and ease of use as critical factors in technology adoption. This theoretical framework helped explain why some teachers were more resistant to e-learning than others. The study is particularly relevant for understanding the digital transition in Indian schools and highlights the need for institutional support to enhance teacher readiness.
https://doi.org/10.1016/j.compedu.2020.103876

Roy, S., & Ghosh, A. (2019) Roy and Ghosh's study, "E-Learning in Indian Teacher

Education: Challenges and Prospects," explored the role of e-learning in teacher training programs. They found that current programs are not adequately preparing teachers for digital education. The authors recommended curriculum reforms to include digital literacy as a core component. The study is based on Transformative Learning Theory, which focuses on how learners can change their perspectives through education. This framework highlights the potential of e-learning to transform teacher education in India.
DOI: 10.1080/1359866X.2019.1645812

Gupta, S., & Das, A. (2019) In their study "Digital Transformation in Education: Challenges and Opportunities for Indian Teachers," Gupta and Das examined the infrastructural and systemic barriers to e-learning in India. They found that teachers in rural and semi-urban areas faced significant challenges, including poor internet connectivity, lack of access to digital devices, and insufficient technical support. The authors concluded that while government initiatives like Digital India have made strides, more robust policies and investments are needed to address these disparities. The study is rooted in the Diffusion of Innovations Theory, which explains how new technologies spread within a social system. This framework helped the authors analyze the uneven adoption of e-learning across different regions of India. Their findings underscore the importance of equitable access to digital resources for teachers and students alike.
DOI: 10.1080/09523987.2019.1684921

Kumar, V., & Rao, P. (2018) Kumar and Rao's research, "Barriers to E-Learning in Indian Higher Education: A Teacher-Centric Analysis," focused on identifying the key obstacles to e-learning adoption among Indian teachers. They found that resistance to change, lack of institutional support, and insufficient training were major barriers. The authors concluded that teacher motivation and institutional policies play a crucial role in overcoming these challenges. The study is based on **Activity Theory**, which examines the interaction between teachers, tools, and institutional contexts. This framework helped the authors analyze how systemic factors influence e-learning adoption. Their findings highlight the need for comprehensive training programs and supportive institutional environments to facilitate the transition to digital education.
DOI: 10.1080/03075079.2018.1482267

Mishra, P., & Koehler, M. (2006) although not specific to India, Mishra and Koehler's Technological Pedagogical Content Knowledge (TPACK) Framework has been widely applied in Indian studies on e-learning. Their framework emphasizes the integration of technology, pedagogy, and content knowledge for effective teaching. In the Indian context, this framework has been used to understand how teachers can effectively incorporate digital tools into their teaching practices. The authors argue that successful e-learning requires a deep understanding of how these three domains intersect. The TPACK Framework has become a critical theory in educational technology research, providing a comprehensive approach to understanding teacher readiness for digital education.
DOI: 10.2190/0EW7-01WB-BKHL-QDYV

3. Methodology

A mixed-methods approach was employed, combining quantitative and qualitative data collection techniques. A structured survey was administered to 100 teachers from primary, secondary, and higher secondary schools in Hooghly. The survey included questions on teachers' perceptions of e-learning, availability of digital infrastructure, and barriers to adoption. Semi-structured interviews were conducted with 20 teachers to gain deeper insights into their experiences and challenges. Quantitative data was analyzed using descriptive statistics, correlation analysis, and regression modeling, while qualitative data was thematically analyzed.

4. Data Analysis and Interpretation

Table 1: Distribution of Teachers by School Level and Gender

School Level	Male	Female	Total
Primary	10	15	25
Secondary	12	13	25
Higher Secondary	18	32	50
Total	40	60	100

The sample included 100 teachers from different levels of schooling in Hooghly. A majority were from higher secondary schools (50%), followed by equal representation from primary and secondary schools. Female teachers made up 60% of the sample, suggesting a relatively higher participation of women in the teaching profession in this region.

Table 2: Teachers' Perceptions of E-learning Benefits

Perceived Benefits	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Enhances student engagement	35	40	15	5	5
Improves access to learning resources	45	30	15	5	5
Increases flexibility in teaching	40	35	10	10	5

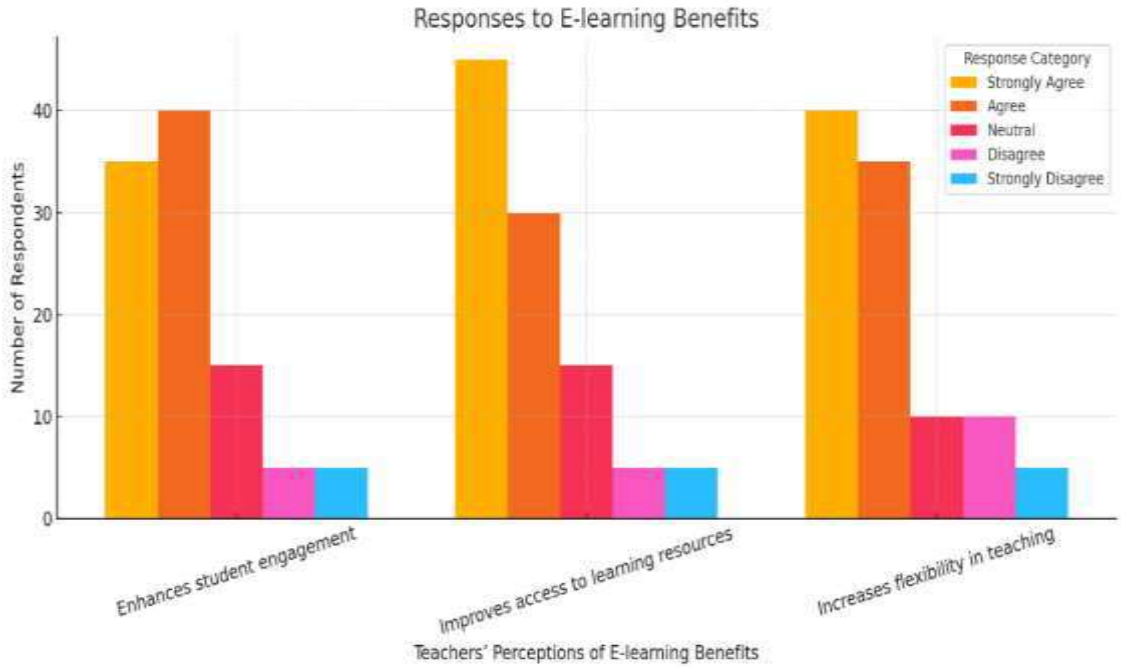

Figure 1: Responses to E-learning Benefits

A significant proportion of teachers agreed or strongly agreed that e-learning enhances engagement (75%) and improves access to resources (75%). Flexibility in teaching was also recognized, with 75% supporting this view. These findings underscore a generally positive perception of e-learning among teachers.

Table 3: Barriers to E-learning Adoption

Barrier Type	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of digital devices	40	30	15	10	5
Poor internet connectivity	50	30	10	5	5
Limited ICT training	45	35	10	5	5

The most commonly cited barriers were poor internet connectivity (80% agreement) and lack of digital devices (70%). Limited ICT training (80%) also emerged as a key issue. These results highlight critical areas that need investment to support effective e-learning integration.

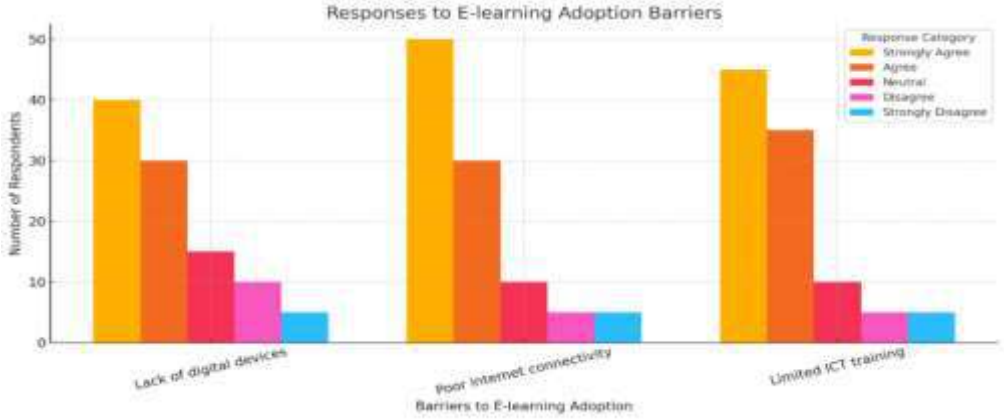

Figure 2: Responses to Barriers to E-learning Adoption

Table 4: Correlation between Digital Infrastructure and Perceived Benefits of E-learning

Variables	Pearson Correlation (r)
Infrastructure vs Engagement	0.62
Infrastructure vs Access to Resources	0.71
Infrastructure vs Teaching Flexibility	0.55

Moderate to strong positive correlations were observed between availability of digital infrastructure and perceived benefits of e-learning. The highest correlation was with improved access to learning resources (r = 0.71), indicating that better infrastructure significantly enhances the utility of e-learning.

Table 5: Regression Analysis – Predictors of E-learning Adoption

Predictor Variable	Coefficient (B)	Std. Error	t-value	Sig. (p-value)
Internet Connectivity	0.45	0.08	5.63	0.000
ICT Training	0.38	0.09	4.22	0.000
Device Availability	0.31	0.10	3.10	0.002
Constant	2.15	0.35	6.14	0.000

Regression analysis reveals that internet connectivity (B = 0.45) is the strongest predictor of e-learning adoption, followed by ICT training and device availability. All predictors are statistically significant ($p < 0.01$), indicating that these factors directly influence teachers' capacity to implement e-learning.

Table 6: Teachers' Digital Literacy Levels

Digital Skill	High	Moderate	Low
Using e-learning platforms (e.g., Zoom, Google Meet)	30	45	25
Creating digital content	20	40	40
Troubleshooting technical issues	10	30	60

While many teachers reported moderate digital literacy, a notable proportion (40%) had low competency in content creation, and 60% struggled with troubleshooting. These gaps suggest the need for targeted digital literacy programs to empower teachers.

Table 7: Socio-Economic Constraints Affecting E-learning

Socio-economic Factor	Frequently Observed	Occasionally	Rarely
Students can't afford devices	65	25	10
Power outages	40	35	25
Lack of parental support	50	30	20

Socio-economic barriers, especially affordability of digital devices (observed by 65% of teachers), remain a major concern. Power outages and parental support also influence the effective integration of e-learning, particularly in rural areas.

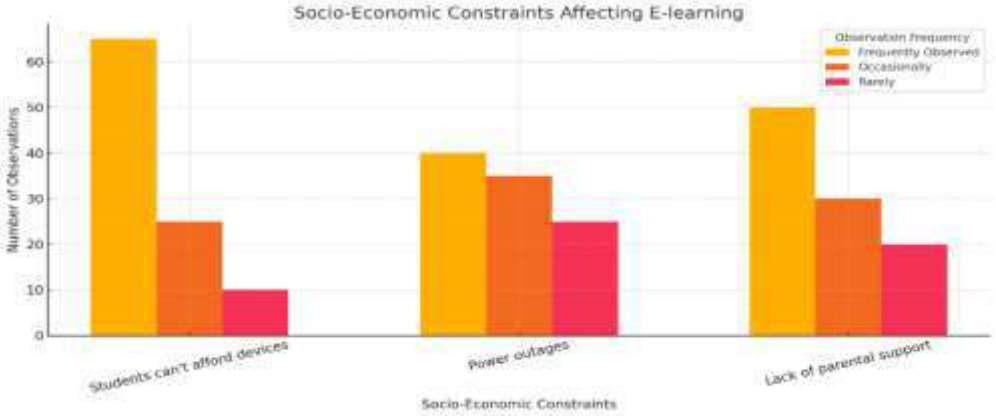

Figure 3: Socio- Economic Constraints Affecting E-learning

Table 8: Thematic Analysis of Teachers' Interview Responses

Theme	Frequency	Sample Quotes
Lack of institutional support	High	"We're expected to use e-learning tools, but no training is provided."
Motivation to adopt e-learning	Moderate	"Some students love it when we use videos and quizzes."
Equity concerns	High	"Students from low-income families are left behind."

Qualitative analysis reveals that institutional support and equity are prominent concerns among teachers. Despite their motivation, lack of structured support systems limits their ability to use digital platforms effectively and equitably.

Table 9: Suggestions from Teachers to Improve E-learning Integration

Suggested Improvement	% of Respondents
Provide ICT training programs	85%
Improve internet infrastructure	80%
Supply digital devices to students	75%
Regular technical support	60%

Teachers widely suggested improving training (85%) and internet infrastructure (80%) to enhance e-learning adoption. Device support for students and regular tech assistance were also emphasized. This indicates clear pathways for policymakers and school administrations to support digital learning.

5. Results and Discussion

Results

The study analyzed the perceptions and experiences of 100 teachers across primary, secondary, and higher secondary schools in Hooghly to understand the status and challenges of e-learning integration. The demographic analysis (Table 1) indicated a higher representation of female teachers (60%) and a significant proportion from higher secondary schools (50%), reflecting the active involvement of experienced educators in the study. Teachers displayed an overall positive perception toward the benefits of e-learning (Table 2). A majority believed that it enhances student engagement, improves access to learning resources, and offers flexibility in teaching—each affirmed by approximately 75% of the respondents. This optimism, however, was tempered by substantial barriers (Table 3), particularly poor internet connectivity (80%), lack of digital devices (70%), and inadequate ICT training (80%). These barriers highlight critical systemic gaps hindering seamless e-learning adoption. Further analysis revealed a moderate to strong correlation between digital infrastructure and perceived benefits (Table 4), especially with access to resources (r = 0.71). This suggests that improving infrastructure directly improves the utility and perception of e-learning. A regression analysis (Table 5) confirmed that internet connectivity was the strongest predictor of e-learning adoption (B = 0.45), followed by ICT training and device

availability. These statistically significant predictors ($p < 0.01$) establish a clear cause-effect relationship between digital readiness and adoption outcomes. The study also explored teachers' digital literacy (Table 6). While many had moderate proficiency in using e-learning platforms, a significant number struggled with content creation (40% low) and technical troubleshooting (60% low). This underlines the urgent need for structured digital literacy programs tailored for teachers. On the socio-economic front (Table 7), the most frequent challenges included students' inability to afford digital devices (65%), power outages (40%), and lack of parental support (50%). These issues disproportionately affect students from marginalized or rural backgrounds, limiting their access to e-learning resources and contributing to educational inequality. Insights from qualitative interviews (Table 8) revealed recurring themes. Teachers expressed frustration over the lack of institutional support and emphasized the need for formal training and resources. They also voiced concern over equity issues, stating that students from low-income households are often excluded from digital learning. Nevertheless, some teachers were motivated by the enthusiasm students showed when exposed to interactive tools like videos and quizzes, pointing to the untapped potential of digital platforms when adequately supported. Finally, teachers offered practical suggestions for improving e-learning integration (Table 9). These included the need for ICT training programs (85%), improved internet infrastructure (80%), supply of digital devices to students (75%), and ongoing technical support (60%). These responses reflect a clear consensus on the steps needed to bridge the digital divide and ensure inclusive and effective e-learning environments.

Discussion

The study brings out a clear picture of how teachers in Hooghly are experiencing and responding to e-learning. It shows that while most teachers understand the benefits of e-learning—like engaging students better, providing access to more resources, and making teaching more flexible—they are also facing serious challenges in actually using it effectively in classrooms. Many teachers, especially those in higher secondary schools, are trying to adopt digital tools, but they are limited by the lack of proper internet, digital devices, and training.

One of the biggest takeaways from this study is that without strong internet and proper devices, even motivated teachers cannot implement e-learning smoothly. The statistical findings support this idea clearly, with internet connectivity, training, and availability of devices all showing a strong connection to successful e-learning adoption. Teachers also pointed out that a large number of students come from families that cannot afford digital devices. This creates a gap in access, especially in rural or economically weaker sections, where e-learning becomes less inclusive. In terms of digital skills, the study found that many teachers have only moderate skills, and some struggle a lot with creating online content or handling technical issues. This shows the urgent need for teacher training programs that are focused on building digital confidence and skills. The interviews added even more depth to the findings. Teachers shared their real experiences, such as how they often do not receive proper support from their schools, or how students from poor families are left behind in digital learning. Still, they also shared some positive experiences—like students enjoying videos and online activities. This tells us that when digital tools are used well, they can really make a difference.

Finally, teachers themselves gave useful suggestions to improve the situation. They want better training, better internet, more devices for students, and regular technical support. These practical ideas reflect what teachers really need on the ground.

6. Recommendations

- **Investment in Digital Infrastructure:** Schools should be equipped with computers, internet connectivity, and e-learning software.
- **Teacher Training Programs:** Regular training sessions should be conducted to improve digital literacy and familiarize teachers with e-learning tools.

- **Addressing Socio-Economic Disparities:** Policies should be implemented to provide devices and internet access to low-income students and teachers.
- **Promoting a Culture of Innovation:** Schools should encourage teachers to experiment with e-learning tools and share best practices.

7. Limitations of the Study

- The study was confined to teachers from schools in Hooghly district, which may not fully represent the situation in other regions of West Bengal or across India.
- The quantitative sample included only 100 teachers, and qualitative interviews were limited to 20 teachers, which may restrict the generalizability of the findings.
- The study relied on self-reported responses in surveys and interviews, which may be influenced by personal bias or social desirability.
- The availability and use of digital infrastructure vary significantly across schools; hence, some findings may not apply uniformly across all educational institutions.
- Data was collected within a specific time frame, and the rapidly evolving nature of digital education may mean that some findings could become outdated quickly.
- The study focused only on teachers' experiences and perceptions, omitting the equally important viewpoints of students who are the end-users of e-learning.

8. Conclusion

This study highlights the challenges and opportunities associated with the transition from traditional to digital education in Hooghly, West Bengal. While significant barriers exist, teachers recognize the potential of e-learning to enhance teaching and learning outcomes. Addressing these barriers requires coordinated efforts from policymakers, educational institutions, and other stakeholders. By investing in infrastructure, providing training, and addressing socio-economic disparities, Hooghly can pave the way for a successful transition to e-learning.

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