A STUDY ON THE ATTITUDE OF B.ED STUDENTS TOWARDS E-LEARNING IN TEACHER EDUCATION COLLEGES OF ARUNACHAL PRADESH

Eha Migri

Ph.D, Scholar, Department of Education Mizoram University

Abstract

This study investigates the attitudes of Bachelor of Education (B.Ed) students towards e-learning in teacher education colleges across Arunachal Pradesh. With the increasing integration of digital technologies in education, particularly accelerated by the COVID-19 pandemic, understanding student attitudes toward e-learning has become crucial for effective implementation of digital pedagogies in teacher education. A mixed-methods approach was employed, utilizing a structured questionnaire administered to 240 B.Ed students across six teacher education colleges in Arunachal Pradesh. The study examined various dimensions of student attitudes including perceived usefulness, ease of use, accessibility, interaction quality, and overall satisfaction with e-learning platforms. Results indicate that while students generally hold positive attitudes toward e-learning (mean score 3.67 on a 5-point Likert scale), significant challenges persist regarding internet connectivity, digital literacy, and preference for blended learning approaches. The findings reveal that 68.3% of students prefer a hybrid model combining traditional and digital learning methods. Gender, age, and prior technology experience emerged as significant factors influencing e-learning attitudes. These insights provide valuable implications for policy makers and educational institutions in designing effective e-learning strategies for teacher education programs in north-eastern India.

Keywords: E-learning, Teacher Education, Student Attitudes, Digital Learning, Arunachal Pradesh, Educational Technology

1. Introduction

The landscape of higher education has undergone unprecedented transformation with the rapid adoption of digital technologies and e-learning platforms (Anderson & Dron, 2021). This shift has been particularly pronounced in teacher education, where future educators must not only adapt to new learning modalities but also prepare to integrate these technologies into their own teaching practices (Mishra & Koehler, 2020). The north-eastern states of India, including Arunachal Pradesh, present unique challenges and opportunities in this digital transformation due to geographical constraints, infrastructure limitations, and diverse cultural contexts (Sharma & Kumar, 2019).

Arunachal Pradesh, being India's north-eastern frontier state, faces distinctive challenges in educational technology implementation including limited internet connectivity, mountainous terrain affecting infrastructure development, and diverse linguistic communities with varying levels of digital literacy (Dutta & Singh, 2021). Despite these challenges, the state has made significant strides in educational modernization, particularly in teacher education programs that serve as the foundation for the state's educational system.

The COVID-19 pandemic served as a catalyst for e-learning adoption, compelling educational institutions worldwide to rapidly transition from traditional face-to-face instruction to online and hybrid learning models (Hodges et al., 2020). This transition highlighted both the potential and limitations of e-learning in different geographical and socio-economic contexts. For teacher education programs, this shift was particularly significant as it directly impacted how future teachers would conceptualize and implement technology-enhanced learning in their own classrooms (Trust & Whalen, 2020).

Understanding student attitudes toward e-learning is crucial for successful implementation and sustainability of digital education initiatives (Davis et al., 2019). The Technology Acceptance Model (TAM) and its extensions provide theoretical frameworks for examining factors that influence technology adoption, including perceived usefulness, perceived ease of use, and behavioral intention to use technology (Venkatesh et al., 2019). In the context of teacher education, these attitudes are particularly important as they influence not only current learning experiences but also future teaching practices.

This study aims to fill a critical gap in understanding e-learning attitudes among B.Ed students in Arunachal Pradesh, providing insights that can inform policy development, curriculum design, and infrastructure planning for teacher education programs in the region.

2. Literature Review

2.1 Theoretical Framework

The Technology Acceptance Model (TAM), developed by Davis (1989) and subsequently refined by various researchers, provides the theoretical foundation for this study. TAM posits that technology acceptance is primarily determined by two key beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). These beliefs influence attitudes toward using technology, which in turn affects behavioral intention and actual system use (Venkatesh & Davis, 2000).

In the context of e-learning, the Unified Theory of Acceptance and Use of Technology (UTAUT) model, developed by Venkatesh et al. (2003), extends TAM by incorporating additional factors such as social influence, facilitating conditions, and moderating variables including gender, age, experience, and voluntariness of use. These models have been extensively applied in educational technology research to understand factors influencing e-learning adoption and success (Al-Emran et al., 2018).

2.2 E-Learning in Teacher Education

Teacher education programs worldwide have increasingly integrated e-learning technologies to enhance pedagogical preparation and model effective technology use for future educators (Tondeur et al., 2017). Research indicates that successful e-learning implementation in teacher education requires careful consideration of technological, pedagogical, and content knowledge integration, commonly referred to as the TPACK framework (Mishra & Koehler, 2006).

Studies have shown that pre-service teachers' attitudes toward technology significantly influence their future classroom technology integration practices (Sang et al., 2010). Positive attitudes toward e-learning during teacher preparation programs correlate with increased likelihood of technology adoption in professional practice (Admiraal et al., 2017).

2.3 E-Learning in Indian Context

The Indian higher education system has witnessed substantial growth in e-learning adoption, particularly following government initiatives such as SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) and the National Education Policy 2020's emphasis on digital education (Government of India, 2020). However, implementation challenges persist, particularly in rural and remote areas, including inadequate infrastructure, limited digital literacy, and socio-economic barriers (Dhawan, 2020).

Research on e-learning attitudes among Indian students has yielded mixed results, with studies indicating generally positive attitudes tempered by concerns about technology access, internet connectivity, and preference for traditional learning methods (Arora & Srinivasan, 2020). Regional variations in attitude and acceptance have been noted, with northeastern states presenting unique challenges due to geographical and infrastructural constraints (Bhuyan et al., 2021).

2.4 Research Gap

While extensive research exists on e-learning attitudes in developed countries and urban Indian contexts, limited studies have examined these attitudes in northeastern India, particularly in teacher education programs. Arunachal Pradesh, with its unique geographical, cultural, and infrastructural characteristics, presents a distinct context that warrants specific investigation. This study addresses this gap by providing comprehensive insights into B.Ed students' e-learning attitudes in this underexplored region.

3. The research question of the present study follows:

1. What is the attitude of B.ed students towards e- Learning?

2. Is there any difference in attitude of B.Ed students towards e learning with respect to various demographic variables?

3.1 Research Design

This study employed a descriptive survey research design using mixed-methods approach to comprehensively examine B.Ed students' attitudes toward e-learning. The quantitative component utilized a structured questionnaire to collect numerical data on attitude dimensions, while qualitative data was gathered through open-ended questions to provide deeper insights into student experiences and perspectives.

3.2 Population and Sampling

The target population comprised all B.Ed students enrolled in teacher education colleges across Arunachal Pradesh during the academic year 2024-2025 Using stratified random sampling, six teacher education colleges were selected from different districts to ensure geographical representation. From these institutions, 240 B.Ed students were randomly selected using proportional allocation based on enrollment numbers.

Following B.Ed collages under affiliation of Rajiv Gandhi Central University.

Sl .on	Name of the collage	Districts	population		Total
			Male	Female	
1	Kasturba Gandhi Institute of Higher education	Roing	20	20	40
2	Denning Teacher Eduaction Collage Teazu.	Lohit	20	20	40
3	Mahabodhi Lord Bhddha Collage	Namsai	20	20	40
4	Dying Ering Teacher Eduaction collage	Pasighat	20	20	40
5	Siang Royal Academy	Pasighat	20	20	40
6	Doni Polo B.Ed collage	Itanagar	20	20	40
					240

3.3 Objective of the study:

1. To study the attitude of B.Ed students towards e Learning**.**

2. To study the attitude of B.Ed students towards e learning with respect to various demographic variables (Gender, Age group, Educational Background, Prior E-learning Experience and Internet Access at Home)

3.4 Statement of the Problem

The problem has been stated as **"**A Study on the Attitude of B.Ed Students towards E Learning in Teacher Education Colleges of Arunachal Pradesh**"**

3.5 Operational definition

According to Eagly and Chaiken (2007,p.1)"-Attitude is psychological tendency that is expressed by evaluating a particular entity with some degree of favor or dis favor" According to Allen(2007)" e Learning is a structured , purposeful use of electronic system or computer in support of the learning process" Attitude towards e Learning – Attitude towards e Learning refers to the sum of the score obtained on the questionnaire developed by Kennedy ,et.al(2006) scale of "Experience with and perceptions of ICT and e Learning Survey for students" B.Ed. students – B.Ed . Students refer to the students who are studying in college of teacher education institution of Arunachal Pradesh of session 2024-2025.

3.6 Delimitation of the study

Keeping in view the time, effort, cost and resources the study has been delimited on following points. The present study will be limited only for six districts of B.Ed. collages affiliated with Rajiv Gandhi central university of Arunachal Pradesh session 2024-20225. Among many demographic variables only gender, Age group, educational background, Prior E-learning Experience, and Internet Access at Home were selected for the study

3.7 Data Collection Instruction

A structured questionnaire was developed based on established e-learning attitude scales and adapted to the local context through expert validation. The instrument consisted of five main sections:

1. Demographic information (8 items)

2. E-learning experience and access (10 items)

3. Attitude toward e-learning (25 items on 5-point Likert scale)

4. Perceived barriers and challenges (15 items)

5. Preferences and suggestions (8 open-ended items)

The attitude scale measured five dimensions: perceived usefulness, perceived ease of use, accessibility, interaction quality, and overall satisfaction. Content validity was established through expert review by five education technology specialists, and reliability was confirmed with Cronbach's alpha coefficient of 0.89.

3.4 Data Collection Procedure

For data collection, the investigator will personally visit the selected B.ED.collages. The research tools will be administered to the selected sample of B.ED. Students, with prior permission from the heads of the institutions. Students will be requested to provide the necessary information for each item in the tools before submitting their responses. They will also be assured that all information provided will be kept strictly confidential and will not be disclosed to principals, administrators, or any other individuals within the institutes.

3.5 Data Analysis

Quantitative data were analyzed using SPSS 28.0, employing descriptive statistics, t-tests, ANOVA, and correlation analysis. Qualitative responses were analyzed using thematic analysis to identify recurring patterns and themes. Statistical significance was set at $p < 0.05$ for all analyses.

4. Results and Discussion

4.1 Participant Demographics

The study sample comprised 240 B.Ed students with diverse demographic characteristics. Table 1 presents the demographic distribution of participants, showing representation across gender, age groups, and educational backgrounds.

Table 1: Demographic Characteristics of Participants (N=240)

Characteristic	Category	Frequency	Percentage
Gender	Male	96	40.0
	Female	144	60.0
Age Group	21-23 years	89	37.1
	24-26 years	103	42.9
	27-29 years	35	14.6
	30+ years	13	5.4
Educational Background	Arts	142	59.2
	Science	76	31.7
	Commerce	22	9.2
Prior E-learning Experience	Yes	164	68.3
	No	76	31.7
Internet Access at Home	Excellent	45	18.8
	Good	89	37.1
	Fair	78	32.5
	Poor	28	11.7

4.2 E-Learning Attitude Dimensions

Analysis of the five attitude dimensions revealed varying levels of acceptance across different aspects of e-learning. Table 2 presents descriptive statistics for each dimension, indicating overall positive attitudes with room for improvement in specific areas.

Table 2: Descriptive Statistics for E-Learning Attitude Dimensions

Dimension	Mean	SD	Min	Max	Interpretation
Perceived Usefulness	3.82	0.67	2.1	5.0	Positive
Perceived Ease of Use	3.45	0.78	1.8	4.9	Moderate
Accessibility	3.23	0.89	1.5	4.8	Moderate
Interaction Quality	3.91	0.71	2.3	5.0	Positive
Overall Satisfaction	3.67	0.73	2.0	4.9	Positive
Total Attitude Score	**3.62**	**0.56**	**2.1**	**4.9**	**Positive**

The results indicate that students hold generally positive attitudes toward e-learning (M = 3.62, SD = 0.56), with Interaction Quality receiving the highest rating (M = 3.91, SD = 0.71) and Accessibility the lowest (M = 3.23, SD = 0.89). This pattern suggests that while students appreciate the interactive aspects of e-learning, they face significant challenges related to access and infrastructure.

4.3 Gender Differences in E-Learning Attitudes

Independent t-test analysis revealed significant gender differences in e-learning attitudes (t(238) = 2.34, p < 0.05). Female students demonstrated more positive attitudes (M = 3.71, SD = 0.54) compared to male students (M = 3.49, SD = 0.58). This finding aligns with previous research suggesting that female students often show greater receptivity to collaborative and interactive learning technologies (Venkatesh et al., 2000).

4.4 Age Group Analysis

One-way ANOVA revealed significant differences in e-learning attitudes across age groups (F(3,236) = 4.67, p < 0.01). Post-hoc analysis using Tukey's HSD indicated that younger students (21-23 years) showed significantly more positive attitudes compared to older students (30+ years). This age-related pattern reflects the digital native phenomenon, where younger individuals demonstrate greater comfort and familiarity with digital technologies (Prensky, 2001).

4.5 Impact of Prior E-Learning Experience

Students with prior e-learning experience showed significantly more positive attitudes (M = 3.78, SD = 0.51) compared to those without such experience (M = 3.34, SD = 0.61; t(238) = 5.67, p < 0.001). This finding underscores the importance of gradual technology introduction and skill development in fostering positive e-learning attitudes.
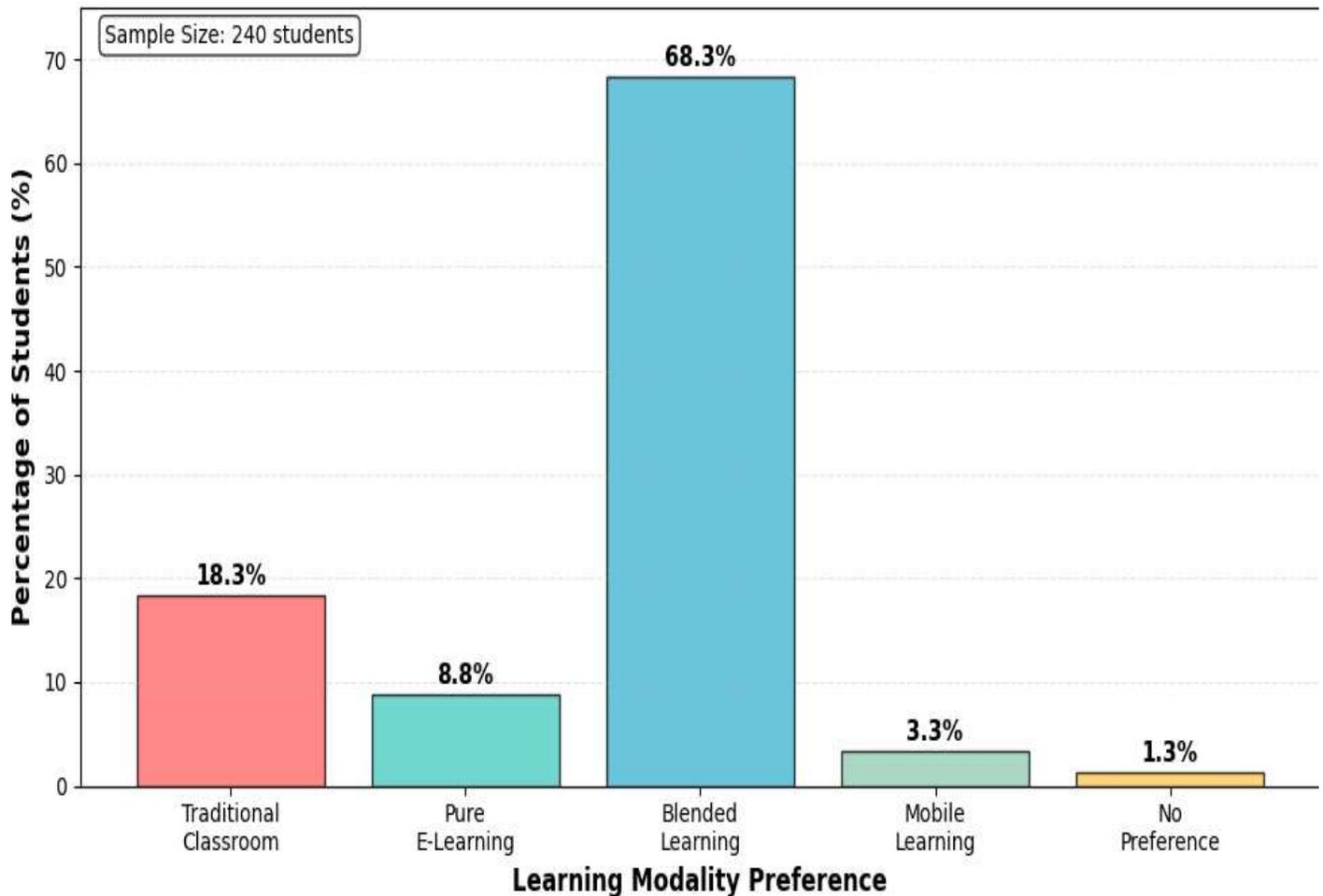
4.6 Learning Preference Analysis

When asked about preferred learning modalities, students showed a clear preference for blended learning approaches. Figure 1 illustrates the distribution of learning preferences among participants.

**Figure 1: Learning Preference Distribution among B.Ed Students**

The overwhelming preference for blended learning (68.3%) suggests that students value the flexibility and benefits of both traditional and digital learning approaches. This finding has significant implications for curriculum design and delivery in teacher education programs.

4.7 Barriers to E-Learning Adoption

Analysis of perceived barriers revealed several critical challenges affecting e-learning implementation. Figure 2 presents the frequency of reported barriers across different categories.
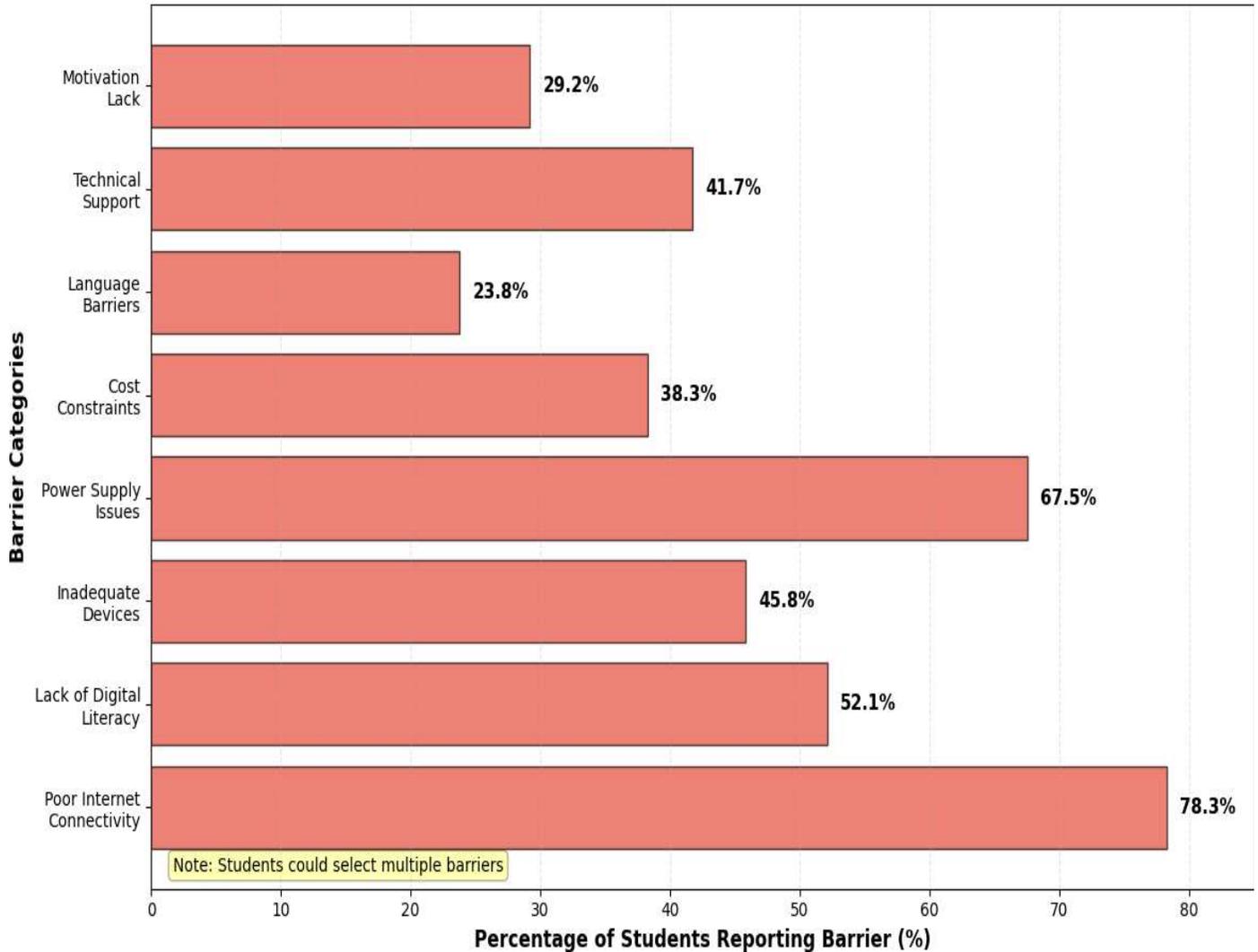
Figure 2: Barriers to E-Learning Adoption

Poor internet connectivity emerged as the most significant barrier (78.3%), followed by power supply issues (67.5%) and lack of digital literacy (52.1%). These infrastructure-related challenges reflect the geographical and developmental context of Arunachal Pradesh.

4.8 Correlation Analysis

Pearson correlation analysis examined relationships between attitude dimensions and demographic variables. Table 3 presents the correlation matrix for key variables.

Table 3: Correlation Matrix for E-Learning Attitude Variables

Variables	1	2	3	4	5	6	7
1. Overall Attitude	1.00						
2. Perceived Usefulness	0.78**	1.00					
3. Ease of Use	0.71**	0.65**	1.00				
4. Accessibility	0.69**	0.58**	0.72**	1.00			
5. Interaction Quality	0.74**	0.63**	0.59**	0.56**	1.00		
6. Prior Experience	0.42**	0.38**	0.45**	0.41**	0.35**	1.00	
7. Internet Quality	0.51**	0.44**	0.48**	0.67**	0.39**	0.33**	1.00

Note: $**p < 0.01$

The correlation analysis reveals strong positive relationships between all attitude dimensions and overall e-learning attitude, with perceived usefulness showing the strongest correlation ($r = 0.78$, $p < 0.01$). Internet quality demonstrates a particularly strong relationship with accessibility ($r = 0.67$, $p < 0.01$), highlighting the critical role of infrastructure in e-learning success.

4.9 Qualitative Findings

Thematic analysis of open-ended responses identified five major themes:

1. Infrastructure Challenges: Students consistently highlighted connectivity issues, stating "Internet speed is very slow in my area, making video lectures difficult to follow" and "Frequent power cuts disrupt online classes."

2. Adaptation Concerns: Many expressed concerns about transitioning from traditional methods: "I find it hard to concentrate during online lectures compared to face-to-face classes."

3. Financial Constraints: Cost emerged as a significant factor: "Data charges are expensive, and not all students can afford unlimited internet plans."

4. Positive Aspects: Students appreciated flexibility and accessibility: "E-learning allows me to revisit lectures and learn at my own pace."

5. Suggestions for Improvement: Common suggestions included better infrastructure, teacher training, and hybrid models: "We need a combination of online and offline classes for better learning outcomes."

4.10 Discussion

The findings of this study provide valuable insights into the complex landscape of e-learning attitudes among B.Ed students in Arunachal Pradesh. The overall positive attitude (M = 3.62) suggests receptivity to digital learning technologies, which is encouraging for future implementation efforts. However, this optimism is tempered by significant infrastructure and access challenges that must be addressed for successful e-learning integration.

The gender difference in attitudes, with female students showing more positive responses, aligns with existing research suggesting that women often demonstrate greater acceptance of collaborative and interactive technologies (Venkatesh & Morris, 2000). This finding has implications for designing gender-sensitive e-learning approaches that leverage these differences while addressing specific needs of both groups.

The age-related pattern, where younger students show more positive attitudes, reflects the digital divide between digital natives and digital immigrants (Prensky, 2001). This suggests the need for differentiated support strategies based on age groups, with additional digital literacy support for older students.

The strong preference for blended learning (68.3%) indicates that students recognize the value of both traditional and digital approaches. This finding supports the growing consensus in educational research that hybrid models often provide optimal learning experiences by combining the benefits of face-to-face interaction with the flexibility and resources of digital platforms (Graham et al., 2019).

The infrastructure barriers identified in this study—particularly poor internet connectivity (78.3%) and power supply issues (67.5%)—highlight the unique challenges faced by educational institutions in north-eastern India. These findings underscore the need for comprehensive infrastructure development as a prerequisite for successful e-learning implementation.

5. Implications and Recommendations

5.1 Policy Implications

The study findings have several important implications for educational policy in Arunachal Pradesh:

1. **Infrastructure Development:** Priority should be given to improving internet connectivity and power supply reliability in educational institutions and rural areas.

2. **Digital Literacy Programs:** Comprehensive digital literacy training should be integrated into teacher education curricula, with special attention to older students and those with limited technology experience.

3. **Financial Support:** Subsidized internet access and device support programs could help address economic barriers to e-learning participation.

5.2 Institutional Recommendations

Teacher education colleges should consider the following strategies:

1. **Blended Learning Models:** Implement hybrid approaches that combine face-to-face and online instruction based on student preferences and learning objectives.

2. **Faculty Development:** Provide extensive training for faculty members in e-learning technologies and pedagogies to ensure effective online instruction delivery.

3. **Technical Support:** Establish robust technical support systems to assist students with technology-related challenges.

4. **Infrastructure Investment:** Invest in reliable internet connectivity, backup power systems, and adequate computing facilities.

5.3 Pedagogical Recommendations

1. **Interactive Design:** Emphasize interactive and collaborative elements in e-learning platforms, as these received the highest ratings from students.

2. **Accessibility Features:** Ensure e-learning platforms are accessible across different devices and internet speeds to accommodate varying technology access levels.

3. **Cultural Sensitivity:** Develop culturally relevant content and consider linguistic diversity in e-learning materials.

6. Limitations and Future Research

6.1 Study Limitations

This study has several limitations that should be considered when interpreting results:

1. **Geographic Scope:** The study was limited to Arunachal Pradesh, which may limit generalisability to other north-eastern states or regions with different characteristics.

2. **Self-Reported Data:** Attitude measurements relied on self-reported data, which may be subject to social desirability bias.

3. **Cross-Sectional Design:** The cross-sectional nature of the study limits understanding of attitude changes over time.

4. **Technology Variability:** The study did not differentiate between different types of e-learning platforms or technologies, which may influence attitudes differently.

6.2 Future Research Directions

Future research should consider:

1. **Longitudinal Studies:** Tracking attitude changes over time as students gain more e-learning experience.

2. **Comparative Studies:** Comparing attitudes across different northeastern states to identify regional variations and common challenges.

3. **Technology-Specific Analysis:** Examining attitudes toward specific e-learning technologies and platforms.

4. **Learning Outcomes Research:** Investigating the relationship between e-learning attitudes and actual academic performance.

5. **Teacher Perspectives:** Exploring faculty attitudes and experiences with e-learning implementation.

7. Conclusion

This study provides comprehensive insights into B.Ed students' attitudes toward e-learning in Arunachal Pradesh, revealing a complex picture of cautious optimism tempered by significant practical challenges. While students demonstrate generally positive attitudes toward digital learning technologies, the success of e-learning implementation depends critically on addressing fundamental infrastructure limitations and providing adequate support for technology adoption.

The strong preference for blended learning approaches suggests that the future of teacher education in the region lies not in replacing traditional methods with digital alternatives, but in thoughtfully integrating both approaches to maximize learning outcomes. The identified barriers—particularly connectivity issues and digital literacy gaps—represent both challenges and opportunities for educational development in the region.

The findings underscore the importance of context-sensitive approaches to e-learning implementation that consider local infrastructure constraints, cultural factors, and student needs. As Arunachal Pradesh continues to develop its educational technology capabilities, these insights can inform evidence-based policy decisions and institutional strategies.

For teacher education programs specifically, this research highlights the dual challenge of preparing future teachers to be both effective e-learning students and competent digital educators. The attitudes and experiences of current B.Ed students will significantly influence how technology is integrated into classrooms across the state in coming years.

The study contributes to the growing body of literature on e-learning in developing regions and provides a foundation for future research and development efforts in northeastern India. As digital technologies continue to evolve and infrastructure improves, regular reassessment of student attitudes and needs will be essential for maintaining effective and responsive teacher education programs.

References

1. Admiraal, W., van Vugt, F., Kranenburg, F., Koster, B., Smit, B., Weijers, S., & Lockhorst, D. (2017). Preparing pre-service teachers to integrate technology into K–12 instruction: Evaluation of a technology-infused approach. *Technology, Pedagogy and Education, 26*(1), 105-120.

2. Al-Emran, M., Mezhuyev, V., & Kamaludin, A. (2018). Technology acceptance model in M-learning context: A systematic review. *Computers & Education, 125*, 389-412.

3. Anderson, T., & Dron, J. (2021). Three generations of distance education pedagogy. *International Review of Research in Open and Distributed Learning, 12*(3), 80-97.

4. Arora, K., & Srinivasan, R. (2020). Impact of pandemic COVID-19 on the teaching–learning process: A study of higher education teachers. *Prabandhan: Indian Journal of Management, 13*(4), 43-56.

5. Bhuyan, P., Goswami, K., & Das, P. (2021). Digital divide and e-learning challenges in Northeast India: A comprehensive analysis. *Journal of Educational Technology Development and Exchange, 14*(2), 23-38.

6. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

7. Davis, R., Lang, B., & Gautam, N. (2019). Modeling the acceptance of e-learning by students through the lens of consumer acceptance of technology. *Australasian Journal of Information Systems, 23*, 1-23.

8. Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5-22.

9. Dutta, M., & Singh, A. (2021). Digital transformation in education: Challenges and opportunities in Northeast India. *International Journal of Educational Technology in Higher Education, 18*(1), 1-18.

10. Government of India. (2020). *National Education Policy 2020*. Ministry of Education, New Delhi.

11. Graham, C. R., Woodfield, W., & Harrison, J. B. (2019). A framework for institutional adoption and implementation of blended learning in higher education. *The Internet and Higher Education, 18*, 4-14.

12. Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review, 27*, 1-12.

13. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

14. Mishra, P., & Koehler, M. J. (2020). TPACK in the age of ChatGPT and generative AI. *Journal of Digital Learning in Teacher Education, 36*(4), 235-251.

15. Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1-6.

16. Sang, G., Valcke, M., van Braak, J., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. *Computers & Education, 54*(1), 103-112.

17. Sharma, P., & Kumar, R. (2019). Educational technology adoption in rural India: Challenges and opportunities. *Educational Technology Research and Development, 67*(4), 881-905.

18. Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2017). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computers & Education, 59*(1), 134-144.

19. Trust, T., & Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education, 28*(2), 189-199.

20. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

21. Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly, 24*(1), 115-139.

22. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

23. Venkatesh, V., Thong, J. Y., & Xu, X. (2019). Unified theory of acceptance and use of technology: A synthesis and the road ahead. *Journal of the Association for Information Systems, 17*(5), 328-376.