A Comprehensive study of Blended Learning Effectiveness in Teacher Education: Insights from M.Ed. Students in Bihar

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Abstract

This study evaluates the academic environment of the Department of Education at Patna University through a survey involving approximately 200 respondents, focusing on five key areas: teaching-learning environment, student support, infrastructure, ICT integration, and overall academic satisfaction. Results indicate a strong teaching-learning culture, with 82% of participants acknowledging faculty approachability and 78% appreciating teaching methodologies. Updated curriculum content received positive feedback from 75% of respondents. Regarding student support, 70% confirmed adequate academic guidance, and 65% appreciated the quality of feedback provided. While 55% were satisfied with classroom infrastructure, concerns emerged about outdated library and ICT facilities. Although 68% noted effective use of ICT tools in teaching, gaps in accessibility and digital literacy remain. Overall, 72% expressed satisfaction with their academic experience, and 66% would recommend the department to others. Despite some dissatisfaction related to infrastructure and administrative processes, the findings highlight a generally positive academic atmosphere. Addressing digital and infrastructural limitations can further enhance the department's academic excellence and student satisfaction.

Keywords: *Blended Learning, Teacher Education, Digital Infrastructure, Bihar, Learning Outcomes*

1. Introduction

Blended Learning (BL) has become an essential pedagogical practice that combines conventional in-person teaching with digital learning techniques to improve the flexibility, accessibility, and efficacy of education [1]. Blended learning integrates traditional face-to-face classroom instruction with online educational activities. This learning modality is being

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favoured at several esteemed universities worldwide for improving educational quality, increasing examination success rates, offering temporal flexibility, and removing geographical limitations. The use of technology into face-to-face training has attracted considerable attention and has created several research possibilities throughout the years. Blended learning is presently considered the most effective and widespread instructional approach employed by educational institutions, due to its perceived ability to provide flexible, timely, and continuous learning opportunities. Blended learning is the combination of face-to-face instruction with technology-enhanced training. The incorporation of information and communication technology (ICT) in educational environments has profoundly impacted students' learning experiences, especially in higher education [3]. As global institutions adopt hybrid learning models, teacher education programs are integrating blended learning methodologies to adequately prepare future educators for a digitally developing classroom environment [4].

The transition to blended learning in India has been expedited by rising internet penetration, improvements in digital infrastructure, and the demand for distant education during the COVID-19 epidemic. Students' acceptability and participation in blended learning are affected by several aspects, including digital literacy, institutional support, socio-economic situations, and regional variations in technology availability [6], [7]. Comprehending these elements is crucial for enhancing the implementation of blended learning in teacher education programs, especially for Master of Education (M.Ed.) students who are anticipated to include technology into their prospective teaching methodologies. Nonetheless, the efficacy of blended learning may rely on several aspects, including student profiles, design elements, and learning objectives. Research indicates that learners' discontinuation of online education is often attributable to insufficient family support or heightened workload, resulting in dropout, as well as limited time for study (Park & Choi, 2009).

Previous authors indicated that learner characteristics and blended learning design aspects contribute to the efficacy of blended learning, with some serving as strong predictors of that effectiveness.

Although several studies have examined the effects of demographic characteristics like age, gender, and past experience on blended learning (BL) efficacy, there is a paucity of research regarding the role of social and contextual elements on students' engagement and performance in BL settings. Furthermore, the majority of current research concentrates on urban and well-resourced educational institutions, neglecting regional gaps in access to technology and digital

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resources. Bihar state in eastern India, offer a distinctive opportunity to assess the efficacy of BL among M.Ed. students. The capitals of both states, Patna and Ranchi, serve as significant educational centres but vary in digital infrastructure, institutional resources, and socio-economic situations. Despite the increasing implementation of blended learning in these areas, there is a deficiency of comparative studies examining how students' attitudes, views, and socio-cultural backgrounds affect their participation with blended learning.

This study seeks to evaluate the efficacy of the blended learning strategy by analysing critical criteria including student characteristics, design features of blended learning, and learning outcomes. These factors are examined as crucial indicators of the overall efficacy of blended learning.

2. Research Methodology

A descriptive research design was adopted for this study to assess the perceptions of faculty members and students regarding various aspects of the academic environment in the Department of Education, Patna University. A **structured questionnaire** based on a **5-point Likert scale** (ranging from *Strongly Disagree = 1* to *Strongly Agree = 5*) was developed, covering key domains such as:

- Teaching-Learning Process
- Student Support and Mentorship
- Infrastructure and Academic Facilities
- Use of ICT and Digital Learning Resources
- Overall Academic Satisfaction

Section 1: Demographic Information

This section captures essential demographic details such as age, gender, institution name, and state of study (Bihar). It also includes information on students' prior experience with blended learning, access to technology, and internet connectivity. These factors provide a contextual background for understanding variations in students' responses.

Section 2: Attitude Scale

A 30-item Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) was employed to measure students' attitudes toward blended learning. The scale was divided into four subcategories:

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a. **Positive Attitude Towards Blended Learning:** Items in this category evaluated students' enthusiasm, engagement, and perceived benefits of blended learning.

b. **Negative Attitude Towards Blended Learning:** These items assessed students' concerns, anxieties, and perceived difficulties associated with blended learning.

c. **Attitude Towards Teachers' Role in Blended Learning:** This section explored students' perceptions of instructors' effectiveness in facilitating blended learning environments.

d. **Attitude Towards Learning Outcomes:** This component analysed students' beliefs about the impact of blended learning on their academic performance, research skills, and overall development.

Section 3: Perception Scale

A separate 30-item Likert scale was utilized to evaluate students' perceptions of blended learning, categorized into four dimensions:

a. **Perceived Effectiveness of Blended Learning:** This section measured students' understanding of how blended learning enhances their conceptual clarity, critical thinking, and academic performance.

b. **Perceived Flexibility and Convenience:** Items in this category examined the flexibility of blended learning in terms of time management, accessibility of learning materials, and self-paced learning benefits.

c. **Perceived Technological and Resource Support:** This aspect analyzed students' satisfaction with digital platforms, learning resources, and institutional infrastructure supporting blended learning.

d. **Perceived Challenges in Blended Learning:** The final category addressed technological barriers, internet connectivity issues, and students' struggles with adapting to online learning environments.

Section 4: Open-Ended Questions

To gain qualitative insights, students were asked three open-ended questions:

What are the major benefits you experience with blended learning?

What challenges do you face with blended learning?

What improvements would you suggest to enhance blended learning?

The responses to these questions provided deeper contextual understanding, highlighting students' personal experiences, specific concerns, and recommendations for improving the blended learning framework

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Interviews: Conducted with faculty and students to gain deeper insights into the factors influencing BL effectiveness.

2.1.Sample Size and Respondent Profile

The survey was distributed to both faculty members and students. A total of **200 valid responses** were recorded, ensuring a representative mix of undergraduate and postgraduate students as well as teaching staff. The sampling technique used was **convenience sampling**, considering accessibility and willingness of participants.

2.2.Data Collection and Analysis

The data were collected through both online (Google Forms) and offline methods over a period of two weeks. Once collected, the responses were coded and analysed using percentage distribution to capture the overall sentiment across the selected parameters. Basic descriptive statistics were applied to interpret the results and highlight key trends.

3. Results and Discussion
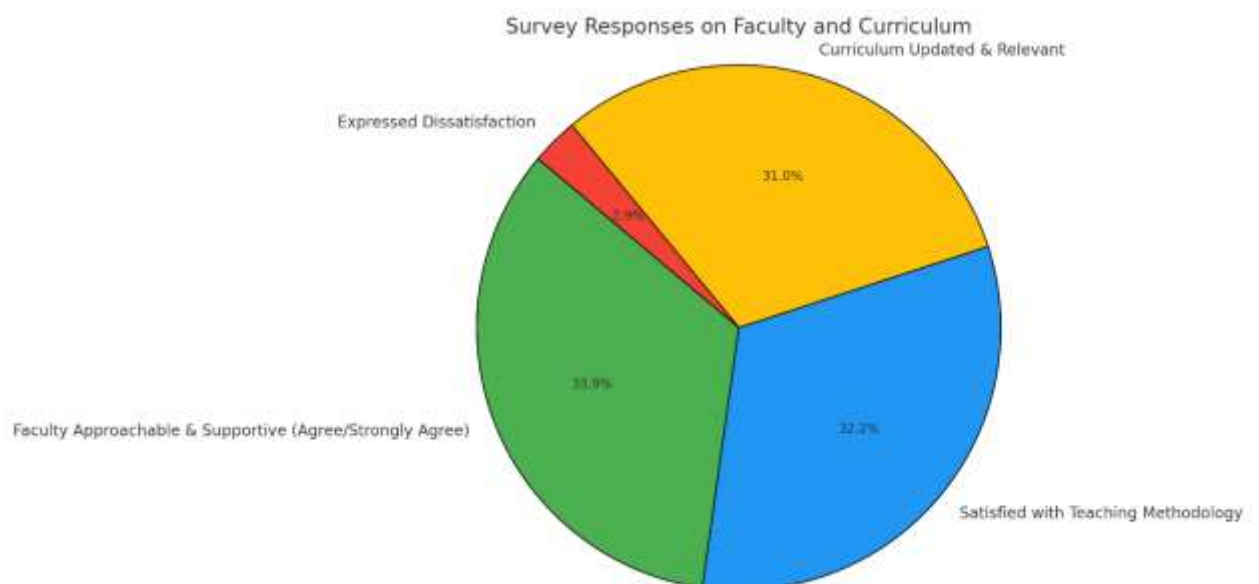### 3.1. Teaching-Learning Environment

Figure 1. Distribution of survey responses regarding faculty engagement and curriculum quality.

From Figure 1 it is clear that 82% of respondents either agreed or strongly agreed that faculty members are approachable and supportive. 78% expressed satisfaction with the teaching methodology used in classes. 75% believed that the curriculum content is updated and relevant to academic and career demands. Only 7% expressed dissatisfaction, suggesting a high level of confidence in faculty engagement and pedagogy. These results point to a robust and positive teaching-learning culture within the department. The faculty's approachability and effective instructional methods have contributed significantly to a constructive academic atmosphere.

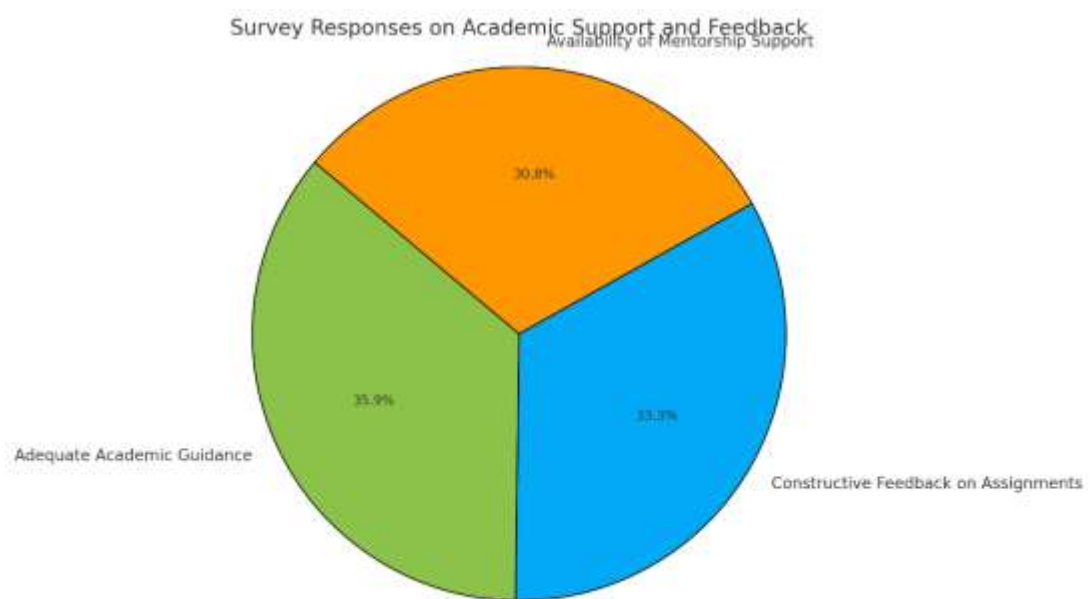### 3.2.Student Support and Mentorship

Figure 2. Student Support and Mentorship responses

From figure 2 survey responses highlighting academic support and feedback mechanisms. The chart shows that 70% of respondents agreed they receive adequate academic guidance from faculty, 65% reported receiving constructive feedback on assignments and evaluations, and 60% confirmed the availability of mentorship support when needed-demonstrating a positive perception of academic assistance.
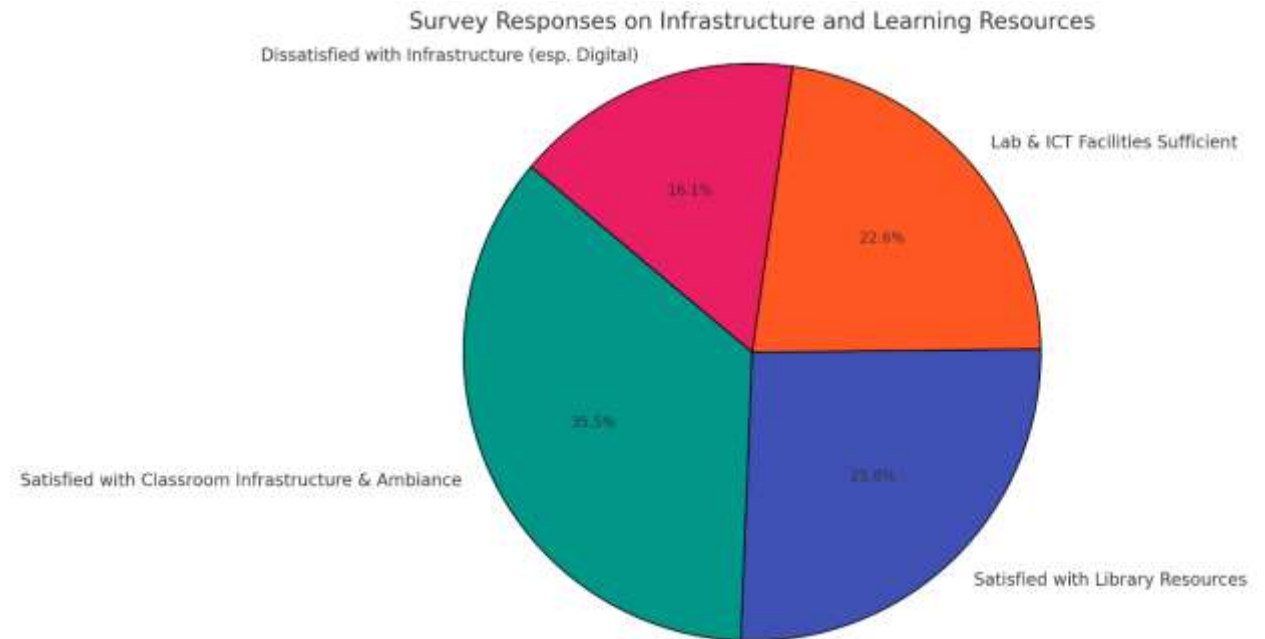
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3.3.Infrastructure and Facilities

Figure 3: Survey responses on infrastructure

Figure 3 indicates that 55% were satisfied with classroom infrastructure and learning ambiance. 40% expressed satisfaction with library resources.35% believed that laboratory and ICT facilities are sufficient for academic requirements. A notable 25% showed dissatisfaction, especially with digital infrastructure and outdated facilities. The findings reveal a mixed perception about infrastructure, with noticeable concern about the adequacy and modernization of academic facilities. Improvement in library digitization and laboratory facilities is essential to enhance the learning experience.

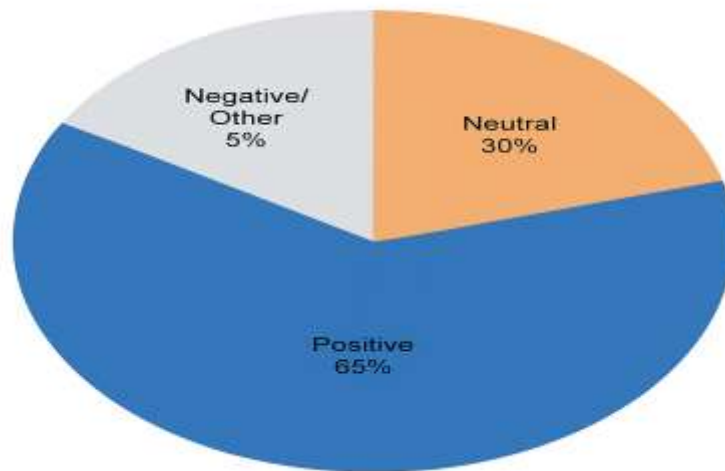### 3.4.ICT Tools and Digital Learning Resources

Figure 4. distribution of opinions on digital learning tools and resources

From Figure 4 it is clear that 68% agreed that faculty use ICT tools in their teaching practices. 62% mentioned that e-resources are available and beneficial. 30% were neutral, which may be due to variability in internet access or lack of familiarity with digital tools. The integration of ICT in the department is progressing, but not uniformly. Providing faculty development programs in digital pedagogy and improving access to digital tools for students can bridge this gap.

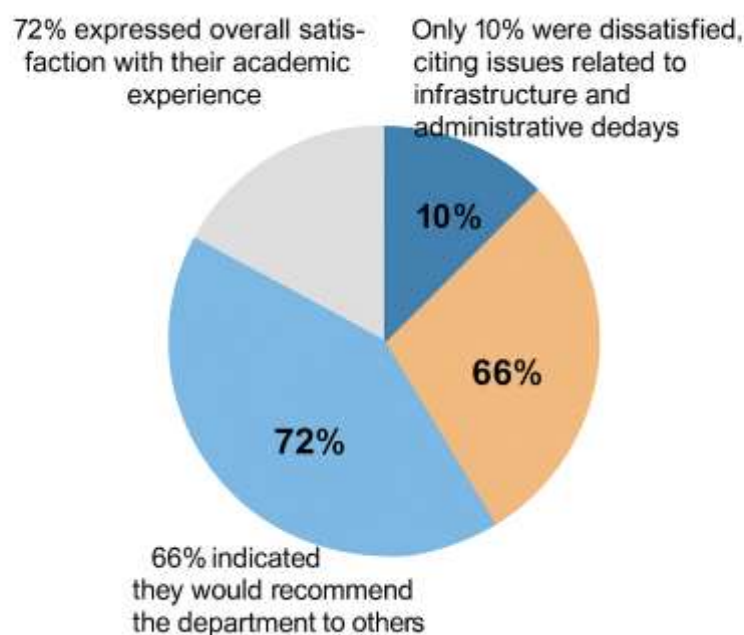### 3.5.Overall Academic Satisfaction

Figure 5. Academic Satisfaction

From figure 5 its shows that 72% of the people expressed overall satisfaction with their academic experience. 66% of the people indicated they would recommend the department to others. Only 10% of the people were dissatisfied, citing issues related to infrastructure and administrative delays. The high overall satisfaction score reflects positively on the department's academic functioning. However, a few operational and facility-based issues remain that, if addressed, could further elevate the department's standing and student satisfaction levels.

4. Conclusion

The findings of this study provide a comprehensive understanding of the academic environment within the Department of Education at Patna University, highlighting both strengths and areas for improvement. The majority of respondents reported high satisfaction with the teaching-learning process, faculty engagement, and curriculum relevance, suggesting that the department fosters an effective and supportive academic culture. The positive feedback regarding mentorship and academic guidance further underscores the faculty's role in enhancing student learning outcomes. However, the results also indicate mixed perceptions concerning infrastructure and digital learning resources. While there is some satisfaction with classroom ambiance and ICT integration, a notable proportion of respondents voiced concerns about outdated facilities, limited digital access, and inconsistent use of technology in pedagogy. These gaps, if addressed, could significantly elevate the quality of education and student experience. Overall, the high levels of academic satisfaction and willingness to recommend the department reflect its commitment to educational excellence. To maintain and improve this standard, strategic investment in modern infrastructure, digital resource accessibility, and faculty training in educational technology is essential. Continuous feedback mechanisms and a student-centric approach will further strengthen the academic ecosystem, aligning it with contemporary educational demands and student expectations.

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