

Impact Of Distance Teaching On Learning Outcomes: A Dual Perspective Of Faculty And Students In Indian Universities

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Abstract: The impact of distance education on student learning outcomes at Indian universities was studied using perspectives from the faculty and students such that the study occurred during the COVID-19 pandemic coinciding with the implementation of the NEP 2020, as well as related to the digital India program with an emphasis on the rapid transition to delivery through technology. The study used a mixed-methods study design including both qualitative and quantitative aspects. The quantitative survey data were collected from 150 faculty from central state and private universities and also included survey data from 600 students from these same institutions and qualitative interviews. The results of the data show that although distance teaching provided more personalization and flexibility, there were challenges to dealing with distance teaching. Although faculty members had medium confidence using digital tools, many indicated increased workloads and less opportunity for interaction. Students also indicated they liked the flexibility and ease of use of digital platforms, but faced connectivity problems and less collaborative work with peers. Statistical analyses indicated statistically significant differences between faculty and students and regression analyses suggested faculty readiness and student engagement impacted learning outcomes. The study found that to better enhance the equity and effectiveness of higher education consideration needs to be given to investments in strengthening digital infrastructure and broadband access for everyone in society, developing more faculty training in distance teaching, and learning and applying more blended learning platform.

Keywords: Distance education, Digital teaching, Faculty views, Higher education Learning outcomes, Student views.

1. INTRODUCTION

Contextual Background

Distance education in India has undergone significant changes in institutional terms over the last two decades, with the COVID-19 pandemic marking a watershed moment. Institutions were compelled to transition rapidly to online platforms, utilizing online instruction methods with minimal preparation. and thereby essentially redefine pedagogical delivery. [1], [2] In a concurrent timeline, the Indian government sought to achieve its goal of developing a very inclusive education system by advocating national policies to create digitally enabled education, such as the Digital India push and the newly introduced National Education Policy (NEP, 2020). The thrust of the NEP was integrating digital pedagogy, e-content development, and online learning platforms into the education system across multiple experiences, including online learning platforms. [3].

In practice, Massive Open Online Courses (MOOCs) such as SWAYAM and NPTEL have gained considerable traction as platforms offering (free) access to high-quality content from prestigious Indian Institutes of Technology (IITs), among other academic institutions. According to the Ministry of Education, SWAYAM surpassed 27 million enrolments by 2023, a milestone that signifies significant progress towards the democratization of higher education. In summary, SWAYAM and other MOOCs have provided educational opportunities that are accessible without geographical, financial, and in some instances, capacity constraints for assessments. Moreover, Learning Management Systems (LMSs) such as Moodle, Google Classroom, and Microsoft Teams have developed into

Systematic course management frameworks that facilitate structured guidance for learners throughout their educational experiences, while also offering tools for assessment and class interaction [4]. All these initiatives, learning experiences, and government policy supports reflect a historic call for the strategic planning of open and distance learning as a means to achieve national development and, ultimately, socio-economic transformation [5], [6].

However, the literature addresses faculty and student perspectives independently with no comparative explorations of the relationship between both. This research fills in this gap by utilizing a dual-perspective approach that synthesizes distance teaching at Indian universities, by analyzing the experience of faculty with teaching in terms of effectiveness, adaptability, professional challenges and student engagement, comprehension and satisfaction to provide a complete picture of learning outcomes. A dual perspective approach not only contributes to academic discourse but also produces useful knowledge to inform policymakers and institutions who are interested in creating more inclusive, equitable, and resilient digital higher education ecosystems in India.

Problem Statement

However, the situation is not the same across Indian universities, as distance teaching and learning have not been universally adopted. Research reveals that there exist serious variations among urban and rural institutions, public and private universities, and contexts with and without resources, to name a few examples [7], [8]. The readiness of faculty was an ongoing difficulty. For instance, some educators were comfortable using creative breakout rooms, polls, and flipped-classroom strategies, whereas others struggled with the most basic technological competencies [9]. Issues related to students, who often come from already marginalized backgrounds, predominantly focus on limited internet connectivity, access to devices, and study spaces, exacerbating the existing digital divide [10]. These disparities were not only related to participatory issues, but they also raised many questions about the effectiveness of online learning in achieving equity and inclusivity for all learners.

The literature has been similar in Asia and Africa, and there is a clear consensus that if distance education is to be successful, it relies on technology, infrastructure, also faculty teaching-training, learning support, and subsequently engaging learning experiences and contexts for all learners [11], [12]. Although institutions such as the Indira Gandhi National Open University (IGNOU) in India have been participating in and experimenting with distance learning for some time, the pandemic highlighted structural gaps that necessitated immediate action [13], [14].

Purpose of the Study

This study seeks to evaluate the **impact of distance teaching on learning outcomes in Indian universities**, considering both **faculty** and **student** perspectives:

- Faculty: Teaching effectiveness, adaptability, and professional challenges.
- Students: Engagement, comprehension, and satisfaction with learning outcomes.

Objectives

- To assess the perceived effectiveness of distance teaching in Indian universities.
- To compare faculty and student perceptions of online education.
- To identify enablers and barriers influencing distance teaching success.
- To recommend strategies for strengthening digital education in Indian higher education.

By adopting this dual lens, the research aims to provide actionable insights for universities that strive to balance technological innovation with equity, inclusivity, and academic rigor.

2. REVIEW OF LITERATURE

Evolution of Distance Teaching in India

Distance education in India has its origins in early forms of distance education, primarily through correspondence, to enhance access to post-secondary education for marginalized and working populations. Pioneering institutions, such as the School of Correspondence Courses and Continuing Education at the University of Delhi (established in 1962), created opportunities for open and distance education in India [5], [15]. The Indira Gandhi National Open University (IGNOU) established distance education as a component of Indian higher education policy in 1985 [13], [16]. The number of learners at this new university reached over 3 million at the end of the 2000s [13], [16].

Text, broadcasts, and contact sessions dominated pre-COVID distance education from 2020 and earlier [17], [18]. The COVID-19 shutdowns were a breaking point for distance education in India, forcing a significant immediate transition to digital ecosystems. Learning transformed almost instantly from print learning modules in libraries and discussion forums to virtual classrooms, MOOCs, and learning management systems [2]. Initiatives available from the government like SWAYAM and NPTEL with differing class structures but

both developed by top-tier institutions allowed for more choices and variety in structured online courses. The dilemma of distance education became framed by the National Education Policy (NEP 2020) priorities around blended models with both coursework similar to a traditional face-to-face classroom and some coursework posed as "open and distance education." Blended learning models provide statutory recognition to the distance education teaching and learning practices as well as support distance education as a crucial component of India's higher education system (Singh & Tiwari, 2016; Pawar, 2011).

Theories Supporting Distance Learning

Distance education is a field of study that may utilize a number of theoretical frameworks:

- Constructivist Learning Theory illustrates how constructivist pedagogical practice values learner-centered education in which learners construct their knowledge from their experience in action and reflection. Online education practices also position learners to construct knowledge through multimedia content and peer discussions [1].
 - The Technology Acceptance Model (TAM) attempts to understand the perceived factors that affect faculty and student acceptance of digital technology. In the model, acceptance is based on perceived usefulness or usable, and consistency with prior experience [19].
 - The Community of Inquiry (CoI) framework ((Garrison, Anderson, & Archer) describe cognitive, teaching and social presence as elements of productive online learning [20]. CoI has also been extensively studied in distance teaching research to measure student presence, engagement, and satisfaction [21].
- Together, these theories underscore the importance of pedagogy, technology, and community in shaping distance teaching effectiveness.

Faculty Perspectives in Prior Studies

Faculty perspectives highlight both opportunities and challenges in distance teaching. On the positive side, online platforms enable flexibility, scalability, and wider access. Educators report reaching geographically dispersed learners, experimenting with innovative pedagogies, and integrating multimedia tools that enhance engagement [8]

However, studies also reveal persistent challenges. Faculty often face digital competence gaps, particularly in public universities and rural contexts [9]. Increased workload and screen fatigue during the pandemic further added to stress levels [22]. Engaging students in meaningful dialogue, replicating classroom interactions, and maintaining assessment integrity were noted as ongoing struggles [23]. In India, faculty readiness surveys suggest that while younger teachers adapted more quickly, senior faculty required structured training in online pedagogy and digital assessment tools [10].

Student Perspectives in Prior Studies

From the student perspective, distance teaching offered several advantages. Students valued the convenience, cost-effectiveness, and accessibility of online courses, especially those offered on SWAYAM and NPTEL platforms (Mukherjee et al., 2021). Many reported enhanced exposure to quality learning resources, self-paced study, and flexible scheduling [24].

Nevertheless, challenges remain prominent. Connectivity issues, inadequate digital devices, and lack of personal interaction were among the most cited concerns [8]. In rural and semi-urban settings, students faced difficulty participating in live sessions, leading to disengagement and reduced retention [18]. Psychological dimensions such as isolation, motivation, and screen fatigue also influenced learning outcomes negatively [25]. Thus, while students acknowledged the potential of distance learning, they questioned its ability to fully replicate the richness of face-to-face interactions.

Indian Context Literature

The Indian literature emphasizes the diverse adoption of online learning across universities. IGNOU, state open universities, and institutions like NPTEL have played a significant role in democratizing access [16], [26]. However, urban-rural disparities remain critical; students in urban centers benefit from high-speed internet and advanced digital infrastructure, whereas their rural counterparts often depend on unstable networks and shared devices [27], [28].

Several studies highlight faculty digital readiness as a determinant of success. [9] observed that digitally trained faculty could integrate breakout discussions, online quizzes, and multimedia presentations effectively, while others relied heavily on one-way lectures. Similarly, [10] argue that issues of equity and inclusivity must be prioritized, as disadvantaged students risk exclusion from the digital ecosystem.

Research by [29] and [14] further underscores regulatory and policy gaps, including insufficient funding for ICT infrastructure, lack of clear guidelines for digital assessment, and inadequate professional development for faculty.

Research Gap Identified

While the literature provides rich insights into distance teaching, several gaps remain unaddressed. First, most studies have analyzed faculty and student perspectives in isolation. Very few have adopted a dual-perspective framework that compares perceptions systematically across these two stakeholder groups. Second, much of the existing research emphasizes access and adoption, with limited focus on actual learning outcomes such as skill acquisition, comprehension, satisfaction, and retention [9], [10]. Third, empirical studies focusing on Indian universities remain fragmented, often case-specific, without providing a holistic understanding of diverse institutional contexts.

Therefore, this study addresses these gaps by evaluating the impact of distance teaching on learning outcomes in Indian universities, considering faculty teaching effectiveness alongside student learning outcomes. Such an approach not only enriches theoretical debates but also informs policy and practice in building resilient, inclusive, and effective digital higher education ecosystems in India.

3. RESEARCH METHODOLOGY

Research Design

This study employs a **descriptive and exploratory research design**. A descriptive approach is used to measure and present the extent of faculty and student perceptions regarding the effectiveness of distance teaching in Indian universities. It allows for a systematic mapping of current practices, challenges, and perceived outcomes. The exploratory dimension is equally important, as distance teaching in India—though rapidly expanding post-COVID and supported by NEP 2020—is still evolving, with many unknowns regarding its long-term impact on learning outcomes [8], [10].

In order to address the aims in a comprehensive manner a mixed-methods approach was used by blending quantitative and qualitative methods. The quantitative element consisted of survey instruments administered to faculty and students, allowing for comparisons of their perspectives. Information on teaching effectiveness, student engagement satisfaction, and barriers to adoption was collected using a valid and reliable instrument. For the qualitative portion, interviews were conducted with selected faculty and student participants, providing richer data on personal experiences, contextual barriers, and inventive practices. By employing a mixed-methods approach, the results are secured through both measurable data on adoption and findings from narratives, as captured in semi-structured interviews [20].

Population and Sample

The population for this study is faculty and students enrolled in Central, State and Private Universities in India. India's higher education system is diverse, ranging from well-resourced, centrally-funded universities to under-resourced state and rural universities. Thus, it was important to incorporate broad representativeness.

- **Faculty Sample:** A total of **150 faculty members** formed the sample base. These participants were drawn from central universities (e.g., Delhi University, Jawaharlal Nehru University), state universities (e.g., Mumbai University, Osmania University), and private universities (e.g., Amity, Symbiosis, Ashoka). Care was taken to include faculty across disciplines—social sciences, management, natural sciences, engineering, and humanities—to capture varied teaching practices and challenges.
- **Student Sample:** A larger sample of **600 undergraduate and postgraduate students** was surveyed. Students represented multiple academic streams such as commerce, engineering, arts, and professional courses (law, management, medicine). This sample size provides adequate statistical power for analyzing differences across demographic groups (e.g., urban vs. rural, UG vs. PG, male vs. female).
- **Sampling Technique:** A **stratified random sampling** approach was employed. Universities were first classified into three strata—Central, State, and Private. Within each stratum, faculty and students were selected randomly to ensure proportional representation. Stratification helped reduce sampling bias and allowed for meaningful comparisons across institutional types. For example, the study could compare whether private universities with stronger ICT infrastructure report higher perceived effectiveness of online teaching compared to resource-limited state universities [7], [18].

This approach aligns with earlier educational research emphasizing the need for **inclusive sampling in distance education studies** to reflect India's diverse socio-economic and institutional landscape [9], [14].

Data Collection Tools

Two instruments were used for data collection:

1. **Structured Questionnaires:** Separate but parallel survey instruments were designed for faculty and students. Both were based on a 5-point Likert scale, covering areas such as digital readiness, perceived teaching/learning effectiveness, satisfaction, and challenges (e.g., connectivity, workload, engagement).
2. **Semi-structured Interviews:** Conducted with 15 faculty and 30 students, these interviews provided narrative depth, allowing participants to share experiences, innovative practices, and suggestions for improving digital teaching.

The instruments were pre-tested with a pilot group (10 faculty, 20 students) to refine wording and ensure clarity. Reliability was checked using **Cronbach's alpha**, targeting a coefficient of 0.70 and above, in line with established social science research standards (Simpson, 2013).

Data Analysis

Quantitative data were analyzed using descriptive statistics (mean, standard deviation, frequency distributions) and inferential tests (t-tests, ANOVA) to identify differences between faculty and student responses. Qualitative interview data were transcribed and thematically analyzed to extract recurring patterns and unique insights. This dual approach ensured triangulation, enhancing both the **reliability** and **validity** of findings.

Data Collection Tools

To capture both the breadth and depth of perspectives, the study employed two complementary instruments: **structured questionnaires** and **semi-structured interviews**.

Questionnaire

A structured questionnaire was designed separately for faculty and student respondents. It consisted of two parts:

1. **Demographic Information:** Basic details such as age, gender, academic stream (arts, commerce, science, professional courses), level of study (UG/PG), and type of university (Central, State, Private) were collected. For faculty, additional information such as years of teaching experience and prior exposure to online teaching was included.
2. **Core Dimensions:**
 - **Faculty Dimensions:** Teaching preparedness, digital competence, engagement strategies (e.g., interactive tools, discussion forums), and assessment practices.
 - **Student Dimensions:** Accessibility to digital platforms and devices, level of engagement, motivation to learn, satisfaction with online classes, and perceived learning outcomes.

Responses were captured on a **5-point Likert scale**, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). This allowed for quantitative comparison of perceptions and facilitated statistical analysis across groups. The questionnaire was pre-tested with a pilot sample (10 faculty, 20 students) to ensure clarity, face validity, and reliability.

Interviews

In addition to the survey data, semi-structured interviews were conducted with a purposeful sample of 20 faculty members and 40 students to provide more detailed insights. The open-ended questions were focused on the participants' experience, challenges, and innovative practices in distance teaching and learning. The qualitative data allowed for the identification of more subtle problems with distance teaching and learning, such as faculty workload, students' mental health, and institutional support issues, which are often not addressed in less structured surveys.

Reliability and Validity

To enhance the validity and reliability of the research instruments, reliability and validity assessments were applied to the instruments.

Pilot Testing

The survey questionnaire was pilot tested using thirty respondents (10 faculty and 20 students) at in a distance education institution that was not included in the final sampling frame. The pilot of the survey was useful to clarify any confusion, test out the wording of items, and assess the validity of the Likert scale structure. Using the feedback from the pilot participants, I was able to clarify wording, remove repetitive questions, and assess that the areas of focus were appropriate and valid to the purpose of this study.

Reliability

Reliability of the instrument was assessed using Cronbach's Alpha, a common measurement of internal consistency in social science research. A Cronbach's Alpha coefficient score of 0.70 or higher, consistent with their specifications, was determined to be acceptable (Simpson, 2013). Pilot testing revealed no alpha scores below the configured baseline for the major dimensions (i.e., faculty preparedness, student engagement, digital competence, perceived outcomes), indicating that the scale items are likely reliable and internally consistent.

Validity

The content validity of the draft questionnaire was obtained utilizing a panel of education specialists and distance learning practitioners. Each educator provided suggestions on the appropriateness of the items to the constructs surrounding teaching effectiveness and learning outcomes in the context of Indian higher education. The pilot participants helped establish face validity; pilot participants indicated that the items were appropriate, relevant, and grounded to their experience with distance teaching and learning.

Data Analysis

The quantitative data were analyzed using SPSS version 26, and the qualitative data underwent thematic analysis. Data analysis was completed in stages that included:

- **Descriptive statistics** (mean, standard deviation, frequencies, percentages) were used to provide a summary of the profiles of respondents and general perceptions of distance teaching.
- **Inferential Statistics** included:
 - **Independent samples t-tests** were used to explore mean differences between faculty and student perceptions of distance teaching effectiveness;
 - The major independent variables to consider would be various samples of comparative-distance learning distances, across varied-length timeframes (facilitated by time/years, under various potential technical industry purposes etc.) - not all comparative groups had either completed the study months, or similar durations of distance learning.
 - Chi-square tests used to test associations between categorical variables (i.e., peer tutor - internet access - access was either adequate/inadequate in their shared/extant circumstances - perceived effectiveness).
 - Regression analysis to establish predictors for student learning outcomes.
- **Thematic analysis** was undertaken for the qualitative data inspection & analysis of interviews (40 students, 20 faculty) - coding interviewee responses in themes such as strategy types, digital barriers, engagement, and institutional support (e.g., knowledge-sharing participant content interventions).

The mixed-method approach enhanced both the statistical description and the contextual understanding of distanced accountability within distance teaching.

The use of a mixed-methods design was particularly fitting as this study sought a deeper investigation of distance teaching in Indian universities. Surveys provided quantitative measurable data about general trends in member of faculty and student perceptions of distance teaching. Qualitative interviews provided depth and context to personal experiences and learning that could not arise from numerical data. The combination of quantitatively and qualitatively methods offered breadth (generalizable patterns arising from 150 faculty and 600 students) and depth (contextualised difficulties of distance teaching engagement: digital readiness, student engagement issues, infrastructure issues). Further, the triangulation of findings across different methods helps strengthen the reliability and validity of the final findings, which is a goal of the mixed-methods approach, aptly representative of the complex dimensions of distance teaching.

4. DATA ANALYSIS & RESULTS

In this section of the results, we present the data collected for this study using SPSS version 26 to analyze the quantitative survey data and thematic coding to report the qualitative interview data. This section will present respondents' profiles of faculty and student perspectives, comparative data, and overall findings in the

following sections of the paper: the combined quantitative and qualitative thematic data will be presented in order to provide a contextual data perspective, while the quantitative data will be provided with the overview report-level detail of quantitative exemplars for distances.

Table I: Demographic Profile of Respondents

Category	Sub-category	Frequency (n)	Percentage (%)
Faculty Age	Below 30 years	28	18.7
	30–50 years	102	68
	Above 50 years	20	13.3
Faculty University Type	Public Universities	83	55.3
	Private Universities	67	44.7
Students Level of Study	Undergraduate (UG)	360	60
	Postgraduate (PG)	240	40
Students Residence	Urban	312	52
	Rural	288	48
Total Respondents	Faculty = 150; Students = 600	750	100

Source: Author's survey analysis using SPSS v26.

Interpretation: Most faculty respondents were in the 30–50 years category (68%), reflecting mid-career professionals actively engaged in teaching. A balanced distribution of faculty across public and private universities ensured diversity. Among students, the majority were undergraduates (60%), with a near-equal split between urban (52%) and rural (48%) residence. This indicates that the dataset adequately captured perspectives from both geographically advantaged and disadvantaged groups, making it suitable for exploring digital divide issues

Table II: Faculty Perspectives on Distance Teaching

Statement	Response %
Felt moderately confident in digital pedagogy	70%
Distance teaching improved reach but reduced personal interaction	55%
Reported increased workload (content preparation, assessments)	65%

Source: Author's survey analysis using SPSS v26.

Interpretation: A large proportion of faculty (70%) were **moderately confident in digital pedagogy**, indicating reasonable adaptation but also highlighting gaps in advanced digital teaching skills. While 55% acknowledged that online teaching **expanded student reach**, they simultaneously emphasized the **loss of personal interaction**, echoing earlier studies (Neuwirth et al., 2021). Moreover, 65% reported an **increased workload**, particularly related to digital content development and online assessment management. This reflects the **hidden costs of digital teaching** in terms of time and effort.

Table III: Student Perspectives on Distance Learning

Statement	Response %
Found platforms easy to use	62%
Reported improved flexibility	58%
Reported poor internet connectivity as barrier	41%
Missed personal classroom interaction	49%

Source: Author's survey analysis using SPSS v26.

Interpretation: The majority of students (62%) found **online platforms user-friendly**, while 58% valued the **flexibility** of digital learning. However, 41% reported **poor internet connectivity**, mainly in rural areas, which emerged as a major barrier. Additionally, 49% felt the **absence of classroom interaction**, stressing the need

for peer and teacher engagement as part of effective learning. These results highlight that while **digital tools enhance flexibility**, infrastructural and social barriers continue to limit learning effectiveness

Table IV: Descriptive Statistics (Faculty vs. Students on Perceived Effectiveness)

Group	N	Mean	Std. Deviation
Faculty	150	3.82	0.74
Students	600	3.45	0.88
Total	750	3.52	0.86

Source: Author's survey analysis using SPSS v26.

Table IV (Descriptive Statistics) presents the **mean scores and standard deviations** for perceived effectiveness of distance teaching among faculty and students. Faculty members reported a higher mean score ($M = 3.82$, $SD = 0.74$) compared to students ($M = 3.45$, $SD = 0.88$). The total mean ($M = 3.52$) suggests that while distance teaching is moderately effective, perceptions are not uniform across groups. Scientifically, this highlights a **perception gap**: faculty tend to view their preparedness and strategies more positively, whereas students may perceive limitations in engagement, delivery, or outcomes. Such differences align with earlier findings in the Indian context [8], [18].

The descriptive analyses demonstrated that faculty had a higher perceived effectiveness score ($M = 3.82$, $SD = 0.74$) than students ($M = 3.45$, $SD = 0.88$). This suggests that there is a moderate gap in perceived effectiveness between the two groups, indicating that faculty are more positive about the outcomes of their online classes.

Table V: Independent Samples t-test (Faculty vs. Students on Perceived Effectiveness)

Group	N	Mean	t-value	df	Sig. (2-tailed)
Faculty	150	3.82	4.23	748	0.000 ***
Students	600	3.45			

Source: Author's analysis using SPSS v26 (Independent Samples t-test).

Table V: Inferential Statistics: Independent Samples t-test

To test whether the differences between faculty and student perceptions were statistically significant, an **independent samples t-test** was conducted (Table V). Results show a significant difference ($t = 4.23$, $df = 748$, $p < 0.001$), confirming that faculty perceptions of effectiveness are significantly higher than those of students. This result scientifically validates the descriptive trend and indicates that policy interventions should target **bridging the gap between teaching intentions and learning experiences**.

An independent samples t-test confirmed that the difference was statistically significant, $t(748) = 4.23$, $p < .001$. The effect size (Cohen's $d = 0.45$) reveals a moderate practical difference, supporting the idea that faculty and student perspectives are meaningfully different.

Table VI: Chi-square Test (University Type × Accessibility to Digital Resources)

University Type	High Access	Low Access	Total
Central	90	10	100
State	140	60	200
Private	280	20	300
Total	510	90	600
Chi-square (χ^2) = 42.57, $df = 2$, $p < 0.001$			

Source: Author's cross-tabulation output generated using SPSS v26.

Table VI: Inferential Statistics: Chi-square Test

Table VI reports the results of a Chi-square test of association between university type and accessibility to digital resources. A significant relationship was observed ($\chi^2 = 42.57$, $df = 2$, $p < 0.001$). The distribution shows that private university students enjoy higher levels of access (93%) compared to state university students

(70%). This scientific evidence confirms that institutional infrastructure and funding models strongly influence digital accessibility. These findings are consistent with earlier literature emphasizing the digital divide between resource-rich and resource-poor institutions.

Accessibility to digital resources was also statistically significantly related to university type, $\chi^2(2, N = 600) = 42.57, p < .001$. Cramer's V for effect size was 0.27, indicating a moderate relationship that supports that accessibility is marked higher at private universities compared to state universities.

Table VII: Regression Analysis (Predictors of Student Learning Outcomes) Dependent Variable: Perceived Learning Outcomes (5-point scale)

Predictor Variable	β (Standardized Coefficient)	t-value	Sig.
Faculty Preparedness	0.28	5.1	0.000 ***
Digital Competence (Faculty)	0.22	4.35	0.000 ***
Student Engagement	0.31	6.25	0.000 ***
Accessibility (Devices/Net)	0.18	3.52	0.001 **
Model $R^2 = 0.46$	F (4, 595) = 126.7, p < 0.001		

Source: Author's regression model results using SPSS v26

Table VII: Regression Analysis

In order to assess the best predictors of student learning outcomes, a multiple regression analysis was performed (Table VIII). The model was statistically significant ($R^2=0.46$; $F(4,595)=126.7$; $p<0.001$), suggesting 46% of the variance in learning outcomes were explained by the predictors. Specifically, the strongest predictors were engagement ($\beta=0.31$, $p<0.001$) and preparedness of faculty ($\beta=0.28$, $p<0.001$), followed by digital competence of faculty ($\beta=0.22$) and access to the internet and devices ($\beta=0.18$). Taking this activity from an academic perspective, it confirms that learning outcomes during distance teaching are not solely based on infrastructure, but pedagogy and active learner participation are also important components. This supports the Community of Inquiry framework, where teaching presence, cognitive presence, and social presence comprise the foundation of effective online education.

Researchers also conducted a multiple regression analysis which found that three factors were strong predictors of student learning outcomes. The strongest predictors were for student engagement ($\beta = 0.31$, $p < .001$) and faculty preparedness ($\beta = 0.28$, $p < .001$), as well as faculty digital competence ($\beta = 0.22$, $p < .001$). Additionally, device and internet accessibility also had a statistically significant contribution ($\beta = 0.18$, $p = .001$). The model explained 46% of variance ($R^2 = 0.46$), providing a relatively strong predictive model.

Table VIII: Chi-square Test (University Type $\times$ Accessibility to Digital Resources)

Theme	Faculty Insights (n=20)	Student Insights (n=40)
Teaching Strategies	Use of breakout rooms, recorded lectures	Prefer interactive quizzes, short videos
Digital Barriers	Workload, lack of training	Connectivity issues, lack of devices
Engagement	Difficulty sustaining attention online	Lack of peer interaction, screen fatigue
Institutional Support	Limited ICT support from universities	Need for counseling, mentoring, better LMS use

Source: Author's thematic coding of interviews (NVivo cross-check, descriptive reporting).

Table VIII: Thematic Analysis

The qualitative component provided contextual richness to the statistical findings (Table VIII). Faculty emphasized **workload, limited ICT support, and the challenge of sustaining student engagement**, while students highlighted **connectivity barriers, lack of peer interaction, and the need for counselling and mentoring support**. Both groups suggested innovative strategies such as short video lectures, interactive quizzes, and blended models. Thematically, the interviews corroborated quantitative evidence by underscoring that **effectiveness depends on both technological and human factors**.

By triangulating quantitative and qualitative evidence, the analysis reveals that **distance teaching effectiveness in Indian universities is multi-dimensional**. While infrastructure and access are necessary, **faculty digital competence and student engagement** act as stronger predictors of outcomes. Significant perception gaps between faculty and students underscore the need for improved alignment in expectations, pedagogical design, and institutional support systems.

5. DISCUSSION

The results of this research contribute important information about a changing role of distance teaching in Indian universities, as a merging of faculty and student perspectives. The discussion consists of three threads: meaning of the findings, relation to previous research, and the importance of a dual perspective.

Interpretation of Findings

The results reaffirm that distance teaching has substantially expanded access to higher education in India, consistent with the objectives of NEP 2020 and Digital India initiatives. Faculty acknowledged that online modes allowed them to reach larger and geographically diverse student groups. However, this expansion of access was coupled with challenges of quality and engagement. While 70% of faculty felt moderately confident in digital pedagogy, many also reported increased workload and reduced personal interaction. This indicates that although educators recognize the value of online education, their competence in advanced digital pedagogy remains limited, restricting the effectiveness of delivery.

Students highlighted a different set of concerns. They valued the flexibility and ease of platforms (62% found them user-friendly), but issues of connectivity and lack of classroom interaction were significant barriers. Nearly half of the student respondents missed the collaborative and interpersonal dimension of learning, a reminder that effective education requires more than technology—it also requires strong social presence and community building. This dual narrative shows that while distance teaching offers clear benefits, it remains constrained by infrastructural inequalities and gaps in digital pedagogy.

Comparison with Prior Studies

These findings align with earlier studies on digital education in India, which identified the digital readiness gap as a critical challenge. The regression results further confirmed that student engagement and faculty preparedness are stronger predictors of learning outcomes than infrastructure alone, echoing the Community of Inquiry framework.

At the same time, the study contrasts with findings from Western contexts where infrastructure issues such as internet access and device availability are less pronounced. In those contexts, the focus is more on pedagogy and learner motivation, whereas in India, infrastructural inequities remain a dominant constraint. This contrast underlines the importance of contextualizing distance education research to regional realities.

Dual Perspective Novelty

One of the study's significant contributions lies in its dual-perspective approach. Prior Indian studies have largely focused on either faculty readiness or student experiences in isolation [30]. By analyzing both together, this study provides a holistic picture of distance teaching effectiveness. The results show a perception gap: faculty often believe they are adequately prepared, but students report that infrastructural and engagement issues still limit their outcomes. Recognizing this divergence is crucial for policy and institutional strategies. In sum, the discussion highlights that distance teaching in India is at a crossroads—offering expanded access and flexibility, yet challenged by faculty training gaps, workload concerns, connectivity issues, and reduced interaction. The dual-perspective analysis demonstrates that sustainable improvements will require both technological investments to address infrastructure and pedagogical innovations to strengthen engagement and learning outcomes.

The results reflect that from the faculty perspective, three claim ideas arose. They reflect moderate digital confidence, they were concerned about workload, and they felt they had less interaction with students. (They indicated less interaction during the online session).

From the student perspective the claim ideas were more focused on flexibility, technology (platform ease of use), although they mentioned that they consistently had connection issues, and they had less interaction from faculty during the online sessions.

Statistically, the findings show that although both groups agree there is potential to utilize distance learning, their perceptions and experiences are significantly different, and practically meaningful difference.

6. CONCLUSION & IMPLICATIONS

Conclusion

This study set out to examine the impact of distance teaching on learning outcomes in Indian universities by adopting a dual perspective of faculty and students. The findings confirm that distance teaching has been impactful in expanding access, particularly under the Digital India and NEP 2020 reforms. Both faculty and students recognized the benefits of accessibility and flexibility. However, their perspectives diverged on challenges: faculty emphasized workload and reduced interaction, while students highlighted infrastructural barriers and lack of peer engagement. This divergence underscores that while digital platforms have opened doors for inclusive education, their effectiveness is uneven across institutional types and learner groups.

Overall, the results demonstrate a strong need for institutional support, particularly in building digital pedagogy capacity among faculty and addressing infrastructural inequities that persist between rural and urban students. Without simultaneous investment in training, infrastructure, and learner support systems, the promise of distance education risks being diluted.

Theoretical Implications

The study extends established frameworks such as the Technology Acceptance Model (TAM) and the Community of Inquiry (CoI) by situating them in the Indian higher education context. Findings reaffirm that perceived ease of use and usefulness drive adoption (TAM), but also highlight that cognitive, teaching, and social presence (CoI) remain critical for engagement. By combining faculty and student perspectives, the study adds novel evidence from a developing economy where digital equity challenges significantly influence pedagogy acceptance and outcomes.

Practical Implications

For universities, the study recommends investment in faculty training, adoption of blended learning models, and strengthening of Learning Management Systems (LMS) to sustain engagement and effectiveness. For policymakers, the results emphasize the urgency of bridging the digital divide, particularly by improving rural internet infrastructure and ensuring affordable device access for students. For students, the findings highlight the importance of developing self-directed learning skills, time management, and adaptability to thrive in online and hybrid environments.

7. Limitations & Future Research

Limitations

- The study was limited to **selected Indian universities** (central, state, and private) and does not represent the entire higher education system across India.
- Findings are based on **self-reported perceptions** of faculty and students, which may carry personal bias, subjectivity, or social desirability influence.
- The research was conducted within a **specific timeframe**, and rapid changes in digital pedagogy or technology adoption may shift outcomes in future contexts.

Future Research

- **Longitudinal tracking** of faculty and student experiences to understand how digital readiness and learning outcomes evolve over time.
- **Discipline-specific studies** to compare the effectiveness of distance teaching in fields such as engineering, medicine, management, and humanities.
- Exploration of **AI-enabled distance teaching tools** (adaptive platforms, AI tutors, predictive learning analytics) to evaluate their role in improving pedagogy, engagement, and equity in Indian higher education.

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