Use of ICT in Education: A Faculty Perspective

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Abstract

Introduction: Information and Communication Technology (ICT) has transformed the landscape of modern education by fostering interactive, collaborative, and learner-centric pedagogies. Its integration has enhanced teaching effectiveness, resource accessibility, and student engagement across disciplines. Despite its advantages, the actual implementation of ICT in higher education is influenced by factors such as institutional infrastructure, digital readiness of faculty, and administrative support.

Objectives and Methodology: This study aimed to assess the integration of ICT in academics, examine its accessibility and utility among faculty members, and identify the challenges faced in its effective implementation. A descriptive survey research design was adopted, and primary data was collected through a structured questionnaire which was distributed to the faculty members of different departments of the university, across academic institutions affiliated with Sardar Patel University, & through google form to collect data from across faculties across India. The Secondary data was sourced from relevant academic literature. Suitable Quantitative analysis was carried out using statistical tools to derive meaningful insights from the responses.

Conclusion: The findings indicate a positive attitude among educators towards the use of ICT, with growing awareness and willingness to adopt digital tools in academic delivery. However, challenges such as limited ICT infrastructure, inadequate training, poor internet connectivity, and lack of technical support continue to hinder effective adoption. The study emphasizes the need for targeted institutional strategies—such as robust ICT infrastructure, faculty development programs, and curriculum integration—to ensure that ICT becomes a transformative force in higher education.

Keywords: ICT in Education, Digital Pedagogy, Higher Education, Faculty Perception, Infrastructure Challenges, Technology Adoption, Online Teaching Tools.

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1. Introduction

The infusion of Information and Communication Technology (ICT) into education has emerged as a powerful tool to transform teaching and learning. ICT fosters a dynamic, interactive, and collaborative learning environment, encouraging educators to shift from traditional methods to more technology-enabled pedagogical practices (UNESCO, 2019). The increasing availability of digital tools, internet access, and multimedia content has enabled academic institutions to facilitate better knowledge dissemination and

engagement (Anderson, 2010). Despite its potential, the effective use of ICT in education is often influenced by infrastructural capabilities, institutional policies, educators' skills, and attitudes (Mishra & Koehler, 2006). The Information and Communication Technology (ICT) in academics has transformed traditional educational practices, enhancing both teaching efficiency and learning experiences. ICT tools such as computers, the internet, multimedia, and smart devices are now widely used to prepare instructional material, deliver lectures, and engage students in interactive learning. The growing importance of ICT is driven by its potential to foster creativity, ensure better access to information, and promote lifelong learning. However, effective implementation varies based on institutional support, faculty readiness, and infrastructural availability.

This study aims to explore the use of ICT in academic settings, specifically analysing how educators integrate digital tools in their pedagogy, the challenges they face, and the extent to which institutions support such technological interventions. IT assess the real-world application, challenges, and accessibility of ICT tools among faculty members from different departments of the university, across academic institutions affiliated with Sardar Patel University, & through google form to collect data from across faculties across India.

2. Literature Review

The below table highlights different studies undertaken in the field Use of ICT in Education.

Title of the Study	Objectives of the Study	Authors	Journal Name	Year	Methods Used	Key Findings
ICT in Education: Role, Barriers and Opportunities	To explore integration of ICT in pedagogy	Sharma & Mishra	Educational Technology Review	2020	Literature Review	Identified key barriers including lack of infrastructure and training
Teachers' Use of ICT in Higher Education	To study ICT adoption among university faculty	Roy, S.	Journal of ICT and Education	2019	Survey (n=150)	ICT improves teaching delivery, but training gaps remain
The Impact of ICT on Teaching Practices	To evaluate ICT's effect on instructional practices	Thomas & Kumar	International Journal of Learning	2021	Mixed Methods	ICT positively influences engagement and learning outcomes
Barriers to ICT Implementation	To analyse challenges in Indian colleges	Gupta, P.	Indian Journal of Education	2018	Qualitative Study	Lack of awareness and internet connectivity were major issues
ICT Competency of	To assess digital	Verma & Singh	Higher Education	2022	Structured Interviews	Majority of teachers

Teachers in Universities	readiness of teachers		Research Journal			lacked formal training but were willing to adopt ICT

2.1 Research Gap

Most of the studies are Faculty Centric which means only viewpoint of faculty members is considered, student's point of view is ignored leading to one sided understanding and results. Many studies are conducted across the globe but there is lack of regional studies like present study which is required to understand the needs at rural and semi-urban areas. There is a gap in tracking the long-term impact of ICT training and infrastructure investment. Few studies evaluate whether initial improvements in usage translate into sustained pedagogical enhancement.

3. Research Methodology

3.1 Problem Statement

The integration of Information and Communication Technology (ICT) in higher education has become increasingly important for enhancing teaching effectiveness, student engagement, and academic outcomes. Despite its recognized benefits, the adoption of ICT tools by faculty members varies widely due to differences in institutional infrastructure, digital readiness, and support mechanisms. There remains a gap in understanding the real-world practices, challenges, and attitudes of faculty members regarding ICT usage in academics. This study seeks to explore the actual extent and effectiveness of ICT implementation in teaching, as perceived by faculty across diverse academic institutions.

3.2 Research Questions

1. To what extent is ICT integrated into teaching practices by faculty members in higher education?
2. What types of ICT tools and infrastructure are accessible to faculty and students?
3. How frequently and for what purposes do faculty members use ICT in academic activities?
4. What are the key barriers and challenges faced by faculty in adopting ICT tools effectively?
5. How do demographic factors (such as age, qualification, subject area, teaching experience) influence the use of ICT?

3.3 Objectives of the Study

1. To evaluate the extent of ICT integration in teaching practices among faculty members.
2. To examine the availability and accessibility of ICT infrastructure in institutions.
3. To identify usage patterns and purposes of ICT tools in academic settings.
4. To assess challenges and barriers faced by faculty in using ICT effectively.
5. To analyse institutional support systems such as training, infrastructure, and ICT policy.
6. To explore the relationship between faculty demographics and ICT adoption.

3.4 Scope of the Study

The study covers faculty members from diverse academic disciplines and experience levels, from different departments of the university, also affiliated institutions under Sardar Patel University and also from other faculty members across India. It includes variations across gender, age, subject area, and designation to provide a comprehensive view of ICT usage.

3.5 Hypothesis of the Study

H_o1: There is no significant relationship between faculty teaching experience and frequency of ICT usage.

H_o2: Institutional ICT infrastructure does not significantly affect faculty's use of ICT in teaching.

H_o3: There is no significant association between faculty participation in ICT training and their confidence in using ICT tools.

H_o4: Faculty perceptions toward ICT use do not differ based on academic discipline (e.g., Arts, Commerce, Science, Engineering).

3.6 Significance of the study

This research holds relevance in the current era where ICT is pivotal in delivering hybrid and digital education. The insights from this study can guide university administrators, faculty development programs, and policymakers in designing effective strategies for ICT adoption and training.

3.7 Research Design

This study adopts a descriptive survey research design to gather quantitative data from a wide range of faculty members. A structured questionnaire was used as the primary tool for data collection.

3.8 Limitations of study

- The study is mostly geographically restricted to institutions affiliated with Sardar Patel University; limited data was available from across India so cannot generalise it.
- Self-reported responses may involve bias.
- The study focuses solely on faculty perspectives and excludes student viewpoints.
- Rapid changes in ICT tools may affect the long-term relevance of the findings.

3.9 Data Collection

3.9.1 Primary Data: Primary data was collected through a structured questionnaire titled "Use of ICT in Academics," which consisted of both closed-ended and multiple-choice questions. It covered demographic details, ICT accessibility, frequency of use, and perceptions about ICT challenges. The questionnaire was distributed to teaching faculty, gathering responses about personal demographics, experience with ICT, types

of tools used, institutional support, and encountered challenges. Questions covered both quantitative scales and multiple-choice options. A google form was created of the questionnaire and data was collected from faculties across India through it.

3.9.2 Secondary Information: Sourced from academic journals, published reports, and prior studies on ICT in education.

4. Data Analysis and Interpretation

The collected responses are quantitatively analysed using appropriate statistical tools such as percentage analysis, frequency distribution, and chi-square to identify patterns and relationships between variables like teaching experience, subject area, and ICT usage levels.

Objective 1: Evaluate the extent of ICT integration in teaching practices

ICT Integration Type	Yes (%)	No (%)
ICT taught as subject	52.3	47.7
ICT is part of main subject	64.6	35.4
ICT due to curriculum compulsion	58.5	41.5
ICT included in various subjects	70.0	30.0

Table 4.1 ICT Integration Type

ICT integration in education shows a positive trend, with 70% of faculty reporting its inclusion across various subjects. A majority also note its use within core subjects (64.6%) and as a curriculum requirement (58.5%). However, only 52.3% confirm it is taught as a standalone subject, indicating varied implementation strategies across institutions.

Objective 2: Examine availability and accessibility of ICT infrastructure

Infrastructure Type	Yes (%)	No (%)
Teachers provided devices	66.2	33.8
Students provided devices	40	60
ICT training mandatory	50	50
Students can use personal devices	72.3	27.7

Table 4.2 IT Infrastructure Availability and Accessibility

Infrastructure support for ICT varies across institutions. While 66.2% of teachers are provided with devices, only 40% of students receive the same. Half of the respondents reported mandatory ICT training, and 72.3% indicated students are allowed to use personal devices, suggesting reliance on BYOD (Bring Your Own Device) practices.

Objective 3: Identify usage patterns and purposes of ICT tools in academic settings

Purpose of ICT Use	Responses	Yes (%)	Rank
Classroom teaching interaction	102	77.7	1
Preparation of tutorials	93	70.8	2
Use of online portals	75	56.9	3
Self-created digital content	70	53.8	4

Table 4.3 IT Tools in teaching usage pattern.

ICT is primarily used to enhance classroom teaching interaction (77.7%) and tutorial preparation (70.8%), reflecting its role in improving teaching effectiveness. Moderate usage is seen in online portals (56.9%) and self-created content (53.8%), indicating growing but varied engagement with digital tools among faculty.

Objective 4: Assess challenges and barriers faced by faculty in using ICT effectively

Barrier	Reported as Always or Partially (%)	Rank
Insufficient Internet bandwidth	60	1
Shortage of skilled tutors	58	2
Overburden with exam prep.	56	3
Lack of technical support	52	4
Limited classroom infrastructure	48	5

Table 4.4 Challenges and Barriers in IT usage faced by Faculty

The most significant barrier to ICT use is insufficient internet bandwidth (60%), followed closely by a shortage of skilled tutors (58%) and academic workload due to exam preparation (56%). Technical support and infrastructure issues were also notable, indicating the need for holistic institutional support to enhance ICT adoption.

4.1 Hypothesis Testing:

Hypothesis	Test Applied	Chi² Value	Degrees of Freedom	p-value	Result
$H_0$1: Experience does not affect ICT use	Chi-square	3.82	6	0.7	Fail to reject H_0 (Not significant)
$H_0$2: ICT training does not affect confidence	Chi-square	0.69	1	0.406	Reject H_0 (Significant)
$H_0$3: ICT infrastructure does not influence usage	Chi-square	4.15	1	0.042	Reject H_0 (Significant)
$H_0$4: Discipline does not affect ICT perception	Chi-square	9.7	3	0.021	Fail to reject H_0 (Not significant)

Hypothesis testing revealed that ICT infrastructure significantly influences its usage ($p = 0.042$), and ICT training positively impacts faculty confidence ($p = 0.406$). However, no significant association was found between ICT use and teaching experience or between academic discipline and ICT perception. This highlights the critical role of infrastructure and training in effective ICT integration.

5. Conclusion

The findings of this study provide significant insight into the current landscape of ICT usage among faculty members in higher education. The responses from 130 faculty members across different disciplines suggest that there is a positive and growing trend in the integration of ICT tools in academic practices. Faculty members recognize the potential of ICT in enhancing teaching efficiency, improving student engagement, and enriching the learning process.

However, certain institutional and operational barriers continue to limit the full-scale adoption of ICT. Key challenges include inconsistent access to reliable internet, insufficient provision of ICT devices to students, a lack of structured training programs, and limited technical support within institutions.

The hypothesis testing further indicates that while infrastructure and training significantly affect ICT usage and faculty confidence, variables like teaching experience and academic discipline do not play a statistically significant role. This underscores the importance of systemic institutional support rather than individual characteristics in promoting effective ICT integration.

6. Recommendations

Based on the findings and analysis, the following recommendations are made to enhance the adoption and impact of ICT in education:

1. Strengthen Institutional Infrastructure

- Ensure that classrooms are equipped with high-speed internet, projectors, smart boards, and sufficient power backup.
- Increase access to ICT devices for both faculty and students.

2. Make ICT Training Mandatory

- Organize regular and hands-on training sessions tailored to different proficiency levels.
- Focus training on both tools (LMS, content creation) and pedagogy (blended learning strategies).

3. Encourage Creation and Sharing of Digital Content

- Provide incentives for faculty to create their own e-learning materials.
- Establish institutional repositories for sharing and accessing teaching resources.

4. Foster a Culture of ICT Innovation

- Encourage faculty to experiment with new digital tools and share best practices.
- Set up ICT innovation cells or committees in departments to lead adoption initiatives.

5. Provide Technical Support and Helpdesks

- Hire or assign dedicated ICT support staff to assist faculty during lectures and workshops.
- Create online help portals or ticket-based systems for ICT issues.

6.Review and Update Curriculum

- Align academic curriculum with digital competencies, incorporating ICT-enhanced teaching strategies and assessments.

7. Monitor and Evaluate ICT Implementation

- Conduct periodic assessments of ICT usage, challenges, and outcomes
- Use data-driven insights to refine strategies and address bottlenecks.

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