INFLUENCE OF ICT TOOLS ON CLOSING THE DIGITAL GAP IN DEGREE COLLEGES: INSIGHTS FROM RURAL MYSORE (KARNATAKA), INDIA

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ABSTRACT

The digital divide continues to be one of the most significant barriers to inclusive higher education in India, particularly in rural areas. With the increasing integration of technology in education, Information and Communication Technology tools are viewed as key enablers in bridging this gap. This study examines the impact of ICT tools on reducing the digital divide among degree students in rural Mysore District, Karnataka. A mixed-method approach was employed, involving surveys with 300 students and 30 faculty members from three rural degree colleges, focus group discussions, and direct field observations. This research analyzes student's digital access, literacy, use of ICT enabled learning, and their effect on academic engagement. The findings reveal that ICT tools, especially mobile friendly asynchronous learning resources, smart classrooms, WhatsApp based communication, and localized bilingual digital content, have improved access, engagement, and learning outcomes. However, challenges persist in the form of connectivity issues, limited device availability, a lack of localized content, and inadequate digital skills. This study concludes that bridging the digital divide in rural colleges requires a combination of affordable technology, teacher training, community partnerships, and sustained policy support.

Keywords: ICT tools, digital divide, rural higher education, Mysore, digital literacy, blended learning, and inclusive education.

INTRODUCTION

In recent years, education systems worldwide have increasingly adopted Information and Communication Technology (ICT) as a catalyst for inclusive and quality learning. The COVID-19 pandemic accelerated the shift toward digital learning, making access to technology essential rather than optional. While urban colleges in India have adapted relatively quickly to ICT-based education, rural colleges continue to face structural and socioeconomic challenges that exacerbate the digital divide.

The digital divide is not just about access to devices and the Internet; it includes differences in digital literacy, the ability to use technology effectively, and the benefits derived from it. In rural Mysore, many degree college students come from low income households, face connectivity problems, and lack adequate digital skills. However, rural higher education remains crucial for empowering communities, increasing employability, and promoting socio-economic development.

ICT tools such as smart classrooms, learning management systems (LMS), mobile applications, audio visual learning modules, and digital content in local languages can reduce barriers and support inclusive learning if implemented effectively. This study explores the

impact of ICT tools on degree students in rural Mysore, focusing on access, usage patterns, engagement, and institutional strategies for digital inclusion.

LITERATURE REVIEW

1. "Dealing with Online and Blended Education in India" R. Kumar (2022)

Findings: Reviews India's rapid shift to online and blended modes during and after COVID-19 and highlights persistent barriers such as poor home connectivity, limited device ownership, and low teacher readiness. We recommend scalable teacher training, low bandwidth content, and blended models that combine asynchronous mobile materials with face to face support for rural settings. Useful for framing the institutional capacity and pedagogy sections of your paper.

2. "Digital Divide and Access to Online Education: A Rural Perspective Tamil Nadu case study" Jafar (2023) National (India, Tamil Nadu)

Findings: Empirical study documenting unequal access to devices and the Internet among rural students shows gendered and socioeconomic gaps (female and first generation learners are more disadvantaged). IT found that low cost asynchronous resources and local language materials improved participation, but device sharing and connectivity remain major constraints. Supports arguments about device scarcity and the value of bilingual or localized content.

3. "The digital revolution in India: bridging the gap in rural areas" Sindakis et al. (2024), Springer Open International journal (India focused)

Findings: This study Evaluates Digital India and local initiatives, showing that outreach programs and targeted digital literacy training raise adoption rates in rural communities. This study highlights the importance of tailored literacy programs (age and occupation specific) and multi stakeholder partnerships (local government, NGOs, and telecoms) to sustain digital uptake. There is good evidence for your recommendation to leverage community partnerships and government programs.

4. "Challenges in Implementation of Blended Learning in Indian Higher Education" Journal of Informatics Education and Research / JIER (2024)

Findings: A mixed method investigation of blended learning rollouts identifies major operational challenges, infrastructure gaps, inconsistent electricity, limited LMS adoption, and insufficient faculty incentives. Concluded that blended learning works best when colleges adopt a "mobile first, low bandwidth" content strategy, institute teacher mentoring, and simple monitoring metrics. Directly applicable to smart classrooms and mobile learning solutions.

5. "Paving the Way to Digital Equity through Digital Literacy Training Programs (DLTPs)" Choudhary (2025)

Findings: Evaluation of DLTP pilots in rural districts shows measurable gains in basic digital skills, improved LMS uptake, and greater student confidence after short modular training sessions. The study recommends iterative contextual training (micro modules in local languages), peer mentoring, and follow up refreshers to convert short term gains into sustained usage. This supports the emphasis on teacher and student capacity building in this study.

Digital Divide and Higher Education

The digital divide is a multi layered concept that involves access to digital infrastructure, digital skills, and the ability to use technology effectively. Van Dijk (2006) and Selwyn (2010) categorize it into three levels: access, skills, and outcomes. In India, rural students face greater barriers than their urban counterparts because of infrastructural and economic inequalities.

ICT as a Tool for Inclusion

Studies have highlighted that ICT integration can enhance teaching and learning outcomes, particularly when low cost mobile friendly tools are used (UNESCO, 2021). Blended learning models that combine offline and online elements are especially effective in resource constrained environments.

Rural and Low Resource Settings

Research in rural regions indicates that community based digital access points, open labs, and low bandwidth content can effectively expand participation (World Bank 2022). Initiatives such as smart classrooms in Karnataka have shown promise but face challenges in terms of sustainability and teacher capacity.

National Policy Frameworks

The National Education Policy (NEP) 2020 emphasizes digital inclusion and technology integration in education in India. This highlights the need for affordable connectivity, digital infrastructure, and local language content to reach rural learners.

Objectives of the Study

➢ To assess the current state of ICT access and digital literacy among degree students in rural Mysore.

➢ To examine the impact of ICT tools on students learning engagement and performance.

➢ To identify key challenges and opportunities in bridging the digital divide through ICT.

➢ To recommend practical strategies for rural higher education institutions.

Research Methodology

Research methodology is a systematic plan and process used to collect, analyze, and interpret data for a study. This section explains how the research was conducted to achieve accurate and reliable results.

Research Design

A mixed method approach was used to collect quantitative and qualitative data.

Sample and Area of Study

The study was conducted in three rural degree colleges in Mysore district

Government First Grade College - Bilikere

Government First Grade College - Bannur

Aided Degree College - Hunsur

Sample size: A total of 300 students and 30 faculty members were selected using stratified random sampling.

Data Collection Tools

➢ Structured questionnaires (digital access, skill levels, ICT tool usage, and perceptions).

➢ Focus group discussions with students and faculty members.

➢ Field observations of ICT infrastructure (labs, smart classrooms, connectivity).

Data Analysis

➢ Quantitative data were analyzed using descriptive statistics and cross tabulation.

➢ Qualitative data were thematically coded to capture patterns and narratives.

Access to Digital Infrastructure

Smartphone ownership: 42% of students owned smartphones that were suitable for online learning.

Laptop ownership: less than 10%.

Internet access: 48% had unstable mobile data, and 22% lacked reliable connectivity at home.

College support: Wi-Fi in two colleges and computer labs in all three colleges.
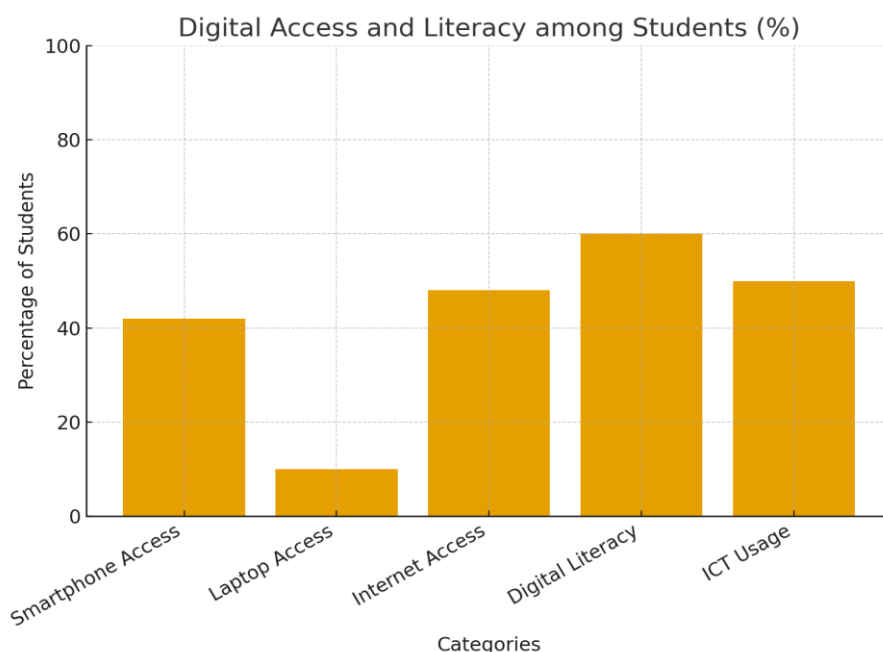
Digital Literacy Levels

➢ Sixty % of students rated themselves as having basic digital literacy (email, WhatsApp, browsing).

➢ Only 28% reported advanced skills, such as document editing or LMS use.

➢ Many students require peer support to access or navigate online resources.

ICT Tools used

➢ Smart Classrooms: Increased student participation during lectures.

➢ Video Lectures & Mobile Learning: Students found downloadable videos useful during power/internet outages.

➢ WhatsApp Groups: Effective for quick communication, resource sharing, and doubt clarification.

➢ LMS (limited): Low usage owing to training gaps and language barriers.

➢ Bilingual Digital Content: Helped first generation learners understand complex topics.

ICT Access and digital divide among rural degree students in Mysore

The above graph highlights the digital divide among rural degree students in Mysore. It shows that while smartphone access (42%) and internet availability (48%) are relatively moderate, laptop access remains very low (10%), indicating a major barrier to effective digital learning in this context. Although digital literacy levels (60%) are improving owing to mobile based learning, the actual use of ICT tools in education (50%) remains limited. This reflects the need for better infrastructure, training, and access to devices to bridge the gap and enhance digital inclusion in rural higher-education institutions.

Impact on Engagement

Students who regularly used ICT resources showed a 12–18% increase in completing their assignments on time. They also became more confident and active during class discussions and showed greater interest in learning. Faculty members noticed that when visual and audio content was included in lessons, students could understand and remember the topics more effectively. This clearly shows that using ICT tools makes learning more engaging and impactful for students.

Barriers Identified

Despite the growing use of ICT in education, several challenges still limit its full impact in rural areas of Mysore. Many villages continue to face poor Internet connectivity, making it difficult for students to consistently access online learning materials. A lack of personal devices, especially among girls in joint family households, further widens this digital gap. In addition, there is limited availability of local language content, which makes learning less accessible to students who are not fluent in English. Irregular power supply often disrupts classes and online sessions, creating further barriers. Moreover, many teachers have limited training in using ICT tools, which affects the quality and effectiveness of technology-based instruction. These issues highlight the need for stronger infrastructure, inclusive policies, and capacity-building initiatives to make digital education effective and equitable.

Discussion

The study shows that appropriate ICT tools can significantly reduce educational inequality among rural students. Mobile based learning and smart classrooms have proven to be cost effective and impactful in enhancing participation and learning outcomes. However, infrastructural and socioeconomic constraints remain.

This aligns with the findings of UNESCO (2021) that blended learning, localized content, and mobile-first strategies are effective in low-resource settings. The NEP 2020 also emphasizes these strategies, but their implementation in rural colleges requires targeted investment and capacity building.

In rural Mysore, community partnerships, device lending programs, and teacher training can serve as practical bridges between policy and practice. Simply providing devices is not sufficient; digital literacy and sustained institutional support are equally critical.

Policy Implications

Bridging the digital divide in rural higher education is not just a technological challenge but also a policy and equity issue. Policymakers must ensure infrastructure funding, support teacher training, and enable partnerships with local NGOs and CSR initiatives and telecom providers. Integrating ICT strategies into institutional development plans ensures long term sustainability.

Limitations and Scope for Further Research

➢ The study was limited to three rural colleges in Mysore, and the results may vary in other districts.

➢ Reliance on self reported engagement data may have introduced bias.

➢ Future research should include larger longitudinal studies and academic performance metrics.

Findings

The findings of the study revealed that the integration of ICT tools in rural degree colleges in Mysore has played a significant role in reducing the digital divide among students. Access to smart classrooms, mobile learning platforms, and computer labs has improved connectivity and provided equal learning opportunities for students from different socioeconomic backgrounds. ICT-based training programs enhance students' digital literacy, increasing their confidence in using online resources and communication tools. The use of interactive platforms also improved student participation and engagement in academic activities, resulting in better academic performance and skill development. Teacher training and institutional support are crucial for ensuring the effective use of technology in classrooms. However, persistent challenges, such as unstable Internet connectivity, irregular power supply, and limited device availability, continue to hinder full ICT adoption. The study concludes that while ICT has positively impacted learning outcomes and digital inclusion, sustainable infrastructure, continuous faculty development, and collaborative efforts are essential to completely bridge the digital divide in rural higher education institutions.

Recommendations

1. Mobile First Strategy: Provide learning resources optimized for mobile use and low bandwidth.

2. Localized Bilingual Content: Kannada English materials were developed for improved comprehension.

3. Device Lending Programs: Colleges can maintain device banks for students in need.

4. Open ICT Hubs: Extend lab hours and community Wi-Fi access points in rural areas.

5. Teacher Capacity Building: Regular ICT training for faculty to effectively integrate digital tools.

6. Policy Support: Align college strategies with the NEP 2020 and leverage state/federal funding.

7. Monitoring and Evaluation: Establish metrics to assess ICT usage and its impact annually.

CONCLUSION

The impact of ICT tools in bridging the digital divide among degree students in rural Mysore is both visible and measurable, reflecting a positive shift in the learning environment of the students. The introduction of smart classrooms, mobile learning platforms, WhatsApp-based communication, and localized digital content has played a significant role in improving students' access to educational resources and their active participation in the learning process. These tools have not only made education more interactive but have also helped rural students stay connected with their teachers and peers beyond traditional classrooms.

However, to make digital education truly inclusive and sustainable, the use of technology must be strategically supported by proper training for students and teachers, the development of region-specific content in local languages, and the establishment of strong and reliable digital infrastructure. Merely providing technology is not enough; empowering learners with the skills and resources to use it effectively is equally important.

When thoughtfully and effectively implemented, ICT can become a powerful equalizer, helping to narrow the gap between urban and rural education systems. It can transform digital access into meaningful learning experiences, ensuring that rural students are not left behind in this digital era. Thus, ICT serves as a catalyst for educational equity, empowerment, and long-term development in rural higher education.

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