



ICT Competence: A Scenario of ICT integration and Digital Literacy in schools of Kashmir Division.

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Abstract

The current era, defined by rapid globalization and the widespread availability of information, has catalyzed a transformation in education through the integration of Information and Communication Technology (ICT). Although ICT infrastructure is present in schools, its potential remains largely untapped due to teachers' digital incompetence. The mere presence of digital tools does not guarantee effective educational change; instead, digitally competent teachers are essential to foster ICT-based learning environments that are student-centered, promote creativity, meta-cognition, collaboration, and communication. Effective ICT integration in education requires skilful guidance by teachers who can serve as mentors, leading students toward problem-solving and innovation, thereby equipping them for the challenges of a globalized world. This study investigates teachers' perspectives on ICT use in schools across Kashmir division and examines the barriers to ICT integration, identifying resistance factors and proposing strategies for effective adoption.

Key Words: ICT, digital literacy, educational institutions, learning environment, Kashmir division.

Introduction

Education systems worldwide are undergoing rapid transformations due to advancements in Information and Communication Technologies (ICT). For the education sector, ICT integration in classrooms are crucial for improving educational outcomes. Haugland (1998) claim that integration of ICT in education is not about "simple improvement of the traditional method" is about radically transforming the pedagogy in education creating collaborative learning through ICT-based learning environment. However, the quality of education in India continues to face challenges. The National Achievement Survey (NAS), conducted by the National Council for Educational Research and Training (NCERT) in collaboration with the Ministry of Human Resource Development (MHRD), has highlighted low learning outcomes in schools in various regions, including the Union Territory of Jammu and Kashmir (NCERT, 2021). Addressing these challenges requires a digitally competent teaching workforce that can integrate ICT and digital libraries effectively into pedagogical practices to create interactive and innovative learning environments.

Traditional libraries are evolving into digital libraries, and many new libraries are established as digital entities, catering to the growing demand for online and digital information sources. The shift toward digital libraries is particularly prominent in India, where multiple institutions are working to set up digital libraries, supported by researchers and practitioners who explore digital library systems, technologies, and applications. Conferences such as the International Conference of Asian Digital Libraries (ICADL) and the International Conferences on Digital Libraries (ICDL) have been instrumental in raising awareness about digital libraries in India, attracting a wide audience and promoting research and development in this field (Kar & Seadle, 2004; Urs & Raghavan, 2002).

The increased adoption of digital libraries is essential in a country where digital literacy is still limited. With over 0.65 million villages, India faces substantial digital literacy challenges, especially in rural areas where many citizens lack basic digital skills. Despite India being one of the fastest-growing mobile markets, digital literacy lags, with 30% of the population lacking basic literacy and 90% lacking digital literacy skills (Digital Empowerment Foundation, 2015). The Digital India initiative, launched in 2015, aims to bridge this gap by empowering citizens with digital literacy, but challenges remain, such as limited infrastructure, low computer penetration, and the need for widespread internet connectivity.

Digital literacy extends beyond basic technology usage, encompassing the ability to find, evaluate, create, and communicate information using digital tools. Hiller Spires of North Carolina State University categorizes digital literacy into three essential skills: finding and consuming digital content, creating digital content, and communicating or sharing information (Spires, 2015). In alignment with this framework, India's National Digital Literacy Mission trains individuals to operate digital devices and access e-governance services, aiming to increase the digital capabilities of its citizens.

This study explores the role of digital literacy and ICT competence among teachers in fostering an environment where digital resources, such as digital libraries, can be used to improve learning outcomes. By examining teachers' perspectives and the obstacles they face in ICT integration, this research aims to provide insights and recommendations for enhancing digital literacy in schools, thereby aligning education with the demands of the digital era.

Review of Literature

The integration of Information and Communication Technology (ICT) in education has proven to be a powerful catalyst for enhancing learning outcomes, transforming traditional educational practices, and fostering digital competence among both students and teachers. ICT in education is particularly significant in developing regions like India, where educational institutions are adapting to digital advancements and increasing their reliance on digital resources such as digital libraries. The shift from traditional libraries to digital libraries reflects the need for accessible, flexible, and up-to-date resources that support a digital learning environment (Kar & Seadle, 2004; Urs & Raghavan, 2002).

Within the educational sector, digitally competent teachers are critical for successful ICT integration. Research underscores that simply introducing ICT infrastructure in schools is insufficient without skilled educators capable of facilitating ICT-integrated pedagogy (Digital Empowerment Foundation, 2015). Teachers must move beyond superficial ICT usage and incorporate digital resources like digital libraries meaningfully into their instructional methods. This competency enables them to create student-centered learning environments that foster creativity, collaboration, metacognition, and problem-solving—key skills for preparing students to meet the demands of the digital age (NCERT, 2021).

Studies indicate that ICT infrastructure alone does not guarantee improved educational outcomes. Teachers must develop digital skills that enable them to incorporate digital libraries into their pedagogy effectively. Such competence

allows them to facilitate student-centered learning environments that foster creativity, collaboration, and critical thinking, skills that are essential for success in the digital age (NCERT, 2021).

The transformation of libraries into digital repositories is part of a larger global trend influenced by advancements in ICT, which provides expanded access to information and educational content. Several international and national conferences, including the International Conference on Asian Digital Libraries (ICADL) and the International Conferences on Digital Libraries (ICDL), have facilitated knowledge exchange on digital library development, advancing awareness and establishing best practices in the digital library sector in India (Kar & Seadle, 2004; Urs & Raghavan, 2002). This transformation aligns with the Indian government's efforts to expand digital literacy through initiatives like the Digital India campaign, launched in 2015 to provide widespread digital literacy and increase citizens' access to digital resources.

Despite these initiatives, research indicates that digital literacy remains a significant challenge in India, with basic literacy still lacking for 30% of the population and digital literacy absent for 90% of citizens (Digital Empowerment Foundation, 2015). The government's response to this need has led to the establishment of the National Digital Literacy Mission, which trains individuals to use digital devices and e-governance services. Hiller Spires (2015) frames digital literacy as a triad of skills: finding and consuming digital content, creating digital content, and communicating or sharing that content. This model of digital literacy highlights the importance of cognitive and technical skills essential for navigating the digital landscape, which includes not only basic digital navigation but also the capacity to critically evaluate and creatively utilize information.

Despite advances in infrastructure, recent assessments such as the National Achievement Survey (NAS) have highlighted persistent issues with educational quality in India, particularly in regions like Jammu and Kashmir, where low learning outcomes continue to pose challenges (NCERT, 2021). The literature emphasizes that teachers play an instrumental role in addressing these issues by integrating digital resources effectively into teaching practices. The shift to digital libraries and ICT-based learning necessitates a robust framework for teacher training, which focuses on not only technical skills but also pedagogical strategies for using digital resources to achieve targeted learning outcomes.

The perusal of literature suggests that digital competence among teachers and availability and access to digital libraries are critical for leveraging ICT to improve educational outcomes. However, successful ICT integration requires an ecosystem of support, including digital literacy initiatives, policy frameworks for digital library utilization, and teacher training programmes designed to foster both technical and cognitive competencies. Bridging the digital divide and ensuring effective ICT integration in schools can significantly enhance the quality of education, making learning more accessible and engaging for students across J&K. By overcoming barriers to digital access and enhancing digital literacy, digital libraries can significantly improve educational outcomes and foster a knowledge-driven society.

Result and Discussion

Across all students, ICT engagement is notably limited. While a substantial portion utilizes basic technology like computers and calculators, tools like projectors, tape recorders, and newspapers see sparse use. More advanced equipment, including laptops, working models, LCDs, and electronic boards, is rarely accessible. Research has shown that students learn more effectively with the use of ICT as lesson designs are more engaging and interesting (Hashim et al., 2020). This lack of availability and access highlights the need for more robust and varied ICT resources in educational settings of Kashmir division to better support diverse learning approaches and foster digital literacy. Contrary to this, technology-based teaching and learning offer various interesting ways which include educational videos, stimulation, storage of data, the usage of databases, mind-mapping, guided discovery, brainstorming, music, World Wide Web (www) that will make the learning process more fulfilling and meaningful (Ghavifekr & Rosdy, 2015).

Technology integration nowadays has gone through innovations and transformed societies that have totally changed the way people think, work and live (Ghavifekr & Rosdy, 2015). As part of this, schools and other educational institutions which are supposed to prepare students to live in "a knowledge society" need to consider Information, Communication, and Technology (ICT) integration in their curriculum. Integration of ICT in education refers to the use of computer-based communication (Rachmawati, 2019). Specifically, it incorporates into daily classroom instructional process. In conjunction with preparing students for the current digital era, teachers are seen as the key players in using ICT in their daily classrooms (Ghavifekr et al., 2014). This is due to the capability of ICT in providing a dynamic and proactive teaching learning environment, while ICT integration aims to improve and increase the quality, accessibility, and cost-efficiency of the delivery of instruction to students, it also refers to benefits from networking the learning communities to face the challenges of current globalization (Albirini, 2006; Abdullah et al., 2017). In the current study, a substantial number of teachers have access to personal computers and internet connections at home, yet their use of ICT in the classroom remains limited. In schools, having a single smart board is insufficient for allowing

all teachers to incorporate it into their lessons. Many schools lack smart boards altogether, and in those that do have them, some are non-functional. In schools with working smart boards, there are additional barriers: many teachers lack the skills to use them effectively, and only a few teachers are comfortable with the technology. Due to limited availability, teachers seldom have the opportunity to utilize the smart board as a regular teaching tool.

A further observation from the data points to varied ICT integration across educational institutions of Kashmir division. While a few private institutions have progressed from traditional blackboards to whiteboards, only a small portion have adopted smart boards, and the availability of digital learning tools remains limited. Government schools, particularly those in rural areas, largely rely on conventional teaching methods with minimal ICT incorporation. Higher-level students in urban areas have comparatively better access to computers and digital resources than their rural counterparts, pointing to a noticeable rural-urban divide in educational technology access.

The data presents a compelling overview of the current ICT integration challenges among teachers, underscoring that, while digital literacy is widely acknowledged as an essential skill in teaching, many teachers lack the competence to incorporate ICT effectively in their classrooms. A majority recognize its importance, but less than a tenth have received formal ICT training. This gap in training reveals that most teachers struggle with even basic ICT applications, highlighting a significant need for professional development to build ICT competencies that could transform classroom instruction. Some researchers opine that teacher education programmes should have a judicious mix of traditional pedagogy and ICT component (Bhattacharjee, 2005). Latest research has revealed that the process of adoption of ICT is not a single step, but it is an ongoing and continuous step that fully supports teaching and learning and information resources. ICT integration in education generally means technology-based teaching and learning process that closely relates to the utilization of learning technologies in schools (Ghavifekr & Rosdy, 2015; Wang, 2008; Sarker et al., 2019).

Many report minimal or no use of ICT tools in their teaching; only a handful have ever used tools such as smart boards or PowerPoint presentations, and few rely on online resources or create their own digital content. Microsoft PowerPoint can be used to present the topic in a very innovative and creative way that will lead to discussion and exchanging ideas and thoughts (Ghavifekr & Rosdy, 2015). Similarly, the majority of teachers do not use online learning platforms for professional growth, indicating limited engagement with resources such as SWAYAM, MOOCs, or NPTEL, which offer rich opportunities for updating knowledge and skills.

When examining digital competence, teachers' personal usage of ICT tools varies significantly. While many regularly engage with social networking sites, messaging apps, and platforms like YouTube, only a small group uses educational applications like Wikipedia, email, or presentation software. Moreover, the data highlights that a substantial portion of teachers does not feel confident in their ICT abilities, which fosters reluctance to use technology in the classroom due to concerns over making mistakes or being embarrassed in front of students.

Systemic challenges persist as well. While a good proportion of secondary schools are equipped with basic ICT infrastructure, a notable segment still lacks these essential resources. Few schools, however, do now have internet access, which could be better utilized if teachers were provided with the skills and confidence needed to integrate ICT in their teaching practices.

Teachers' perspectives on ICT integration further reveal that nearly all recognize the need for targeted ICT training to support effective teaching. Many feel the current curriculum does not facilitate ICT integration and advocate for updates that would include provisions for modern digital tools. Recent research studies report that preparations for technology based teaching and learning begin with proper implementation and supports by the school's top management (Rochmawati & Rahmayanti, 2021). If the implementation process of technology integration in schools takes place appropriately from the very beginning stage and continuous maintenance is adequately provided, ICT integration in schools will result in huge success and benefits for both teachers and students (Riyanto et al., 2021). Additionally, a large proportion of teachers see their limited computer skills as the primary barrier to ICT use in education, while a smaller group identifies infrastructure gaps as a secondary limitation.

These findings clearly indicate that, despite significant investments in ICT infrastructure and internet connectivity, the absence of teacher training remains a major impediment to meaningful ICT integration in classrooms. Many teachers began their careers before the digital age and have little or no background in ICT, making structured training programs essential to build their skills and confidence.

Lastly, external factors such as the lack of administrative policies, limited encouragement from school leadership, and the need for curriculum modernization influence ICT adoption. Addressing these broader issues would help teachers overcome the obstacles to ICT integration, fostering a digital literacy culture within the educational system that could enhance student engagement and learning outcomes

Implications

The results underscore the urgent need to bridge the digital literacy gap among teachers to enhance ICT integration in schools. Although a proportion of Sr. Secondary schools are equipped with ICT infrastructure and internet connectivity, the low level of teacher competence and confidence in using these resources restricts their potential impact on educational outcomes. Without targeted training, teachers are unable to fully utilize digital tools to support interactive and effective learning experiences. Furthermore, the lack of ICT use among teachers implies a missed opportunity to familiarize students with essential digital skills that are critical for success in a technology-driven society. This also risks widening the digital divide, especially in regions where ICT access is limited outside school settings.

Inadequate curriculum alignment with ICT further hampers the practical application of technology in education. A curriculum that fails to support ICT integration constrains teachers from leveraging digital tools meaningfully, affecting their motivation and reducing the likelihood of successful ICT adoption in teaching practices. The implications suggest that professional development, curriculum reform, and policy support are essential to foster a more digitally proficient teaching workforce and create an educational environment that embraces technology.

Recommendations

1) Comprehensive ICT Training Programmes:

It is necessary to develop and implement ICT training programmes tailored for teachers across all skill levels. These programmes should focus not only on basic ICT tools but also on advanced digital applications and pedagogical strategies for ICT integration in classrooms. Hands-on workshops, online courses, and mentorship opportunities should be provided regularly to ensure continuous professional growth.

2) Incorporation of ICT in Teacher Induction and Professional Development:

State Council of Educational Research and Training (SCERT)-J&K must play a key role in promoting ICT skills and digital literacy as part of induction programmes for newly recruited teachers so as to set a strong foundation for technology integration from the start for such teachers. Furthermore, continuous professional development opportunities should be offered to experienced teachers, ensuring ICT becomes a core component of their instructional methods.

3) Curriculum Revision for ICT Integration:

Curriculum updates are needed to incorporate digital literacy and ICT-related competencies. Subjects should include ICT-supported learning outcomes, encouraging teachers to utilize digital resources as part of their teaching. This would allow teachers to experiment with ICT tools within a structured framework, making them more comfortable with technology use in their subjects.

4) Strengthening of School Infrastructure and Technical Support:

Although many schools have basic ICT infrastructure, technical support is essential to maintain and troubleshoot digital resources. Schools should also prioritize acquiring smart boards, projectors, and other tools that can facilitate ICT-integrated lessons. This would ensure teachers have the necessary tools to deliver quality digital content and reduce technical challenges that may hinder ICT adoption.

5) Building a Supportive Administrative Environment:

School administrators particularly State Council of Educational Research and Training (SCERT)-J&K must play a key role in fostering ICT usage. Policies that encourage ICT in everyday teaching and incentives for teachers who demonstrate successful ICT integration could improve digital adoption rates. Providing regular feedback, recognizing tech-savvy teachers, and facilitating resource-sharing practices can create a more supportive culture for ICT use.

6) Leveraging of Online Learning Platforms for Teacher Development:

Encouraging teachers to engage with platforms like SWAYAM, MOOCs, and NPTEL could provide them with continuous learning opportunities. These platforms offer vast resources that can enhance teachers' ICT skills and keep them updated on new developments in educational technology.

7) Promoting Digital Literacy Awareness Programmes for Teachers and Students:

Regular awareness programmes focusing on the importance and impact of digital literacy in modern education could help build teachers' motivation and awareness. These programmes should highlight practical examples and benefits of ICT integration, addressing both teacher and student perspectives to promote a more holistic understanding of digital literacy's role in learning.

By addressing these recommendations, schools can significantly enhance the digital literacy and ICT competencies of teachers, enabling a more effective and enriched teaching-learning experience that prepares students for future digital landscapes.

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