

Role of School Leadership and Institutional Support in Promoting ICT Use Among Teachers

Dhiman Shil

Research Scholar, Kalinga University, Raipur, CG, INDIA.



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ABSTRACT

Information and Communication Technology (ICT) is key in assisting in improving teaching and learning outcomes at the era of the digital transformation in education. While the success of integration of ICT to school contexts largely depends on the schools leadership and the level of institutional support offered to teachers. This paper investigates the contribution of school leadership as well as institutional frameworks in promoting ICT adoption among teachers. The paper draws on empirical studies and on theoretical frameworks to document key factors that affect ICT integration such as visionary leadership, creation of collaborative cultures, infrastructure, and initiatives in building capacity. Therefore, as a conclusive note, the study states that in order to have sustainable ICT driven educational innovation, school leaders should be empowered as well as institutional support mechanisms should be strengthened.

Keywords- ict integration, school leadership, institutional support, teacher development, digital education, educational technology.

I. INTRODUCTION

The welcoming of Information and Communication Technology (ICT) into the world of education has, in recent times, now been declared an important global mandate bringing in one of the most important transformations in the way knowledge is being delivered, accessed and assessed. Today, in the 21st-century's digital space, ICT is not any supplementary tool for using in the other fields of pedagogy but an important constituent in current pedagogy as seen in past few years following the COVID-19 pandemic that has demonstrated its irreplaceable role in ensuring the continuity of education. The desire for digital competencies to be incorporated in national curricula and teacher training programs drives their inclusion in document reforms from governments and educational institutions all over the world. Even though ICT has been heavily invested in digital resources and infrastructure, the applications and effective use of ICT in classrooms is still inconsistent. According to the UNESCO (2021), research shows that the fact that technology is made available does not automatically mean that it would be put into use to influence teaching and learning. There is thus no human element in ICT integration, and in particular the roles played by school leadership and external institutional support, that is more important in determining whether ICT integration leads to greater or lesser transformation in classrooms.

Leaders like principals, vice principals, department heads and ICT coordinators are in a unique position to impact on the course and extent of ICT uptake. They are the strategic visionaries; they are motivational influencer and they are administrators whose decisions play a key role in shaping the culture of innovation in schools. Leaders who show an active attitude towards ICT use, show the use of digital practices and offer remote support for staff have better chances of successful ICT integration. On the other hand, disengaged leadership can mean fragmented or tokenistic adoption, limiting the value technology can have for improving educational outcomes. Institutional support (in this case, defined as the policies, training frameworks, infrastructural support and collaborative environments provided to enhance the use of ICT for teaching) are also equally crucial. Such factors as professional development opportunities, access to technical support, time for digital lesson planning, and the possibility of curriculum alignment enable or inhibit the capacity of teachers for

more successful integration of ICT into their practices. In developing regions, for example, West Bengal, India, characterized by the absence of a technological infrastructure and limited resource capacities of schools, the importance of interaction between leadership and institutional support is increased. Exploring how these dimensions function in actual educational field will enable policy decision, capacity building programs, as well as leadership training initiatives aimed at promoting sustainable digital transformation will be possible.

This paper therefore studies the multi faceted roles of school leadership and school institutional mechanisms to engender the uptake of ICT by teachers and to identify the opportunities and challenges that exist in the school ecosystem in promoting their use.

II. OBJECTIVES OF THE STUDY

Such study has the purpose of investigating the articulation between school leadership, institutional support, and ICT integration on teachers' classroom. Specifically, the objectives are:

1. An attempt is made to analyze how school leadership influences promoting ICT use among teachers by looking into leadership behaviours, strategies and vision setting that promote or discourage ICT adoption.
2. As an example of integrating the types and effectiveness of institutional support mechanisms for ICT through training programs, infrastructure, peer support systems, technical assistance, and policy directives.
3. Find out about the barriers and enablers in the implementation of ICT at school level, i.e. digital literacy gaps, resistance to change, as well as inconsistencies in ICT policy or lack of motivation and institutional incentives.

Such objectives will be helpful in the framing of a general appreciation of the structural and leadership related dynamics to ICT use in education settings. Our research investigates how school administration and organizational systems support teachers in using ICT daily. The modern education system needs to understand why school leadership and support systems affect teachers' ICT adoption to help students succeed. The main purpose of this research is to examine which school leaders and support systems help teachers properly use ICT or make usage difficult. This investigation follows certain clear research targets to direct its progress.

Research goal number one is to evaluate how effective school leadership helps teachers use digital technology. The objective aims to research how school officials direct changes in using ICT classroom technology. The study will explore: Leadership (transformational, instructional or distributed leadership) actions guide teachers toward better or worse ICT attitudes. School leaders set direction for ICT education and find resources to make strategies happen. School principals establish environments that let teachers test new digital ideas and learn without limits. The analysis will show which approaches best help teachers maintain their interest in using technology in teaching. Our research examines which types of institutional backing work best when teachers incorporate ICT into their teaching methods. Leadership vision needs support from institutions to become real classroom practice. This goal examines the main supports teachers receive from their institution.

Organizations hold special classes that teach teachers digital capabilities and help them develop their skills in ICT tools. The school needs technical systems that include online connections and electronic libraries plus digital classrooms supported by electronic equipment. School teams use mentoring relationships and designate IT experts to help teachers with technology challenges. Technical assistance mechanisms for ongoing troubleshooting and maintenance of hardware and software. The school system must have clear rules about ICT usage and supervising digital resources. The research will measure if teachers have these support systems plus whether they remain practical useful and available for education technology in their view. This research will assess how ICT implementation runs into problems and helps success at school level. Many schools continue to use ICT tools poorly even after receiving multiple funding projects. The study examines elements that either support or block the adoption of ICT systems at basic educational institutions.

Digital literacy gaps among teachers, particularly in rural or under-resourced settings. People resist change because they fear new technology lack self-assurance and worry about their work volume. A failure by officials to properly execute rules or provide proper directions makes people lose direction. Teachers feel unmotivated because they lack incentives and do not advance in their careers when they start using ICT tools. This study identifies the elements that made successful ICT integration possible including strong leadership direction and proven pilot programs plus peer-assistance and match-up to learning content.

III. THEORETICAL FRAMEWORK

The theoretical framework for this study is based on two theoretically linked theories, Transformational Leadership Theory (Bass & Avolio, 1994) and the Technology Acceptance Model (TAM) (Davis, 1989), that provide multiple perspectives of leadership and perception to ICT adoption.

Transformational Leadership Theory

Transformational leadership is one of the leadership approaches that aspires to inspire employees, to empower them, and intellectually elate them so that they can do beyond their own expectations and be willing to embrace change. In

the educational environment, transformational school leaders explain a meaningful digital learning vision, encourage new ideas and establish a culture based on collaboration and trust. Furthermore, they model ICT use themselves, incite experimentation, and give teachers who are attempting to adopt technological change moral and administrative support. This theory implies that leadership is not only management functions but through type of leadership approach, enhances deep pedagogical transformation especially during technological shift.

Technology Acceptance Model (TAM)

Using TAM gives us a psychological perspective of how users acquire new technologies and embrace them. According to it, the attitude of a person towards the use of technology is influenced by two main factors, Perceived Usefulness and Perceived Ease of Use, which affect the behavioral intention of a person to use it. In the area of schools, teachers tend to integrate more ICT when they believe that it would increase their teaching effectiveness and feel to be more confident with their ability to use the tools. Shaping perceptions of the two role categories depends on institutional support mechanisms (training, peer mentoring) and leadership behaviour (encouragement, role modeling).

The study combines these frameworks to include the structural and the human dynamics of the ICT adoption in schools; the alignment of the visionary leadership with respect to user perception and the effect of the systemic support on the final behaviour. The dual framework also facilitates an examination of the sociotechnical factors related to ICT integration among teachers.

IV. METHODOLOGY

In order to explore the complex relationship between school leadership, institutional support and ICT integration; qualitative research design approach was utilized. However, this approach was seen as appropriate since it possesses strength in capturing in depth perspectives, nuanced experiences and contextual realities of educational stakeholders.

These schools were located across the ten schools of the purposive sample, with the schools covering various infrastructural capacities and leadership models in urban and semi urban areas of West Bengal. To achieve variance in institutional support structures and administrative practices, these schools included government run, private and government aided schools.

4.1 Data Collection Methods

- In addition, Semi-Structured Interviews were done with 15 school principals and 30 teachers. Principals and teachers represented various subjects, early career and experienced staff, and the role of principals as administrative and pedagogical leaders. The interview protocols consisted of open ended questions relating to leadership practice, institutional support, professional development and challenges to the use of ICT.
- Document Analysis: Various institutional documents such as the ICT policies in school, training records, school improvement plans, technology usage reports were analyzed to triangulate data in support of how support systems were operationalized.
- Observations made during classroom and informal discussion with ICT coordinators and staff members at the various site visits allowed for an insight of the actual implementation of ICT practices.

4.2 Data Analysis

The data were coded using a grounded theory approach that allowed themes to emerge from the data. During the coding, coding categories were iteratively refined and the emerging patterns of clustered around three core domains: leader practices, institutional mechanisms, and barriers to ICT integration. Qualitative analysis software (such as NVivo) had been used to assist managing and organizing data.

V. FINDINGS AND DISCUSSION

Thematic analysis of documents and interviews produced three major domains on the role of school leadership, on institutional mechanisms of support and on prevailing barriers to the effective integration of ICT. Below we discuss each of them, using as illustrative examples the applications we studied.

5.1 Role of School Leadership

School leadership was a central factor in ICT integration. The majority of principals did not, however, lead by example, showing little digital fluency, discouraging creativity, and not supporting educator development: in other words, they were not actively prototyping ICT adoption and did not make it part of a shared institutional goal.

Key Leadership Practices Identified:

- Visionary Leadership: Those who did make the digital roadmap explicit and provided guidance and context with reference to school development goals or state policies also had staff orient themselves around that direction. 'Technology is a tool, but also the future of teaching,' said one principal. "Digital literacy is now our school development plan."

- Encouragement and Recognition: Leaders, who recognised ICT effort in the school, motivated teachers to experiment. So they were recognized in informal way of praise, presented with the certificates and during staff meetings some were ICT champion.
- Delegation and Distributed Leadership: ICT task forces or, as with some effective principals, the assignment of ICT champions in departments to support peer training and debugging of problems. Apart from creating teacher capacity, this approach distributed the responsibility among many teachers, giving rise to a culture of shared responsibility.

5.2 Institutional Support Structures

Finally, leadership initiatives were most successful if the institutions had strong mechanisms to support them. There were three major forms of institutional support.

- Continuous Professional Development (CPD): Every successful school had a well established in-house, and external agencies' teachers training program. Other methods mentioned as effective include peerlearning models and mentoring programmes – all of which are useful to assist older or less techsavvy staff.
- Infrastructure Provision: For availability of well maintained infrastructure such as projectors, smart boards, tablets, access to curated digital content, Wi-Fi etc was viewed as a prerequisite. Semi urban schools had less consistent infrastructure than urban schools.
- Time and Administrative Support: Designated time was given to the teachers to plan for ICT lessons and on call technical support during lessons were valued by them. Allocation of specific periods was effective for fostering adoption, and schools that did so experienced better adoption rates.

5.3 Barriers to ICT Integration

Even with positive efforts, a number of systemic, and individual level barriers were found.

- Resistance to Change: On the other hand, a part of the teachers, particularly older ones, were reluctant to switch to the new way, something that may be attributed to their fear of failure or their lack of confidence to use technology. 'I still prefer chalk and talk.' One teacher said. It is just not something I can do on my own in a digital tool."
- Inconsistent Policy Implementation: National and state policies to integrate ICT, and subsequently school practices, were sometimes unclear or inconsistent. There were no clear guidelines in schools which resulted in ad hoc or the fragmented implementation.
- Resource Inequality: Urban and semi-urban schools were clearly different. Semi urban schools too faced intermittent electricity supply, lack of functioning equipment or poor internet bandwidth and teachers found it difficult to deliver digitally enriched lesson.

VI. IMPLICATIONS FOR PRACTICE AND POLICY

It therefore identifies areas where intervention focusing on ICT integration in schools is critical in order to make it more robust via institutional and policy reforms.

Leadership Training and Empowerment

- There is a need for provision of school principals with structured formation in digital leadership that extends their role beyond administrative to innovation in pedagogy and change management as well as capacity building approaches.

The leadership development programs should also embody the reflective practices such as the leaders should reflect on their digital visions, supporting systems as well as their adaptability.

Policy Alignment and Implementation :

- ICT – related policies must be implementable, context – specific and flexibly adjustable to the school's specific needs. Clear roads for implementation need to be provided to schools with adequate benchmarks and progress indicators.
- School selections of tools and strategies should be worked within school autonomy under suitable policies rather than through inflexible top down models.

Equity in Access and Resources

- Therefore, under resourced schools must take the priority of the resource allocation by the state governments and the education departments. What this precisely entails, is that provision of hardware includes, but is not limited to: On going technical support; maintenance; localised digital content.
- It is imperative for ICT funding to go hand in hand with monitoring systems to ensure even distribution and utilization of such funding to prevent its abuse.

Promoting Collaborative Cultures

- Teachers should be encouraged to embed the use of ICT into their classrooms, for the schools to become communities of practice that facilitate collaboration, sharing of ICT strategies, and mentoring among the teachers.
- ICT champions can contribute to sustained change through peer-led innovation by being institutionalized within departments.

VII. CONCLUSION

The paradigm of integration of Information and Communication Technology (ICT) into the educational environment is not any longer an optional enhancement of, but a fundamental necessity for contemporary education and learning. However, ICT adoption in schools is more effective than simply having devices and digital tools. The results of this study illustrate that only a robust structure of support and a strong leadership within the school can account for the successful adoption of ICT into education.

Above all, school leaders have a critical role in determining the digital culture of their institutions. A climate characterized by innovation, collaboration, and continuous improvement is more likely to exist when leadership is proactive, visionary, and it involves all people. ICT use is likely to be higher among teachers when led by leadership that equally applies digital practices, demonstrates a coherent pedagogical view on the use of ICT by teachers and empowers staff through support and the provision or allocation of resources.

Institutional support is also a very important enabler. Therefore, teachers' confidence and capacity to integrate ICT meaningfully in their classes is based on access to professional development, digital infrastructure and administrative flexibility. This study, however, also brings to light some persisting challenges which range from unequal resource distribution, a lack of willing participants and change, not to mention inconsistent implementation of policies all of which hold back progress especially in semi urban or poorly funded schools.

Inevitably, the eventual success of ICT integration is a matter of system integration encompassing leaders' vision, structures of the institutions and teachers' preparedness. Sustainable, digitally enabled education systems will be developed by investing in school leadership development, strengthening school contextual support mechanisms, and removing equities barriers.

Schools must now use Information and Communication Technology as an absolute requirement for modern 21st-century education. Digital technology affects how information travels and how education takes place particularly by empowering teachers and students with modern effective learning techniques.

The research shows that making computers available to students does not guarantee successful online education sessions. Instead, real success stems from strong institutional structures and effective leadership support. Using digital tools by itself does not ensure effective learning practices in education. Studies confirm that what truly drives successful ICT integration in schools is excellent leadership who builds teamwork and promotes innovation throughout the organization.

The Role of School Leadership : The results show school leaders play the foremost part in creating digital culture spaces for their students. Leadership teams across different school levels motivate teachers to use digital tools by demonstrating and setting up plans for digital excellence. Leaders who actively participate and bring staff together to envision the future create schools with these outcomes.

The school should establish its digital vision by connecting it to all learning goals. The school leadership creates precise technology requirements and offers assistance teachers need to use technology in their teaching methods. Encouragement of collaborative professional learning communities, and School leaders show students how technology should be used during daily leadership tasks. Team members develop their skills better when leaders support risk-taking and empower staff to trust their decisions. Teachers confidently try new methods and enhance class activities once the school system backs and equips them with the needed resources and instructions.

Institutional Support as an Enabler

Leadership values and suitable school support mechanisms build educators' skills and self-assurance when integrating technology into teaching practice. This includes: Educational institutions must organize development programs for educators that move past hardware training to cover digital learning practices and design assessments and content.

Students need reliable devices plus dependable internet plus online tools for learning to succeed. Administrative support, such as time allowances for ICT planning, flexibility in instructional design, and access to troubleshooting resources; Teachers can work in teams to exchange digital teaching techniques and handle IT issues with one another. Schools become better at using technology throughout every aspect of their operations when these helping factors get set up correctly.

Persistent Challenges and Systemic Barriers : The research shows process yet recognizes that basic infrastructure needs and training barriers limit ICT adoption in certain underfinanced schools. These challenges include: The study showed that not all schools receive equal facilities including minimum building requirements.

Policies for ICT use that do not stay the same from school to school create ineffective plans that cannot be properly monitored. Teachers with low digital skill levels including the senior generation who did not use technology before. People oppose change because they fear new things while working more and seeing no advantage in it. Teachers receive few rewards from their institution to use technology in their classrooms and ICT professional practice is not professionally valued. These problems require addressing ICT integration through approaches that extend past single teachers and focus on fixing system-level problems affecting schools and their districts.

Toward Sustainable ICT Integration: ICT integration reaches its potential through effective understanding and development of both organizational management and technological infrastructure. It requires: Each school needs to agree on digital goals and their leaders should understand digital transformation to reach them successfully. The school system receives continuous teacher development based on specific school requirements.

Organizations need basic systems to help teams create new solutions while taking responsibility and working with everyone. Each school regardless of location and funding level must have equal chances to integrate digital learning. Research results show digital empowerment in education requires parallel growth of leadership training with strong institutions plus fair system upgrades. To meet current educational needs schools need to spend funds on people and methods to effectively use technology in the classroom. ICT integration becomes real learning transformation when schools support teachers and leadership to build digital classrooms across all aspects of education.

VIII. RECOMMENDATIONS

In order to respond to these multi faceted challenges of ICT integration and empower a digitally empowered, future ready teaching workforce, the following recommendations are proposed. They are rooted in the study's findings and match the global best practices of educational leadership as seen in policy and educational innovation.

i) Develop Structured Leadership Programs Focused on Digital Transformation in Education

The success or failure of ICT integration efforts depends on school leadership. It is, therefore, imperative to provide specific training to the school principals, the heads of certain departments, and more generally to educational leaders, that is related to digital leadership. Such programs should have modules on strategic ICT planning, leading digital change, data-driven school management, and building collaborative ICT enabled learning environments.

Training should be tiered and ongoing one involving basic ICT awareness that will pave way for higher level training modules for instructional leadership and innovation management. Relevance and scalability can be ensured through collaboration with teacher training institutions, ICT experts and the government bodies. Such leadership should be able to model ICT use, effectively align resources for use by teachers, and positively infuse technology into teaching.

ii) Establish ICT Mentoring and Peer Learning Models Within Schools: Peer to peer mentorship and collaborative learning are one of the best ways of adoption of ICT among teachers. As well, schools should formally identify and support ICT champions or digital coaches (teachers with good ICT competencies) to lead ICT specialists in activities like regular workshops, demonstrations, and classroom co teaching. Professional Learning Communities (PLCs) centered on digital pedagogy can be established in which teachers can share experiences, tools and resources on a regular basis. Low pressure learning, trust building, and the decreased anxiety and resistance often caused by the change from analog and digital worlds to the world of computers may also be encouraged by peer mentorship. Creating such initiatives also eases sustainability by establishing a shared growth and collective accountability culture.

iii) They Must Also Guarantee the Infrastructure Maintenance and a Support to the Technical Part.

Having access to technology is not enough, ICT's functionality and reliability need to be constant and robust. The schools should therefore have a regular budget and appropriate technical support services for proper, normal repair, maintenance and upgrading of the ICT infrastructure like projectors, computers, internet networks, smart boards etc. One option is to reduce down time and smooth out the integration with day to day teaching is to appoint or outsource dedicated ICT support staff (e.g. technicians or IT coordinators).

Those that have infrastructural challenges should implement backup solutions as offline digital libraries, power backups, and device sharing models. ICT infrastructure is reliable teachers can rely on digital tools for their lesson planning and deliver.

iv) Promote a Culture of Innovation and Experimentation in Teaching Practices: Environments that encourage risk taking and being seen for what it is, a learning opportunity produce innovation. School leaders should ensure there is no punitive and supportive environment for teachers to feel good exploring new digital tools and teaching strategy. Regarding recognition systems: there could be "Digital Innovator Awards" letting teachers' best practices out or "Teacher Tech Showcases" where teachers leverage on their own accomplishments and become role models. Teachers should be given dedicated time on the timetable to come together, try out a new tool or attend a micro training.

The school culture needs to be matured enough to embed innovation as a core value, a mechanism to move ICT adoption from compliance to creativity.

v) Align Policy, Curriculum, and Assessment with ICT Goals

In order to sustain ICT initiatives, there is need to ensure policy coherence and alignment with teaching objectives. Specifically, national and state education departments should develop clear (and flexible) policies on the integration of the use of ICT in the existing national and state curriculum frameworks and classroom assessment practices. On the one hand they should be integrated into the ICT subjects and therefore into the syllabus as subjects, on the other, within the range of disciplines they should be embedded across all subjects.

Our assessment models should have the ability to recognize and evaluate digital literacy, project based learning, and technology enhanced performance tasks. Engagement of teachers with technology is more likely to be meaningful when curricular, pedagogical, and assessment purposes align with the objectives of ICT.

vi) Bridge the Urban-Rural Digital Divide

However, the study found that in terms of ICT, schools especially in rural areas are disadvantaged as compared to urban schools and this discrimination must be corrected if educational equity is to be achieved.

- In the conflicts between budget constraints and demand for education, governments and educational authorities must allocate their resources to the rural and underserved areas, allowing for adequate infrastructure and training as well as appropriate policy attention to be given to these areas.
- Bringing technology into the remote places – Initiatives such as mobile ICT labs, portable low cost tablets, community based digital learning centers etc.
- NGOs, CSR, and tech companies can easily partner to innovate, scale, and deploy such solutions cost effectively in the context of their range of interventions.

In order to promote social justice, but also to meet the objective of inclusive national digital education, this divide must be bridged.

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