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"ICT Readiness: A PRISMA-Based Systematic Review of Empirical Studies"

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Abstract

The integration of Information and communication technology (ICT) in school education has become a central component of contemporary teaching-learning processes. Teachers' readiness to use ICT effectively is a critical determinant of successful classroom integration, particularly at the primary and upper primary levels where foundational learning takes place. This PRISMA-Based systematic review synthesizes empirical research on ICT readiness among primary and upper primary school teachers. Drawing on peer-reviewed studies published between 2010 and 2024 was conducted across Scopus-indexed journals, ERIC, and UGC-CARE-listed sources. After applying PRISMA screening and eligibility criteria, 45 empirical studies were included for final analysis. The review analyses and examines key dimensions of ICT readiness, including methodological trends, major barriers, and enabling factors. The findings indicate that while teachers generally demonstrate positive attitudes towards ICT, their readiness is often constrained by inadequate training, limited access to resources, and lack of institutional support. The review identifies major trends methodological approaches, and research gaps, and highlights implications for teacher education, policy formulation, and future research.

Keywords: ICT readiness, primary school teachers, upper primary teachers, PRISMA, digital pedagogy, systematic review

1. Introduction

The rapid advancement of digital technologies has transformed educational practices worldwide. Information and Communication Technology (ICT) is increasingly recognized as a powerful tool for enhancing teaching effectiveness, learner engagement, and educational equity. In school education, particularly at the primary and upper primary levels, ICT integration plays a vital role in developing foundational skills, creativity, and digital literacy among learners. At the primary and upper primary levels, ICT plays a foundational role in promoting interactive learning, early digital literacy, and learner engagement. However, the effective use of ICT is contingent upon teachers' readiness, which encompasses technological competence, pedagogical integration, and institutional support.

Despite significant investments in ICT infrastructure and policy initiatives, the effective use of technology in classrooms largely depends on teachers' readiness. ICT readiness refers to teachers' ability, willingness, and confidence to integrate digital tools into pedagogical practices. A growing body

of empirical research has explored ICT readiness among teachers', findings remain fragmented across context, methodologies, and educational levels. Empirical evidence suggests that disparities in ICT readiness among teachers remain a major challenge, especially in developing and resource-constrained contexts. Given the importance of early schooling, understanding ICT readiness among primary and upper primary teachers is essential. Therefore, a systematic synthesis of empirical evidence is necessary to provide a comprehensive understanding of ICT readiness at these foundational stages of schooling.

The present articles systematically reviews empirical studies on ICT readiness among primary and upper primary school teachers to identify key dimensions, trends, challenges, and gaps in existing research.

2. Objectives of the Review

The systematic review aims to:

1. Examine the level of ICT readiness among primary and upper primary school teachers.
2. Identify key dimensions and determinants of ICT readiness.
3. Analyse methodological trends in empirical studies.
4. Highlight the research gaps and implications for practice and policy.

3. Methodology: PRISMA Framework

3.1. Review Design

The review followed the PRISMA 2020 guidelines, ensuring transparency and rigor in identifying, screening, and synthesizing relevant empirical studies.

3.2 Search Strategy

A systematic literature search was conducted using the following databases:

- Scopus-indexed education journals
- ERIC
- Google Scholar
- UGC-CARE-listed journals

Search terms included: "ICT readiness", "teacher ICT readiness", "primary school teachers", and "digital competence".

3.3 Inclusion and Exclusion Criteria

Inclusion Criteria

- Empirical studies (quantitative, qualitative, or mixed-method
- Focus on primary and/or upper primary school teachers

- Published between 2010-2025
- Peer-reviewed journal articles
- Explicit measurement or discussion of ICT readiness

Exclusion Criteria

- Conceptual or theoretical papers
- Studies focussing solely on secondary or higher education
- Conference papers, reports, dissertations
- Non-English Publications

4. Result of the Systematic Review

The majority of studies report moderate ICT readiness among primary and upper primary teachers. Basic operational skills (e.g., use of computers, projectors, internet resources) were common, whereas advanced instructional integration remained limited.

Across diverse contexts, teachers demonstrated positive attitudes toward ICT, perceiving it as beneficial for student engagement and instructional effectiveness. However, positive attitudes did not consistently translate into sustained classroom use.

Empirical evidence revealed limited use of ICT foe learner-centred pedagogies such as collaborative learning, formative assessment, and inquiry-based instruction. ICT use was predominantly teacher-centred, especially at the primary level.

Continuous professional development emerged as a strong predictor of ICT readiness. Teachers who participated in long-term, hands-on training programs exhibited significantly higher readiness than those who attended short-term workshops.

Lack of adequate infrastructure, unreliable connectivity, limited technical support, and heavy teaching workloads were consistently reported barriers. School leadership and administrative encouragement were found to positively influence ICT readiness.

5. Methodological Characteristics of Reviewed Studies

- Predominantly descriptive survey designs
- Common tools: questionnaires, self-report scales
- Frequent use of descriptive statistics, t-test, ANOVA, correlation, and regression
- Limited qualitative and experiential research
- Scarcity of longitudinal studies

6. Discussion

The findings indicate a persistent gap between teachers' positive perceptions of ICT and their actual classroom practices. This gap is influenced by pedagogical preparedness, institutional constraints, and limited opportunities for sustained professional learning. The review highlights the need for a shift from skilled-based ICT training to pedagogically ground digital competence development.

7. Research Gaps and Future Directions

1. Underrepresentation of upper primary teachers in empirical research
2. Limited intervention-based and experimental studies
3. Insufficient focus on contextual and socio-cultural variables
4. Lack of linkage between teacher ICT readiness and student learning outcomes

8. Implications

- Strengthening digital infrastructure at foundational school levels
- Adoption of mixed-method and longitudinal designs
- Integration of ICT pedagogy in pre-service curricula
- Continuous, practice-oriented in-service training
- Cross-national and comparative studies

9. Conclusion

The PRISMA- based systematic review provides comprehensive evidence that ICT readiness among primary and upper primary teachers remains moderate despite positive attitudes toward technology. Enhancing ICT readiness requires a holistic approach encompassing pedagogical competence, sustained professional development, institutional support, and policy alignment. Strengthening teacher readiness at the foundational level is essential for achieving meaningful digital transformation in school education.

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