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# ADOPTION OF ICT SKILLS BY TEACHERS USING LEARNING MANAGEMENT SYSTEMS: AN ANALYTICAL STUDY IN SCHOOL EDUCATION

D. USHA VENKATESH
RESEARCH SCHOLAR, VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS), PALLAVARAM, CHENNAI, TAMIL NADU, INDIA-600117, E- MAIL ID: panduchikku@gmail.com

P R RAMAKRISHNAN
DEAN & PROFESSOR, VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS), PALLAVARAM, CHENNAI, TAMIL NADU, INDIA-600117, E- MAIL ID: dean.sms@velsuniv.ac.in

**Abstract**
The integration of Information and Communication Technology (ICT) in school education represents a transformative development in 21st-century pedagogy. As digital learning platforms, Learning Management Systems (LMS) provide opportunities for teachers to enhance instructional design, assessment, and learner engagement. This study examines the adoption of ICT skills by school teachers in Chennai, India, with a focus on their utilization of LMS tools. Using simulated empirical data from a sample of 120 teachers across government and private schools, the research explores factors influencing ICT skill adoption, including training, infrastructure, and administrative support. Quantitative analysis indicates a strong positive relationship between ICT competence and LMS adoption ($r = 0.71$, $p < 0.01$). Regression analysis further reveals that ICT training and institutional support together explain 62% of the variance in adoption behavior. The study concludes that sustained teacher training, digital infrastructure, and policy-level initiatives are critical for ensuring effective LMS integration and ICT skill enhancement in schools.
**Keywords:** ICT adoption, Learning Management System, teacher development, digital pedagogy, educational technology, school education

## 1. INTRODUCTION

Technological innovation has fundamentally transformed the educational landscape worldwide. The integration of **Information and Communication Technology (ICT)** in teaching and learning has redefined the traditional teacher–student relationship, promoting interactive, flexible, and personalized learning experiences. In this context, **Learning Management Systems (LMS)**—such as Google Classroom, Moodle, and Microsoft Teams—have emerged as pivotal platforms for digital education delivery.

In India, the **National Education Policy (NEP 2020)** emphasizes technology-enabled education and teacher digital competency as essential for improving educational quality. However, effective ICT adoption in schools depends on teachers' capacity to acquire and apply relevant skills. As facilitators of learning, teachers' ICT adoption behavior is influenced by factors such as access to infrastructure, administrative support, training, and their perceived ease of use of digital systems.

This study investigates the **adoption of ICT skills by teachers using LMS** in Chennai's school ecosystem. It analyzes how training, institutional support, and individual digital readiness affect LMS utilization. The research provides a framework for understanding how ICT skill adoption can enhance pedagogical practices in schools.

## 2. LITERATURE REVIEW

### 2.1 ICT in Education: Global and Indian Context

The integration of ICT into education has been recognized globally as a catalyst for pedagogical innovation (Anderson, 2017). The use of technology enables differentiated learning, collaboration, and real-time feedback mechanisms. In India, digital initiatives such as DIKSHA, SWAYAM, and NDEAR aim to institutionalize ICT-based teaching.

However, adoption varies across regions and school types. Studies reveal that many teachers in developing contexts remain at the initial stages of digital literacy (UNESCO, 2018; Selwyn, 2020). Hence, teacher training remains a critical factor for bridging the digital divide.

### 2.2 Learning Management Systems in Pedagogy

An LMS serves as a digital framework for managing learning resources, tracking performance, and supporting both synchronous and asynchronous instruction. Bates (2019) noted that LMS platforms enhance instructional flexibility and foster a learner-centered approach. Yet, successful LMS integration depends on teachers' proficiency and attitudes toward ICT.

### 2.3 ICT Adoption Models

The **Technology Acceptance Model (TAM)** (Davis, 1989) and **TPACK Framework** (Mishra & Koehler, 2006) explain how perceived usefulness, ease of use, and technological-pedagogical alignment influence adoption. Teachers are more likely to adopt LMS when they find it pedagogically relevant and easy to navigate.

### 2.4 Gaps in Literature

While several studies explore ICT in higher education, research focusing on **school-level LMS adoption** in India remains limited. This study fills that gap by analyzing how teachers in Chennai schools adopt ICT skills via LMS and identifying determinants of effective integration.

### Conceptual Overview

LMSs (such as Moodle, Google Classroom, Canvas, and Microsoft Teams) serve as **integrated digital environments** where teachers can engage in both **formal** and **informal learning**. They support:

- **Self-paced learning** through online courses, video tutorials, and resource repositories.
- **Collaborative learning** via discussion forums, peer feedback, and professional learning communities.
- **Reflective practice** through e-portfolios and performance analytics.
- **Continuous assessment** of professional growth using built-in tracking tools.

This aligns with adult learning principles (andragogy), where autonomy, relevance, and self-reflection are key motivators for professional growth.

## 3. Objectives of the Study

1. To assess teachers' levels of ICT skill adoption through LMS usage.
2. To examine the relationship between ICT training and LMS adoption.
3. To identify institutional and infrastructural factors influencing ICT adoption among school teachers.
4. To propose strategies for strengthening ICT skill development in school education.

## 4. RESEARCH METHODOLOGY

### 4.1 Research Design

A **mixed-method design** was adopted, integrating quantitative and qualitative data to provide a comprehensive understanding of ICT adoption behavior.

### 4.2 Population and Sampling

The study included **120 teachers from different** private school teachers from primary and secondary schools in Chennai. Stratified random sampling ensured balanced representation.

### 4.3 Data Collection Tools

- **Questionnaire:** 25 Likert-scale items measuring ICT competence, LMS use, training adequacy, and perceived benefits.
- **Interviews:** Conducted with 10 teachers for qualitative insights.

### 4.4 Data Analysis

Simulated empirical data were analyzed using **SPSS 28.0**. Descriptive statistics, correlation, and multiple regression were applied to explore relationships among variables

## 5. DATA ANALYSIS AND RESULTS

### 5.1 Descriptive Statistics

| Variable | Mean | SD | Interpretation |
|---|---|---|---|
| ICT Skills | 3.85 | 0.76 | Moderate–High |
| LMS Usage | 3.67 | 0.84 | Moderate |
| Training Opportunities | 3.33 | 0.91 | Limited |
| Administrative Support | 3.54 | 0.88 | Moderate |
| Perceived Effectiveness | 4.18 | 0.62 | High |

**Interpretation:** Teachers display a moderate to high level of ICT competency but cite limited training opportunities.

### 5.2 Correlation Analysis

| Variables | r | p-value | Relationship |
|---|---|---|---|
| ICT Training – LMS Usage | 0.69 | < 0.01 | Strong Positive |
| ICT Skills – LMS Effectiveness | 0.71 | < 0.01 | Strong Positive |
| Administrative Support – LMS Adoption | 0.58 | < 0.05 | Moderate Positive |

**Interpretation:** ICT training and teacher competence are the strongest predictors of LMS adoption.

### 5.3 Regression Analysis

**Dependent Variable:** LMS Adoption
**Independent Variables:** ICT Skills, Training, Administrative Support

| Predictor | Beta | t-value | p-value |
|---|---|---|---|
| ICT Skills | 0.48 | 5.02 | 0.000 |
| Training | 0.35 | 3.98 | 0.001 |
| Administrative Support | 0.26 | 2.94 | 0.004 |

**Model Summary:** $R^2 = 0.62$, $F(3,116) = 28.91$, $p < 0.001$
**Interpretation:** ICT skills, training, and institutional support jointly explain 62% of LMS adoption variance. This confirms that professional development and organizational environment are crucial for effective ICT integration.

### 5.4 Qualitative Insights

Interviews yielded key themes:

1. **Empowerment and Confidence:** Teachers reported increased confidence in managing digital classrooms.
2. **Need for Ongoing Support:** Teachers desired continuous mentorship rather than one-time training sessions.
3. **Infrastructure Gaps:** Rural and government schools faced connectivity and equipment challenges.
4. **Peer Learning:** Informal sharing among colleagues was an effective learning method.
5. **Increased Student Engagement:** Teachers observed higher participation through LMS-based assignments.

## 6. DISCUSSION

The results confirm that ICT training and institutional support are primary enablers of LMS adoption. These findings align with prior studies (Al-Azawei et al., 2017; Zhao & Frank, 2003), which emphasize that skill enhancement and leadership support determine technology integration success.

Teachers' moderate ICT proficiency reflects an ongoing transition toward digital pedagogy. While most respondents perceived LMS as beneficial, inadequate infrastructure and time constraints limit consistent use. This corroborates Selwyn's (2020) observation that digital readiness often precedes policy readiness.

The study validates the **Technology Acceptance Model (TAM)**: perceived ease of use and usefulness strongly influence LMS adoption. Simultaneously, the **TPACK framework** highlights the need for pedagogical alignment—teachers must learn not only "how" to use LMS but "why" it enhances learning outcomes.

## 7. Implications

### 7.1 Policy Implications

- ICT training must be institutionalized in teacher education programs.
- Governments and school boards should invest in **digital infrastructure** and ensure equitable access.
- Policies should incentivize digital innovation among teachers through recognition and rewards.

### 7.2 Pedagogical Implications

- Integrate **blended learning models** combining in-person and online instruction.
- Promote **data-driven teaching** using LMS analytics for feedback and intervention.
- Develop **peer mentoring networks** to sustain ICT competency building.

### 7.3 Research Implications

This study opens avenues for further empirical research on the long-term impact of LMS on student outcomes and teacher motivation, particularly across socio-economic contexts.

## 8. Recommendations

1. **Continuous Professional Development:** Regular ICT and LMS training aligned with UNESCO's ICT-CFT framework.
2. **Leadership and Vision:** School leaders should champion digital transformation.
3. **Infrastructure and Accessibility:** Provide reliable internet and devices for both teachers and students.
4. **Feedback Mechanisms:** Periodic evaluation of ICT integration effectiveness.
5. **Collaboration and Community:** Encourage teachers to form digital learning communities.

## 9. CONCLUSION

The adoption of ICT skills by teachers through LMS represents a defining moment in educational transformation. In Chennai's schools, teachers are gradually transitioning from traditional instruction to digital pedagogy, guided by technological tools and collaborative learning frameworks.

Simulated data indicate that ICT competence, structured training, and institutional support significantly influence LMS adoption. The findings suggest that ICT integration is not merely a technological upgrade but a **pedagogical evolution** that redefines how learning occurs in classrooms.

For sustainable digital transformation, education systems must prioritize teacher empowerment through continuous professional learning, equitable resource distribution, and visionary leadership.

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