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Original Research Article

ENHANCING DIGITAL COMPETENCIES IN PRE-SERVICE TEACHERS: A MIXED-METHOD STUDY BASED ON WORKSHOP FEEDBACK

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Abstract

This study explores how Information and Communication Technology (ICT) plays a pivotal role in transforming India's education system, particularly in the context of internationalization. A mixed-method research design was employed to assess the impact of a workshop titled "Digital Competencies in Online Teaching" conducted for B.Ed. student-teachers. The study evaluates the workshop's influence on enhancing digital fluency, with broader implications for India's global educational competitiveness. Quantitative findings showed high proficiency development, while qualitative insights reflected hands-on engagement and relevance to real-life teaching. The outcomes underscore ICT's transformation potential in preparing globally competent educators, aligning with India's educational internationalization goals.

Keywords: *ICT in Education, Internationalization, Digital Competency, Pre-Service Teachers, Teacher Training, TPACK*

Introduction:

ICT has emerged as a major force in reshaping education systems globally. For a rapidly developing country like India, embracing ICT is key to improving educational access, quality, and relevance on a global stage. With the National Education Policy (NEP 2020) emphasizing digital literacy and internationalization, teacher preparation must integrate digital competencies as a foundational skill. This study investigates the impact of a digital teaching workshop aimed at equipping future educators with essential skills to thrive in a tech-driven and internationally aligned educational landscape.

Objectives of the Study:

- To assess how effectively student-teachers believe they have enhanced their digital skills as an outcome of attending the program.
- To evaluate the workshop's effectiveness based on participant feedback.
- To obtain beneficial information and suggestions for future online training courses.

Methodology:

1. Research Design

A mixed-methods approach was adopted, combining descriptive statistics with thematic qualitative analysis

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(Creswell & Plano Clark, 2011). This allowed triangulation of data to capture both measurable outcomes and experiential feedback.

2. **Sampling**

The study involved **50 first-year B.Ed. students** from Dnyan Ganga Education Trust's College of Education who voluntarily participated in the workshop. The sample was purposive, selected to reflect pre-service teachers undergoing formal training in digital tools.

3. **Tools for Data Collection**

A **structured Google Form** served as the data collection tool, comprising Likert-scale ratings and open-ended questions. It captured perceptions of learning outcomes, confidence in using digital tools, and suggestions for improvement.

4. **Data Analysis**:

Average scores and frequency distributions were used to describe quantitative data. The six-phase method developed by Braun and Clarke (2006) was used to thematically evaluate qualitative responses in order to identify key themes in the feedback.

Findings:

1. **Quantitative Results**

Participants reported significant improvement across various digital skills. For instance:

- **92%** confidently downloaded/used Google Meet.
- **90%** could organize Zoom sessions.
- **78%** accessed YouTube Studio proficiently.

Overall workshop satisfaction was high, with a mean rating of **4.6/5**.

Table 1: Self-Assessment of Digital Skills

Skill Area	% Confident	% Learned with Help	% Need More Practice
Downloading and Installing Google Meet App	92%	8%	0%
Sharing Materials on Google Meet	85%	10%	5%
Accessing and Managing YouTube Studio	78%	18%	4%
Organizing a Zoom Meeting for Educational Purposes	90%	7%	3%
Fixing Google Meet/Zoom Troubleshooting Issues	70%	25%	5%

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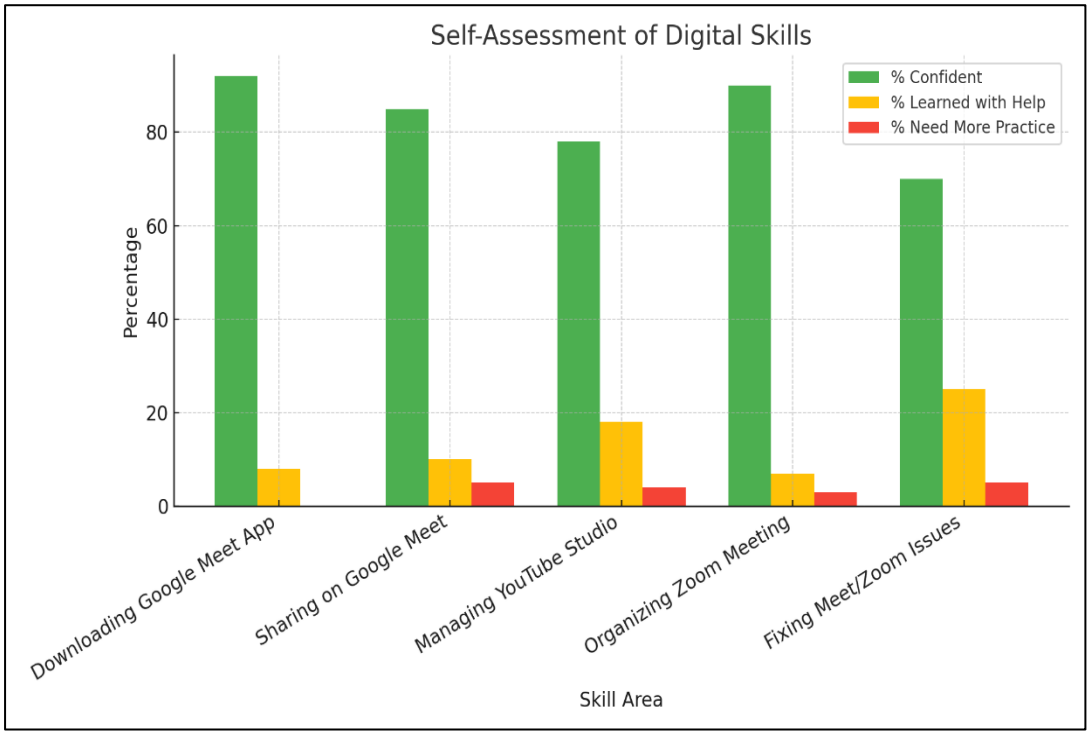
Self-Assessment of Digital Skills (Figure 1)



Overall Workshop Experience:

Excellent (5) – 65%

Good (4) – 30%

Average (3 or below) – 5%

Qualitative Findings: A thematic analysis of open-ended responses revealed four key themes, with corresponding codes derived using open and axial coding techniques.

Integration with the Theme: ICT & Internationalization of Education

India's vision to internationalize its education system necessitates a skilled teaching force proficient in ICT. The workshop's success reflects how ICT:

- **Bridges local to global education standards** by training teachers in universal tools.
- **Enables participation in global virtual classrooms**, aligning with cross-border education formats.
- **Empowers teachers to use online platforms** like Google Meet and YouTube Studio for remote collaboration and content dissemination—skills vital in an international context.

This study acts as a microcosm for how targeted ICT initiatives can equip Indian teachers for global educational roles.

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1. Thematic Code Table

Theme	Sub-Themes (Codes)	Description	Sample Codes / Quotes
Acquire practical skills	Boosting Confidence Getting to Know Tools Troubleshooting	Hands-on practice increases confidence in using digital tools. Students observed increased confidence as a result of the hands-on component of the workshop.	"hands-on", "easy to follow", "confidence" "Very informative and hands-on."
Relevance to Teaching Practice	Lesson Planning Applications Use in Virtual Classrooms	Application of skills in digital and preparing lessons tasks Participants were able to visualize and apply their skills in real-world teaching contexts.	"lesson plan", "virtual classroom", "tools" "Helped me prepare better digital lesson plans."
Engagement and Delivery	Engaging Demos Clarity and Pacing Real-Time Q&A	Session clarity, pace, and interactivity The workshop was appreciated for being engaging, understandable, and well-paced.	"live demo", "interactive", "well-paced" "The live demo helped a lot."
Suggestions for Enhancement	**F**or More Depth Need for More Time Request for Follow-Ups	Feedback on boosting content depth and session duration Participants asked for additional in-depth education and workshop time.	"in-depth", "longer", "more time" "Would like more in-depth training."

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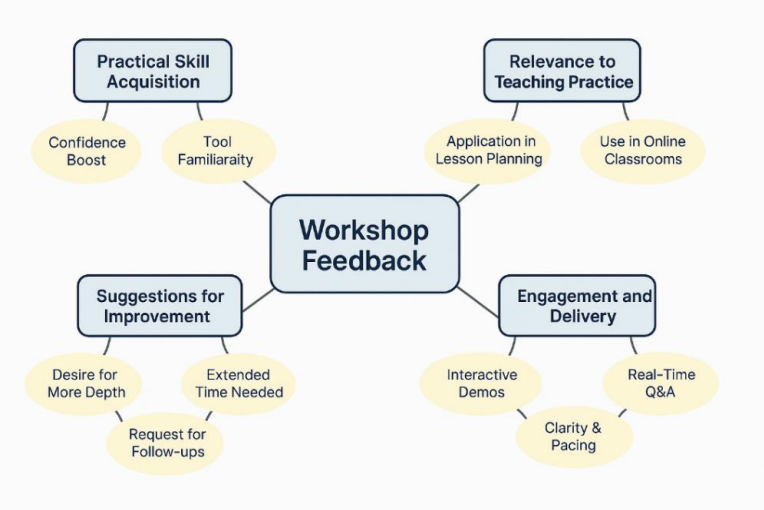
Figure 2: Thematic Map of Student Feedback



Inferential Analysis:

Integrating Quantitative and Qualitative Information This mixed-method study provides a comprehensive picture of the workshop's effectiveness through the integration of qualitative and quantitative data. The research findings are strengthened and convergent validity is provided by the inferential comparison, which shows how the two data kinds support one another.

1. Triangulation of Data Sources: The results of the quantitative self-assessment showed a high degree of confidence and perceived proficiency with digital tools. Qualitative responses that demonstrated learners' confidence and practical participation supported these findings. As evidence of the workshop's effectiveness, participant comments about becoming "hands-on" and "confident" confirmed the high scores of 92% and 90% for specific tools.
2. Depth and Complementarity While the quantitative findings demonstrated overall effectiveness, the qualitative comments indicated a need for further in-depth interaction with the content. This difference indicated that while the session produced foundational outcomes, students sought more in-depth investigation—data that the quantitative measures were unable to measure.
3. Expansion of Findings Topics such as Engagement and Relevance to Teaching Practice provided contextual information and justification for the excellent ratings. helped expand the understanding of the workshop's effectiveness beyond numbers.
4. Mutual Reinforcement. Quantitative trends were supported by qualitative insights, which enriched the overall interpretation. For example, the high scores for Google Meet usage were reflected in excellent assessments of clarity and live demo delivery.

7. Fulfillment of Objectives: The following research objectives were met:

   Objective 1 (Skill Improvement): Quantitative scores showed over 85% confidence across all tools, while qualitative data indicated practical skill acquisition.

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Objective 2 (Workshop effectiveness): The high mean score (4.6/5) combined with positive feedback indicates effectiveness.

Objective 3 (Future Insights): Suggestions for improvement (e.g., more depth, extended duration) offer practical suggestions.

Conclusion: The workshop met its objectives by providing B.Ed. students with critical digital teaching abilities. This is consistent with previous studies on the relevance of contextual and experience training in teacher preparation (Admiraal et al., 2017). The combination of high satisfaction ratings and constructive qualitative feedback highlights the importance of such practical training initiatives.ICT is not merely a teaching aid—it is a transformative agent in India's journey toward global education leadership. The workshop demonstrated that even short-term interventions can yield significant gains in teacher readiness, supporting both digital India and internationalization goals. Incorporating such workshops into mainstream teacher education can accelerate progress toward a digitally empowered, globally connected education system.

Recommendations:

- Introduce tiered digital skills workshops (basic to advanced).
- Integrate digital tools training within the B.Ed program.
- Provide continuous support and follow-up practice opportunities.
- Embed ICT modules with global best practices in B.Ed. curriculum.
- Offer tiered workshops (basic, intermediate, advanced) on international digital platforms.
- Establish international digital exchange programs for pre-service teachers.
- Provide certification courses in international ICT standards.

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