

Experiences In Preparing Teachers For Innovative Activities Based On Digital Technologies

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Abstract: The digital transformation of education necessitates innovative teaching practices and digitally competent educators. This article explores international experiences in preparing teachers for innovative activities based on digital technologies. Drawing from global models such as TPACK, DigCompEdu, and real-world practices in countries like Finland, Singapore, and the United States, the paper analyzes effective strategies and persistent challenges. Findings suggest that blended learning, digital mentorship, action research, and supportive policy frameworks are critical in equipping teachers for digital innovation. The paper concludes with recommendations for sustainable teacher training programs that foster creativity, adaptability, and continuous professional growth.

Keywords: Digital competence, teacher preparation, innovative pedagogy, educational technology, professional development, TPACK, DigCompEdu, blended learning, digital transformation, global education practices.

Introduction: Digital technologies are reshaping education, demanding a shift from traditional instruction to more innovative, flexible, and learner-centered approaches. To meet these demands, teachers must be prepared not only to use digital tools but to integrate them meaningfully into pedagogical practices. This article investigates experiences and models of preparing teachers for innovative activities based on digital technologies, focusing on global best practices and lessons learned. In the 21st century, the integration of digital technologies in education has revolutionized teaching and learning. Preparing teachers to engage in innovative activities through digital tools is no longer optional but a necessity for effective pedagogy and professional development. The growing importance of digital literacy, blended learning, and the use of emerging technologies such as artificial intelligence, virtual reality, and cloud-based collaboration platforms requires a strategic approach to teacher preparation.

The Need for Digital Competence in Education. The European Commission emphasizes that digital competence is one of the key competencies for lifelong learning. According to the Digital Competence Framework for Educators (DigCompEdu), teachers

need to develop digital skills not only for personal use but also for professional pedagogical practices, collaboration, and student empowerment. This calls for targeted efforts in initial teacher education (ITE) as well as continuous professional development (CPD) programs. Mishra and Koehler's TPACK (Technological Pedagogical Content Knowledge) model (2006) is widely accepted as a framework to help educators integrate digital technologies meaningfully. It emphasizes the intersection of technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), providing a structured way to think about the kinds of knowledge teachers need.

Preparing for a Digital Society. The digitalization of society has transformed the nature of knowledge, communication, and employment. Educational institutions are expected to prepare learners not just with subject-specific knowledge, but with transversal skills such as problem-solving, collaboration, digital literacy, and adaptability. To do this effectively, teachers themselves must possess high levels of digital competence. They must be able to:

- Select and integrate appropriate digital tools into teaching and assessment;
- Use digital resources to support diverse learners;

- Foster students' own digital skills;
- Engage in continuous professional learning using online platforms and communities.

According to Ferrari, digital competence involves five key areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. Teachers need to be able to model and teach all of these areas.

Global Experiences in Digital Teacher Preparation.

Numerous countries have launched initiatives to equip teachers with digital competencies. For instance, Finland is renowned for its comprehensive teacher education programs that blend research-based pedagogical training with real-world digital applications. According to Sahlberg, Finnish teachers are trained to act as curriculum developers and innovators, with strong autonomy to implement digital tools creatively. In Singapore, the Ministry of Education has adopted a "Future-ready Educators" framework, which includes the integration of ICT in pedagogy and the use of digital portfolios to document teacher growth. Chai, Koh, and Tsai note that Singapore's teachers undergo regular CPD courses focusing on emerging edtech, supported by mentoring and collaborative learning communities.

The United States follows a more decentralized approach. Many institutions, such as the University of Michigan and Arizona State University, offer digital innovation labs and practice-based training models where teacher candidates co-design digital learning experiences. As Darling-Hammond et al. highlight, strong teacher residency models and ongoing mentorship are crucial for translating digital knowledge into innovative classroom practice.

Challenges in Implementing Digital Innovations in Teacher Education

Despite the global momentum, challenges remain. A study by Tondeur et al. revealed that many teacher education programs still rely heavily on theoretical instruction and offer limited hands-on experience with educational technologies. Without authentic engagement, teachers often lack the confidence to experiment with digital tools in their classrooms. Resistance to change, inadequate infrastructure, and the digital divide are also barriers. In low- and middle-income countries, such as those in Sub-Saharan Africa and parts of Central Asia, UNESCO reports that limited access to internet, devices, and tech support hampers the widespread adoption of digital teaching tools. Moreover, a lack of policy alignment often results in fragmented or unsustainable digital training programs.

Best Practices in Digital Teacher Preparation. Several best practices have emerged globally to enhance

teacher readiness for digital innovation:

Blended Learning Models: Combining face-to-face instruction with online modules provides flexibility and increases exposure to digital platforms. Means et al. found that blended learning is more effective than traditional or fully online formats in teacher education.

Micro-credentials and Digital Badging: Modular, competency-based certifications allow teachers to specialize in areas such as digital assessment, gamification, or virtual collaboration. These are gaining popularity as they validate practical skills.

Communities of Practice (CoPs): Wenger's theory on CoPs underlines the importance of social learning in professional development. Digital CoPs enable teachers to share resources, reflect on practice, and co-create content across geographical boundaries.

Action Research and Reflective Practice: Encouraging teachers to engage in small-scale research on the use of digital tools in their classrooms fosters a mindset of inquiry and continuous improvement. As Schon argued, reflective practice is key to professional growth.

Digital Mentorship and Coaching: Expert mentoring helps bridge the gap between theory and classroom implementation. Studies by International Society for Technology in Education (ISTE) have shown that mentoring programs increase the effective use of tech-integrated lesson planning.

Role of Policy and Leadership. Successful implementation of digital innovation in teacher preparation requires enabling policies and visionary leadership. Fullan stresses that change leadership is not about technology alone but about transforming the culture of teaching and learning. School leaders must model the use of digital tools, support experimentation, and create a safe space for failure and learning. National strategies, such as the EU's Digital Education Action Plan or India's National Education Policy, emphasize the systemic integration of technology in education. These strategies provide funding, set standards, and support professional learning networks that sustain innovation.

Implications for Future Research and Practice. As technologies evolve, so must the approaches to teacher education. There is a growing need for:

AI-powered Personalized Learning: Tools that adapt training modules to individual teacher needs based on learning analytics.

XR (Extended Reality) in Teacher Training: Simulation environments using virtual or augmented reality can provide immersive teaching experiences, especially useful for classroom management or inclusive education.

Open Educational Resources (OER): Curated and localized digital content can bridge equity gaps and foster contextual innovation.

Future research should focus on long-term impacts of digital innovation in teacher training and how it affects student outcomes. Additionally, there is a need to explore culturally responsive digital pedagogy that aligns with local traditions and values.

CONCLUSION

Experiences from around the world demonstrate that effective preparation of teachers for innovative digital activities requires a multi-pronged approach. The integration of strong theoretical models, hands-on training, peer collaboration, and supportive leadership forms the backbone of successful programs. While challenges such as access, resistance, and policy misalignment persist, ongoing innovation, research, and investment are paving the way for more dynamic and inclusive education systems. Empowering teachers with digital competence is not only a professional necessity but a societal imperative. Preparing teachers for innovative activities based on digital technologies is a multifaceted endeavor that requires strategic planning, institutional support, and continuous professional development. The integration of digital tools into teacher education must go beyond technical training and aim to foster creativity, critical thinking, and adaptability. Successful experiences from countries like Finland, Singapore, and the United States show that a research-based, hands-on, and collaborative approach yields the best results. Yet, to make such innovations sustainable and equitable, policymakers and educators must address infrastructural, pedagogical, and cultural challenges together. As education systems navigate the post-pandemic world, empowering teachers with the skills and confidence to innovate through digital means will be central to shaping the future of learning.

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