

AI Integration in Instruction at a Rural Taiwanese Elementary School: A Qualitative Study of Teachers Across Subjects

Research Overview

This study examines how six primary school teachers in rural Taiwan integrate artificial intelligence (AI) into lesson planning, classroom teaching, and assessment. Guided by TAM and TAM2 models, the findings indicate that the AI is largely teacher-centered, structural barriers such as limited school funding and parental concerns regarding screen time present the main obstacles.

Purpose of Study

The rapid advancement of artificial intelligence (AI) technologies has significantly transformed educational practices worldwide, particularly in language and content instruction. AI-powered tools, including generative AI systems such as ChatGPT and other large language models, offer new opportunities for lesson design, personalized learning, and automated feedback. However, the successful integration of these technologies depends largely on teachers' acceptance, contextual constraints, and institutional support.

In Taiwan, AI education has been promoted as a national priority. Nevertheless, rural schools often face persistent disparities compared to urban contexts, including limited technological infrastructure, fewer professional development opportunities, and reduced access to subsidized digital resources. While existing research has largely focused on well-resourced urban environments, the experiences of rural teachers remain underexplored.

This study addresses this gap by examining how elementary school teachers in rural Central Taiwan integrate AI into their instructional practices across multiple subject areas. Guided by the Technology Acceptance Model (TAM) and its extension (TAM2), the study investigates perceived usefulness, perceived ease of use, and social influence as key factors shaping AI adoption. By situating local practices within broader global trends, this research contributes to ongoing discussions on how educators bridge technological innovation and educational equity across diverse contexts.

Research Methods

This study adopts a qualitative research design to explore teachers' lived experiences with AI integration. Participants include six elementary school teachers working in a rural district in Central Taiwan, representing a range of grade levels and subject areas, including Chinese

language, mathematics, science, and English as a foreign language.

Data were collected through semi-structured interviews lasting approximately 60 to 90 minutes, conducted either in person or via video conferencing. Interview questions were designed to elicit detailed accounts of teachers' AI usage, perceived benefits and challenges, and contextual factors influencing their instructional decisions.

All interviews were audio-recorded, transcribed verbatim, and analyzed using thematic analysis following Braun and Clarke's six-phase framework. The analysis proceeded in two stages: initial coding based on TAM and TAM2 constructs, followed by thematic organization around three domains—lesson preparation, classroom instruction, and assessment. This approach enabled both theory-driven and data-driven insights into AI integration practices.

Results and Discussion

The findings reveal two distinct models of AI integration. Most participants adopt a teacher-centered approach, using AI primarily for lesson preparation and administrative tasks rather than direct classroom instruction or student assessment. Teachers reported using AI tools to generate lesson plans, create instructional materials, adapt content for different proficiency levels, and draft communications with parents. However, student-facing applications of AI remain limited.

Despite recognizing the potential of AI to enhance engagement and efficiency, teachers encounter significant structural barriers. A major challenge is the lack of institutional funding for AI tools, resulting in a "pay-to-play" barrier where access to advanced features depends on personal financial investment. Additionally, varying levels of teacher self-efficacy and limited professional training further constrain effective implementation.

Social influence also plays a critical role in shaping adoption. Government-led initiatives and administrative expectations often encourage AI integration regardless of teacher readiness, while parental concerns, particularly regarding screen time and young learners' health-restrict classroom use. Teachers of lower-grade students reported strong parental resistance to increased digital exposure.

These findings reflect broader global challenges in equitable AI adoption, particularly in under-resourced educational contexts. While AI represents a powerful tool for educational innovation, its implementation remains uneven across different socio-economic and geographical settings. The study highlights the importance of institutional investment, subsidized access to AI

technologies, and context-sensitive professional development.

Ultimately, bridging the digital divide requires moving beyond individual teacher initiative toward systemic support. By demonstrating how local educators adapt global technologies within constrained environments, this study contributes to the conference theme of “Bridging Cultures, Co-creating Knowledge,” emphasizing the need for collaborative and equitable approaches to technology integration in education.

Keywords

artificial intelligence in education; technology acceptance model; rural education; digital divide; educational equity.