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Beyond Tools for Meaningful Technology Integration: Unravelling the Dynamics of Teachers' Beliefs and Practices in Chinese as Second Language Classrooms in Singapore

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Abstract

Guided by a qualitative multiple-case study approach, this research investigates technology integration in Secondary 1 and 2 levels Chinese as second language education in Singapore, focusing on four promising teachers recognized for their effective use of technology. The study explores the intricate weave of teachers' technology integration practices, beliefs about technology in education, and pedagogical decision-making. Data were collected through classroom observations, focus group discussions, and in-depth interviews, interpreted through a lens that views teachers' beliefs, knowledge, and practices as interconnected strands of a complex dynamic system (Larsen-Freeman, 2017). The findings illuminate the strategic and adaptive use of technology in language classrooms. These teachers are reflective practitioners who prioritize pedagogical objectives and the enrichment of learning experiences. Their beliefs about technology integration are intertwined with their pedagogical understanding and identity as educators. The study particularly highlights the reflective and iterative nature of technology integration, demonstrating how teachers' values, experiences, and contextual dynamics shape their technological and pedagogical choices.

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Introduction and Background

As highlighted by Kern (2014), the transition from print to digital in language classrooms has profoundly influenced the pedagogical landscape in today's world. Singapore is at the forefront of embedding educational technologies into its national curriculum, demonstrated by initiatives like the Student Learning Space (SLS). These initiatives underscore the growing importance of thoughtfully integrating technology into educational practices to support self-directed, personalized, and connected learning experiences (Ministry of Education, 2021).

Effective technology integration hinges critically on teachers' pedagogical decisions, as highlighted by Mishra and Koehler (2006), Arntzen and Krug (2011), and Kimmons et al. (2015). Despite extensive professional development resources in Singapore, the impact on teachers' practices and dispositions towards technology-enhanced language learning remains under-explored. The integration process is ongoing and complex, requiring teachers to adapt and strategize continuously (Kopcha et al., 2020). Therefore, viewing technology integration as part of a dynamic system, reductionist approaches to studying a teacher's use of technology can be problematic because they seek to decompose a system that is not decomposable.

Employing an interpretive, qualitative, multiple-case study approach, this study aims to uncover how teachers' knowledge of technology integration, their classroom pedagogy, and their perceptions and beliefs about technology integration interact. This study investigates technology integration in Chinese as heritage language education for Secondary 1 and 2 levels in Singapore, focusing on four 'promising teachers' who effectively incorporate technology to enhance learning and foster a student-centric environment. It emphasizes moving beyond merely understanding what technologies teachers use to exploring how and why these decisions are made. The research seeks to answer the following questions:

1. What are these teachers' beliefs about technology integration?
2. How do teachers' beliefs, knowledge, and pedagogical design practices interact in their decision-making process?

Methodology

The study employs a qualitative multiple-case study design, as outlined by Yin (2018), suitable for in-depth analysis of complex phenomena within real-life contexts.

Participants

Four secondary school Chinese language teachers in Singapore were identified through purposive sampling (Patton, 2002) as having significant potential for integrating technology meaningfully into their teaching practices.

Data Collection

Data for this study were collected using a triangulated approach, ensuring comprehensive coverage and enhancing the validity of our findings. A total of nine school visits and 12 interviews were conducted, comprising 532 minutes of lesson observations and 462 minutes of one-on-one interviews.

Data Analysis

Interpretative analysis was conducted through the lens of complex dynamic systems theory (Larsen-Freeman & Cameron, 2008), emphasizing the non-linearity and interconnectedness of teachers' beliefs, knowledge, and experiences. Thematic analysis was employed to identify key patterns and themes.

Key Findings

RQ1 delved into teachers' beliefs about technology integration within their pedagogical practices. The findings articulated through three distinct yet interrelated themes highlight a nuanced understanding of how teachers view their evolving roles and responsibilities in the context of digital technology integration in education.

1) Dynamic Adaptation in Education:

The first theme revealed teachers' beliefs about the necessity of adapting to the constantly evolving educational environment. They recognize the importance of updating their skills and teaching methods to keep pace with technological advancements. This adaptation is not seen as optional but as an essential part of their professional growth and commitment to providing a relevant and effective learning experience for their students.

2) Empowered Learning through Technology Integration:

The second theme brought to light the conviction among our teachers that technology should serve as an empowering tool rather than an end in itself. This belief is deeply rooted in a pedagogy-driven approach to technology integration where digital tools are leveraged to enhance student engagement, facilitate

diverse learning approaches, and build meaningful connections within the learning process. Teachers hold that technology, when thoughtfully integrated, can augment learning in ways that traditional methods alone cannot.

3) Evolving Educator Roles in the Digital Age:

The third theme captured the transformative shift in teachers' self-perception and roles due to the advent of digital technology. They see themselves as facilitators, co-learners, and designers who work alongside students in a more collaborative and student-centered learning environment. This shift underscores their role in cultivating human potential and emphasizes the importance of remaining relatable and approachable to students in an age where technology is omnipresent.

In essence, the findings for RQ1 underscore that technology integration, from the perspective of the participating teachers, is a dynamic, empowering, and transformative journey. It requires ongoing reflection, adaptation, and a willingness to redefine the educator's role to meet the demands and opportunities presented by the digital age. Teachers' beliefs about technology integration are deeply integrated with their understanding of effective pedagogy, their identities as educators, and the purpose they find in their work.

Findings for RQ2 illuminate the intricate dance between teachers' pedagogical beliefs, their understanding of technology integration, and their classroom practices. The central theme, "Contextual and Iterative Pedagogical Refinement through Reflective Technology-Infused Teaching," emerged from our data, underscoring the non-linear and reflective nature of technology integration in the educational landscape.

Teachers are seen as navigators, charting their course through the ever-changing waters of classroom dynamics, student needs, and the evolving digital world. They approach technology integration not as a static checklist but as an ongoing journey of adaptation and discovery. This process is profoundly influenced by their values and beliefs, with decisions made not in isolation but as part of an interactive system that is both influenced by and influences the broader educational context.

The study revealed three salient themes within this process, addressing RQ2:

1. Technology Integration as Value-Driven Practice: Teachers integrate technology when it aligns with their valued educational goals, reflecting a belief that technology should serve pedagogy, not the other way around.
2. Technology Integration Embedded in Dynamic Systems: Apart from beliefs and knowledge, teachers' decisions to integrate technology are

continually adapted based on the dynamic interplay between classroom environments, student interactions, and curriculum demands.

3. Non-Linear and Ongoing Nature of Technology Integration Process: The progression of teachers' practices is marked by a continual cycle of trial, reflection, and evolution. Through thoughtful self-reflection, teachers heighten their awareness and deepen their understanding of their own knowledge, beliefs, and practices, thus enabling more deliberate and informed decisions about the use of technology.

Overall, RQ2 spotlights the complexity of technology integration as a reflective and iterative practice, rooted in the educational values of teachers. It illustrates how the confluence of beliefs, knowledge, and experience, within the distinctive contexts of their classrooms, shapes educators' technological and pedagogical choices.

Discussion

The findings highlight the importance of reflective practice in teachers' technology integration decisions. Given that the findings emphasize the dynamic and iterative nature of this integration process, it is evident that ongoing reflection and adaptation are crucial. Professional development should incorporate reflective exercises to help teachers understand their beliefs, knowledge, and practices. Training should also involve scenario-based exercises to enhance adaptability and responsiveness. Fostering sense-making, awareness, and agency is crucial, encouraging teachers to adopt a growth mindset as lifelong learners and collaborators. Expanding teachers' repertoire through reflective practice and adaptability will enable innovative and effective technology integration, enhancing student engagement and learning outcomes in a technology-rich educational environment.

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