Chapter 9
AI-Guided Professional Development:
A Vygotskian Approach for Teachers in Multilingual Classrooms

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ABSTRACT

This chapter presents a Vygotskian approach to AI-guided professional development through the case study of Verónica, an AI-powered virtual tutor designed to support preservice and in-service teachers in multilingual classrooms. By integrating constructivist and constructionist learning principles, the model emphasizes personalized, continuous support rooted in sociocultural theory and responsive AI design. The chapter outlines how prompt engineering, fine-tuning, and custom embeddings improve Verónica's context awareness and educational effectiveness. It also explores the hybrid training model that combines face-to-face workshops, online modules, and AI interaction to enhance teacher preparation, promote equity, and empower educators with culturally relevant tools for bilingual and ESL instruction.

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UNDERSTANDING THE COMPLEX LANDSCAPE OF MULTILINGUAL EDUCATION

Based on our collective experiences as bilingual classroom teachers, we have witnessed firsthand the unique challenges educators in multilingual settings face. These challenges extend well beyond the standard hurdles of teaching and create a complex landscape that requires specialized support.

One of the most daunting challenges we encountered during our early teaching careers was implementing effective differentiation in classrooms where students possessed varying levels of language proficiency. Unlike monolingual classrooms, bilingual settings require teachers to simultaneously address content understanding while supporting language acquisition across multiple proficiency levels. During our experiences teaching in dual-language programs, we had students ranging from newcomers with minimal English proficiency to fully bilingual children fluent in both Spanish and English. Each morning, we would review our lesson plans, questioning whether we had adequately addressed the needs of all our students. Were we challenging our bilingual students sufficiently while not overwhelming our newcomers? Were we providing the right scaffolds for intermediate language learners to access grade-level content?

We vividly remember teaching science units on objectives like the ones related to ecosystems where some students could comfortably engage with complex ecological concepts in both languages, while others struggled to understand basic vocabulary even in their native language. Creating materials that honored both content objectives and language development goals felt like preparing for two separate classes, which is a constant, comprehensive, and exhausting process.

This reality translates into what effectively amounts to double the planning workload compared to monolingual instruction. Our approach typically involved first identifying core content objectives, then determining appropriate language allocation, followed by developing differentiated approaches for various proficiency levels in each language. This multi-layered process extended our workdays by several hours, contributing to professional burnout. Even routine tasks became complex endeavors. Creating anchor charts meant producing parallel versions in both languages while maintaining content consistency, and selecting appropriate texts required finding materials in both languages that addressed the same concepts but weren't mere translations, a difficult challenge given the limited bilingual resources available to most teachers. Unsurprisingly, statewide data show that bilingual and ESL teachers leave the profession at about 18% per year (six points higher than the overall teacher attrition rate) underscoring how this workload fuels staffing instability in multilingual programs (Carver-Thomas & Darling-Hammond, 2022).