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From Artificial to Authentic: A Sociocultural Case Study of AI-Scaffolded Transitions to Professional Communication

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Abstract

Grounded in sociocultural learning theory, this qualitative case study examines how vocational undergraduates transition from AI-scaffolded practice to peer-mediated, authentic communication in developing care-oriented professional competencies. Thirty-three first-year students in health and wellness programs completed a 16-week sequence of AI-to-peer tasks across four communication domains. Data included semi-structured interviews (n=9), focus group discussions (n=14), and weekly learning journals. Reflexive thematic analysis revealed three key findings: (1) AI agents served as mediating tools that created low-stakes practice spaces and provided clear language patterns and example phrases, enabling students to rehearse professional discourse within their zones of proximal development; (2) the transition to human interaction presented significant challenges that required students to develop flexible communication strategies to handle emotional responses and unexpected situations; and (3) students gained a clearer understanding of care communication, recognizing AI's instrumental value while confirming that human connection remains essential in therapeutic contexts. The study contributes to sociocultural theory by showing how digital tools can support professional communication development and outlines the limits of AI in building relationships. The findings offer practical guidance for integrating AI into professional communication courses while preserving interpersonal dimensions essential for care-oriented professions.

Keywords

sociocultural learning, zone of proximal development, AI-scaffolded learning, professional communication, technology-mediated transition, vocational English education

1. Introduction

1.1 Research Context and Rationale

The integration of artificial intelligence technologies in language education has generated considerable

interest among researchers and practitioners seeking to address persistent challenges in professional communication development. In vocational undergraduate programs, College English courses face the complex task of bridging general language proficiency with career-specific communication competencies, particularly in care-oriented fields where interpersonal skills are fundamental to professional practice. Students preparing for health and wellness care careers must develop communication abilities that extend beyond linguistic accuracy to include empathy, cultural sensitivity, and skills for building therapeutic relationships essential for effective client care.

Traditional approaches to College English instruction often center on general texts and exams and therefore fail to adequately prepare students for the communicative demands of professional practice, creating transfer challenges from classroom learning to workplace application (Xu et al., 2025). While AI technologies offer personalized practice, timely feedback, and low-stakes rehearsal, questions remain about how these tools can support the interpersonal competencies central to care-oriented professions. The challenge lies not in replacing human interaction with technology, but in understanding how AI scaffolding can support learning that ultimately strengthens authentic professional communication.

1.2 Theoretical Framework

This study is grounded in sociocultural learning theory, which views learning as social and culturally mediated through interaction with tools and people (Vygotsky, 1978). Central to this perspective is the zone of proximal development (ZPD), the gap between independent performance and what can be achieved with appropriate support. Within professional communication contexts, the ZPD represents the space where students can develop career-relevant competencies through guided practice before demonstrating autonomous performance.

Sociocultural theory emphasizes mediating tools in supporting learning within the ZPD. These tools can be physical, symbolic, or psychological instruments that mediate human activity and facilitate cognitive development (Xu & Long, 2021). In language learning contexts, mediating tools traditionally include textbooks, classroom activities, and teacher guidance; the rise of AI technologies introduce new forms of digital mediation that can structure input, model discourse patterns, and pace practice while students develop professional communication competencies.

The theory also highlights the importance of social interaction in learning processes, particularly through collaborative activities that allow learners to co-construct knowledge and develop shared understandings. In professional communication development, peer interaction provides opportunities for authentic practice that technology alone cannot replicate, particularly in care-oriented fields where empathy and emotional intelligence are essential competencies.

1.3 Problem Statement and Research Gap

Despite growing interest in AI applications for language learning, limited research examines how students experience transitions between AI-supported practice and peer-mediated authentic communication in professional contexts. Most existing studies treat AI as a standalone instructional

tool rather than examining how digital mediation can scaffold progression toward human-to-human professional interaction (Meinlschmidt et al., 2025). This gap is particularly significant in care-oriented professional preparation, where the ultimate goal is developing interpersonal competence that technology alone cannot fully address.

Moreover, sociocultural learning theory provides limited guidance on how digital mediating tools function within learners' ZPD when preparing for professions requiring high levels of interpersonal competence. While the theory acknowledges various forms of mediation, empirical research examining AI agents as mediating tools in professional communication development remains scarce. Understanding how students navigate the transition from AI-scaffolded practice to peer-mediated authentic interaction is crucial for designing effective pedagogical approaches that leverage technological capabilities while preserving the human-centered nature of care professions.

The intersection of technology-mediated and human-mediated learning in professional communication contexts represents an underexplored area requiring theoretical and empirical investigation. Current literature does not sufficiently explain how students make sense of learning progressions from artificial to authentic interaction, particularly regarding the development of empathetic communication competencies essential for care-oriented careers.

1.4 Research Purpose and Questions

This study examines student experiences of AI-scaffolded transitions to professional communication development within a sociocultural learning framework. The research investigates how AI agents mediate learning within students' ZPD and how learners progress from technology-supported practice to peer-mediated, authentic communication in care-oriented professional contexts. Three research questions guide this investigation:

RQ1: How do AI agents function as mediating tools within students' zones of proximal development in professional communication learning?

RQ2: How does the transition from AI-scaffolded practice to peer-mediated communication unfold in care-oriented preparation?

RQ3: How do students reconceptualize professional communication competencies through AI-to-peer learning progressions?

By examining these questions through a sociocultural lens, the study clarifies how digital tools can be integrated into professional communication curricula while preserving the interpersonal dimensions essential for care-oriented practice. The findings have implications for both sociocultural learning theory and practice in technology-enhanced professional education.

2. Literature Review

2.1 Sociocultural Theory in Language Learning

Sociocultural learning theory, originating from Vygotsky's (1978) work on cognitive development, has become increasingly influential in understanding second language acquisition processes. The theory's

central premise that learning occurs through socially mediated activity has clear implications for language education, particularly in professional communication contexts where learners must develop both linguistic competence and workplace-relevant interaction skills.

The concept of the zone of proximal development (ZPD) provides a theoretical framework for understanding how learners progress from assisted to independent performance. Shvarts and Abrahamson (2023) show that the ZPD is not a static cognitive space but a dynamic, collaborative construction that emerges through interaction between learners and mediating resources. In language learning contexts, effective instruction operates within learners' ZPD by providing appropriate scaffolding that gradually withdraws as competence grows. However, limited research examines how digital technologies might function as mediating tools within professional communication development.

Vygotsky distinguished between physical tools that mediate interaction with the material world and psychological tools that mediate mental processes. Educational technologies introduce new forms of mediation that can support language development by structuring input, modeling discourse, and pacing practice. Schnaider (2023) argue that digital tools can function as cognitive mediators when they provide structured support for language practice while maintaining learner agency in meaning-making processes.

Social interaction remains fundamental to sociocultural approaches, with peer interaction providing opportunities for scaffolded assistance that differs qualitatively from teacher-student interaction (Puntambekar, 2022). This research suggests that effective language pedagogy must balance technological mediation with authentic interpersonal interaction.

2.2 Digital Mediation and AI Technologies in Language Education

The integration of AI in language education has generated considerable research, though most studies examine AI tools as delivery mechanisms rather than as mediating tools within sociocultural frameworks. Current AI applications primarily focus on automated feedback systems, adaptive content delivery, and personalized practice environments (Strielkowski et al., 2025). While these technologies demonstrate effectiveness for certain objectives, they often emphasize skill automation rather than meaning-making processes central to sociocultural theory.

Recent advances have enabled AI applications that engage in conversational interaction with learners. Ding and Yusof (2025) found that AI chatbots can provide valuable opportunities for low-stakes language practice, particularly for learners experiencing anxiety in human interaction contexts. However, their research reveals significant limitations in AI systems' ability to understand pragmatic appropriateness and cultural context, suggesting AI tools function most effectively as complements to rather than replacements for human interaction.

The theoretical positioning of AI technologies within sociocultural learning frameworks remains underexplored. While AI systems can provide scaffolding support, questions arise about their capacity to function as effective mediating tools within learners' ZPD. Most research examining AI mediation

focuses on general language skills rather than complex interpersonal competencies required for professional communication in care-oriented fields.

2.3 Professional Communication Development in Care Contexts

Communication competencies in health and wellness care professions extend significantly beyond general language proficiency to encompass specialized knowledge, interpersonal skills, and ethical awareness essential for effective practice. Research in healthcare communication emphasizes the relational nature of therapeutic interaction, where technical accuracy must be balanced with empathy, cultural sensitivity, and emotional intelligence (Abou Hashish, 2025). These requirements create particular challenges for language education programs preparing non-native English-speaking students for care-oriented careers.

Professional identity development represents a crucial component often overlooked by traditional language instruction. Healthcare professionals must learn not only what to communicate but how to embody professional roles through discourse practices that establish credibility while maintaining accessibility to diverse client populations. This process occurs primarily through authentic practice, raising questions about how classroom instruction can effectively prepare students.

The intercultural dimensions add additional complexity. Ben-Arye et al. (2024) found that healthcare providers must navigate cultural differences in communication styles, health beliefs, and power relationships while maintaining therapeutic effectiveness. For non-native English speakers, these challenges require specialized pedagogical approaches addressing both language development and cultural competency.

English for Specific Purposes (ESP) research provides some guidance for career-relevant communication instruction, though most programs focus on technical language rather than interpersonal competencies. Nasiri and Khojasteh (2024) argue that effective ESP instruction in healthcare contexts must address discourse socialization processes. However, existing ESP research provides limited guidance on how technology-enhanced instruction can support the integration of linguistic, interpersonal, and professional identity development required for care-oriented careers.

2.4 Transition Processes in Technology-Enhanced Learning

Learning progressions in technology-enhanced environments involve complex processes that remain poorly understood. Most research on blended learning examines outcomes rather than processes, providing limited insight into how learners navigate transitions between different instructional modalities (Bozkurt, 2022). This gap is particularly significant for professional communication development, where learners must transfer technology-supported practice to authentic interpersonal interaction.

Scaffolding theory provides a framework for understanding how instructional support can be systematically reduced as learner competence develops. Wood et al. (1976) identified key characteristics of effective scaffolding, including contingent responding, graduated assistance, and timely withdrawal of support. However, most scaffolding research focuses on human tutoring rather

than examining how digital tools can provide scaffolding that leads to autonomous performance.

Research on technology-mediated learning transitions reveals both opportunities and challenges. Leis (2025) found that students value technological support for confidence-building and skill practice but emphasize the continued importance of human interaction for developing authentic communicative competence. However, their findings and similar studies examine outcomes rather than processes, leaving the experiential dimensions of AI-to-peer transitions largely unexplored.

The concept of developmental thresholds provides additional insight into learning transitions. Meyer and Land (2003) describe threshold concepts as transformative understandings that fundamentally alter learners' perception of disciplinary knowledge. In professional communication contexts, the transition from technology-supported practice to authentic interpersonal interaction may represent a threshold experience requiring qualitative shifts in understanding.

3. Methodology

3.1 Research Design and Theoretical Approach

This study employed an interpretive single-case study design grounded in sociocultural learning theory to examine student experiences of AI-scaffolded transitions in professional communication development. Case study methodology was selected as most appropriate for investigating complex learning processes within their natural educational context, allowing for in-depth exploration of how students navigate the progression from AI-mediated to peer-mediated communication practice (Yin, 2018). The interpretive approach emphasizes understanding participants' meaning-making processes and lived experiences of learning transitions rather than testing predetermined hypotheses.

The theoretical foundation in sociocultural learning theory guided all aspects of research design, from participant selection through data analysis. This theoretical lens directed attention to how AI agents function as mediating tools within students' zones of proximal development, how scaffolding withdrawal occurs during transitions to peer interaction, and how students co-construct understanding of professional communication competencies through social interaction. The study's focus on transition processes reflects sociocultural theory's emphasis on learning as dynamic movement between different forms of mediated activity.

The research adopted a longitudinal approach to capture learning processes as they unfolded over time, recognizing that transitions from AI-scaffolded practice to peer-mediated interaction occur gradually through repeated cycles of practice and reflection. This temporal dimension allows for examination of how students' understanding of professional communication evolves through sustained engagement with different forms of mediation.

3.2 Research Setting and Context

The study was conducted at a vocational university in China that specializes in application-oriented undergraduate programs designed to prepare students for specific industry careers. College English courses are mandatory for all first-year students and traditionally follow standardized curricula

focusing on general language proficiency rather than career-specific communication competencies.

The research took place within an experimental College English course section that integrated AI-assisted learning with peer-based communication activities. Class size was 30–40 students; weekly contact time was two 45-minute sessions over a 16-week semester. Instruction and data collection occurred in regular timetabled classes to minimize novelty effects.

The institutional context provided an authentic setting for examining how vocational students experience technology-enhanced professional communication instruction. The university's emphasis on practical skill development and industry relevance aligned with the study's focus on preparing students for care-oriented careers requiring strong interpersonal communication competencies.

3.3 Participant Selection

Participants were selected through criterion-based purposive sampling designed to ensure representation of students experiencing the AI-to-peer learning progression while maintaining focus on care-oriented professional preparation. The primary participant group consisted of 33 first-year students enrolled in health and wellness care programs, including therapeutic wellness services, rehabilitative care, and elderly care management specializations. This sample size was determined based on the principle of information power, which considers study aim, sample specificity, theoretical foundation, quality of dialogue, and analysis strategy in determining adequate sample size for qualitative research.

Inclusion criteria required enrollment in first-year College English courses, declared major in health and wellness care programs, consistent attendance, no prior professional-English coursework, and voluntary consent to participate throughout the 16-week study period. These criteria ensured participants were experiencing their first systematic introduction to professional communication in English while preparing for careers emphasizing interpersonal competencies.

For intensive data collection through interviews and focus groups, a theoretically informed subsample was selected to maximize variation in relevant characteristics. Interview participants (n=9) were chosen to represent diversity in initial English proficiency levels, technology comfort, academic performance, and demographic characteristics including age, gender, and regional background. Focus group participants were organized into two groups (n=6-8 each) with composition designed to encourage open discussion while maintaining heterogeneity of perspectives and experiences. Participation was voluntary and unrelated to grades.

3.4 AI-Scaffolded Intervention Design

The intervention was designed according to sociocultural learning principles, particularly Vygotsky's concept of the zone of proximal development and the role of mediating tools in supporting learning transitions. The 16-week program featured four sequential task chains corresponding to core professional communication domains in care contexts: health and wellness consultation, care documentation and reporting, therapeutic program presentations, and intercultural client communication.

Each task chain followed a theoretically grounded pedagogical sequence reflecting scaffolding

principles. The AI practice phase positioned AI agents as digital mediating tools that provided structured support within students' ZPD by offering low-stakes practice opportunities, immediate feedback, and graduated complexity progression. The AI agents were programmed to simulate client interactions while providing scaffolding support including vocabulary assistance, discourse pattern modeling, and strategic prompts for empathetic responding.

The peer interaction phase was designed to facilitate scaffolding withdrawal as students transitioned from AI-mediated to human-mediated communication practice. These activities included role-play scenarios, case study discussions, and simulated client consultations that required students to apply AI-practiced skills in authentic interpersonal contexts demanding empathy, cultural sensitivity, and adaptive communication strategies.

Task progression within each chain moved systematically from foundational skill development through bridging activities to autonomous performance tasks. This progression reflects sociocultural theory's emphasis on gradual transfer of responsibility from mediating tools to independent learner agency. The intervention integrated seamlessly within regular course schedules, with AI practice sessions occurring during individual work periods and peer interactions taking place during collaborative class activities.

3.5 Data Collection Methods

Data collection employed multiple qualitative methods designed to capture different dimensions of student learning experiences while maintaining theoretical focus on mediated learning processes and transition dynamics. The longitudinal data collection strategy allowed for examination of learning progression over time rather than capturing isolated snapshots of experience.

Semi-structured interviews were conducted with nine purposively selected participants at three critical time points: mid-intervention (week 8), immediate post-intervention (week 16), and delayed follow-up (four weeks post-intervention). Interview protocols were developed based on sociocultural learning theory concepts, exploring participants' experiences with AI agents as mediating tools, perceptions of scaffolding support and withdrawal, and understanding of professional communication development through different forms of mediated practice. All interviews were conducted in participants' native language to ensure full expression of experiences and meanings.

Focus group discussions were conducted with two groups during weeks 14-15 of the intervention to capture collective sense-making processes and peer learning dynamics central to sociocultural theory. Focus group protocols explored shared experiences of AI-to-peer transitions, collaborative construction of professional communication understanding, and group perspectives on the relationship between technological and human mediation in care-oriented communication development.

Learning journals provided ongoing documentation of student experiences throughout the intervention period. Participants received theoretically informed prompts encouraging reflection on weekly experiences with AI practice, peer interaction challenges, insights about professional communication requirements, and evolving understanding of care-oriented communication competencies. Journal entries offered longitudinal data on participants' meaning-making processes and learning progression

over time.

All interviews and focus groups were audio-recorded with participant consent and transcribed verbatim by professional transcription services. Learning journals were submitted electronically through Rain Classroom platform, allowing for ongoing monitoring while maintaining participant confidentiality.

3.6 Data Analysis Procedures

Data analysis followed interpretive qualitative analysis procedures guided by sociocultural learning theory. Initial analysis involved repeated reading of all data sources and creation of analytic memos documenting theoretical insights. Systematic coding employed both theory-driven codes based on sociocultural learning concepts (ZPD experiences, mediating tools, scaffolding processes) and data-driven codes emerging from participant descriptions. Thematic analysis followed Braun and Clarke's (2021) recursive process, with theme development prioritizing participant voices while identifying patterns that illuminate AI-mediated learning transitions. Throughout analysis, empirical findings were connected with sociocultural learning theory to examine how participant experiences extend theoretical understanding of mediated learning in professional communication contexts.

3.7 Trustworthiness and Ethical Considerations

Trustworthiness was addressed through member checking with interview participants, peer debriefing with experienced researchers, and triangulation across multiple data sources. Researcher reflexivity involved ongoing examination of how the researcher's dual role as instructor influenced data collection and analysis. Ethical approval was obtained from the institutional research ethics board. All participants provided informed consent with no impact on grades, and participation remained entirely voluntary. Cultural sensitivity included conducting interviews in participants' preferred language and respecting Chinese educational cultural norms. Confidentiality was maintained through participant codes and secure data storage.

4. Findings

4.1 Overview

Analysis of interviews (n=9), focus group discussions (n=14), and weekly learning journals revealed three interconnected themes that illuminate how students experienced AI-scaffolded transitions in professional communication development through a sociocultural lens. These themes demonstrate how AI agents acted as digital mediating tools within students' zones of proximal development, how scaffolding withdrawal created developmental challenges requiring adaptive strategies, and how peer interaction enabled co-construction of professional communication competencies essential for care-oriented practice.

4.2 AI Agents as Digital Mediating Tools within Students' ZPD

4.2.1 Creating Safe Practice Spaces and Structured Scaffolding

Students consistently described AI practice sessions as providing low-stakes psychological safety that enabled experimentation with professional communication beyond their current independent

capabilities. AI agents functioned as mediating tools by lowering anxiety while providing systematic scaffolding support through immediate feedback and gradual complexity increases.

Participant 7 explained: "When I talk with the AI, I don't worry about embarrassing myself. I can try saying the same thing in different ways until I find what sounds professional. If I make mistakes, only my phone knows." Participant 9 described the scaffolding process: "Before using AI, I didn't know how to ask about symptoms or explain treatments in English. The AI taught me the right words step by step, then showed me how to put them together professionally."

Students reported that reduced social pressure freed attention for language form while building foundational competencies. Participant 12's learning journal documented this progression: "Week 3: Still nervous talking to AI about patient care. Week 6: I found myself practicing even during breaks, trying different ways to explain procedures." By week 14, the same participant noted: "I'm starting to focus more on how to be empathetic, not just correct, because the basic language feels more automatic now."

4.2.2 Recognizing Limitations of Digital Mediation

Despite positive experiences, students developed clear understanding of AI limitations in professional communication development. This awareness emerged through direct comparison between AI and peer interactions, revealing the boundaries of digital mediation in care-oriented contexts.

Participant 5 observed: "The AI helps me get the words right, but it doesn't teach me whether I sound caring or cold. Real patients will notice my tone, not just my grammar." Participant 11 articulated: "The AI taught me correct professional language, but when I practiced with classmates, I realized that patients are not like computers. They have emotions, they interrupt, they don't always understand medical terms the same way."

Focus Group 2 participants discussed how AI interactions lacked unpredictability essential for authentic practice: "AI responses follow patterns. Real people are complicated. We learned that being professional means adjusting to each person's needs, not just following scripts" (Participant 26).

4.3 Scaffolding Withdrawal and the Transition Challenge

4.3.1 Experiencing Transition as Developmental Threshold

The progression from AI-mediated to peer-mediated communication practice emerged as a significant developmental threshold that required qualitative shifts in students' understanding of professional competence. This transition challenged students to move beyond scripted responses to adaptive communication strategies.

Participant 2 described the initial challenge: "After practicing with AI for weeks, I thought I was ready to communicate professionally. When we started peer activities, I felt confused and nervous again. Classmates don't respond like the AI. They have different personalities, different emotions." Participant 15 explained: "The AI taught me what to say, but people taught me when and how to say it differently depending on their feelings and cultural background."

Learning journals documented students' evolving understanding of this transition challenge. Participant

4 wrote in week 10: "I'm starting to understand that professional communication is not just about perfect language. It's about reading people and responding to their needs." This reflection illustrates the threshold nature of the AI-to-peer transition, requiring a reconceptualization of communicative competence.

4.3.2 Developing Adaptive Communication Strategies and Recognizing Complementary Functions

Students developed practical strategies for transferring AI-learned skills to peer interaction contexts while recognizing the complementary roles of different mediation forms. Participant 13 explained: "I learned to use the AI-practiced language as a starting point, then watch my partner's reactions and adjust. If they look confused, I explain differently. If they seem worried, I speak more gently."

Rather than viewing AI and peer interaction as competing, students understood their complementary functions. Participant 10 articulated: "AI practice gave me the foundation I needed to focus on human connection during peer activities. Without that foundation, I would have been too worried about grammar to notice my partner's emotions." Participant 17 explained: "The AI helped with technical language and professional formats. Working with classmates helped with emotional intelligence and cultural sensitivity. I needed both to feel ready for real patient care."

4.4 Co-constructing Professional Communication through Peer Mediation

4.4.1 Recognizing the Relational Nature of Care Communication

Through peer interaction experiences, students developed a clearer understanding of care communication as fundamentally relational rather than merely technical. This represents a significant shift from viewing professional communication as information transfer to understanding it as relationship-building essential for therapeutic effectiveness.

Participant 1 described this realization: "When my classmate role-played being worried about her health, I saw real emotion in her face. I understood then that caring for people means connecting with their feelings, not just giving correct information." Focus Group 2 participants collectively explored this: "With AI, we practiced asking questions and giving advice. With real people, we learned that sometimes just showing we understand and care is more important than having perfect English" (Participant 22).

4.4.2 Developing Cultural Sensitivity and Affirming Human Connection

Peer interaction with classmates from diverse backgrounds enabled cultural awareness development that AI alone could not provide. Participant 18 explained this cultural learning: "In my group, we had students from different provinces with different health beliefs and communication styles. When we practiced giving health advice, I learned that I need to respect different ways of understanding wellness, not just translate medical information."

By the intervention's conclusion, students articulated strong commitments to maintaining human connection as central to their future professional practice. Participant 7 stated: "I want to use AI tools to help me communicate better with patients, but I never want technology to replace human caring. People need to feel that someone really understands them as individuals." Participant 9 wrote: "This

experience taught me that technology can make me more competent, but only human connection can make me truly caring. Both matter, but caring matters most for the kind of healthcare professional I want to become."

5. Discussion

The findings reveal three interconnected processes through which students experienced AI-scaffolded transitions in professional communication development. These processes illuminate how digital and human mediation operated in complementary rather than competing ways in supporting career-oriented competency development.

5.1 Theoretical Contributions to Sociocultural Learning Theory

5.1.1 Digital Mediation and Scaffolding Transitions within the ZPD

This study extends sociocultural learning theory by demonstrating how AI agents function as digital mediating tools within learners' ZPD and by revealing the qualitative nature of scaffolding withdrawal in technology-enhanced contexts. Building on Vygotsky's (1978) conceptualization of physical and symbolic instruments, the findings show how AI technologies combine anxiety reduction with structured discourse modeling and immediate feedback. Unlike traditional mediating tools requiring human interpretation, AI agents offered direct, responsive scaffolding that adapted to individual learning pace while maintaining consistent availability.

The study's contribution lies in specifying both the mechanisms and boundaries of digital mediation, as well as reconceptualizing scaffolding withdrawal processes. Students recognized that AI agents could not address emotional resonance, cultural appropriateness, or adaptive communication strategies, illuminating domains where human mediation remains essential. Traditional scaffolding research emphasizes gradual reduction of human support (Wood et al., 1976), but this study shows that withdrawal involves changing the type of support: learners shift from AI-provided language scaffolds to peer-provided interactional scaffolds, requiring them to redefine professional competence.

Students experienced the AI-to-peer transition as a developmental threshold that pushed them beyond rule-based discourse toward adaptive, culturally sensitive communication. This finding extends Meyer and Land's (2003) threshold concepts theory into sociocultural contexts, suggesting that effective scaffolding withdrawal in digital contexts requires explicit support for the handover from technological to human mediation rather than assuming automatic transfer.

5.1.2 Professional Identity Co-construction through Peer Mediation

The study reveals how peer-mediated interaction enables co-construction of professional communication competencies that expert instruction alone cannot provide. Students' discovery of care communication as fundamentally relational emerged through authentic peer experiences that revealed emotional and cultural dimensions of professional competence. This finding extends understanding of how professional identity formation occurs through collaborative meaning-making rather than skill acquisition.

Intercultural peer interaction facilitated cultural sensitivity development that neither AI mediation nor instructor-led instruction could address. This highlights the irreplaceable role of human diversity in professional communication development, particularly for competencies requiring cultural adaptation and emotional intelligence.

5.2 AI-to-Peer Transitions as Professional Learning Thresholds

The identification of AI-to-peer transitions as developmental thresholds contributes to understanding professional competence development in technology-enhanced contexts. The transitions were transformative (altering students' understanding of professional communication), irreversible (students could not return to purely technical views), and integrative (requiring synthesis of technical and interpersonal dimensions).

This challenges linear skill development models in ESP literature by demonstrating that professional communication involves qualitative shifts in understanding rather than additive skill accumulation. Students' progression from viewing professional communication as information transfer to understanding it as relationship-building reflects fundamental changes in professional self-concept through experiential contrast between different mediation forms.

The research contributes to threshold concepts theory by identifying technology-mediated transitions as sites of potential threshold learning, with implications for professional education design that should anticipate and support threshold experiences rather than treating them as implementation challenges.

5.3 Limitations and Future Directions

Several limitations constrain these findings' transferability. The focus on Chinese students in health and wellness care programs limits generalizability to other cultural contexts and professional fields. The 16-week intervention provides limited insight into long-term professional development and workplace transfer. The researcher's dual role as instructor may have influenced responses despite ethical safeguards.

Future research should examine how AI-to-peer transitions function across different professional contexts and cultural settings. Longitudinal studies following students into workplace practice would provide crucial evidence about the long-term effectiveness of AI-scaffolded communication training. As AI technologies evolve, ongoing investigation will be essential for understanding how to preserve interpersonal authenticity while leveraging technological capabilities in professional education.

The study's theoretical contributions provide a foundation for continued research into how technology can enhance rather than replace human-centered professional preparation, particularly in care-oriented fields where empathy and cultural sensitivity remain fundamentally human competencies.

6. Conclusion

This study examined how vocational undergraduates experienced AI-scaffolded transitions in developing professional communication competencies for care-oriented careers. Grounded in sociocultural learning theory, the research revealed how AI agents functioned as digital mediating tools

within students' zones of proximal development while highlighting the irreplaceable role of peer interaction in developing empathetic communication competencies essential for care provision. The study makes three theoretical contributions: extending understanding of digital mediation within the ZPD, reconceptualizing scaffolding withdrawal as qualitative transitions between mediation forms, and illuminating how professional identity formation occurs through peer-mediated co-construction of relational competencies that technology alone cannot provide.

The findings challenge replacement models of AI integration by demonstrating that effective technology-enhanced professional education requires complementary rather than competing mediation functions. Students recognized AI's value for building foundational competencies while affirming human connection as central to care-oriented practice. For educational practice, the research provides evidence for sequential AI-to-peer progressions that explicitly support learning transitions, offering a framework for making College English instruction more career-relevant while preserving interpersonal authenticity. The study contributes to broader discussions about AI's role in human-centered professional preparation, suggesting that the future lies not in choosing between technological and human instruction, but in understanding how to leverage the unique affordances of both mediation forms while maintaining the balance between technical competence and authentic human connection essential for care-oriented careers.

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