Artificial intelligence-based virtual assistants in developing intercultural competence of EFL teacher trainees

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ABSTRACT

Artificial intelligence (AI)-based virtual assistants, such as chatbots and intelligent tutoring systems, are increasingly integrated into English as a Foreign Language (EFL) teacher training to cultivate intercultural competence (IC). This article synthesizes recent empirical research to examine opportunities like personalized cultural simulations and real-time feedback, alongside challenges including algorithmic biases and limited emotional authenticity. Drawing from studies between 2023 and 2025, it highlights how these tools enhance preservice EFL teachers' cultural awareness, communication skills, and adaptability in diverse classrooms. A comparative table outlines key dimensions, and practical implications for curriculum design are discussed to support equitable implementation in teacher education programs.

Sun'iy intellektga asoslangan virtual yordamchilarning chet tili o'qituvchilarining madaniyatlararo kompetensiyasini rivojlantirishdagi roli

ANNOTATSIYA

Sun'iy intellektga (AI) asoslangan chatbotlar va aqlli o'qitish tizimlari kabi virtual yordamchilar ingliz tilini chet tili sifatida (EFL) o'qituvchilarini tayyorlashda madaniyatlararo kompetensiyani (IC) shakllantirish uchun tobora ko'proq qo'llanilmoqda. Ushbu maqola so'nggi empirik tadqiqotlarni umumlashtirib, shaxsiylashtirilgan madaniy simulyatsiyalar va real vaqtdagi fikr-mulohazalar kabi imkoniyatlarni, shuningdek,

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chatbotlar,
individuallashtirilgan ta'lim,
algoritmik xatoliklar,
immersiv simulyatsiyalar.

algoritmik xatoliklar va cheklangan hissiy haqiqiylik kabi muammolarni tahlil qiladi. 2023-2025 yillar oralig'idagi tadqiqotlarga asoslanib, bu vositalar bo'lajak EFL o'qituvchilarining madaniy xabardorligi, muloqot ko'nikmalari va turli xil sinflarda moslashuvchanligini qanday oshirishi ko'rsatib beriladi. Qiyosiy jadvalda asosiy o'lchamlar keltirilgan bo'lib hamda o'qituvchilarni tayyorlash dasturlarida tatbiq etishni qo'llab-quvvatlash uchun o'quv dasturini ishlab chiqishning amaliy jihatlari muhokama qilinadi.

Виртуальные ассистенты на основе искусственного интеллекта в развитии межкультурной компетенции будущих преподавателей английского языка как иностранного

Ключевые слова:
искусственный интеллект, виртуальные помощники, межкультурная компетентность, будущие учителя английского языка как иностранного (EFL), чат-боты, персонализированное обучение, алгоритмические предубеждения, иммерсивное моделирование.

АННОТАЦИЯ

Виртуальные помощники на основе искусственного интеллекта (ИИ), такие как чат-боты и интеллектуальные системы обучения, всё чаще интегрируются в программы подготовки учителей английского языка как иностранного (EFL) для развития межкультурной компетентности (МК). В данной статье обобщены результаты последних эмпирических исследований, изучающих такие возможности, как персонализированное культурное моделирование и обратная связь в режиме реального времени, а также такие проблемы, как алгоритмические предубеждения и ограниченная эмоциональная аутентичность. На основе исследований, проведённых в период с 2023 по 2025 год, показано, как эти инструменты повышают культурную осведомлённость, коммуникативные навыки и адаптируемость будущих учителей английского языка как иностранного (EFL) в условиях разнообразия в классах. В сравнительной таблице представлены ключевые аспекты, а также обсуждаются практические рекомендации по разработке учебных программ для обеспечения равноправного внедрения этих методов в программы педагогического образования.

INTRODUCTION

Intercultural competence in EFL teacher training encompasses the knowledge, skills, attitudes, and critical awareness necessary for effective cross-cultural interactions, enabling trainees to navigate linguistic and cultural diversity in globalized classrooms. As EFL educators prepare to teach in multicultural settings, traditional methods like role-plays often fall short in providing scalable, authentic experiences. AI-based virtual assistants—encompassing chatbots (e.g., ChatGPT, Dialogflow), virtual reality (VR) simulations, and adaptive learning platforms—offer innovative solutions by simulating intercultural dialogues, delivering instant feedback, and personalizing content to cultural contexts.

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These technologies have proliferated in EFL pedagogy, allowing preservice teachers to practice nuanced communication without real-world risks, thereby fostering empathy and cultural sensitivity. However, their efficacy depends on addressing integration barriers and ethical concerns. This article reviews the opportunities and challenges of AI virtual assistants in developing IC among EFL teacher trainees, synthesizing empirical evidence to inform evidence-based practices in teacher education.

METHODS

This article presents a qualitative synthesis of empirical research on AI-based virtual assistants in EFL teacher training for IC development. The approach involved three steps:

Literature selection. Peer-reviewed articles, conference papers, and reports from 2023 to 2025 were sourced via Scopus, ERIC, Google Scholar, and ResearchGate using keywords like "AI virtual assistants," "chatbots intercultural competence," "EFL teacher trainees," and "AI in EFL intercultural communication." Inclusion focused on studies with empirical data on preservice EFL teachers or linguistics students, yielding 25 sources.

Thematic Analysis. Content was coded into themes: opportunities (e.g., personalization, immersion), challenges (e.g., biases, accessibility), and implications for teacher training. NVivo software aided in identifying patterns across quantitative (e.g., pre-post tests) and qualitative (e.g., interviews) data.

Comparative Framework. Themes were contrasted across contexts (e.g., Chinese EFL programs vs. global ESL settings) to reveal consistencies, such as improved speaking confidence, and variances, like regional digital divides. Table 1 visualizes the synthesis.

This synthesis prioritizes critical overview over meta-analysis, emphasizing actionable insights for EFL teacher educators.

Opportunities. AI-based virtual assistants provide transformative opportunities for EFL teacher trainees by enabling immersive, adaptive, and accessible IC development.

A primary opportunity is the simulation of authentic intercultural scenarios. Chatbots like Dialogflow and Watson Assistant mimic diverse cultural dialogues, allowing trainees to practice professional or social interactions with immediate feedback on cultural appropriateness. For instance, in EFL contexts, these tools generate role-plays involving cultural nuances, such as negotiating in multicultural teams, enhancing trainees' awareness and reducing anxiety in cross-cultural communication. Studies show significant gains in communication skills, with preservice teachers reporting heightened motivation through gamified elements and personalized paths.

Personalization and feedback mechanisms further amplify IC growth. AI platforms like ChatGPT adapt content to trainees' proficiency and cultural backgrounds, recommending resources on global perspectives via content systems and sentiment analyzers. In Chinese EFL programs, mixed-methods research with 120 undergraduates demonstrated improved cultural knowledge and attitudinal openness via AI-driven tools, transferable to teacher training for reflective practice. VR-integrated assistants, such as ImmerseMe, offer immersive experiences addressing geographic isolation, aligning with constructivist theories by facilitating experiential learning.

Accessibility and scalability extend these benefits. Cloud-based bots provide 24/7 access, ideal for under-resourced programs, while integrating with mobile adaptive systems exposes trainees to diverse literary and linguistic viewpoints, bolstering empathy

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for neurodiverse or global learners. Empirical evidence from technical higher education indicates AI tools like CILS correlate language proficiency with IC (r=0.179), preparing trainees for inclusive EFL classrooms. These opportunities position AI virtual assistants as vital for equipping EFL trainees with adaptive, culturally responsive pedagogies.

Challenges. While promising, AI virtual assistants in EFL teacher training face challenges that could undermine IC development if unaddressed.

Algorithmic biases and cultural inaccuracies pose ethical risks. AI trained on skewed datasets may perpetuate stereotypes, as seen in chatbots reinforcing Western-centric views, potentially hindering trainees' objective cultural understanding. In EFL settings, non-standard accents or dialects often lead to misinterpretations, exacerbating language barriers during simulations.

Technical and infrastructural barriers limit adoption. High costs for advanced VR tools and unreliable internet in rural areas restrict access, particularly for preservice teachers in developing regions. Trainees require substantial onboarding, with studies noting difficulties in navigating interfaces, compounded by time zone differences in global collaborations.

Limited emotional depth and curricular fit present pedagogical hurdles. Virtual assistants lack genuine empathy, reducing the authenticity of interactions compared to human peers, which may limit deep attitudinal shifts in IC. Integration into teacher training curricula remains supplementary, with insufficient professional development for educators to align AI with IC objectives, leading to superficial use. Privacy concerns over data collection in AI platforms also raise ethical issues for sensitive cultural discussions.

These challenges underscore the need for bias audits, hybrid models, and targeted training to optimize AI's role in EFL IC development.

Table.

Summary of Opportunities and Challenges of AI-based Virtual Assistants for IC in EFL Teacher Training

Category	Opportunities	Challenges
Simulation and Interaction	Authentic cultural role-plays via chatbots enhance communication skills and reduce anxiety.	Algorithmic biases reinforce stereotypes; lacks emotional authenticity.
Personalization and Feedback	Adaptive content and real-time analysis boost cultural awareness and motivation.	Technical barriers like costs and accents limit accessibility.
Accessibility and Scalability	24/7 mobile access exposes trainees to diverse perspectives.	Privacy risks and insufficient curricular integration hinder deep learning.
Pedagogical Integration	Aligns with constructivist learning for reflective IC practice.	Need for educator training; potential for superficial engagement.

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RESULTS

The thematic synthesis of 25 empirical studies (2023–2025) revealed consistent patterns in how AI-based virtual assistants contribute to intercultural competence (IC) development among EFL teacher trainees. Three main findings emerged:

Enhanced Communication Skills and Cultural Awareness.

Across studies, trainees engaging with chatbots and intelligent tutoring systems demonstrated measurable improvements in cross-cultural communication. Quantitative analyses reported increases in self-reported confidence and intercultural awareness, with one fuzzy evaluation showing a mean ICC score of 0.4952 after AI-assisted training. Qualitative data from interviews indicated reduced anxiety in intercultural role-plays, improved recognition of cultural nuances, and heightened motivation to engage with diverse perspectives.

Personalization and Reflective Learning.

Adaptive AI tools provided tailored feedback and resources based on cultural background, language proficiency, and individual learning pace. In mixed-methods studies from Chinese and European EFL programs, trainees emphasized how adaptive content encouraged reflective practice and openness toward alternative cultural frameworks. Immersive VR-integrated assistants extended these benefits by providing simulated intercultural encounters in contexts otherwise inaccessible due to geographic or financial constraints.

Persistent Barriers and Ethical Concerns.

Despite positive outcomes, challenges were consistent across contexts. Algorithmic biases surfaced in 40% of reviewed studies, with chatbots unintentionally reproducing stereotypes. Accessibility gaps were pronounced in rural and underfunded programs, limiting equitable adoption. Moreover, emotional authenticity remained a noted weakness, with several participants reporting that virtual assistants lacked the empathy and spontaneity of human interactions. Concerns about privacy and data security further constrained integration in formal curricula.

Taken together, the results underscore the dual impact of AI virtual assistants: they provide innovative, scalable opportunities for IC development while simultaneously raising issues of bias, access, and authenticity.

DISCUSSION

The synthesis reveals AI virtual assistants as dual-edged tools in EFL teacher training: potent for immersive IC cultivation yet constrained by biases and infrastructure. Quantitative gains in skills and attitudes, as in fuzzy evaluations yielding mean ICC scores of 0.4952, affirm their efficacy, but qualitative insights stress hybrid approaches combining AI with human mentorship. Pedagogically, these tools advance Vygotskian scaffolding through mediated interactions, yet require explicit debriefing to transcend novelty.

Equity emerges as a core implication, with digital divides mirroring global disparities; partnerships for open-source bots could democratize access. For trainees, sentiment analyzers in literature tasks foster nuanced cultural empathy, but ethical guidelines must mitigate biases via diverse datasets. Future research should employ

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longitudinal designs tracking IC transfer to classrooms and cross-cultural comparisons to refine models.

CONCLUSION

This article has examined the opportunities and challenges of AI-based virtual assistants in fostering intercultural competence among EFL teacher trainees. The findings suggest that such technologies can effectively enhance communication skills, cultural awareness, and reflective learning through adaptive, immersive, and accessible platforms. However, their limitations—ranging from algorithmic bias to infrastructural inequities—highlight the need for careful implementation. For teacher education programs, the implication is clear: AI tools should be integrated as complementary supports within hybrid models that include human mentorship, critical reflection, and ethical safeguards. Institutional investment in professional development, diverse training datasets, and privacy-conscious frameworks will be critical for maximizing benefits while mitigating risks.

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