Leveraging Generative AI for Culturally Responsive Teaching: A Shift in Educator Planning and Practice

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Abstract: This paper explores AI-driven prompting approaches to foster inclusive, equitable, and culturally sustaining learning environments. Using a macro-to-contextualized culturally responsive micro-prompt AI continuum, educators can align materials with students' cultural identities, linguistic backgrounds, and learning needs. A mixed-methods study of 292 educators across two Canadian provinces highlights how AI-enhanced culturally responsive teaching (CRT) promotes equity, cultural identity, and inclusive knowledge access. The proposed framework offers AI-driven strategies for curriculum design, lesson planning, assessment, and professional development, transforming pedagogy, enhancing AI literacy, and empowering educators to prepare diverse modern learners for the unknown future.

Keywords: Generative AI, Culturally Responsive Teaching, Culturally Responsive Pedagogy, AI Prompting (Continuum), Educational Equity, Teacher Professional Development

Introduction

The rapid evolution of AI presents opportunities to enhance culturally responsive teaching. As education adapts to globalization, educators must address the increasing need to create inclusive learning environments and innovative and experiential educational materials and lessons that recognize students cultural and linguistic backgrounds and individualized needs. The need for culturally responsive and sustaining pedagogies in education has never been more urgent, particularly as the COVID-19 pandemic revealed deep inequalities that disproportionately affected marginalized students and widened existing achievement gaps (Acquah & Szelei, 2020). As educators navigate this interconnected world of changing power structures and dynamics, particularly recently in North America, they have an even more imperative moral obligation to address these disparities by creating learning environments that foster belonging, value diversity, and enable all students to learn to their fullest potential.

Culturally responsive teaching fosters equity in education by acknowledging students' identities and embedding them within instructional design (Paris & Alim, 2017). Yet educators often face time and resource constraints in designing lessons that honour these cultural diversities or lack the experience and knowledge on how to effectively utilize culturally responsive pedagogies in their practice. Generative AI offers solutions in helping educators design culturally responsive lessons more efficiently, particularly when AI-driven prompting is applied through a culturally responsive lens. Such practices enable the customization and personalization of lessons and educational materials that reflect students' lived experiences. Research by Ober et al. (2023) indicates that AI-driven tools embedded in CRT frameworks can lead to more inclusive educational systems that prioritize diversity and equity. Therefore, by utilizing tailored prompts to align content with students' cultural background, educators can uphold culturally responsive teaching principles (Rane et al., 2023). However, AI's ethical considerations necessitate critical engagement to mitigate biases that may perpetuate inequitable learning conditions. This paper

Literature Review

Generative AI has the potential to support culturally responsive pedagogies (CRP) in significant ways. Through an AI-prompting continuum that spans from broad (macro-prompts) to specific and contextualized (micro-prompts), educators are provided with structured flexibility for designing culturally relevant curriculum (Ewart & Rutherford, 2025). This continuum, informed by equity, diversity, inclusion, decolonization, and anti-racism frameworks, empowers educators to create lessons, assessments, and learning activities that resonate with diverse student identities (Zhang, 2024).

Generative AI's Role in Culturally Responsive Pedagogy

The relevance of AI in education has been increasingly recognized, with studies highlighting its potential to transform teaching practices and support diverse educational needs (Mustafa et al., 2024). AI literacy and prompt engineering are critical components in this transformation, enabling educators to design personalized learning experiences that are culturally relevant and inclusive (Walter, 2024). The integration of AI in culturally responsive pedagogy not only enhances the effectiveness of teaching strategies but also addresses the unique backgrounds, needs, and interests of diverse student populations (Hernandez & Patel, 2024). But, the use of AI in education must be approached with a critical lens to ensure that it does not perpetuate existing biases or inequalities. As Chen et al. (2025) argue, AI for social good education through a culturally responsive pedagogy can help address these concerns while maximizing the benefits of AI integration. Additionally, Donley (2024) highlights the potential of AI tools like ChatGPT as linguistically responsive tools for multilingual learners, further emphasizing the importance of culturally responsive AI implementation.

Designing Lessons with Macro-to-Micro AI Prompting Strategies

Macro-prompts, if engineered mindfully, can address universal themes such as cultural appreciation, equity, and diversity, while micro-prompts tailor instructional elements to the unique socio-emotional, cultural, and linguistic contexts of individual students. For example, Nyaaba et al. (2024) demonstrate how generative AI tools equipped with such prompts can adapt to various educational environments, thus reflecting students' multifaceted identities more accurately in lesson design. Furthermore, generative AI can act as a collaborative partner for educators, producing multimodal resources that amplify culturally relevant material. Nanduri (2024) highlights AI's role as a co-creator, contributing to instructional materials that resonate with students' lived experiences. For example, a lesson on "community and identity" could use macro-prompts to set a thematic framework, while micro-prompts would adapt the theme to specific student experiences. Students with immigrant backgrounds might share cultural traditions through written reflections, while refugee students might have different perspectives and experiences. Song et al. (2024) argue that this contextualized, inclusive AI design promotes engagement and improves learning outcomes.

Beyond content personalization, AI can enrich lessons with multimodal experiences. For instance, AI could generate interactive simulations of historical events from diverse cultural perspectives or create personalized reading materials with audio support for students with dyslexia. Ober et al. (2023) highlight that AI-driven, culturally responsive learning supports CRT principles by accommodating different learning modalities and developing 21st-century competencies. By embedding culturally responsive frameworks within AI design, educators can ensure that AI-generated content reflects diverse perspectives, reinforcing the values of culturally sustaining pedagogies as advocated by Paris and Alim (2017).

Methodology

This study employs a mixed-methods approach to examine AI's role in culturally responsive teaching-based lesson planning by exploring the impact of AI continuum training on pre-service, in-service, and Faculty of Education educators in designing contextualized, culturally responsive educational activities, lesson plans, and resources. A quasi-experimental pre-and-post design was utilized to measure shifts in AI literacy, confidence, and CRP integration in AI-generated lesson materials.

Participants

A total of 292 educators over a period of 7-months participated in this study, representing two Canadian provinces and 18 school boards, including K-12 teachers and Faculty of Education instructors, Bachelor of Education students, and graduate students from two institutions. Purposive sampling ensured representation across diverse AI experience levels, teaching backgrounds, and subject areas. Informed consent was obtained, and data were anonymized to protect identities. The research framed AI's role within critical digital literacy to ensure transparency, mitigate AI bias, and emphasize educator agency in CRP-integrated AI use.

Data Collection and Analysis

This quasi-experimental pre- and post-study design assessed shifts in AI literacy, confidence, and culturally responsive teaching-aligned lesson planning. Participants completed a pre-survey measuring AI literacy, usage, and perceptions of AI in culturally responsive teaching. They then engaged in structured AI-prompting training through a four-tiered continuum, progressing from macro-prompting to culturally responsive contextualized micro-prompting. Post-survey results were analyzed using paired-sample t-tests to assess changes in AI competency, while qualitative discourse analysis examined AI-generated lesson plans and educators' peer reflections.

Findings

As this study is ongoing, preliminary findings reveal important insights into how AI can support culturally responsive teaching practices.

Pre-and Post-Training Perceptions and Shifts of AI Usage

Pre-training survey results indicate that participants with low AI literacy and limited use with AI, exhibited skepticism regarding AI's role in culturally responsive teaching, expressing concerns about ethical dilemmas, biases, and unintended consequences. Those with prior AI experience viewed it as a potential tool for designing culturally responsive instructional content. Following structured training, participants who originally demonstrated low AI fluency and usage reported on increased confidence in AI's role in lesson design and assessment creation. Many recognized AI's potential to enhance culturally responsive teaching by prompting deeper reflection on bias and cultural inclusivity. Survey data indicated that 92% of educators planned to continue using AI for lesson planning, and 22% noted a heightened awareness of culturally responsive teaching after applying AI-driven structured prompting.

Reflection Responses

Qualitative feedback from peer discussions and reflections highlighted how the structured macro-to-micro prompting AI continuum prompting process, deepened participants' understanding of culturally responsive pedagogy and how to effectively prompt, ideate, and evaluate AI's effectiveness. Many educators reported increased awareness of their own biases and assumptions when designing prompts, emphasizing the importance of intentional AI use. Concerns about algorithmic bias and ethical AI implementation lessened with the increased awareness of ensuring that AI is used in culturally responsive ways yet reinforces the need for ongoing AI literacy development and critical digital pedagogy training. Ultimately, significant results indicate that AI as a tool for CRP lesson design was seen favorably. Additional data analysis and ongoing training are suspected to yield similar findings and will continue with the sustainment of this research.

Discussion and Implications

Findings from the preliminary stage of this study underscore the transformative potential of AI-driven CRP lesson planning. Educators who initially approached AI with skepticism developed confidence in leveraging AI as a scaffolded pedagogical partner. This shift suggests that structured AI training with a focus on culturally responsive pedagogy can significantly impact educators' willingness to integrate AI into their practice. The AI prompting continuum presented in this study offers a practical framework for educators to implement culturally responsive teaching through technology. By progressing from macro-prompting to culturally responsive-contextualized micro-prompting, educators can create instructional materials that are increasingly aligned with students' cultural backgrounds and learning needs. This approach not only enhances the cultural relevance of educational content but also promotes equity by ensuring that all students see themselves reflected in the curriculum. Furthermore, the findings highlight the importance of embedding CRT frameworks within AI tools themselves. When AI is designed with cultural responsiveness in mind, it becomes a more effective partner in creating inclusive educational experiences. The customized generative AI tool used in this study demonstrates how technology can be harnessed to support equity-focused teaching practices.

Equipping Educators with the Skills and Competencies to Implement AI in Culturally Responsive Teaching

To integrate AI effectively into culturally responsive teaching, structured professional development is critical. Training should focus on refining macro-to-micro prompt strategies, fostering collaborative practice within professional learning communities, enhancing ethical AI literacy to mitigate bias, and encouraging hands-on experimentation with AI tools in low-risk environments and equipping educators with the necessary skills and confidence to use these tools effectively is critical. By providing structured, gradual professional learning opportunities, these gaps can be bridged to empower educators to understand AI's capabilities while reinforcing their commitment to equitable education. There are six strategies for professional development in AI-enhanced culturally responsive teaching as a place to start and include:

a) Professional Development on Macro-to-Micro AI Prompting: A foundational step is introducing educators to macro-prompts and gradually advancing to micro-prompts that allow for individual student differentiation. Training workshops can provide teachers with hands-on experience in crafting prompts that range from general themes to contextually specific inquiries aligned with CRT principles.
b) Building AI Competencies Through Collaborative Practice: Collaborative professional learning communities (PLCs) can be instrumental in helping educators share insights, challenges, and best practices related to AI in CRT. By working together, teachers can experiment with AI-generated prompts, co-develop culturally relevant lesson plans, and refine their approach through peer feedback.
c) Designing Customized AI Tools with Built-In CRT Frameworks: Educators can benefit from AI tools that incorporate CRT frameworks, such as the Equity, Diversity, Inclusion, Decolonization, and Anti-Racism (EDIDA) models, directly within their design. These tools could include built-in ethical guidelines, cultural resources, and prompts designed in collaboration with culturally diverse communities, ensuring the AI outputs are grounded in representative perspectives. It is important to note that the frameworks chosen for this study were based on conversations, collaborations, and research; however, still involve some recognized innate biases of the creator. This is why it is imperative to continue to collaborate with marginalized communities and critically evaluate AI's developed outcomes from an ethical and culturally responsive lens. It is critical to recognize their limitations. These tools are not human and operate based on predefined algorithms that may introduce biases, generate inaccurate or misleading information (hallucinations), and lack contextual understanding. Algorithmic bias, in particular, can perpetuate systemic inequalities if not carefully monitored and mitigated. Therefore, continuous evaluation, verification of AI-generated content, and ethical considerations must be prioritized to ensure the responsible use of AI when designing educational resources.
d) Ethics and Reflective Practice Training: Educators should be trained not only in how to use AI tools but also in reflecting on the ethical implications of AI-driven content. Workshops on AI ethics could include topics such as data privacy, data surveillance, cultural biases in AI algorithms, and potential limitations in AI-driven assessments.
e) Encouraging Innovation with Hands-on AI Labs: Setting up hands-on AI labs within schools, districts and Faculties of Education can provide educators with the opportunity to experiment with AI tools in a low-stakes environment. In these labs, educators can trial AI-generated lessons, assessments, and resources, tailoring them to their student demographics.

Ultimately, the implications of this research extend beyond individual classrooms to broader educational policy and practice. As educational institutions increasingly incorporate AI into their systems, there is a need for policies that prioritize cultural responsiveness and equity. Professional development programs should address not only the technical aspects of AI use but also its ethical implications and potential for enhancing culturally responsive teaching.

Conclusion

Generative AI offers a transformative opportunity to integrate CRT into education by enabling teachers to design lessons, assessments, and resources that genuinely reflect their students' cultural and linguistic backgrounds. By employing a CRT-focused AI-prompting continuum, educators can move from broad, generalized approaches to highly personalized, culturally relevant teaching methods that celebrate diversity. These AI-driven tools empower educators to embrace the cultural richness within their classrooms, creating inclusive and culturally supported learning environments. By adopting AI-driven prompting strategies, educators can bring us closer to an educational

system where every student's culture, language, and identity are not only acknowledged but celebrated as assets in the learning process. This shift aligns with national frameworks advocating for equitable education and allows for transformative change in the modern educational landscape.

As this research continues, future studies should explore the longitudinal impacts of AI-supported CRP lesson planning on student engagement, curriculum inclusivity, and professional learning communities. As well, research on the effectiveness of different AI tools and prompting strategies in diverse educational contexts will further enhance our understanding of how best to leverage AI for culturally responsive teaching. By centering equity and cultural responsiveness in the approach to AI implementation, educators can harness its potential to create more inclusive, engaging, and effective learning experiences for all students.

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