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SIMON FRASER UNIVERSITY

Faculty of Education

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SFU EDUCATION GRADUATE STUDENT ASSOCIATION

ABOUT SFU EDUCATIONAL REVIEW JOURNAL

We respectfully acknowledge that at SFU's three campuses, where our journal is edited and distributed, we live, learn and work on the unceded traditional territories of the Coast Salish peoples including the Squamish, Tsleil-Waututh, Musqueam, Semiahmoo, Kwantlen, Katzie, Kwikwetlem, Qayqayt and the Tsawwassen First Nations.

SFU Educational Review Journal is a graduate student run journal at Simon Fraser University and supports diverse scholarship in the field of Education. The journal is fully open access. Published work is licensed under *Creative Commons Attribution-NonCommercial 4.0 International License*. The copyright for content in this journal is retained by the author(s), with first publication rights granted to the *SFU Educational Review*. We practice a double-blinded review process to ensure the highest quality of submissions. All of our issues are published online at www.sfuedreview.org and are publicly accessible. Despite the challenges posed by the pandemic, the journal has published three issues since 2020. Following the graduation of the previous editorial team, a new team has been formed and endeavors to publish two issues annually. The editorial team includes Shaghayegh Bahrami, Jennifer Cummins, Chunhong Liu, Micheal Obakhavbaye, Anna Rumjahn, and Bahar Zandrazavi.

The *SFU Educational Review* published its inaugural first issue in the spring of 2007. Originally, the *SFU Educational Review* followed a traditional academic journal format; however, in 2012, the journal was redesigned in order to make it more welcoming and accessible. *SFU Educational Review*'s mission, revised in 2024, is to advance diverse forms of knowledge by providing a forum of discussion and engagement with current issues in education. Through shared scholarship and research, it aims to contribute to pedagogical practices and intellectual discussions among the SFU Faculty of Education community and beyond.

Ultimately, our goals are to:

1. Support intellectual and academic freedom by publishing a diverse range of scholarship with regards to content and format.
2. Support graduate students and emerging scholars to find their academic voice and develop as scholars.
3. Engage SFU's Faculty of Education's community with other scholarly communities to enrich its multiplicity.
4. Re-establish editorial processes to align with the journal goals #1-3.

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LETTER FROM THE EDITORS

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Introduction

Dear SFU Educational Review readers,

Welcome to our 2024 issue of SFU Educational Review, marking the continued efforts to promote educational scholarship under a new editorial team. This issue reflects a pivotal moment for the journal as it is the first one coordinated by our editorial members who are deeply committed to fostering critical dialogues that challenge and transform the realm of educational research and publishing. It is an honour to have engaged in the process of co-creating a product that we are proud to share with the Simon Fraser University community and beyond.

Recently, our editorial team engaged in an extensive discussion centered around the themes of decolonization in education and the progression of research publishing. These conversations have greatly influenced the direction of SFU Educational Review and our future objectives. In academic settings, the focus of academic publishing often remains on the technical aspects of writing with the aim of helping emerging researchers to publish more. Yet, we argue that it is essential to first ponder foundational questions: Why do we write? For whom? And what values influence our writing? Driven by the insights that emerged from our recent editorial discussions, this issue tackles these questions through the lens of de/colonization in knowledge-making. We seek to explore how academic writing and publishing can be approached differently to promote a decolonizing agenda in the field of education research. Decolonizing scholarly writing involves the daunting yet crucial task of unlearning dominant individualistic and neoliberal scholarship frameworks, embracing a collective, community-focused approach, and fostering inclusive academic environments.

This editorial proceeds in three parts. First, we explore the concept of de/colonization in academia and discuss the current challenges within the publishing arena. We then present our visions towards healing and justice in academic publishing, which will guide us in incorporating decolonization in our editorial processes, article selection, and overall publication practices. Following the thematic discussions, we provide a snapshot of the articles and works included in this issue. We hope that the articles and discussions featured here will inspire further dialogue and action towards a more equitable and inclusive academic future.

Epistemological Colonization in Publishing

Academic publishing is becoming increasingly commercialized, characterized by several key trends as noted by Fyfe and colleagues (2017). First, the number of research journals is rising, with a sharper focus on specific subdisciplines. Second, the audience for these journals has shifted from primarily individual researchers to institutions that are willing to pay high subscription fees. Third, the academic publishing market has globalized, adopting English as its primary language, with editorial boards and contributors that reflect an international perspective. While marketization and globalization may seem to facilitate the production and dissemination of knowledge, they also transform academia into a competitive marketplace, where research

outputs become commodified. This commercial approach introduces substantial challenges and disparities among researchers, particularly in terms of social, economic, and linguistic equity. Moreover, this trend contributes to epistemological colonization, as it reinforces the dominance of Western perspectives and methodologies in the creation and validation of knowledge (Liu & Arora, 2023). Such a dynamic underscores the need to critically assess how knowledge is produced and circulated in our increasingly interconnected academic world.

In our editorial meeting, several issues emerged that sparked our critical reflection, including: (1) colonization as a one-way imposition, (2) the impact of epistemological racism on knowledge-making, (3) binary and categorical thinking, (4) standardization and exclusion, (5) access and inequity, and (6) metrics-based success. In the context of academic publishing, colonization can manifest as a one-way imposition where Western knowledge, always under the guise of international scholarship, enforces its standards and norms on scholars, particularly those from underrepresented populations, including scholars from the Global South, Indigenous communities, and non-native English speaking backgrounds. As put forward by Chunhong Liu, one of our editors, “the colonial way of doing, thinking, and knowing is directly transferred or applied in an educational context”, which often leads to a homogenization of knowledge and, even worse, the “invalidation” of diverse cultural perspectives and practices (personal communication, October 31, 2024).

Epistemological racism concerns knowledge frameworks that are centered around specific, often Western-centric, viewpoints and rejects other knowledge systems and practices that can be simply labeled non-Western due to their geopolitical situations (Kubota, 2020). These frameworks dominate academic publishing, leading to a narrow understanding of what constitutes “valid” research (Sugiharto, 2023). The egocentric, Western-oriented standard, in editor Micheal Obakhavbaye words, “constitutes epistemology and ways of knowing, and ... it stifles Indigenous ways of knowing. Most of us coming from different parts of the world, and we have our ways of our culture, which actually influences the way we think about reality. That’s our ontology and epistemology” (personal communication, October 31, 2024). However, the current global system of knowledge production, consumption, and dissemination primarily originates from Euro-American academic centers and locations (Canagarajah, 2002). In this case, emerging scholars who incorporate Indigenous knowledge systems or alternative epistemologies may unfortunately find their work undervalued or dismissed.

Meanwhile, academic publishing often falls into binary and categorical thinking—classifying work into rigid categories that reflect a dichotomous view of knowledge (e.g., qualitative versus quantitative, theoretical versus applied). This reflects a reductionist, logocentric view of knowledge that can stifle innovation and overlook the complex, interconnected nature of scholarly inquiry. The binary thinking further regulates how researchers, especially emerging ones, position themselves in a wider scholarly community. As pointed out by editor Bahar Zandrazavi, this means that one can only be “inside or outside” and that “we are in

categorized boxes, and if we don't fit, we don't belong" (personal communication, October 31, 2024).

In more specific terms, the epistemological colonization in publishing operates through mechanisms of standardization, access, and metrics-based evaluation. The standardization in publishing practices involves the one-way communication of requirements and criteria that decide the publishability of one's intellectual creation, such as formatting, language use, and methodological approaches. Such standards often exclude those who may not have access to certain educational resources or who may approach academia differently, such as researchers following Indigenous and art-based understanding of knowledge and reality. This prevents emerging scholars from non-traditional backgrounds or non-English speaking regions from fully participating in the global research community. Access to publishing in leading journals often requires significant resources, including funding for research activities, institutional support for research, and language editing services, which may not be equally available to all scholars. This creates inequity in who can publish and whose voices are heard. Emerging scholars, especially those from less affluent institutions or countries, face considerable barriers, limiting the diversity of research and perspectives in academic literature. The emphasis on metrics such as citation counts, impact factors, and h-index in academic publishing also disproportionately affect emerging scholars. These metrics often favor established researchers and traditional fields of study, making it difficult for new scholars to showcase the impact of their work. Additionally, the pressure to meet these metrics can lead to a focus on quantity over quality and innovation in research output.

Towards Healing and Justice in Publishing

During our discussions of efforts to decolonize academic publishing, we identified several key themes that will guide our way forward: (1) decentering and multiplicity, (2) fostering a diverse ecology, (3) communal healing, (4) emphasis on process over product, and (5) practical strategies.

To counteract the one-way imposition of knowledge in academic publishing, we believe in the value of decentering and multiplicity. This includes not only bringing new voices to the centre but also creating multiple centres or more accurately, de-centring the academic publishing platform. Our journal's commitment to decolonization on this decentred, multiplied platform then, as editor Shaghayegh Bahrami said, would be "making additional ways for understanding the world, for communicating in the world, with the world, within the world" (personal communication, October 31, 2024). We aim to approach academic publishing as developing a network of centers, each as valid as the others, each in connection with the others, and each essential to the existence of the scene on which we interact. In our effort to connect with authors, reviewers, and readers within and beyond SFU, we hope to foster a diverse ecology of scholars and practitioners shaped by the interactions of multiple communities (Lemke, 2000). An ecological view of academic publishing helps us to approach emerging researchers in an

alternative light; for instance, graduate students are seen as legitimate and meaningful contributors to scholarly discussion, avoiding the deficit-based framing of them as merely novice or student researchers.

When envisioning the path to decolonization, our editorial team emphasize the significance of engaging in healing as a communal act which requires “being responsive to our diversity, dialogu-ing across differences, crafting possibilities of solidarity and common agendas” (Bhattacharya, 2019, p. 11). This approach manifests itself in our peer review process which is informed by the ethics of care. In the editorial process, as editor Anna Rumjahn puts it, we recognize that challenging external structures requires cultivating an awareness of the symbiotic relationship between the internal landscape of emotions, perspectives, and responses, and external events. We are committed to undertaking this inner work as we strive to create collective possibilities for the future.

Many of our authors and editors are graduate students and emerging scholars who are actively navigating the continual, dynamic process of un/re/learning. To reflect our goal of communal healing, we place great emphasis on the quality of the process. We seek to intentionally engage in dialogue with authors, reviewers, readers, and our editorial team by asking: How was that process for you? We understand that each individual experiences a unique process depending on who and where they are in their academic and life journey; and we see this as an opportunity to support a sustainable practice.

Complementing the above-mentioned guiding principles, some of our practical strategies moving forward include: (1) promoting the contributions of emerging scholars and practitioners in addition to the works of more established scholars; (2) supporting diversified forms of scholarship in regard to both content and format; and (3) considering the introduction of a new submission format to encourage engagement with published content and foster dialogue between authors and readers.

Overview of Articles

This issue of the SFU Ed Review offers a diverse range of scholarship that highlights the eclectic nature of research in the field of education.

First, through three vignettes, Bridget McClarty brings us into a sense of stillness, emerging us in embodied ways of knowing which can be developed through engagement with more-than-human entities in her piece, “Does Stillness Bring Wisdom?: A Journey Towards Human-Body-Land Intercorporeality”. McClarty uses an artful and reflective writing style to convey the practice of eco-centered slow pedagogy. The writer encourages us to adopt a learner’s mindset when engaging with the more-than-human so that we can learn to listen to the wisdom it offers.

Next, Ana Vojnovic's arts-based paper, "Nowhere In Memoriam", draws readers into the experience of an artist and educator while the writer reflects on a childhood in Belgrade, Serbia, the immigration journey to Canada, and the sense of "ungroundedness" living in present day Vancouver. Using photography, poetry, and experience, Vojnovic uses affective and embodied ways of knowing to evoke emotional responses from readers. Using a unique combination of modes, Vojnovic shares the experience of finding liminal moments of time and place within the urban environment, bridging emotional and visceral connections between past and present.

In "Preparing Anti-Racist Educators Through Critical Transformative Emotional Praxis: A Theory of Change", Tonje Molyneux reviews literature addressing Whiteness and White culture in education, finding that Whiteness is particularly pervasive in teacher education programs. Molyneux emphasizes the damage that Whiteness, white supremacy, and systemic racism can have on students, pre-service teachers, and teacher educators. To enact change, Molyneux combines transformative learning and critical emotional praxis to present an original framework: "Theory of Change for Critical Transformative Emotional Praxis in Teacher Education".

In Gobeil et al.'s paper, "Investigation of Experiential Learning Practices in K-12 Education", the authors identify a critical gap in the literature regarding Experiential Learning in K-12 settings. Gobeil et al. find that assessment practices in general are rarely studied in the field of Experiential Learning, and more importantly, no current studies exist that delve into assessment practices related to Experiential Learning in K-12 settings. The authors argue that studying assessment practices for Experiential Learning in K-12 settings will improve student outcomes, thereby encouraging future research in this area.

Cris Barabas then introduces us to new and liberating conceptual propositions in the field of youth critical literacy in the literature review "Researching Literacy with (Marginalized) Young People: Some Conceptual Propositions from the Literature". Drawing on the exciting diversity of research in this area, Barabas highlights three emerging themes within the field: *ecological and sociomaterial orientations of literacy studies*, *transborder literacies*, and *literacies as public medium for communal desirings and resisting*. By consolidating the literature into these themes, Barabas points researchers in new directions to widen the scope of research in youth critical literacy practices.

Following Barabas, Tsoghik Grigoryan's piece, "Tutorial Booking and Tracking Application Interactivity: A Multimodal Social Semiotic Analysis Framework", introduces us to *Multimodal Social Semiotics Theory* to frame understandings of human-digital interaction through a sociocultural lens. The author applies theories of Multimodal Social Semiotics in an investigation of 'ASP tutTrak', an online tutorial booking and tracking application. Through this investigation, Grigoryan offers insights into how users make meaning when interacting with

digital platforms, and the interplay of social, cultural, and contextual factors during human-digital platform interactions. Grigoryan's findings emphasize the importance of considering user engagement through sociocultural and multimodal lenses in Educational Technology development.

Finally, Malik et al. conclude the issue with their piece, "A Thematic Literature Review of Decolonization and Abolitionist Approaches in Computing Education". Throughout their review, the authors focus on how to bring critical, culturally responsive, decolonial, and abolitionist pedagogies into the curriculum of Computing Science classrooms, both in secondary and post-secondary contexts. Malik et al. find that although there are numerous promising practices in this area, large gaps still exist in normalizing anti-oppressive approaches in the field of Computing Science education. This leads to a call for better integration of critical, culturally responsive, decolonial, and abolitionist pedagogies in Computing Science education to embed themes of justice and equity in the work of Computing Science educators.

Concluding Thoughts

Building on a seventeen-year legacy, this issue of the SFU Educational Review embodies the beginning of our new editorial team's commitment to challenging dominant academic publishing frameworks and amplifying emerging voices. The diverse contributions featured in this issue reflect the richness of perspectives and methodologies that drive educational research forward. From embodied eco-pedagogy to arts-based inquiry, critical reviews of literature and empirical studies, these works inspire reflection and action across varied educational contexts.

As we move forward, we aim to remain dedicated to cultivating a platform that not only showcases scholarship but also serves as a space for dialogue, communal healing, and collaborative growth. By embracing a process-oriented approach, we hope to advance a vision of academic publishing that prioritizes epistemic justice, multiplicity, and an ethics of care. Submissions are welcomed on an ongoing basis through our website, and we encourage you to share your thoughts on this issue via our contact page. We invite readers to engage with the articles presented here, carry forward the conversations they spark, and join us in imagining and enacting a more inclusive academic future.

With gratitude and sincere spirits,

The Editorial Team

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**WORKS OF ART AND OTHER ACADEMIC
PIECES**

NOWHERE IN MEMORIAM

ANA VOJNOVIC

Simon Fraser University

Abstract

Disruptive shifts within the fabric of the Vancouver's urban environment evoke a feeling of 'futility of place' and are indicative of current socio-economic climate. At the same time, this feeling embodies a morbid similarity with my personal experience of the bombing of Belgrade, 1999, and feelings of being dislocated and dismembered. Both cities, so distinct and remote from one another, have been violated by power which brought about the displacement of local communities and livelihoods. This state of impermanence of certain urban spaces in Vancouver evokes an abiding sense of ungroundedness and a circular re-activation of historical memory, my present experience and the emotional connection between the two. I work with photography and poetry, as a personal and intimate narrative, to holistically reconstitute my lived experience across time and two cultures. The resulting work, my 'experiential reportage', becomes an ethereal emotional bridge to a remote part of myself and an emblematic, psychological portrait of the city's transitional state.

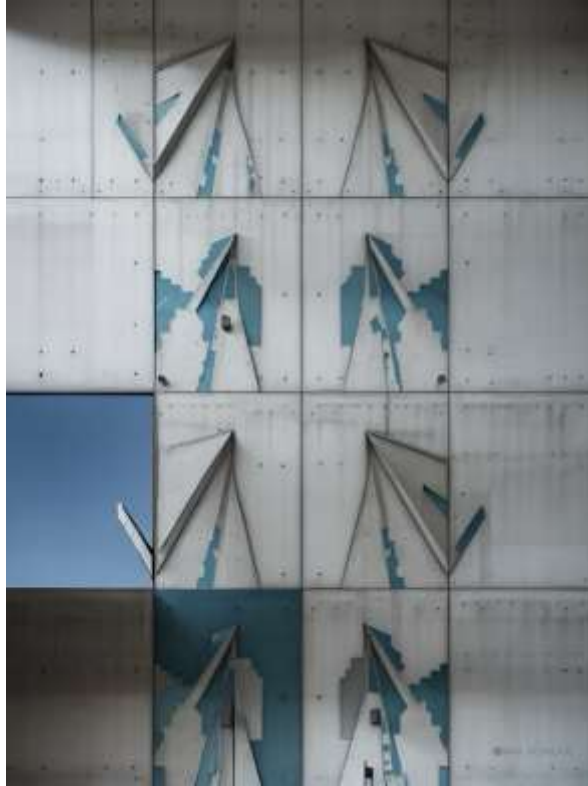
Keywords: experiential reportage, futility of place, photography, poetry, memory

The present contains nothing more than the past, and what is found in the effect was already in the cause. —Henri Bergson



In Memoriam: The Ambiguity of Relation, Without-Within (Vancouver, 2024)

Contemplating my artistic practice as an expansive self-exploration, I am prompted to think about how a deep immersion in subjectivity and sensibility directly generates possibilities for curriculum and diverse pedagogical approaches. In other words, to know what is germane and meaningful to me is to know who and how to be as an educator.



In Memoriam: Re-membering the Self (Vancouver, 2024)



In Memoriam: Walls are Not Walls (Vancouver, 2024)

The streets of Belgrade bathed in summer warmth – my forever remembered and secretly resented June of 1999. Streets dislocated, buildings dismembered, the strange assemblage of walls, fractured and juxtaposed planes, cold air and absence of light. A psyche in disarray. The sounds of the bombs still crisp and vibrating in the membrane of the city.

Growing up in Belgrade, Serbia, my childhood was shaped by the physical and ambient character of the city itself. I had an innate sense of being held and grounded by the energy of this locale, the architecture and its unique aesthetic atmosphere – all of which signify a deep collective memory and culture.

In 1999 my sense of place and my life as I lived it was suddenly and irrevocably shattered. All that I knew of my safe and settled connection to this urban place was violently rearranged and dismembered; the spaces and the feel of the city chaotically disarrayed.

Long after immigrating and acclimatizing to my life in Vancouver, there remains an abiding sense of ungroundedness. Witnessing the disruptive, rapid demolition and construction within the fabric of the urban environment reawakens vivid memories of the events in Belgrade, 1999.

These two cities so distinct and remote from one another, embody a strange and somewhat morbid similarity: both have been violated by power, one in the name of ‘peace’ and the other on the pretext of ‘modernization’.

Whereas Belgrade, a vibrant and peaceful city was bombed and demolished by NATO in the name of social and political stability, Vancouver is besieged by capitalistic land developers who, encouraged by city politicians, undertake a program of urban renewal which involves widespread demolition and disruption of existing communities.

The impermanence of certain urban spaces in Vancouver evokes a feeling of ‘futility of place’ and a loss of meaningful continuity with the past. The shock of demolition, the physical voids ripped into the edifice of the city and the irruption of swarming construction sites, indicate the displacement of persons, homes and livelihoods. Successive generations of ‘developers’, abetted by city planners, have absurdly obliterated the places where existing structures, environments and local communities have *actually developed*. The irony of the developers’ logic is that it demolishes and erases to create anew the promise of community and meaningful locales.

As a response to these conditions an artistic practice has organically emerged. Photography has allowed me to re-envision and re-member fragments, impressions and residual memories germane to my experience of life across two cultures.

I conceive of my work as experiential reportage, a purposeful meandering with the camera as a sensor that captures and collects the imagery of the urban environment. It is a disciplined, repeated engagement of looking and photographing that serves as a way of discovering parts of myself that are hidden; seeking out an experience of physical conditions with the intention to re-catalyze dormant memories and latent emotions.

My *reportage* is, in the strict etymological sense, to ‘make known and carry back’ (i.e. return to consciousness) what I have experienced, felt and still hold in my body’s memory. This process is a circular re-activation of historical memory, my present experience and the emotional connection between the two. The resulting images become an emblematic, psychological portrait of the total situation.

As I witness and photograph Vancouver, I actively re-imagine through an emotional lens my feeling of the city and its disappearing elements. There is a strange curiosity compelling me to capture these transitional states. I use my images and poetry to construct an ethereal emotional bridge across time to a remote part of myself, as I creatively explore my relationship to the urban environment.

nowhere

*mourning the loss
of thousand voices fading
flow within
thousand offerings
never to remain*

*mourning the loss
of time grasping
witnessing the remnants
mourning the loss
of un-known resonance my longing
breath at the doorway
of thousand returns
nowhere*



In Memoriam: Nowhere (Vancouver, 2024)

The nexus of architecture in transition, buildings in demolition and the disruption of atmospheres is a compelling and illusive subject. It is at once abstract, intuitively engaging, viscerally felt and aesthetically complex. As a personal and intimate narrative, my goal is to capture this transitional subject with a multiplicity of images. In contrast to post-war French street photography, where a “decisive moment” (Cartier-Bresson et al., 1952) occurs between the photographer, place and the subject resulting in a complex and iconic photograph, I am primarily guided by a sense of anxiety about the limitation of what the camera can record. My ‘indecisive moment’ is a visual inquiry that is sceptical of the singular image. I photograph a particular urban scene repeatedly, and as my attention modifies the framing, the light and the focus, salient details will advance or recede. The suite of images become a record of my augmented perception within a concentrated window of time. These photographs are the catalyst which re-activates dormant memories enabling me to holistically reconstitute my lived experience across time and two cultures.



In Memoriam: Topography of Healing (Vancouver, 2024)

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ARTICLES

DOES STILLNESS BRING WISDOM?: A JOURNEY TOWARDS HUMAN-BODY-LAND INTERCORPOREALITY

BRIDGET MCCLARTY

University of British Columbia

Abstract

Three vignettes illustrate my journey towards human-body-land intercorporeality. More-than-human beings have guided me for decades, as both teacher and student. Re-engaging with intercorporeality through eco-centric, slow pedagogical practices fosters enduring learning, connecting the body, emotions, intellect, and spirit to the more-than-human world in a pursuit of stillness and peace.

Keywords: intercorporeality, slow pedagogy, embodied learning, awe, connection

Spending my childhood playing in the forest and snow molded who I am, shaped the lens through which I see the world, and guided my choices in life. I endeavour to spend time daily in the natural world, and to help others establish their connection with the more-than-human world. Re-engaging with intercorporeality through eco-centric, slow pedagogical practices fosters enduring learning, connecting the body, emotions, intellect, and spirit to the more-than-human world in a pursuit of stillness and peace.

As a child, I spent much of my time building forts and creating snow sculptures. At school, I would sneak away at lunchtime with a few of my friends; our place was secret, and we felt free, playing among ancient trees. At home, we had a treed space in our backyard, and beyond these trees were *the Woods*. Potawatomi botanist and educator, Robin Wall Kimmerer (2013), refers to the “grammar of animacy” (p. 48), which refers to showing respect and kinship for more-than-humans through the use of pronouns and capitalized names. The Woods were a constant in my life; I could always return there. Experiences in the Woods shaped me as a child, allowing me to feel nurtured and connected through body, mind, and spirit. My childhood involved being in the Woods and in Snow—often alone—spending hours building, creating, learning, and being. Cedar and Hemlock towered over me, protecting me from the snow, the rain, and the sun. My tree friends buffered and muffled the judgements, the expectations, the voices of the world. I could imagine and create while feeling peaceful and still.

My chosen path allowed me to work outside, and it was through this work that I learned to move my body through vast landscapes. My first career allowed me to follow animals through coral reefs, over mountain passes, and on frozen rivers. Later, I taught others how to move their bodies through these landscapes thoughtfully and efficiently, while remaining attentive to their own corporeal needs.

Through my outdoor work, I discovered that I loved adventuring outdoors during my leisure time, and my expeditions became longer, more remote, more adventurous. Over time, my trips became focused on external achievements, not internal peace. Mountain travel requires full-body, bilateral stimulation for uninterrupted periods of time, bringing me not into a state of flow, but rather into a state of mental stillness. When my mind and body become synchronized, my mind is present and empty. Only then, am I fully in my body.

Years ago, I had the opportunity to join a month-long ski traverse through the Coast Mountains, a major part of the Pacific Coast Ranges located in British Columbia, Canada. For the first ten days, I slogged through the snow, step by step, pulling a sled and hauling a backpack. I was slow, unfit, and often afraid. Tibetan Buddhists chant the mantra *Om Mani Padme Hum* to invoke the universe’s benevolence for safe travels in the mountains (Matthiessen, 1978); I tried channelling courage as I murmured my mantra in time with my movement:

Om, Mani, Padme, Hum

I found my rhythm in the glide, shift, glide, shift, glide

Skis moving on the snow. Om, Mani, Padme, Hum

My world became snow, sky, weather, wind

Food, sleep, glide, shift, glide, shift

Om, Mani, Padme, Hum, Ski, eat, sleep, repeat, Om, Mani, Padme, Hum.

Figure 1. *Traveling through the Coast Mountain Range.*



Finally, on the twenty-seventh day, the end was near; tomorrow, I would leave the trip. It was a rare and glorious mountain day: no wind, blue skies, bright sun, perfect snow. Peak after snowy peak crested in every direction, as endless as waves on the ocean.

Never had I felt so powerful and confident. I had never travelled such distance through my own power. My body and mind were healthy, strong, and resilient. I stood on top of the icefield, feeding my ego and gazing at the highest peak in the range, feeling empowered and accomplished.

When I looked down at the snow, it took me a moment to digest what I was seeing. A long, steady line of tracks had appeared, perpendicular to our route, climbing straight up the enormous mountain, crossing the glacier, and continuing, without a break, as far as I could see. The five-toed track and loping gait were the signature of Wolverine.

Humbly I stood staring at the snow. My ego crashed as I instantly became aware of my fragile existence; I felt vulnerable and completely dependent. The blinding sunlight clearly revealed that I was but a tiny, naked ape in this alpine environment, protected yet encumbered by my layered clothing and heavy pack of food and equipment. In contrast, Wolverine had traveled from the ocean, across the mountain's icefield, and beyond. She lived her entire life in the mountains—fully embodied, thriving—depending on her wits and senses.

I breathed in the stillness as I stood quietly for a few minutes. It dawned on me that, despite my best efforts, I had been so distracted by my journey's challenges and outcomes that I had forgotten how to be present. When I saw Wolverine's tracks, I suddenly felt a surge of awe and appreciation for her ability to move her body with confidence and grace through the vast landscape. Her survival depended on her awareness of her senses and her ability to live in the

moment. Wolverine's presence taught me humility and gratitude, and connected me emotionally to this place, her home.

I closed my eyes and felt the breeze in my hair and the sun on my face. I inhaled deeply. I was embodied, I was still, I was in the mountains again.

Playing as a child in the forest, watching wild animals, and adventuring through the mountains throughout my life has inspired an awe for, and a connection with, the world. The wisdom traditions have always recognized this connection, this non-duality: there is no distinction between body/world, body/spirit, self/other (Bai et al., 2016; Scott et al., 2021). Our consciousness is vast and exists beyond our corporeality, in the liminal space between our body and the limitlessness of existence (Todd, 2014). Whenever I seek answers, I turn to the more-than-humans, the universal consciousness, to seek guidance; I know that the wisdom of the universe will show me the way.

During my thirteenth year of teaching, I needed guidance. I held yet another temporary, one-year teaching contract in yet another school in the district. I dreaded each day of that co-teaching year: it was chaotic, traumatic, and unstable.

In late May, my principal offered me the golden carrot: a permanent contract. The devastating catch? I had to remain in the same co-teaching situation for yet another year.

Should I stay, or should I go? Surely, my mind argued, I have the strength to spend another year in exchange for career stability, security, seniority, and standing. My heart tightened. Insomnia, anxiety, and tachycardia had been with me throughout the year.

I conferred with my parents, friends, and counsellors. I journalled, listed, and mind mapped. I dreamed, reasoned, and meditated. What should I do? Where is my path? I needed wisdom. I needed guidance.

Years ago, in Peru, I worked with the medicine of a Plant Teacher under the guidance of a shaman. Now, as I sought wisdom and guidance, the Plant Teacher reappeared to help me make sense of the situation.

My medicine was strong tasting and fast acting as her spirit infused my body. My sensations were distorted and beautiful and intense; sorrow, empathy, realization, and awe washed over me. I was reduced, my layers disintegrated, until only my core remained.

Eventually, her message made sense: *Never forget you have a green heart.*

I fell into the deepest sleep. Waves of peace and gratitude washed over me, as I remembered who I was. With certainty, I saw my path forward.

Figure 2. *Preparing the plant medicine.*



I left that classroom to teach outdoors for a year. My sabbatical without tenure. Each day I was moving my body outside, finding meaning in the world, and my heart was full of joy. Each night, I gave thanks to my Plant Teacher, who had gently reset my feet on the right path.

My green heart beat strong again.

Figure 3. *My green heart, beating strong.*



Indigenous peoples around the world have a long history of communing with, and learning from, plant and fungi teachers for the purposes of wisdom and spiritual connection (Buhner, 1996; Miller, 2017; Pollan, 2018). Inviting my Plant Teacher into my body allowed me to somatically and spiritually connect with the more-than-human beings. My Plant Teacher dissolved my ego, allowing me to become receptive to her wisdom, and her clear message cut through the fog of expectations, redirecting me back to a life outside.

For many years I taught outdoor education within a variety of pedagogical frameworks and felt a vague sense of unease with the ontologies I had witnessed. The quiet reflection period of the pandemic lockdown provided me with the space to identify the source of my unease: many outdoor pedagogies perceive the outdoors as a setting for personal growth and achievement, often emphasizing kinesthetic activity and quantifying participants' outdoor experiences in terms of elevation, distance, speed, etc. (Lowan, 2009; Sabet, 2018). Additionally, the semantics are often patriarchal, colonial, and violent: bag, take, conquer, overcome, defy, challenge, face, beat, crush, slay. The message is clear: the natural world is available for us to use as a playground, an obstacle course, a conquest. Dualisms are emphasized and facilitating opportunities for developing a meaningful connection to the more-than-humans are minimal at best, but more commonly ignored.

In contrast, my most profound experiences with the more-than-human world – the gifts, the moments of awe, the sense-making and wisdom and guidance – have occurred during quiet and often inactive moments, where I am not necessarily 'alone' (as a host of other beings surround me) (Blenkinsop & Piersol, 2013), but not in the company of other humans. Indeed, when I facilitate outdoor-immersion opportunities for my students, many are genuinely surprised by the impact of the experience of stillness.

Sense-making through re-engaging intercorporeality and eco-centric, slow pedagogical practices is the learning that endures (Payne & Wattchow, 2009). Connecting the human body to the more-than-humans kinaesthetically—through eating the flesh of the berries and breathing the oxygen from the trees—is to be *Embodied* and *Being-in-the-flesh* (Eli, 2013). To be conscious of the fact that we are ingesting, and communing with, the land is to enter the liminal space between flesh and spirit (Todd, 2014). We bridge the outer and inner worlds by bringing the outside in: somatically our senses detect the scent of the branches, the touch of the bark, the taste of the berries, the sound of the leaves rustling, and the sight of the contrasting red berries and green leaves. Mindfully we use our senses to connect with the world outside our bodies, sense-making through contemplation.

Recently, my students and I entered that liminal space while on a field trip, walking through the old growth forest fringing the coastline. We stop frequently, sharing stories and details about the living giants surrounding us: the many uses for Western red cedar, the tree of life for the Coast Salish peoples (Stewart, 1984); the fire-resistant, insulative bark of Douglas-fir; the open canopy where grandmother Hemlock once stood, but recently fell over during a windstorm. Walking slowly, stopping to talk, admire, observe. Then walking again, slowly, through the forest.

Notice this patch of shrubs with their fragile, succulent red flesh berries. Salmon from the nearby stream, who traveled the ocean for four years, have returned here, to complete their journey home. Eagles, ravens, bears take the fish from the river, and the salmon bodies, along with the rain and the water in the soil, nourish the

forest plants. These shrubs combine sunlight and carbon dioxide from the atmosphere to produce oxygen and the sugars that sweeten their berries.

Now, as you eat these berries and breathe the air, the water, sugar, and oxygen from the land will nourish each cell in your body. The land—the oxygen, the water, the sugars, the salmon—and all the smaller oceanic fish that the salmon ate—is now part of your body. You breathe the oxygen produced by the forest plants. You exhale the carbon dioxide that will be used to create more berries, more oxygen. You and the land are integrated: you are a part of the land, it has become a part of you—the land is in your cells, your blood, your lungs, your tissues.

We walk. Digesting. Breathing. Integrating.

We pause.

Figure 4. *Eating salmonberries. Being-in-the-flesh.*



You are all very busy people. Your schedules and lives are full and rich. Right now, however, I would like to give you the gift of time. Soon, I will invite you to simply be.

When I finish speaking, I will invite you to find your sit spot. Perhaps you like the view, perhaps it is comfortable and soft, perhaps it is quiet and inviting. Your spot will? be away from distractions. You will recognize your spot when you find it. You will be close enough to hear me when I call you back, but far enough away that it will feel like your own space.

When you visit your spot, you won't need to read or write or answer questions. You will simply be. Perhaps you close your eyes to focus on the sounds around you. Perhaps you lie back to watch the cloud formations. Perhaps you notice an ant, carrying its food. It's up to you. The only thing I ask is—please put your phones away – do not use them, you do not need them, I will call you back when it is time.

We sit. Digesting. Breathing. Integrating.

Time passes.

I invite them back to our starting location. The group moves slowly, quietly, and with intention. Their energy has changed—they are peaceful, thoughtful.

How was that experience for you?

Smiles and nods.

What sorts of things did you notice?

A spider building a web. Birds singing in the trees near my spot. The sounds of leaves rustling in the wind. The way the moss was soft to lie on.

How do you feel now?

Relaxed. Calm. Happy. Content. Peaceful. Aware.

What did you like most about this activity?

You didn't give us an assignment or a worksheet—that made me feel relaxed.

I haven't ever really been without my phone like that. It was really hard at first – I was distracted because I couldn't look at it. But after a while I started to see other things around me. Things I hadn't noticed in a long time, bugs and sounds. I felt like a little kid again, just lying in the grass, doing nothing. It was cool.

I liked smelling the salt in the air. It reminded me of when I was little, and my parents would take us down to the beach. I took a lot of deep breaths.

I lay down on the ground, underneath this big tree, and it made me feel really small. I started to wonder how old the tree was, and what changes it had seen in its lifetime.

I haven't ever done that before—just sitting alone in nature. I liked it. I feel happy.

We pause. Digesting. Breathing. Integrating.

In a few minutes, we are going to leave this place. The reality is that we might never return here, to this place—life is unpredictable that way, and there are no guarantees. Think about how you feel, right now, and know that whenever you want to feel this way again, you can always come back to the Land. It's always here for you.

When I finish speaking, I invite you to turn to a view that you like, find stillness, and intentionally remember this place, and how you feel right now. It's like you are taking a mental photo, or postcard, of this place, this memory, this experience. Perhaps you would like to silently say a few words of gratitude or prayer or appreciation. Then, when your heart is full, come back to our circle, and together we will make our way home.

The Land blesses us.

The Land teaches us.

We walk. Digesting. Breathing. Integrating.

Figure 5. *Noticing Spider's web.*



I am not my talk. I am not my actions. I am my silence. I am the consciousness that perceives all these things. When I go to my consciousness, to that great pool of silence that observes the intricacies of my life, I am aware that I am me. (Wagamese, 2013, p. 15)

Since time immemorial, humans from world cultures have sought wisdom in and from the Land (Lee-Hammond, 2017; Wildcat et al., 2014). “Land” includes everything on Earth—rivers, plants, stars, animals, humans, winds—and is the source of all wisdom (Goodyear-Kaopua, 2013; Kimmerer, 2013; Styres, 2019; Wildcat et al., 2014): “[a]ncient knowledges are (re)membered experiences that form deeply intimate and spiritual expressions of our connections to Land” (Styres, 2019, p. 26). For it is in the stillness where we can hear the messages from other beings; listening to the Land is where we find the answers (Hill, 2008; Smith, 2005).

Temporarily leaving society to spend time away from humans to allow the self to dissolve into the universe has always been an important ontological and spiritual practice (Bai & Cohen, 2014; Smith, 2005). “After periods of intense solitude in nature people often remark that they feel as if they are in the presence of something greater, whether conceptualized as God, Creator, or higher force” (Daniel, 2005, p. 96). To become fully immersed in the quiet of the Earth is to

shed the dualism of body/spirit, human/world (Bai, 2015; Bai & Cohen, 2014). As Niitsitapi scholar Leroy Little Bear says:

That's the reason why our people go on a vision quest. That is why I call on the bears. That's why I call on the eagle. I call on the rocks, the plants and so on to tell us knowledge that we would not otherwise pick up—the knowledge that is beyond our frequency range (Leroy Little Bear, as cited in Hill, 2008, p. 8).

But to receive the wisdom of the universe, one must be open and receptive, listening with both heart and mind (Hill, 2008).

The more-than-human world has guided me on my journey, and I am intrigued: what is the essence of spending time away from other humans and intentionally listening to other beings? What revelations might arise from eco-centric, slow pedagogical practices? Connecting the body, emotions, intellect, and spirit to the more-than-human world in a pursuit of stillness has been a common thread throughout my life, oscillating between the fore- and background, guiding my life choices and directions. And, although I have played the role of teacher for two decades, the time has arrived for me to embrace the beginner's mind, to hold space, to practice patience, to be still, and to learn.

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PREPARING ANTI-RACIST EDUCATORS THROUGH CRITICAL TRANSFORMATIVE EMOTIONAL PRAXIS: A THEORY OF CHANGE

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Abstract

In settler-colonial countries like Canada, Whiteness—the customs, beliefs, values, and so on that comprise White culture—is the standard to which all others are compared. Whiteness is woven into the very fabric of our society, working to uphold White supremacy and systemic racism. Education, as part of this system, is also fraught with Whiteness, and its deleterious effects are evident in the persistent inequities experienced by students of Colour. Dismantling Whiteness in education is a daunting task, but one promising solution is to develop anti-racist educators capable of embodying and enacting culturally responsive and sustaining pedagogies. However, this requires directly addressing Whiteness in teacher education programs, an endeavour that has proven challenging. As an entry into this topic, this paper explores Whiteness writ large including how it is studied both broadly and within the field of education. Then, approaches to addressing Whiteness in teacher education are reviewed, including what is and is not working. Next, other approaches to teacher education that could ameliorate current efforts to develop anti-racist educators are introduced: transformative learning and critical emotional praxis. Finally, these are woven together in a theory of change to address Whiteness in teacher education and support preservice teachers' anti-racist development.

Keywords: Anti-racism, Whiteness, teacher education, transformative learning, critical emotional praxis

Introduction

In the preface to the sixth edition of sociologist Bonilla-Silva's (2021) widely read and acclaimed book *Racism without Racists: Color-Blind Racism and the Persistence of Racial Inequality in America* he speaks directly to his White¹ readers:

If you are a White reader, you belong—and please know this is mostly beyond your control—to the White team. You were born into that team, raised as a member of that team, and...[m]ost things in your life (e.g., your friends, neighborhood where you reside, school you attend, things you watch and read) help configure your cognitive, aesthetic, and even emotional Whiteness. How can you deeply empathize with people of color when everything in your life revolves around Whiteness? (p. xviii)

Following this logic into the field of education, the question becomes: how can White educators empathize with students of Colour and enact anti-racist pedagogies when they themselves are imbued in and a product of Whiteness? Going further, just as recapitulation theory contends that ontogeny recapitulates phylogeny (Haeckel, 1866), one might argue that the hegemony of Whiteness in education recapitulates White supremacy and systemic racism more broadly. The pervasive and seemingly intractable problem of Whiteness in education has garnered much scholarly interest in recent decades (see Leonardo, 2009; McIntyre, 1997; Picower, 2021; White, 2012) with efforts working towards dismantling its effects occurring predominantly on two fronts: preservice teacher education (Cochran-Smith, 1995a, 2000; Picower, 2021; Sleeter, 1995) and classroom pedagogy (Gay, 2018; Ladson-Billings, 1995; Paris, 2012). All efforts are needed to tackle the problems wrought by Whiteness in education. This paper focuses on how Whiteness is and can be addressed during the critical period of educator ontogenesis that occurs in teacher education programs.

Underpinned by my positionality as a White, female educator (see Appendix), I present this treatment of Whiteness in teacher education and how it can be addressed to support the development of anti-racist educators in four parts. In part one, I explore Whiteness more broadly, including its impact on society and approaches to its study, including in the field of education. In part two, I define the problem of Whiteness in education and argue that teacher education programs are key contexts for addressing Whiteness as part of broader efforts to develop anti-racist educators. I review empirical research investigating the development and implementation of teacher education programs designed to address Whiteness in education, noting both their promise and pitfalls. In the third part of this paper, I describe approaches to adult education in general, and teacher education in particular, that can address the barriers faced by existing teacher education programs aimed at addressing Whiteness and developing anti-racist educators:

¹ Per Appiah (2020), I capitalize labels that denote race (for example, Black, White, Whiteness) to call attention to the unnatural, socially constructed nature of these terms compared to common nouns which are not capitalized. Capitalization used in this way does not denote an elevated status; rather, it emphasizes that these racial identities were created and are not neutral categories. In direct quotations, I maintain the original capitalization choices of the authors.

transformative learning and critical emotional praxis. Finally, to conclude, I weave these two approaches together and propose a theory of change for preparing anti-racist educators.

Whiteness in education: What is Whiteness?

Understanding Whiteness requires first understanding how race and racism operate in Western society. Race as a social construct originated during the European colonization of the Americas to help assign labourers differentiated rights and privileges based on their skin tone (Leonardo, 2009). Greater status, rights, and privileges were awarded to people with lighter skin tones who were deemed more human than those with darker skin tones. Thus, without any biological basis, the race labels of “Black”, “White”, and so on were created and a hierarchy of humanity was established. Bonilla-Silva (2021) contended that structuring society around race is what produced the systemic racism that pervades every aspect of Western settler-colonial society today. He described the relationship thusly:

This means that racism is about the practices and behaviors that produce a racial structure—a *network of social relations at the social, political, economic, and ideological levels that shapes the life chances of the various races*. This structure is responsible for the production and reproduction of systemic racial advantages for some (the dominant racial group) and disadvantages for others (the subordinated races). (Bonilla-Silva, 2021, p. 21)

In Canada and other settler-colonial nations, the dominant racial group is White people, and it is Black, Indigenous, and People of Colour (BIPOC) who are disadvantaged due to the presence of their racialized bodies within a racist, White supremacist society.

Not all scholars agree that we exist in a racialized society replete with structural racism. Those who subscribe to humanist ideology deny race and racialized experiences and instead advocate a universal human experience (Leonardo, 2009). Importantly, it is in this denial of racialized experience that Whiteness rears its ugly head. For what humanists deem “human” and in common for all is in fact the White experience because in a racist society steeped in Whiteness “‘human’ equates with ‘White,’” (Leonardo, 2009, p. 36). Indeed, this implicit Whiteness provides the ontological and ideological basis that upholds White supremacy and systemic racism (Picower, 2021). Picower (2021) explained Whiteness as follows:

[Whiteness] is the way in which people—generally White people—enact racism in ways that consciously and unconsciously maintain this broader system of White supremacy. While individual people of Color may also enact Whiteness, they do not benefit from the broader system of White supremacy in the ways that White people do. White supremacy is the *what*. White people are typically the *who*, and Whiteness is the *how*. (pp. 6-7)

Therefore, a key factor underlying the success of Whiteness in upholding White supremacy is that it operates undetected yet sanctioned and performed by the White people who stand to benefit. Indeed, Whiteness clearly grants White people “ownership of the earth forever and ever” (Du Bois, 1920/1999, p. 30).

Studying Whiteness

Critical Whiteness studies

Understanding Whiteness and White racial identity is a scholarly undertaking that spans decades and intersects many disciplines (Casey, 2021). Critical inquiries into Whiteness first emerged in early to mid-twentieth century works of eminent Black scholars including W.E.B. Du Bois (1903/2015), Ralph Ellison (1952/1992), and James Baldwin (1965/1998), and in the later twentieth century works of contemporary Black scholars including bell hooks (1988), Derrick Bell (1992), and Thandeka (1999). In recent decades, White scholars have joined the field of study (see Allen, 1994; Frankenberg, 1993; Ignatiev, 1995; Roediger, 1991) and this has been met with significant criticism. Most notably, White scholars are derided for ignoring the original contributions to critical Whiteness studies (CWS) made by Black scholars (Carter & Jocson, 2022; Jupp et al., 2019; Matias & Boucher, 2021). Further, critics argue that when White scholars engage with CWS, it decenters the emphasis on the struggles of BIPOC and instead provides a venue for White confessional scholarship that detracts from the abolitionist and decolonizing aims of critical social justice research and activism (Carter & Jocson, 2022; Leonardo, 2013; Matias & Boucher, 2021). However, some scholars suggest that it is possible to study Whiteness without centring it (Leonardo, 2013). For example, Matias and Boucher (2021) asserted that avoiding White epistemological framing and broadening the focus beyond helping Whites achieve racial consciousness will help move CWS towards dismantling Whiteness instead of centring White people. Importantly, Leonardo (2009) emphasized that “delving into Whiteness is central to antiracism” (p. 81); thus, the critical study of Whiteness is integral to the broader aims of equity and social justice.

Waves of Whiteness studies in education

Despite its many critics and critiques, CWS has become part of the scholarly universe in educational research (Casey, 2021; Jupp et al., 2019; Leonardo, 2009). Indeed, Matias (2022) contended that CWS is a necessary framing for educational research because it can help identify how Whiteness functions within education thereby eradicating its hegemonic power. Educational research framed through a CWS lens, also referred to as White teacher identity studies (WTIS), is widely understood to have occurred in two waves (Casey, 2021; Jupp et al., 2019; Jupp, 2021; Matias, 2022). Occurring from the late 1980s to early 2000s, first-wave research inquired into White privilege and its enactment in White preservice and practicing teachers (Casey, 2021; Jupp et al., 2019; Jupp, 2021). Scholarship generated in the first wave is recognized as helping construct knowledge regarding White teachers’ identities in relation to White privilege and color-blind racism, and how this impacted their teaching (Cabrera et al., 2022; Jupp et al., 2019; Jupp, 2021). Peggy McIntosh’s (1988) widely read essay on White privilege and male privilege is credited with awakening White teachers to their privilege (Leonardo, 2009), and ushering in an era of teacher education courses with content that addressed this privilege (Levine-Rasky, 2000).

Although first-wave CWS/WTIS in education raised awareness about White privilege and how it is operationalized in the classroom by White educators, it also garnered criticism due to its simplistic and essentialist view of White teacher identity, and its limited ability to inform

practical, pedagogical initiatives to address the impact of Whiteness in education (Cabrera et al., 2022; Casey, 2021; Jupp et al., 2019; Jupp, 2021). However, the second wave of CWS/WTIS in education has been able to build on the first wave's foundation and introduce a more complex, nuanced understanding of racism and White teachers' racial identities that enables the development of approaches to teacher education that promote anti-racist practices (Casey, 2021; Reyes & Aronson, 2022). As Jupp (2021) explained, second-wave scholars seek to move beyond documenting the effect of race and racism in education "to reflexively understand and work through White teachers' racialized experiences and discourses in order to better conduct affective, cognitive, and pedagogical interventions for learning and teaching about race, Whiteness, and White identity" (p. 727). Therefore, in this new era of second-wave CWS, new approaches to teacher education and professional development that aim to tackle the deleterious effects of Whiteness in education and help develop teachers prepared to engage in anti-racist praxis are being developed (Jupp & Lensmire, 2016).

Whiteness and teacher education

First- and second-wave CWS/WTIS in education helped define the issues and concerns related to Whiteness in education and prompted changes to how people are prepared for the teaching profession, in particular White people. These changes, and the problems they address, are broadly aimed at advancing the goals of social justice and equity in education. More specifically, Jupp (2021) noted three primary problems that undergird the motivation for WTIS in education: the demographic imperative, the White problem in education, and majority White teacher preparation programs. First, the demographic imperative signifies a disproportionately White teaching population in comparison to the majority BIPOC student population. This issue has and continues to receive considerable attention, often serving as an entry into the topic of Whiteness in education in the extant literature (see Deutschman, 2022; Galman et al., 2010; Hill-Jackson, 2007; Jupp et al. 2019; Picower, 2009; Ryan et al., 2009; Sleeter, 1995, 2001, 2008, 2016; Smith & Ladner, 2012; Wozolek & Atif, 2022). Second, the White problem in education acknowledges that systemic racism and White supremacy operate in schools in ways that disadvantage and dehumanize students of Colour, with Whiteness (for example, as evident in curricula, standards, and staff) positioned as a key operant in continuing their hegemony (Jupp, 2021; Leonardo, 2009; Picower, 2021). The third problem is evident in teacher education programs that are categorically White, from the students they enrol, to the faculty they employ, as well as the theories and pedagogies they promote (Jupp, 2021; Picower, 2021). Efforts to address all three problems that contribute to the larger problem of Whiteness in education are underway, but changing the demographics of teachers and teacher educators is a slow process yielding little to no shift in recent decades despite efforts to recruit more education students and faculty of Colour (Burns Thomas, 2020; Sleeter, 2001; Sleeter et al., 2015). More urgent, then, is to change White teachers themselves during their ontogenesis in teacher education programs. It is to this topic that I turn in the next section, with a review of programs and approaches that have been developed in recent decades.

Teacher education is evolving

Over 50 years ago, the American Association of Colleges for Teacher Education published *Teachers for the Real World* (Smith, 1969), in which three problems in preparing

teachers to teach “poor” students (treated synonymously with “diverse” students) were identified: (a) teachers were unfamiliar with the backgrounds of poor students and the communities where they lived; (b) teacher education programs ordinarily did little to sensitize teachers to their own prejudices and values; and (c) teachers lacked preparation in the skills needed to perform effectively in the classroom. Today, teacher education programs continue to evolve as they grapple with identifying the knowledge, skills, and attitudes necessary to prepare effective educators for diverse classrooms (Varghese et al., 2019). In recent decades, calls for social justice have expanded this knowledge base to include learning that prepares educators to embody and enact anti-racist and culturally sustaining pedagogies (Giroux, 1992; Paris, 2012). Preparing educators in this way can help create an equitable education system and, more broadly, achieve the abolitionist and decolonizing aims of social justice (Tuck & Yang, 2018). Based on their review of the literature, Varghese and colleagues (2019) identified the following as typical foci for university-based teacher education programs with equity and social justice aims: building pedagogical content knowledge and skill for teaching diverse students; developing general knowledge about diverse students through immersion or exposure to their communities; and exploring and understanding one’s own identity and racialized self. For White teacher education students, the third approach is particularly important for it is this identity work that can bear fruit in awakening students to their racialized White selves and how they contribute to upholding White supremacy (Taylor, 2012). However, no one avenue to this awakening and subsequent enactment of anti-racist pedagogies has surfaced as most effective. In some cases, well-designed, years-long programs have failed (see Buehler et al., 2009).

Addressing Whiteness through teacher education

Preparing culturally competent educators

Multicultural education and ethnic studies expert, Dr. Christine E. Sleeter has long focused her teaching, research, and scholarship on preparing teachers for culturally diverse classrooms. Sleeter is credited with developing the terminology used to analyze how Whiteness operates through White teachers including race resistance, race evasion, and silence, and for calling attention to the “overwhelming presence of Whiteness” (Sleeter, 2001, p. 94) in teacher education (Jupp, 2021). In 2001, Sleeter published an extensive review of the literature examining strategies for preparing teachers for diverse schools. Of the 80 studies she reviewed, few offered guidance for developing culturally responsive teachers; rather, the strategies tested centered on remedying White preservice teachers’ attitudes and lack of multicultural knowledge. Sleeter pronounced the extant research “very piecemeal, [and] predominated by small-scale action research studies that...together produce a disjointed and somewhat repetitious knowledge base” (p. 102). Notably, Sleeter concluded by calling for more research that focuses on what happens in the classroom suggesting an emphasis on practice rather than theory and knowledge. This emphasis on practice is evident in the research-based framework Sleeter (2008) offered some years later that positioned preparation in the classroom as one of three key parts to teacher education programming aimed at improving White teacher quality and ability to teach diverse students.

In the decades since Sleeter (2001) published her review of strategies for preparing culturally responsive teachers, efforts have been made to strengthen the research base by further

testing the recommended strategies in practice, but the studies have remained predominantly small-scale, local efforts. Positioning themselves as White teacher educators, Galman and colleagues (2010) described their self-study of various attempts at integrating anti-racist content informed by Sleeter (2001) into a teacher education program. These attempts included spiraling content across existing teaching methods courses; offering a stand-alone but required social justice course; adding action research projects to the social studies curriculum; and delivering single-event seminars on topics such as social justice and critical pedagogy. The researchers explored data from focus groups conducted with teacher education students and their own self-study data (for example, transcripts, emails, conversations, syllabi, correspondence, notes, and journals). Through a process of modified grounded theory, the researchers found that their own beliefs and practices served to reinforce White racial knowledge, affirm White non-participation, and silence race talk. Reinforcing White racial knowledge was accomplished by perceiving White education students as lacking the readiness and maturity to engage with Whiteness and by privileging White comfort when difficult topics arose. The practice of privileging White comfort was related to silencing race talk as the teacher educators demonstrated confusion about how to talk about race and found that they tended to allow the “glossing over” of race talk through their own or others’ sanitized language. Importantly, Galman et al.’s (2010) findings exemplify Sleeter’s (2001) contention that the “overwhelming presence of Whiteness can be silencing” (p. 101). The findings also highlight the need for White teacher educators to interrogate their own Whiteness to be prepared to model and facilitate this work with others (Chinnery, 2008).

Approaches to address Whiteness through teacher education in service of wider social justice goals are often found within well-designed, specialized teacher education programs or courses that aim to develop teachers’ cultural competence, but with variable success. For example, Buehler and colleagues (2009) offered a detailed account of the challenges faced by a beginning teacher when trying to demonstrate the cultural competence she aimed to build during the two-year Teachers for Tomorrow program. Despite coursework in culturally relevant pedagogy and developing culturally responsive dispositions, the beginning teacher was unable to enact cultural competence when required due to challenges that arose from her emotional responses to racialized situations, her struggles with her own Whiteness, and the racially diverse school context. Importantly, the researchers suggested that while she learned about cultural competence in theory during her teacher education program, she was not adequately prepared to handle the struggle required to enact it in reality. Similarly, Hill-Jackson (2007) administered pre- and post-multicultural course surveys to nearly 100 White preservice teachers and found that the experience of one course was not enough to shift their cultural competence to levels that support social action and anti-racist teaching. Findings from both Buehler et al. (2009) and Hill-Jackson (2007) suggest that whether the content is infused in a lengthy program or delivered in a stand-alone course, focusing on knowledge, skills, and attitudes is not enough to prepare White teachers to enact anti-racist pedagogies in the classroom. Indeed, this theory-to-practice disconnect is not new to teaching or teacher education, but in this critical realm of equity and social justice, the stakes are too high to accept this as inevitable or the status quo.

Addressing educators’ emotions

Levine-Rasky (2000) submitted a pointed critique of White privilege pedagogy evident in knowledge-based approaches to developing anti-racist educators: “If the work consists only of

individual whites examining their white-skin privileges, the effect on social change and rectifying unjust social relations is vague” (p. 276). She contended that the lack of attention to affect—in particular the shame, fear, and hopelessness White teachers experience when confronting the privilege of Whiteness—is part of what makes White privilege pedagogy both appealing and ineffective. It is appealing in that it checks a box that allows teacher education programs to proclaim they are addressing social justice aims by graduating teachers prepared to meet the challenges of teaching in diverse classrooms; however, it is ineffective in that this approach fails to develop teachers who have adopted an anti-racist stance (Mujawamariya & Mahrouse, 2004; Picower, 2021). Indeed, studies have found that White beginning teachers resist, discount, or entirely forget what they learned about teaching diverse students in their teacher education program (Causey et al., 2000; Smith, 2000) which demonstrates the power of their socialization in Whiteness (Sleeter, 2008).

Addressing the affective component of learning about Whiteness and helping White preservice teachers do the emotional work required is an area of inquiry that is gaining research attention. Dr. Cheryl Matias stands at the forefront of this movement to elucidate and address White teacher emotionality in teacher education. Based on her experience as a teacher educator of Colour in urban teacher education programs, Matias’ contributions to the literature have revealed the extent to which White students’ resistance to learning about Whiteness affects their ability to adopt anti-racist pedagogies, and how this resistance is rooted in the emotionalities of Whiteness (Matias, 2013; Matias, 2014; Matias, 2016; Matias & Zembylas, 2014; Matias et al., 2016; Matias et al., 2017a). Matias and colleagues (2017b) asserted: “[I]f teacher education truly seeks to be racially equitable, then it should not only focus on the prevalence of whiteness, it should also recognize how the emotionalities of whiteness are being strategically used to keep whiteness at the center” (p. 11). Although she has been the target of overt racism and microaggressions from White teacher education students (Matias, 2013; 2016; Matias et al., 2017b), Matias has persevered in her work and, with colleagues, generated several recommendations to tackle Whiteness and White emotionalities in teacher education (Matias et al., 2017b). Paramount among these are calls to explicitly address and weave Whiteness, race, and racial justice throughout teacher education programs, and to directly teach about the emotionalities of Whiteness; however, this emerging area has received little empirical attention, and studies examining the implementation of these recommendations are lacking.

Picower (2021) described several examples of specialized teacher education programs that include content and pedagogy aimed at addressing Whiteness in teacher preparation and the classroom, including the emotional component. Known together as Racial Justice Programs (RJPs), Picower, who also co-directs an RJP, explained how these programs seek to disrupt Whiteness by centring race in every aspect of their programming through direct and explicit instruction about race, White supremacy, and Whiteness, and how they impact the classroom through curricular tools of Whiteness (Picower, 2021). Moreover, by design, Picower (2021) asserted that RJPs ensure there is “nowhere for Whiteness to hide” (p. 125). When Whiteness exerts its influence, whether in White students’ comments during class or instruction during teaching practicums, RJP faculty and staff do not shy away from addressing it directly. Furthermore, they do not silence or stop racial conflict in the classroom. Rather, they encourage productive emotions and differentiate between White tears that take up space versus tears that help usher in growth. RJP faculty and staff recognize and encourage the emotional work required

of students to dismantle their own Whiteness, but this comes at a cost borne primarily by teacher educators of Colour. Picower described how this emotional work affects faculty:

[H]olding these emotions takes a toll on them, particularly on faculty of Color, who are navigating the unexamined racism of their White students and supporting the internalized racial trauma of their students of Color. For faculty of Color, navigating the balance of protecting themselves from the racism of their White students while also simultaneously using the program to push students' anti-racist development places them in their own space of vulnerability. (p. 152)

Similar to sentiments expressed by Matias (2013) regarding the impact her work with White preservice teachers has on her own mental health and well-being, this begs the question whether it is just or fair to ask people of Colour to do this work with White educators at all.

Reducing the burden on people of Colour

Racial affinity groups, also known as identity caucusing, have emerged as one way to address the problem of overburdening people of Colour with supporting White preservice teachers' anti-racist development. In Race-Based Caucuses (RBCs), White students and students of Colour meet separately to explore the relation between their racialized selves and developing teacher identities (Varghese et al., 2019). RBCs create safe spaces for teacher education students to speak frankly, make mistakes, and discuss race while minimizing harm to people of Colour (Picower, 2021). In their description of RBCs conducted in an elementary teacher education program in the Northwestern United States, Varghese and colleagues (2019) highlighted their overwhelmingly disruptive and chaotic nature. However, they also emphasized that within RBCs, White students can "articulate uncritical, ignorant, and racist sentiments without directly inflicting violence on candidates or faculty of Color" (Varghese et al., 2019, p. 11). Therefore, RBCs have potential to reduce harm towards people of Colour while still providing a context that can help White students process their own Whiteness and its relation to perpetuating White supremacy in education. However, although RBCs conducted by Varghese and colleagues (2019) did provoke critical introspection and reflection, some White teacher candidates grew in their resistance to analyzing racism and Whiteness. Indeed, while the authors identified emotions as a prominent part of the process, there was inadequate attention paid to working with and through these emotions leaving "a few White teacher candidates ...so angered by the RBC process and so resistant to acknowledging their own racialized identity that they cultivated a profound resentment toward the teacher education program itself" (Varghese et al., 2019, p. 22). Thus, while a promising approach to supporting teacher candidates' anti-racist development, RBCs may be improved by evolving from the albeit challenging critical praxis they entail to a more comprehensive critical emotional praxis (Zembylas, 2008, 2012).

Key takeaways for teacher education program design

Although piecemeal and fragmented (Sleeter, 2001; 2008), the extant literature investigating approaches for addressing Whiteness in teacher education and supporting White preservice teachers' anti-racist development does yield some tentative advice for designing programs to help meet this end. For example, the literature reviewed above suggests that

approaches to teacher education which solely address White privilege or stand informed by first-wave CWS/WTIS will likely be inadequate in moving White preservice teachers away from espousing colour-blind ideologies in the classroom (Hill-Jackson, 2007; Levine-Rasky, 2000). Especially ineffective is when this White privilege pedagogy is delivered as a stand-alone course or topic within a course (Picower, 2009). Thus, teacher education programs aimed at dismantling Whiteness in education should integrate content throughout their courses and practicum experiences that explicitly promotes a thorough understanding of Whiteness and its impact on students of Colour. Moreover, the coursework should intentionally provoke critical reflection and introspection regarding the role White preservice teachers can play in upholding White supremacy (DeLuca, 2012; Picower, 2009; White, 2012). The extant literature also suggests that addressing the emotionalities of Whiteness is integral to moving teacher education students through and beyond their resistance to learning about Whiteness, racism, and White supremacy (Matias & Mackey, 2016; Matias et al., 2017b). Importantly, to reduce harm towards students and faculty of Colour, the research also suggests that there needs to be dedicated spaces for White students and faculty to do this work separately from their peers and colleagues of Colour (Chinnery, 2008; Picower, 2021; Varghese et al., 2019). Moreover, White faculty need to have done their own intensive work before engaging in similar work with their students to ensure that they are not condoning White fragility and preserving White comfort (DiAngelo, 2011; Galman et al., 2010; Helms, 1990). Finally, preparing anti-racist educators must also entail sufficient time to practice their skills and test their cultural competence in the classroom (Lambeth & Smith, 2016; Sleeter, 2001; 2008). Supporting beginning teachers in doing so requires that teacher education programs stretch beyond their typical one- or two-year length to include continued support and mentoring during the first years of teaching and beyond (Picower, 2021).

Transforming White teacher education students

Current approaches to preparing teachers to embody and enact anti-racist pedagogies in diverse classrooms are falling short (Howard, 2006; Ladson-Billings, 1999; McGregor et al., 2015; Mujawamariya & Mahrouse, 2004; Sleeter, 2016). Research findings suggest that White teacher education students are particularly fatigued by anti-racist course content (Flynn, 2015). They may either resist anti-racist course content (Crowley & Smith, 2015) or avoid teacher education programs with social justice aims altogether (Sleeter, 2016). In a field dominated by “nice white ladies” (Wozolek & Atif, 2022, p. 756), more impactful and transformative pedagogies are needed to ensure that teacher education programs cease reproducing White (women) teachers who, while espousing an ethic of care, continue to view students of Colour through a deficit lens (Dyce & Owusu-Ansah, 2016; Sleeter, 2016; Wozolek & Atif, 2022). Leonardo (2009) argued that to break free from Whiteness, white people need to “be transformed or experience a transformative education” (p. 96). Thus, teacher education program content and pedagogy aimed at developing anti-racist educations must support not only knowledge acquisition, but also transformative change accomplished through transformative learning experiences (Addleman et al., 2014; Dyce & Owusu-Ansah, 2016; Mezirow, 1978, 1981; Resch, 2022; Ukpokodu, 2009). Moreover, within the learning process, White teacher education students need a means to critically examine the emotions that arise in response to this work and develop a practice that allows them to work through these emotions in support of their anti-racist development (Matias & Zemblyas, 2014). It is to these two areas I turn in the next section to build the case that integrating transformative learning and critical emotional praxis in service of

White preservice teachers' anti-racist development is what will propel the aim of disrupting Whiteness in education forward and carve a new path towards developing anti-racist educators.

Transformative learning

In the 1970s, American sociologist Jack Mezirow began to recognize adulthood as a period in human development uniquely suited to learning that went beyond the mastery of basic skills. He posited: “[A] crucial dimension of adult development involves a structural reorganization in the way a person looks at himself and his relationships” (Mezirow, 1978, p. 108). Furthermore, he suggested that this change occurs through perspective transformation and is connected to the capacity for social action (Mezirow, 1978, 1981). Influenced by the works of philosopher Thomas Kuhn, educator and philosopher, Paulo Freire, sociologist and philosopher, Jurgen Habermas, and psychologist, Jerome Bruner, Mezirow developed his ideas into transformative learning theory (Calleja, 2014) which, at its core, asks adult learners to inspect “how we are caught in our own history and reliving it” (Mezirow, 1978, p. 101). He argued that the process of perspective transformation supported by transformative learning permits significant, meaningful behaviour change otherwise not possible through typical approaches to adult learning and called for a redefinition of adult learning—also known as andragogy—through this lens (Mezirow, 1978).

In transformative learning theory, Mezirow (1981) proposed a process of learning and development that moves through ten phases:

- 1) Disorienting dilemma; 2) self examination; 3) a critical assessment of personally internalized role assumptions and a sense of alienation from traditional social expectations; 4) relating one's discontent to similar experiences of others or to public issues—recognizing that one's problem is shared and not exclusively a private matter; 5) exploring options or new ways of acting; 6) building competence and self-confidence in new roles; 7) planning a course of action; 8) acquiring knowledge and skills for implementing one's plans; 9) provisional efforts to try new roles and to assess feedback; and 10) a reintegration into society on the basis of conditions dictated by the new perspective. (p. 7)

Although initially proposed as a linear ten-phase process, subsequent research suggested the phases occur in a looping or recursive pattern (Calleja, 2014) and that there are, for example, seven rather than ten phases (Cranton, 2002). Regardless, researchers agreed with Mezirow that the process is typically triggered by the disorienting dilemma, the severity of which Mezirow (1981) proposed was related to the potential for perspective transformation. Importantly, all ten phases provide the opportunity for critical self-reflection that can help move learners towards conscientization and change the socially and culturally constructed habits of mind and points of view, together known as frames of reference (Mezirow, 1997), through which they filter their experiences (Cajella, 2014; Mezirow, 1981, 1997). Through this process learners can achieve critical consciousness which allows them to “identify real problems involving reified power relationships rooted in institutionalized ideologies which one has internalized in one's psychological history” (Mezirow, 1981, p. 18). Indeed, Dyce and Owusu-Ansah (2016) noted: “In the education literature, transformative learning is closely tied to critical pedagogies, such as social justice education, critical race theory, critical multicultural education, and diversity” (p.

334). Thus, given that transformative learning can prompt preservice teachers to examine their hegemonic frames of reference, and through critical self-reflection transform them, this learning theory has relevance for teacher education programs with social justice aims (Cajella, 2014; Dyce & Owusu-Ansah, 2016).

Using transformative learning to develop anti-racist educators

Despite the natural alignment between transformative learning theory and teacher education aimed at developing critically conscious teachers, the research examining its application in teacher education is relatively sparse. Moreover, the learning goals vary considerably from broad aims such as developing social change agents (Woodrow & Caruana, 2017) or promoting social justice perspectives (Baily et al., 2014) to more narrow targets such as fostering diversity skills (Resch, 2022) or promoting multicultural education (Ukpokodu, 2009). Further, transformative learning theory is often applied as a theoretical framework to analyze teacher education course outcomes and student perceptions of learning (see Addleman et al., 2014; Baily et al., 2014; Riley & Solic, 2017; Rudge, 2015; Ukpokodu, 2009; Woodrow & Caruana, 2017) rather than as the theory translated into course or program design and pedagogy.

Research that has identified content and pedagogical practices that promote transformative learning among White teacher education students who are preparing to teach diverse students can inform more intentional course design with aims to disrupt Whiteness and develop anti-racist educators (McGregor et al., 2015). For example, Dyce and Owusu-Ansah (2016) theorized that emphasizing social change, identity development, and conscientization in a diversity-focused teacher education course would yield transformative learning for their predominantly White teacher education students. They infused these aspects into their course design via exposure to diversity studies literature, field trips to schools that serve newcomer children, and a cultural immersion experience. Transformative learning was intentionally activated through several critical reflection assignments aimed at helping students internalize their learning. The researchers found evidence of increased knowledge and awareness about diversity among their students, with the critical reflection assignment emerging as the key driver for these changes. Focus group data surfaced additional evidence suggesting that the experience changed White preservice teachers into social justice advocates; however, whether this shift remained evident when they became practicing teachers is unknown.

Similar to Dyce and Owusu-Ansah (2016), Resch (2022) sought to evaluate the effectiveness of a diversity course aimed at transforming predominantly White preservice teachers in Austria. Resch's course included readings and critical self-reflections as in the previous example, but more in line with elements of Mezirow's transformative learning theory, Resch had learners identify disorienting dilemmas in response to course materials, and to analyze and reflect on their frames of reference through small-group social learning activities. Resch found that her students did experience shifts in their cultural frames of reference, but they became stalled when encountering difficult emotions. Notably, Resch (2022) observed that "actual transformative learning took place...when emotions changed" (p. 9); however, her course design featured no explicit tools to help learners critically examine or process their emotions in ways that could reliably effect this change.

Research by Ukpokodu (2009) and Woodrow and Caruana (2017) provide further evidence that, as in the above examples, critical reflection and social learning are related to transformative learning for majority White teacher education students. In both of their studies, learners identified these practices as contributing most to their transformations. However, Ukpokodu (2009) found that students' emotional experience was unsettling enough that they either resisted learning or left the program altogether. Significantly, as a teacher educator of Colour, Ukpokodu found the experience emotionally challenging herself.

A sampling of the scant research, the studies reviewed above suggest that critical self-reflection, social learning, and disorienting dilemma analysis in response to diversity-related content are key components of transformative learning experiences in teacher education courses aimed at developing anti-racist teachers. Importantly, these align with the dimensions of transformative learning emphasized by Mezirow (1990): critical reflection, engagement in discourse, and reflecting on transformed frames of reference. However, these approaches neglected to provide teacher education students with the tools to critically examine their emotional experiences which limited their effectiveness (Resch, 2022) and resulted in both resistance to learning or program attrition (Ukpokodu, 2009). Thus, exploring ways to incorporate critical emotional praxis into the transformative learning process is warranted.

Addressing White emotionality through critical emotional praxis

Teaching is recognized as an emotionally taxing profession, with the emotional labour involved a well-traversed topic in educational research (see Hargreaves, 1998, 2000; Horner et al., 2020; Isenbarger & Zembylas, 2006; Molyneux, 2021; Schutz, 2014; Schutz & Lee, 2014; Schutz & Zembylas, 2009; Wang et al., 2019; Yin et al., 2019). Thus, it is troubling that, as Sutton and Wheatley (2003) noted, “[r]esearchers know surprisingly little about the role of emotions in learning to teach, how emotional experiences relate to their teaching practices, . . . how the sociocultural context of teaching interacts with teachers’ emotions, . . . and how integral emotional experiences are in teacher development” (p. 328). The emotional landscapes navigated by developing and practicing teachers is underexplored and yet, in the context of teacher education, it is this very emotional work that can trigger meaningful changes to their frames of reference and induce a radical shift toward embodying and enacting anti-racist pedagogies (Chubbuck & Zembylas, 2008; Resch, 2022). Especially considering the emotional discomfort triggered by explorations of difference and power in relation to racism and White supremacy (Giroux, 1997a, 1997b; Winans, 2012), White teacher education students need tools to help them navigate these emotions in service of their anti-racist development. This can be accomplished through critical emotional praxis, “a term that captures . . . how emotions are engaged as critical and transformative forces in teaching for social justice” (Chubbuck & Zembylas, 2008, p. 284). Before describing critical emotional praxis and its potential for use in teacher education, White emotionality—what it is and how it can make developing anti-racist educators challenging—is briefly reviewed to further demonstrate the need for the addition of critical emotional praxis to White preservice teachers’ transformative learning experiences.

White emotionality

When engaged in discussions about race, people can be bombarded with a wide assortment of mostly uncomfortable emotions (DeCuir-Gunby et al., 2020). For White people, there is a tenuous balance to their emotional state dubbed White fragility (DiAngelo, 2011) and when challenged in discussions about race, defensive emotions like anger, fear, and guilt can be activated. These racialized emotions can elicit behaviours ranging from silence to arguing, or worse, which function to forcefully reinstate the norms of Whiteness (DiAngelo, 2011). In the context of teacher education, Matias (2016) labelled the emotional displays by White students in response to anti-racist content as the emotionalities of Whiteness or White emotionality. When exploring the emotional ways Whiteness worked in Matias' urban teacher education course, *Social Foundations and Issues of Cultural Diversity*, Matias and Zembylas (2014) found that White teacher candidates' repression of racialized emotions such as disgust and shame, along with related emotional distancing, became barriers to their learning about and commitment to anti-racism. Similarly, Buehler and colleagues (2009) noted that beginning teachers' cultural competence was mediated by their experience of anxiety, guilt, and fear when learning about Whiteness in education. Further, in the context of a Canadian teacher education program, Taylor (2011) found that White preservice teachers especially wrestled with feelings of guilt when confronting their Whiteness. Considering the barrier to developing anti-racist teachers the emotionalities of Whiteness pose, Matias and colleagues (2016) argued that teacher education needs "to consider critical emotional literacy as a tool to deconstruct how these emotions get normalized as proper in the field of teaching" (p. 8). Indeed, Matias went so far as to make this emotional work part of her students' participation grade as "without emotional investment white teachers will not engage in projects of racial justice in the classroom" (Matias et al., 2017a, p. 24). In so doing, Matias aimed to provide spaces for racial healing to help produce "antiracist educators who do have the emotional fortitude to remain committed to racially-just education" (Matias et al., 2017a, p. 25).

Critical emotional praxis

Originally theorized by scholar Michalinos Zembylas (2008, 2012) through his ethnographic research in Cyprus, a country scarred by ethnic conflict, critical emotional praxis is a pedagogical tool that can help students and teachers grapple with the emotional resistance that arises in social justice education (Chubbuck & Zembylas, 2008). Zembylas (2013) elaborated on the tool's potential: "[It] helps educators and students to identify patterns in their emotional, historical, and material lives, to realize how these patterns are made and what their consequences are for maintaining the status quo, and to motivate action for change" (p. 12). Critical emotional praxis advances the work of socially just teaching in three ways: (1) it supports questioning emotional attachment to injustices; (2) it elicits examination of the role of emotions in sustaining hegemonic worldviews; and (3) it catalyzes change as learners transform emotions of discomfort into action toward social justice (Chubbuck & Zembylas, 2008).

In the context of teacher education, critical emotional praxis can help White teacher educators and their majority White students move beyond a superficial understanding of their racialized emotions (typically regulated through emotion suppression as evidenced in White silence or resistance) towards emotion utilization that can "harness the energy of emotion arousal

in constructive thought and action” (Izard et al., 2008, p. 156). However, to my knowledge, it has neither been theorized nor studied as a pedagogy applied to teacher education. Zembylas developed and used critical emotional praxis in his ethnographic research to analyze classroom teachers’ interactions with students in the context of reconciliation education (see Zembylas, 2012). Given its potential to promote critical examination of emotions, I propose that integrating critical emotional praxis into transformative learning experiences can support White preservice teachers’ anti-racist development through explicit and intentional emotional work that facilitates using the emotionalities of Whiteness for social justice.

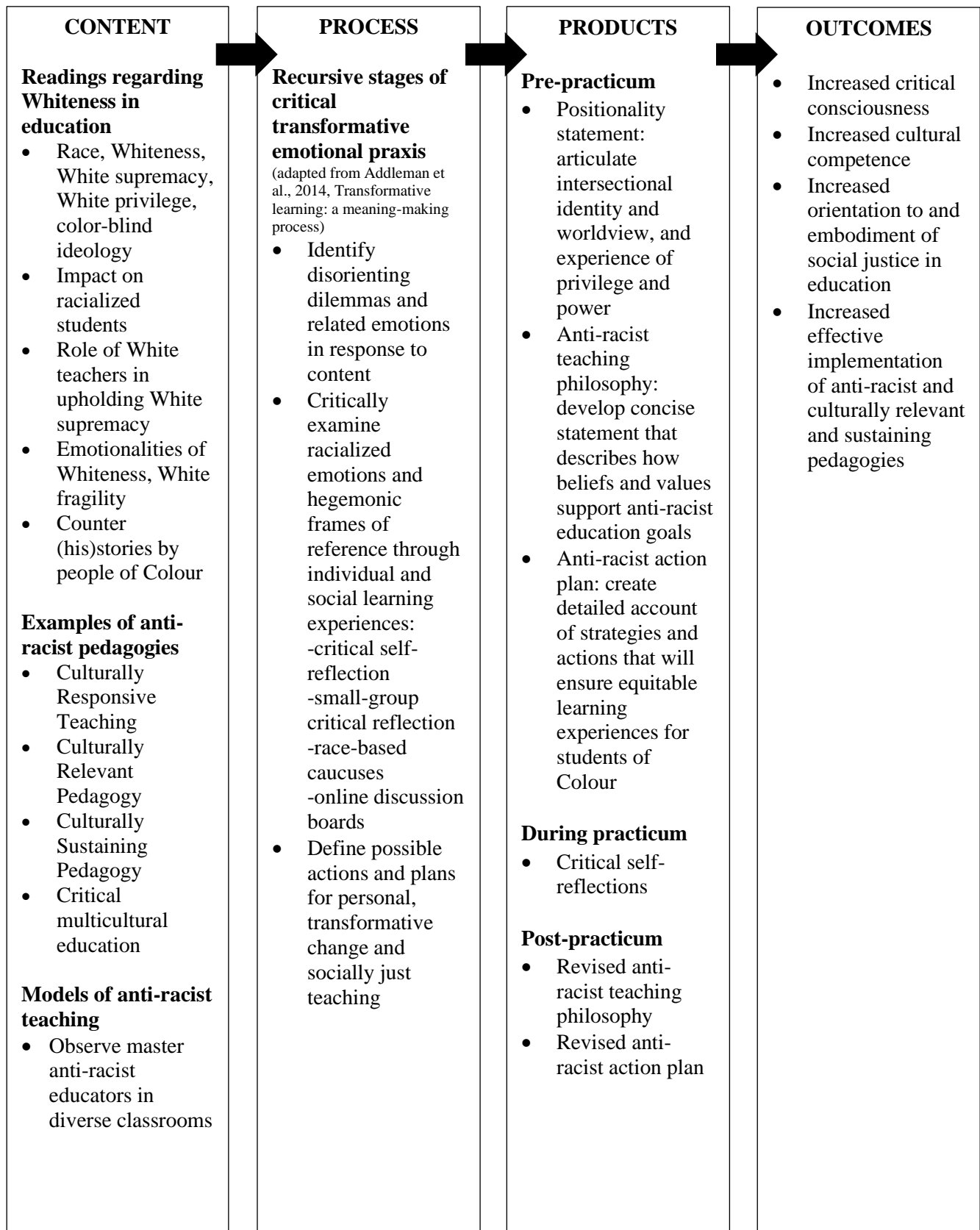
Critical transformative emotional praxis: A theory of change for teacher education

In the following, I advance a theory of change that marries transformative learning theory and critical emotional praxis to promote White preservice teachers’ anti-racist development. I propose that integrating critical transformative emotional praxis into White preservice teachers’ education program can activate a transformation not supported by existing teacher education programs that include some content and pedagogies aimed at developing anti-racist educators. This theory of change builds on the components of teacher education programs that have proven effective in developing the knowledge, skills, and dispositions that can support the embodiment and enactment of anti-racist pedagogies; however, through inclusion of content and pedagogical practices that facilitate critical transformative emotional praxis, I propose this theory of change goes further towards ensuring that White preservice teachers’ learning experience is meaningfully transformative and a catalyst for social change.

Synthesized from theory and research, the Theory of Change for Critical Transformative Emotional Praxis in Teacher Education (see Figure 1) specifies the content, process, and products that can be integrated into existing teacher education programs to promote preservice teachers’ anti-racist development. First, drawing on the research and scholarship of several scholars (see Buehler et al, 2009; Gay, 2018; Ladson-Billings, 1995; Leonardo, 2009; Levine-Rasky, 2000; Matias, 2016; McIntosh, 1988; McIntyre, 1997; Paris, 2012; Picower, 2009, 2021; Schick & St. Denis, 2003; Sleeter, 2001, 2008; White, 2012), the specified content includes readings about Whiteness in education, examples of anti-racist pedagogies, and models of anti-racist teaching. Second, the theory of change conveys a transformative learning process adapted from Addleman and colleagues (2014) that is infused with elements of critical emotional praxis (Zembylas, 2008, 2012) and other learning strategies that promote meaning-making and learner transformation. These include the identification and analysis of a disorienting dilemma (Mezirow, 1978, 1981, 1990; Resch, 2022), critical reflection (Dyce & Owusu-Ansah, 2016; Mezirow, 1978, 1981, 1990), race-based caucuses (Picower, 2021; Varghese et al., 2019), and social learning (Resch, 2022; Ukpokodu, 2009; Woodrow & Caruana, 2017). Importantly, the third part of this recursive process has learners start to define an action plan for transformative change and socially just teaching which captures several action-oriented phases from Mezirow’s (1978, 1981) transformative learning theory. Third, in line with Sleeter’s (2001, 2008) emphasis on the importance of preparation in the classroom, the theory of change identifies products of learning for before, during, and after preservice teachers’ practicums. To aid in the identity work critical to developing anti-racist educators (Varghese et al., 2019), as well as the critical work that supports transformative learning (Mezirow, 1978, 1981, 1990), pre-practicum products include a positionality statement, an anti-racist teaching philosophy, and an anti-racist action

plan. These products are then reflected upon in relation to practicum experiences and revised following practicums. Finally, the theory of change includes hypothesized outcomes for beginning teachers suggested from the research including increased critical consciousness, cultural competence, social justice orientation and embodiment, and effective implementation of anti-racist and culturally relevant and sustaining pedagogies. Although not defined in the theory of change, it is important to note that the content, process, and products specified need to be facilitated by teacher educators who have interrogated their own relationship with Whiteness and its impact on their philosophy of teaching and practice (Chinnery, 2008; Galman et al., 2010; Picower, 2021). Moreover, to prevent undue harm to teacher educators of Color, it has been suggested that this work be conducted by White teacher educators with their White teacher education students (Chinnery, 2008; Picower, 2021; Varghese et al., 2017).

Figure 1. Theory of change for critical transformative emotional praxis in teacher education.



Conclusion

Urgent calls for social justice ring out across Canada and other Western nations where White supremacy continues to permeate social and economic systems. Central to achieving the abolitionist and decolonizing aims of social justice is an equitable education system (Tuck & Yang, 2018) featuring educators prepared to embody and enact anti-racist and culturally sustaining pedagogies (Giroux, 1992; Paris, 2012). However, teacher education programs struggle to offer adequate preparation to develop anti-racist educators (Howard, 2006; Ladson-Billings, 1999; McGregor et al., 2015; Mujawamariya & Mahrouse, 2004; Sleeter, 2016). Indeed, making the requisite changes to White preservice teachers' perceptions of race, racism, and White supremacy that would enable their adoption of anti-racist pedagogies has proven particularly problematic (Buehler et al., 2009; Hill-Jackson, 2007; Matias, 2013; Solomona et al., 2005). Yet, there is research and theory to suggest that promoting transformative learning and opportunities to critically examine racialized emotions can support White preservice teachers' anti-racist development. The Theory of Change for Critical Transformative Emotional Praxis in Teacher Education described herein outlines theory- and research-informed content, processes, and products of learning that can help address Whiteness during the critical period of educator ontogenesis that occurs in teacher education programs. In so doing, teacher education programs can make more intentional and meaningful progress toward their goal of developing anti-racist educators prepared to achieve the aims of social justice in education.

Appendix

Positionality

As a White, female educator preparing for a career in educational research and teacher education, I have a responsibility to learn how I might better prepare preservice and practicing educators to meet the aims of social justice and equity in education. To do so I must first acknowledge and articulate my positionality within the parameters of White supremacy and Whiteness in education. When I entered a teacher education program over 20 years ago, I was the quintessential White female that has and continues to dominate the teaching profession (Picower, 2021). Typical of White educators, my motivation to teach was fuelled by a desire to help all children reach their potential and help create a better world (Schick & St. Denis, 2003). The naïveté evident in this quixotic fantasy was further fuelled by both color-blind racism (Bonilla-Silva, 2021) and a White saviour mentality (Aronson, 2017) that I was completely unaware of at the time. Two decades hence, I have experienced immense growth in my awareness and understanding of White supremacy and systemic racism, and how they are propagated in society via Whiteness ideology in education. Moreover, I recognize my responsibility as an educator is to students of Colour first (Picower, 2021); thus, I am compelled to focus my teaching and scholarship on helping prepare anti-racist educators capable of embodying and enacting the culturally relevant and sustaining pedagogies that can help realize an equitable education for all. In so doing, I make an intentional shift from charity and saviourism to solidarity and anti-racist action.

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INVESTIGATION OF EXPERIENTIAL LEARNING PRACTICES IN K-12 EDUCATION

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Abstract

Experiential learning is a teaching strategy and theory that emphasizes the individual student's experience in the learning process. This approach critically links education with personal experience, recognizing that students achieve superior learning outcomes through experiential methods. While extensive research has demonstrated the effectiveness of experiential learning, significant gaps remain in understanding how to evaluate and measure its implementation in K-12 settings. Assessment challenges persist in measuring both process-based learning outcomes and the effectiveness of teaching practices. Although experiential learning frameworks exist for higher education and professional development, their application to K-12 education presents unique challenges due to differences in student developmental stages and curricular requirements. Current literature primarily focuses on student progression through experiential cycles but provides limited guidance for K-12 teachers on implementing and evaluating experiential learning methods within standard curriculum frameworks. This research identifies areas for further exploration in K-12 experiential education and provides a foundation for developing practical supports to facilitate meaningful experiential learning in K-12 settings.

Keywords: experiential education, assessment, K-12, critical reflection, Dewey, Kolb, experiential learning model

Introduction

Experiential learning (EL) is a broad category that includes inquiry learning, problem-based learning, land-based teaching, and many other subsets that intentionally place students in an environment where learning occurs through direct experience. While Kolb's (1984) experiential theory laid the foundational framework for understanding learning through experience, more recent developments (Matsuo & Nagata, 2020; Kolb & Kolb, 2018) have further refined these concepts. There is no direct EL connection to K-12 education that demonstrates the specific use or the ability to gauge the effectiveness of EL methods on student learning. According to Burch and colleagues (2019) experiential learning methods have a significant impact on student learning. Their meta-analysis of journal articles, dissertations, thesis articles, and conference proceedings concluded that students experience superior learning outcomes when experiential learning methods are used by measuring their effectiveness using Cohen's *d* (Cohen, 1988), a statistical measurement that helps determine how substantial the difference is between two groups, in this case, showing how much more effective experiential learning was compared to traditional approaches. Of the 13,626 studies examined, K-12 education was not explicitly mentioned; the literature focused primarily on experiential learning in post-secondary and alternative education settings. Therefore, further investigation specific to the context of K-12 education and the development of theories and frameworks specific to the context of K-12 education is required. There is little published research on the assessment methods associated with experiential learning (Wilson et al., 2018). However, some authors report empirical findings related to learning from experience—specifically that experience can teach a broad spectrum of competencies—raising questions about the experiences through which lessons can be taught (Spreitzer et al., 1997). No systematic K-12 education model for educators of experiential learning exists.

To better understand experiential learning in K-12, this research aims to provide insight from educators on their facilitation of these learning experiences. This paper provides educators with insights into effective experiential learning implementation and assessment methods in primary and secondary classrooms, emphasizing their impact on student learning. The most prevalent experiential learning framework, Kolb's model (1984), was developed for adult learning and fails to consider social relationships, critical reflection, and goals (Matsuo, 2015; Miettinen, 2000). This research aims to support the future development of a new framework of experiential learning by establishing the theoretical foundation for a K-12 education model based on holistic characteristics such as social relationships, critical reflection, and goals. The findings can help develop a framework or assessment tool specifically tailored for evaluating the implementation and effectiveness of experiential education in primary and secondary classrooms. This tool could be used by researchers to study experiential learning outcomes, as well as educators to assess and refine their own experiential teaching practises.

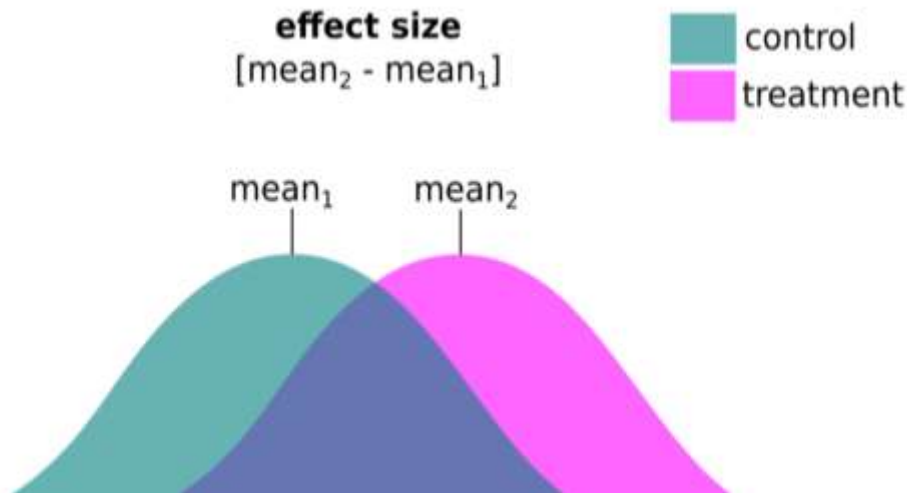
John Dewey, the father of experiential learning, is widely regarded as the source from which all experiential learning frameworks and models originated, beginning with his 1938 book *Experience and Education*. His research establishes a base understanding of the relationships between students and educators and emphasizes the critical reflection of the students' learning experience. While Dewey's theoretical framework remains foundational to experiential learning practices in K-12 education, systematic evaluation of its implementation is notably absent from

current literature. Particularly, research in K-12 experiential learning that includes both a treatment and control group is non-existent. Furthermore, analysis of the assessment methods of experiential education approaches within the K-12 range of experiential assessment does not exist. In contrast, post-secondary focused research has identified 89 studies of experiential learning that included a treatment and control group (Burch et al., 2019). Additionally, no K-12 study mentions specific assessment methods, as Wilson, Yates, and Purton (2018) note, “journals, reports, group projects, presentations, self-evaluation, etc., many courses still rely on traditional assessment formats such as tests and quizzes” (p. 2). In their meta-analysis, Burch et al. (2019) classified the 89 studies under analysis into only two broad assessment categories: objective measures (such as test, scores, and grades) and subjective measures (such as self-reported learning and satisfaction surveys), thus reaffirming the need for additional research that explores assessment approaches and their impact on experiential education.

Kolb’s model (1984) has been synonymous with experiential learning across multiple fields. However, his model is controversial as it was initially created to complement the development of the Learning Styles Inventory for the business community (Miettinen, 2000) and may not be suitable for K-12 education. This research will inform methodology for K-12 educators resulting in a more complete understanding of practical, experiential learning methods and assessments that they may wish to incorporate into their courses.

Problem Statement

What is known about experiential learning is its profound impact on student learning. From John Dewey to David Kolb there is no question that experiential learning positively contributes to the students’ learning experience. To fully understand K-12 educators’ assessment methods in experiential learning, both quantitative measures and qualitative insights are needed, as the latter can capture inherently subjective aspects of experiential education, while the former provides measurable outcomes. Two scales were identified during review: Cohen's *d* (Cohen, 1988), and John Hattie’s scale of effectiveness (Hattie, 2012). Cohen’s *d* is found to be prevalent in peer-reviewed academic journals where Hattie’s scale is found to be popular among K-12 educators. Studies using Cohen’s *d* (1988) to estimate and describe the effect of experiential learning on learning outcomes found that EL methods resulted in nearly a half standard deviation higher in their effectiveness ($d = .43$) when experiential learning pedagogies were deployed (Burch et al., 2019; Kolb, 2014; Kuh, 2008). Burch et al. (2019) employed Cohen’s *d* (1988) to estimate and describe the effect of experiential learning exercises on learning outcomes. This metric allows for reporting the standardized mean difference (Cohen, 1988), and Cohen’s *d* is a standard metric used in meta-analysis (Borenstein et al., 2021).

Figure 1.1 Cohen's *d* (Héroux, 2017).**Figure 1.2** Cohen's *d* equation (Héroux, 2017).

$$\frac{\text{mean difference}}{\text{standard deviation}}$$

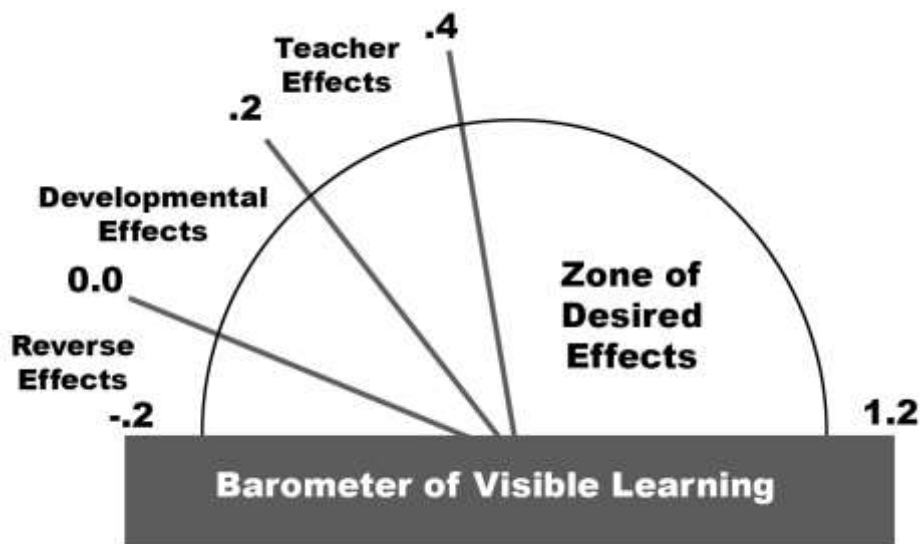
or

$$\frac{M_2 - M_1}{\text{pooled standard deviation}}$$

According to Borenstein et al. (2021), Cohen's *d* is a commonly used metric in research but may confuse K-12 educators who are more familiar with John Hattie's scale of effectiveness from his 2012 book *Visible Learning for Teachers: Maximizing Impact on Learning*. Using Hattie's barometer of effectiveness, the effect size is determined by a meta-analysis of specific factors such as the factor of constructivist teaching resulting in an effect size of 0.64 (Hattie, 2021), or feedback (reinforcement and cues) with an effect size of 0.92 (Hattie, 2021) which means educators who utilize these factors within EL would have the potential to considerably accelerate student learning. In K-12 education circles, John Hattie's research on 'visible learning' and his effect size scale (2012) have both become a widely recognized framework. K-12 educators commonly use Hattie's terminology of 'effect size' to evaluate and discuss the impact of various teaching strategies. His scale has become a practical tool that helps educators, understand and communicate the relative effectiveness of different educational interventions. Although the two scales of effectiveness are similar, the measurement of experiential methodologies with the effect size of ($d = .43$) results in a medium impact on student learning or "superior" as described by Burch et al. (2019). This analysis achieves a higher rating on Hattie's (2012) scale of effectiveness when deconstructed into the elements that make up EL, specifically

constructivist teaching and feedback. Further investigation is needed to determine how researchers can best utilize these two scales when studying K-12 experiential learning. While Cohen's *D* is prevalent in academic research and Hattie's scale is familiar to K-12 educators, understanding how to bridge the two measurement approaches could help translate research findings into meaningful guidance for classroom practice. Specifically, examining how Burch et al.'s (2019) effect size findings align with Hattie's visible learning scale could help contextualize experiential learning impacts within a framework that resonates with K-12 Educators.

Figure 1.3 Adapted from Hattie's barometer of effectiveness (Hattie, 2012).



What remains unknown is which experiential teaching approaches (such as reflection protocols, hands-on activities, or guided inquiry) most effectively support K-12 students in achieving deeper understanding of learning outcomes. Furthermore, we need to better understand how success and experiential learning could be measured beyond traditional academic metrics, considering factors like student engagements, skill development, and transfer of learning to real-world contexts. When K-12 educators understand why specific experiential learning activities succeed in achieving learning outcomes they can better evaluate and adapt their teaching practices. This knowledge will ultimately strengthen the design of future courses and programs.

Various K-12 educational programs and teaching approaches incorporate experiential learning principles. These include service-learning initiatives, land and environment-based education programs, practical education courses, and inquiry-based learning classes, all of which draw from John Dewey's theories of constructivism and experiential learning frameworks. Experiential learning is active learning where the learner is physically engaged in the process of learning and reflection. As Dewey described in 1938: "Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning results naturally" (p. 45). However, defining experiential learning as a single theory has led to debate in the literature as there are many ways that scholars interpret how students learn. Kolb (1984) stated that learning is "the process whereby knowledge is created through the transformation of experience" (p. 41). Dewey argues that learning comes from transformation from reflecting on

the experience (Dewey, 1938). Therefore, it is essential to reframe the experiential learning debate to focus on learning outcomes. The field of quantitative research regarding assessment methods of experiential learning in K-12 education remains largely unexplored. While notable contributions have been made in qualitative studies, such as Heinrich and Green's (2020) work on experiential learning design and assessment and Nolen, Westfall-Rudd, Ferand, and Drape's (2024) evaluation within agricultural education, a more comprehensive examination of assessment methods is essential to better support educators and students.

Supporting Literature

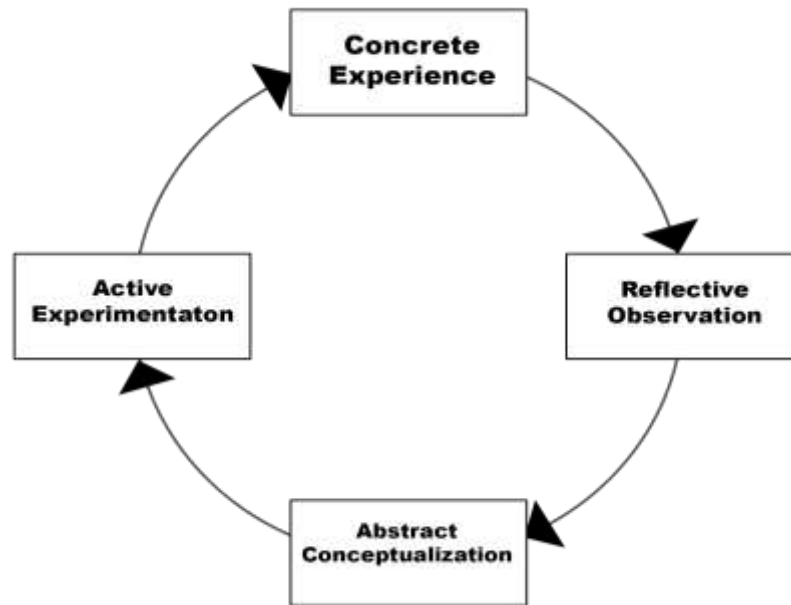
Experiential learning literature frequently identifies John Dewey as its founder, and his 1938 book *Experience and Education* as the fundamental text from which all subsequent theories are derived. It was David Kolb who came up with the first experiential learning theories dating back to 1984. Kolb's work combined Dewey's theory of learning development with the Lewinian Model of Action research and Laboratory Training (Kolb, 1984). Despite the lack of evidence of suitable studies in K-12 education, Burch et al. (2019) provides the basis of research conducted at the post-secondary level in the form of meta-analysis. Presented below is an overview of the relevant theories, studies, and gaps associated with experiential learning literature.

The contemporary conception of experiential learning is based on the work of John Dewey who proclaimed that experiential learning is an essential element of formal education. Dewey (1916) stated that "no experience having a meaning is possible without having some element of thought" (p. 107). His impact on education makes him one of the most influential educational thinkers of the 20th century (Theobald, 2015; Williams, 2017). In the literature and research dating as far back as Dewey's 1938 work, experiential learning has been shown to contribute positively to students' understanding of concepts (Burch et al., 2019; Dewey, 1938; Kolb, 1984; Kuh, 2008).

Kolb's experiential learning theory proposed that we are capable of learning naturally, providing an example of how an experiential learning activity contributes to knowledge construction, transfer, and acquisition. The Kolb model views learning as the internalization of knowledge resulting from personal experiences in particular contexts (Kolb, 1984). It is important to note that Kolb's model is based on his prior work on the Learning Style Inventory (1971). Kolb describes effective learning occurs in four stages:

- 1. Concrete experience:** The learner encounters a new experience or engages in a reinterpretation process of an existing experience.
- 2. Reflective observation:** The learner reviews and reflects on the new experience and identifies any inconsistencies between experience and understanding.
- 3. Abstract conceptualization:** Through the reflective process, the learner creates a new idea/concept or modifies an existing abstract concept – analyzing the concepts and forming conclusions and generalizations.
- 4. Active experimentation:** The learner plans and tries out what was learned and can apply the new knowledge to other situations – conclusions and generalizations are used to test hypotheses; thus, the learner engages in new experiences.

Figure 1.4 *The Experiential Learning Cycle, adapted from (Kolb & Kolb, 2018).*



Throughout the four stages of this model, the learner can take any step and repeat the process to acquire new knowledge. For effective learning to occur, the learner should complete each stage of the model, and no single stage can serve as a learning procedure.

Kolb's model is not without its criticism centered mainly on his interpretation of Dewey's original theory of experiential learning. Kolb's model, according to Miettinen (2000), oversimplifies Dewey's original perspective of experiential learning as a lived experience, particularly regarding how the participant makes meaning of their own experiences. The criticism that surrounds Kolb's work on the experiential learning cycle is a continuation of his prior development of the Learning Styles Inventory. The experiential learning model was first created to manage and gain control over one's own learning through the identification of one's learning style (Kolb, 1976a, 1976b, as cited in Miettinen, 2000). The controversy associated with Kolb's model is also intrinsically linked to his work. Kolb's model was identified as being simplistic and epistemologically problematic (Garner, 2000; Greenaway, 2008; Miettinen 2000). Perhaps the most significant critique comes from Garner (2000) who elaborates that Kolb's theory isn't necessarily wrong but rather lacks any coherent foundation and clear links to psychology; thus, it should be used with caution. While early critiques from Garner (2000) questioned the theoretical foundations of Kolb's work, more recent research such as Matsuo and Nagata (2020) offer a revised model that addresses higher-order learning and developing a checklist for debriefing.

Gaps in Existing Knowledge

Only 89 studies included both empirical treatment and control data in the meta-analysis of Burch et al. (2019). Considering the 13,626 articles included in the literary search, 89 studies is incredibly low and identifies a tremendous gap in research concerning experiential learning.

The study by Burch et al. (2019) noted the gap in the literature and lack of research on the topic, noting empirical studies do not often lend themselves well to educational settings despite their obvious importance in promoting experiential learning. This meta-analysis of experiential learning effectiveness indicated no research had been conducted in K-12. Moreover, a meta-analysis data set that only includes assessments conducted objectively or subjectively is limited in its application. To determine which assessment methods engage K-12 students effectively, additional research is needed.

Considerations

Notably absent from teacher training are practical guides and tools in K-12 education for the facilitation of experiential learning, and more specifically, assessments of methods that might be most appropriate for achieving student outcomes.

This paper introduces the concepts and focus of required research to establish a base of methods and strategies used in K-12 educational assessment specific to experiential learning. An essential first step is understanding assessment methods currently used and providing educators with resources and support to select appropriate and effective methods for assessing students' abilities and achievements concerning experiential education. Further research is needed not only to identify which assessment methods may be most supportive of student learning, but also to promote the use of experiential learning in K-12 education. This review has demonstrated a significant need for research in the areas of K-12 experiential learning and specifically the factors which lead to success as outlined in research conducted at the post-secondary level.

Future research in K-12 experiential learning education, particularly studies that compare student outcomes between groups receiving experiential learning approaches (treatment group) and those receiving traditional instruction (control group), will contribute to understanding this area as there are no known studies suitable for meta-analysis. Formative feedback from educators during the experiential learning process, a concept emphasized explicitly by Dewey (1938), was noticeably absent from the research reviewed for this study. Burch et al. (2019) noted that instructor feedback becomes an essential factor for learner motivation but was noticeably absent in how the studies were conducted. Timing of student feedback is a concern for educators as it can be formal or informal; formative and/or summative (Dewey, 1938). Feedback can be applied at different points during experiential learning and for different purposes. The meta-analysis of Burch et al. (2019) relied on Bruner's 1970 definition: "Learning depends on knowledge of results, at a time when, and at a place where, the knowledge can be used for correction" (p. 120). Burch et al. concluded that any feedback received either during the experiential exercise or immediately after will increase students' learning since people seldom learn from their experience unless the meaning is applied. Feedback is an important area related to assessment that is not evident in any experiential learning study in K-12 education.

Conclusion

Students experience superior learning outcomes when experiential learning methods are used (Burch et al., 2019). A significant challenge in confirming these results in primary and secondary education is the lack of empirical evidence in those areas. Of the 89 studies identified

by Burch et al. (2019) which included a treatment and control group, not one was conducted in K-12 education. The Burch research, although very promising, was limited in its analysis of specific experiential assessment methodology—only categorizing it as either objective or subjective—leaving an incredible opportunity for future research focused on specific assessment methods best suited for experiential learning in K-12 settings. The research revealed overwhelmingly positive learning effects from experiential learning, with the majority of empirical studies documenting substantial student benefits (Burch et al., 2019).

A review of experiential learning models identified Kolb's model (1984) as one of the most influential frameworks for understanding experiential learning. Although designed specifically to promote his work of the Learning Style Inventory, it is insufficient in the areas of feedback and reflection when applied to the context of K-12 education. In Kolb's model, the emphasis is placed on the student passing through all four stages. To effectively support K-12 education, the model should emphasize the educator's critical role in designing experiential learning opportunities that enable students to actively participate and apply meaning through intentional reflection (Nolen et al., 2024). Assessment methods of these experiences should emphasize personal connections and exploration of concepts through frequent and personal feedback from the educator. Successful application of experiential learning methods by K-12 educators could potentially benefit post-secondary instructors, particularly regarding students' ability to reflect and make meaning of experiences. Proper facilitation and resources for experiential learning opportunities which align assessment specific to the context of K-12 education is paramount in supporting educators' continued success and enhancing post-secondary learning experiences.

This systematic review has established the current state of knowledge regarding experiential learning in K-12 education, including identifying critical gaps in our understanding. Building on these findings, several essential questions emerge that warrant further investigation through mixed methods research that values both qualitative and quantitative approaches. Central to future work are two fundamental questions: What are the experiences of educators when choosing experiential learning as a teaching strategy, and how do teachers adapt their assessment methods when implementing new pedagogical approaches. The need to address these questions is paramount for advancing our understanding of experiential learning and assessment practices in K-12 education.

These questions point to the need for research that examines educators' lived experiences with experiential learning while also gathering systematic data on implementation practices and outcomes. Such investigations could address several key questions, including the critical components of effective experiential learning strategies, assessment methods commonly employed, and the specific supports educators need for successful implementation. Additionally, exploring how different variables such as teaching experience, grade level, and subject area influence experiential learning practices and outcomes would contribute valuable insights to this field.

Future research in these areas has the potential to bridge the theoretical foundations established in this review with practical applications that can enhance K-12 experiential learning implementation and assessment practices.

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RESEARCHING LITERACY WITH (MARGINALIZED) YOUNG PEOPLE: SOME CONCEPTUAL PROPOSITIONS FROM THE LITERATURE

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Abstract

In this conceptual essay situated in literacy studies, I attempted to map out recent conceptual propositions in researching with young people. Whilst these propositions came about from research with youth in general, I paid particular attention to research with marginalized young people such as immigrant youth of colour, Black youth, Indigenous youth, and young people who identify belonging with the 2SLGBTQ+ community. Drawing on emerging themes from the literature, I developed three categorizations of these conceptual propositions, namely, ecological and sociomaterial orientations of literacy studies, transborder literacies, and literacies as public medium for communal desirings and resisting. This paper aims to consolidate these concepts to facilitate ongoing discussions in the field, rather than providing a comprehensive overview or systematic literature review.

Keywords: research with youth, sociomateriality, transnationalism, immigrant literacies, stories and counterstories, literacy research concepts

Introduction

Literacy researchers share enthusiasm regarding investigating the literacy activities of learners both in formal classrooms and out-of-school settings (Barabas, 2023; Deroo & Watson, 2020). By so doing, scholars also advocate for the expansion of the meanings of literacy while similarly understanding it from the lens of various poststructuralist and critical theories. With this goal, along with deploying non-traditional and arts-based methodologies, literacy research concerning the lives of marginalized youth such as immigrant youth of colour, Black youth, Indigenous youth, and youth who identify belonging with the LGBTQ+ community is proliferating. Some works in this area look at the historical dimensions of immigrant youth's home countries when attempting to understand their literacy practices in the new country (Jiménez et al., 2015) and some scholars call for the use of poetry to convey identities and interrogate social issues and injustices (Jocson, 2005; 2011) along with the utilization of social media (de los Ríos, 2020; Lemieux et al., 2022; Wargo, 2017). There is also no dearth of studies that look at immigrant youth's translingual practices outside and after school contexts (Burton, 2023; Daniel, 2018; Smith, 2020; Watson & Knight-Manuel, 2017). Some work has explored the influence of social spaces or institutions on youth's literate lives, for instance religious institutions (Ek, 2019; Pacheco & Morales, 2019; LeBlanc, 2017). Recently, there is also a growing number of projects that highlight partnerships between organizations and school communities to solidify creative literacies (for example, hip-hop literacy) in formal schooling contexts (Gage et al., 2019), in addition to using digital stories of immigration to enrich educational programmes (Low, 2015).

Given the multitude of domains in the field of literacy studies, the goal of this essay is to map out these conceptualizations, thereby providing an overview on recent theoretical and conceptual propositions. In what follows, I offer three categorizations of these conceptual propositions, namely, *ecological and sociomaterial orientations of literacy studies*, *transborder literacies*, and *literacies as public medium for communal desirings and resisting*.

Ecological and Sociomaterial Orientations of Literacy Studies

Towards Decentering the Humans

Expanding on the theorization that literacy should be viewed from a social and cultural perspective (Ku et al., 2015; Linares, 2020; Wood, 2023), scholars have put forward the argument to decenter humans from inquiry. The current ecological and sociomaterial turn in literacy studies (Bhatt & Roock, 2013; Burnett & Daniels, 2019; Kalan, 2024) advocates for giving equal value to objects, felt forces, and the environment where literacies are enacted, mediated, and challenged. This is because these entanglements of bodies and objects produce new realities (Zapata et al., 2018), and material platforms are needed for literacy to come into being (Villacañas de Castro et al., 2020). Such reimagination and reconsideration of our understandings of diverse entities as they come into concert with worldly relations (Zapata et al., 2018) may reveal further insights on how economic and political structures shape rhetorical practices (Kalan, 2024) and thus, in a broader sense, literacies engagements. However, while series of human encounters in space and time are often dictated by structures and institutions, they are not always driven by necessity (Baynham, 2017). Interpreted in the context of literacy

instruction, this means that the hyperfocus on functionality (for example, language, genre production) fails to capture the sociomaterial and affective processes that significantly impact the enactment of learners' organic literacies.

These entanglements of humans, non-humans, and more-than-humans which produce new realities, knowledges, and literacies may be analyzed not as interactions but intra-active relationships (Zapata et al., 2018). Barad (2007) prefers to call this relationship "intra-action" instead of interaction to emphasize that "meaning ...emerges through a constant interplay within context" (Liaw et al., 2023, p. 199) and in effect "it forces us to consider what might be and what might have been missed or excluded" (Zapata et al., 2018, p. 482). Intra-action is the suspension of boundaries between bodies in an activity (Ehret et al., 2016) and when literacy is conceptualized this way, all materials involved function "together to co-produce meaning in the ongoing flow of experience and entanglement of agencies" (Ehret et al., 2016, p. 348). The conceptual framing of intra-activity therefore troubles the notions of agency as human-centric, highlighting instead its dynamic nature (Zapata et al., 2018) that is provoked by multiple forces (for example, digital tools) that are inherent in human's literate practices (Bhatt & de Roock, 2014). For Barad (2007), these practices "do not reveal what is already there" (p. 361), but what is exposed is the outcome of the intra-active engagements of human's participation. In this case, literacy phenomena emerge through specific intra-actions which, Barad argues, do not require cognizing minds to exist but instead are material phenomena that surface through entanglements of (non)materials and actions.

A Non-Representational Theory

It is for this reason that Ehret (2018) calls for a nonrepresentational theory of literacy events through the lens of relational transformation, affective tonality, event-time, and desire. By relational transformation, Ehret (2018) refers to the act of becoming and the consciousness of the individual as they go through the literacy events. In terms of affective tonality, the focus is on the "qualification of events- soothing, care, fright, embarrassment" (p. 572). Put simply, it is the tone of the affective moment. On the other hand, event-time is what binds both relational transformation and affective tonality and it is through the entanglement of these two entities that moments are being sought. This leads finally, for Ehret, to desiring. Put simply, desiring is looking for answers to questions through actions (for example, writing, speaking, and reading). However, it is not purely representational. Beyond these literacy events, there is a sense making in light of what matters in life.

Because the post-humanist concept of intra-activity is interested in the entanglements of human bodies and material objects, such conceptualization can be seamlessly applied in the context of digital (multimodal) literacies, particularly marginalized youth's engagements. We already know that, from the lens of multiliteracies, marginalized youth leverage their various literacies in order to engage in multimedia manipulation, thereby developing criticality in exploring various dimensions of their identities (Bigelow et al., 2017; Cingel et al., 2019; Daniel, 2018; Lam & Rosario-Ramos, 2009; McLean, 2010; Stewart, 2013). By situating literacy in this regard, we develop lenses into how these youth draw from multiple linguistic and semiotic resources to portray themselves and how they navigate diverse networks (Lam & Smirnov, 2017).

Research has also shown that understanding literacies in the context of multimodality transcends representations of material objects and that the human body is co-equally responsible for generating tensions that may emerge from these material engagements (Burton, 2023; Lenters, 2018; Pyo, 2015; Watts-Taffe, 2022). For instance, immigrant youth's multimodal literacy practices bring together their diasporic identities and reveal different forms of tensions (Honeyford, 2014; Melo-Pfeifer, 2021). Whilst research on multimodal digital literacies reveals how youth leverage their digital literacy practices and participation in both online and physical spaces, Darvin (2023) cautions that there are missing components here. Drawing on ecological approach, he similarly aligned his views with sociomaterial ideations that cognition and agency are distributed across the body, the environment, and the availability of materials or resources in a given space and time. Centering his inquiry on Filipinx learners who had unequal access to resources, and utilizing materialist semiotic lens to investigate their engagement with different tools, Darvin (2023) proposed conceptualizing design as sociotechnical structures. That is, while digital designs may offer learning opportunities, they are also platforms of inequity since it may cause constraints in literacies engagements. This corroborates the claim that meaning-making and other aspects associated with literacies such identities, power, and privilege are laden with inequities that are "entangled with/in non/human sociomaterial force relations" (Dernikos et al., 2023, p. 170). For Darvin (2023), attending to the ways in which resources determine access to information may transform literacy instruction such as that taking digital platform design as an assemblage of sociotechnical structures may allow learners to "recognize to what extent tools can shape our behaviour" (p. 41).

An Ecology of Literacy Practices

As literacy events and the structures that mediate their enactment occur in a localized environment, it is co-equally important to take a conceptual stance that considers the ecology of practices. Bhatt and de Roock (2014) opine that carefully attending to these practices, such as "contestations, impasses, breakthrough" (p. 6) would surface our understanding of how sociomaterial relations are materialized and enacted. This would also allow us to trouble traditional or habitual ways of approaching literacy activities (Burnett et al., 2019, such as those conceptualizations that emphasize sociocultural relations or participatory cultures. For Burnett and colleagues (2019), acknowledging the sociomaterial relations that maneuver and emerge across time and space might significantly contribute to how we account for social injustices that permeate our social structures. Thinking about these assemblages in an ecology of practice could contribute to our understanding of how our use of objects, in terms of their cultural agency, might highlight how space and materials are claimed and re-claimed as they are assigned meaning (Burnett & Daniels, 2019) in spaces that are not neutral and where matter is understood to have agency (Gravett, 2020).

This meaning-making, in turn, may present envisioning of various future possibilities, which according to Compton-Lilly and colleagues (2022) is subject to revision, reiteration, and rejection. We see an example of this in critical digital literacy studies that capitalize on identity work and activism such as in Shrodes' (2022) conceptualization of queer political feeling and Coleman's (2019) elucidation on queer futurity and the digital age. Moreover, recently, conceptualizing literacies in algorithmic cultures (Ehret 2024; Low et al., 2023) from the lens of sociomaterial and affect theories is starting to emerge in order to further understand contextual

ecology of practice. For instance, Ehret (2024) postulates that critical literacies in these cultures are driven by processes of “human-machine feeling-thinking that cannot be reduced to rational critiques of ideologies, platform capitalism or other forms of power alone” (p. 1).

As we can see, within this ecology of practices there is a widening definition of literacy, and it pushes the boundaries of conceptualizing agential notions. Thiel (in Zapata et al., 2018) brings into the conversation the conceptual framing of porosity, trans-corporeality, and liveliness by looking into young people who are spontaneously creating, doing, or making something. Situating theory making within the posthumanist epistemology, conceptually framing literacies as a trans-corporeal phenomenon removes the division of the biological or human activities from other bodies—that is material objects. Borrowing from Alaimo (2010), Thiel argues for permeability that takes into consideration interconnections, interchanges, and transits between bodies and non-human objects as they participate in an emergent literacy event. Similarly echoing Ehret’s (2018) argument that writing materializes through bodily experiences and that “material works on mind and mind on material” (p. 564). Thiel argues that trans-corporeal writing bodies allow stories to emerge and that these stories were made possible not only by obvious bodies but also by other dimensions that were not physically present (Zapata et al., 2018).

In short, although the human body is a tool for writing and a medium that experiences writing (Woodard et al., 2020), materials need to be also understood in the human bodies’ social context and must be taken as “sociomaterial assemblages that can be studied to uncover relationships and power dynamics” (Burke, 2023, p. 110). Taken this way, this leads us to further understand the felt forces of literacy. This can be drawn from the lens of affective atmosphere (Hollett, 2020) and affective imaginaries that may produce new ways of being and reconceptualize what it means to be together (Nichols & Coleman, 2020) in any social spaces.

In this section, I explored conceptual provocations that augment current understandings of the ecological and sociomaterial orientations to literacy studies. These orientations, which center embodiment, material objects, and affects, have (in)direct implications to (re)conceptualizing identities and spaces. This is because as individuals move around, they also carry with them their literacies that may or may not be afforded similar value. Such is especially true for transnational individuals, who may experience both liberation and disengagement as they attempt to recognize their place in the community. In the following section, thus, I explore conceptualizations that reimagine transnational identities in reference to literacies enactment. I will center my exploration on literacy concepts that relate to transnationalism and immigration.

Transborder Literacies: Dismantling Ideological Borders and Normalizing (Un)mediated Crossings

Transnationalism and Borders

Given the transnational background of immigrants, the act of physical and ideological border crossings plays a central role in the ways literacies are framed in relation to understanding constructs of identities and documenting varieties of struggles that marginalized youth and their families experience. In this regard, I find that viewing literacies from the lens of transnationalism

and border thinking reveals new angles into the complex dynamics and more often problematic relationships of humans as well as the failure of the very social institutions that are supposed to center their identities and lived experiences. Whereas there are varying interpretations of transnationalism, I subscribe to the view that it has multiple and multilayered manifestations due to movements across both physical and ideological borders, and that it is an on-going process (Machado & Hartman, 2020; Skerrett, 2012; Taira, 2019). Examples of these multilayered dimensions include languaging, national, ethnic, and political affiliations, navigating online spaces, religious affiliations, among others. There are indeed connections between transnationalism and the development of youth's nuanced global understandings through language and literacy practices (Kwon et al., 2022) not only between their countries of origin and the present host countries, but also through shared colonial legacies. In this case, whilst identity work is at the center of transnationalism, connectivity and social networks are key components for successful literacies engagements.

Perhaps one of the concrete manifestations of transnationalism is traversing borders. These borders are tangible, real, and always the subject of contestations especially when they physically divide nation-states that are of different economic stature or laden with historical and political conflict. However, borders are also ideological (Orellana, 2016) in a sense that they perpetuate values, beliefs, and may put some population at a disadvantage especially when both cultural and physical forces reinforce internalized prejudices. As Orellana (2016) further explains, borders are:

Social constructions that appear far more real than they could ever actually be. They are used to decide what belongs together and to proscribe what should be kept apart. We participate in their construction and enforcement even when we do not know what we are doing so, understand why, or realize their full effects. (p. 2)

This critique is concretized, for instance, in the shaping of literacy education which is often mandated by politicized and ethno-centric legislations. As Kalan (2023) argued, despite progressive discourses for a more inclusive language and literacy education, the guiding ideologies always go back to how states are created, that is through common race or ethnicity and religious identities. This, in essence, has lasting or generational implications for the minority population who will always hold on to their cultural and linguistic identities. Thus, even those who do not engage in physical mobility imagine themselves in connection to languages and cultures outside the boundaries of the nation-state (Kwon et al., 2022).

Border Thinking and Third Space

The undeniable intensification of border crossings, both physical and ideological, led to the transnational turn in literacy studies (Gallo & Corral, 2023; Kwon et al., 2022; Machado & Hartman, 2020; Skerrett, 2012). And although several terminologies and framings have emerged as a result of centering the concept of transnationalism and border thinking, the key ideas direct our attention to physical and ideological crossings of humans and the various types of literacies that are enacted in these spaces. One of the prominent conceptual framings is Anzaldúa's (2012) border theory and border thinking. Anzaldúa's influential work on border thinking (*pensamiento fronterizo*)—which highlights both the physical and imagined boundaries—provides a critical

lens on understanding movement, literacies, and the several social justice issues that arose from these spaces. It emerges from “critical reflections of (undocumented) immigrants, migrants, bracero/a workers, refugees, campesinos, women, and children on the major structures of dominance and subordination of our times” (Saldívar, 2006, p. 152). The concept was theorized out of the nature of borderlands, which, for Anzaldúa (2012), have their own unique culture that is formed out of its unique space between first world and third world.

One of the ways to understand the concept of borderlands is to look at it from the lens of youth and their schooling experiences. For instance, transnational youth do not fully identify with the cultures and values of both sides, which are perceived to be dominant “principles, ethics, and ideals of popular culture” (Kazanjian, 2011, p. 372). These young people’s unique position is a powerful central focus of inquiry and the reflections derived could contribute to decolonizing citizenship because they can “capitalize on the insights of their outsider status and create new collective identities that are not tied to the nation-state and its hegemonic social formations” (Dyrness & Sepúlveda, 2020, p. 182).

The emphasis on *pensamiento fronterizo* or border thinking and the centering of immigrant youth’s in-betweenness and unique identity positioning strengthens the sociological construction of third space. The concept of third space refers to how minority populations reclaim their identity in order to speak back to the stereotypes propagated by first space (Bhabha, 1994). The first space is dominated by the majority group and is imposed on minority groups, while the other space refers to where the minority groups see their actual culture (Benson, 2010). Within these third spaces, minoritized youth’s interactions emit mutual attention, harmony, conflict, and disruption that are similarly provoke by language, topics, and interactions (Gutiérrez, 2011).

This has been applied to literacy studies, especially in the context of transnational youth. For example, Linares (2020) proposed the term “transborder writing space” where one could develop personally and academically. It has been theorized that such space allows youth to enact their agency in making decisions to translanguage, engage in multimodal writing, and use familial knowledge (Linares, 2020). However, understanding border literacies is not simply confined to re/deconstructing what is tangibly produced by marginalized youth. Along with questions on representations through authoring their identities for tangible portrayal (Kwon et al., 2022), agency as a form of invisible force remains unexplored. I found Gallo and Corral’s (2023) framework on transborder literacies of (in)visibility as more encompassing when it comes to understanding diasporic people’s innovative interactions with both texts and society in general. This is because in addition to acknowledging the strong influence of racializing immigration processes, they positioned institutions as mutually unintelligible, requiring hybrid types of transborder literacy practices (de la Piedra, 2010). Situated in the complex immigration policies of the United States, Gallo and Corral (2023) argued that “individuals develop literacy practices of (in)visibility as they navigate when and how to be recognized by, or remain outside the sight of, government authorities” (p. 104).

Indeed, such political tension that looms over immigrants due to their or their family’s immigration status calls for recontextualization of texts and literacy practices (de la Piedra & Guerra, 2012). This is concretized by the concept of border crossing biliteracies (Nuñez, 2023),

which was proposed to understand how children and youth read and write the world. For Nuñez, language and literacies are more than just distinct monolingual systems of reading and writing skills. Language and literacies are also about navigating and thriving despite facing numerous oppressive systems and practices that exclude youth and families through such notions as immigration, nationality, and language use. It is important to note that in Nuñez's theoretical conceptualization, she positioned these youth and families as subaltern communities who are capable of using their experiences of reading and other textual engagements to agentively imagine and rewrite the "multiple and in-between worlds" (Nuñez, 2023, p. 478) that they actively inhabit. I find such positioning complementary to Gallo and Corral's transborder literacies of (in)visibility in a way that despite the population's desire to remain unnoticed in some aspects of their literacies engagements, they also exercise agency in spaces, situations, and times that call for it.

These concepts, again situated within border thinking, also highlight the utilization of transcultural knowledge (Flores & Saco, 2022; Jones & Curwood, 2020; McNeil, 2021). Such knowledge, which includes information, understandings, and skills, is acquired or constructed through youth's lived experiences and is continuously reconstructed in relation to daily life (Nuñez, 2023). We might surmise that this view is zooming in on the micro-context of literacies engagements in daily life, but in the realm of transnationalism, border thinking, and diasporic lenses; therefore, execution and enactment of transcultural knowledge is seen from a wider viewpoint. In writing, for instance, Leal and Gilliland (2023) argue that it cannot be boxed in a limited context because transnational youth writers are affected by, and affect, macro contexts as they cross borders and congregate in multiple cultural worlds. It is because of these entanglements—that is culturally and linguistically dynamic humans (Entigar, 2021) affecting and being affected by their situated practices and contexts—that Ghiso (2016) argues for "a return to the relationship of temporality to spatiality" to further understand "global patterns of mobility within and across locations while retaining the historicity of particular contexts" (p. 6). Applied to my own work, I can see the relevance of this conceptual framing because immigrant youth's current meaning-making is a complex and dynamic process that is contingent on their histories and practices, and further complicated by dissonances (Ghiso, 2016). Such on-going engagements may also produce new identities, particularly since youth participate in the flows of ideas and engagements that they can use for cultural and political organising (Entigar, 2021).

Transliteracies Framing

In the context of the trans turn in literacy studies, the work of Stornaiuolo and colleagues (2016)—which they called "transliteracies framework"—seems to offer an overarching and comprehensive view on mobility, literacies, identities, and could provide a feasible lens for understanding self-decolonising and healing. Arguing for the need "for theoretical and methodological approaches to explain and study the contingency, instability, and emergence of mobile literacy practices that simultaneously open some opportunities and foreclose others" (Stornaiuolo et al., 2016, p. 70), their framework centers on the paradox of mobility. While other conceptual framings that I have so far discussed primarily center literacy practices, Stornaiuolo and colleagues position mobility as loaded with paradox. Although I am not necessarily distancing myself from the social practice of framing literacies, the transliteracies framework is also something that I would like to associate myself with because, in addition to analyzing how

people's practices can be relationally valued and recognized regardless of context, there is also a closer inspection of how such practices can actually reproduce, intensify, or confront social inequities. The framework, highlighting the paradoxical nature of mobility as its dialectical focus, takes into consideration the configuration of materials, persons, practices, and texts as they dynamically interact within and across various temporalities and spaces. This echoes Ghiso's (2016) arguments to foreground time and space to also problematize dissonances.

Through the transliteracies lens (Stornaiuolo et al., 2016), four tools for inquiry are proposed to be beneficial to trace relational systems of literacies while also accentuating concerns about power and ideology. The first tool is *emergence*. By this, they are referring to the entanglements of cognitive and affective aspects of meaning-making where the researcher is cognizant of the emergent, felt, and mobile dimensions of literate practice in order to develop sensitivities to the paradox of mobility. The second lens is what they called *uptake* which focuses on how researchers can trace ways people's bodies and material, or semiotic objects, respond to one another and otherwise make visible collaborative sense-making processes. In other words, this refers to looking for ways (or methods) to make people's sense-making practices visible as they take into consideration other humans, ideas, feelings, and material things. The third lens is *resonance*, and it is through this tool that "questions about how ideas, practices, symbols, objects, and the like become 'shared' and circulate across spaces and times, even when they do not seem to share direct links or traces to follow" (Stornaiuolo et al., 2016, pp. 80-81). However, in the context of this lens, it is also important to take into account what does not resonate to participants. The last tool is *scale*. This lens allows researchers to trace how a specific artifact moves from its site of production to various spaces of interpretation and how participants participate in scaling practices that situate humans and entities in different relations. It is important to interrogate, in the context of this lens, how hierarchies are constructed and boundaries between humans and things are strengthened.

As presented in this section, literacy can be further understood by reimagining it from the lens of transnational identities and reconfiguring conceptual understandings of borders and borderlands. Because humans are still one of the important elements of this inquiry, their (counter)stories matter. Hence, in the following section, I focus my exploration on conceptual framings that highlight the centering of these voices. In particular, I frame literacies here as medium for the expression of human desires and resistance.

Literacies as Public Medium for Communal Desirings and Resisting

In the third and final section of this paper, I frame literacies as public medium and means for communal desirings and resisting. In this section, I briefly discuss the conceptualization of public because this lens is crucial in understanding how various literacies are enacted and appropriated as medium. I will then connect the concept of public to critical literacy. Because critical literacy is about examining issues of power and encourages reflection, transformative change, and action (Bishop, 2014), I consider other concepts presented here (for example, diaspora literacies and critical racial literacy) as embodiments of critical literacy.

Public vs. Publics

One of the ways to understand how literacies can be a medium for expressing (Comber, 2014; McMillan & O’Neil, 2012) the embodied experiences of the marginalized population who desire change and equity is by viewing it from the conceptual lens of publics (Warner, 2021). Although common understanding of public refers to the general population regardless of race, gender and sexuality, and economic and social status, scholars have problematized and reconceptualized the essence of the term. Warner (2021), for instance, distinguishes the public from a public. For Warner, the former refers to a social totality—that is, what we often consider the general public—whereas the latter pertains to a concrete audience that also has a sense of totality, but is bounded by an event or by shared physical space.

Ervin (2006) argues, however, that there is no such thing as general public, or a unified one in that sense. This is because of, as Ervin (2006) contends, a “rhetorical fantasy” (p. 413) that connotes a citizenry that is both inclusive of ourselves and those whom we deem to be like us, and emphatically exclusive of those whom we deem to be unlike us. Similar to Warner’s concept of a public, she proposed the framing of counterpublics, which is manifested through specific concrete audiences (Rogers, 2016; Warner, 2021). What makes it distinct, however, is that a key component of its conceptual operation is the emphasis on the power difference between members and the larger public (Rogers, 2016). Because counterpublic is a social space created by the reflexive circulation of discourse and is constituted through attention (Warner, 2021), it is also distinct in a sense that its participants share similar lived experiences. They also have similar desirings as a result of the types of marginalization that they experience. It can also be, as exemplified in the work of Rogers (2016), that those who are engaged in public-oriented literacy activities are relationally affected by the circumstances of those who are marginalized, hence they perform enactment of such advocacies. This is similar to local public, a concept proposed by Higgins et al. (2006) to denote a body of interested parties who only come into existence because the participants are willing to lend their attention and participate in the discourse.

The local or counterpublic, however, needs legitimization from their participants. The process of legitimization could be something that is continuously shaped or reconstructed as participants also interminably renegotiate their place in a specific local public. We see an example of this in Rogers’ (2016) work, where youth engaged in zines, films, photojournalism, and performances, which she collectively called aesthetic citizenship. The youth in these multiple projects produced the work as a counter narration to “address local desires, inequities, and concerns within and against transnational spatial awareness” (Rogers, 2016, p. 272), but the possibility of such production was such works do not only tend to examine lived experiences and the social issues that grapple society. These youth are also engaged in re-envisioning their everyday spatialities (Hamilton-McKenna & Rogers, 2020; Rogers, 2016; Rogers et al., 2010). It is important to note that, rhetorically and discursively, there is an acknowledgment of the material, embodied, and collective dimensions of voice (Harvey & Cooke, 2021).

The concept of local or counterpublics is made evident in literacy studies, particularly when the intention of the inquiry is to advocate for systemic change (for example, infrastructure development, educational resources) and countering harmful ideological narratives (for example, racial stereotypes, gender issues, and dis/ability advocacies). Viewed from the conceptual lens of critical literacy, these undertakings are not only seen to challenge hegemonic discourses but are

also designed to interrogate how the self can be redefined in the midst of oppressive social structures and relations of production (Morrell, 2008). In essence, critical literacy is all about questioning, exploring, or challenging the power relationships between authors and readers (Bishop, 2014). By using texts and print skills, youth examine the politics of daily life in relation to their personal, sociopolitical, economic, and intellectual border identities (Bishop, 2014). Engaging in critical literacies, then, involve border crossing in/within texts; therefore, the act of interpretations of texts and print skills is widened in relation to various modalities that youth engage with due to the powerful impact of technology.

Youth and Critical Literacy

At the center of this engagement is meaning making and understanding how youth position themselves in relation to the dynamic complexity their social and virtual world. Critical literacy makes a case for critically literate individuals being able to understand the social construction of meanings that are embedded in texts and its wide definition in relation to the political and economic contexts of such production (Morrell, 2004). In these projects, youth are engaged in speaking back to their chosen publics and perhaps, multiple publics. These literacy activities are enacted, for instance, in the context of religion (Deroo & Mohamud, 2022), race and sexuality (Bean & Dunkerly-Bean, 2020; Jones & Curwood, 2020; Lee et al., 2021; Lee, 2019), documenting and processing prejudices that are experienced due to embodied migrant identities (Alford, 2023; Mann & Lee, 2022; Lee, 2019; Watson & Knight-Manuel, 2017) and accessing higher education (Player et al., 2016).

Because, theoretically, participants in a public engage in “poetic world making” (Warner, 2021, p. 114), it is not a coincidence that in the context of critical literacy and its participatory approaches with marginalized youth, the use of literary analytic tools (Hamilton-McKenna & Rogers, 2020), for instance poetry writing and spoken word poetry, have become a salient and powerful means to speak back. Not only do youth craft poems whose themes resonate with them, they are also able to employ additional languages in conjunction with their developing cultural identity (Jocson, 2011; Jocson, 2005). In the past decade, spoken word poetry has gained its momentum as an invaluable critical literacy tool for speaking back (Call-Cummings et al., 2020; Curwood & Bull, 2023; Desai, 2016). In these modalities, critical literacy skills are harnessed when youth are empowered to interrogate texts and their world (Jones & Curwood, 2020) and critically reproduce and perform texts that are intertwined with their lived realities and imaginaries. Moreover, artistic and creative means of countering prejudices and speaking back have also been appropriated by marginalized youth through hip-hop (Atséna Abogo, 2019; LeBlanc et al., 2016; Lesacher, 2014; Low et al., 2009). Being a form of creative and critical literacy work, hip-hop is a form of resistance that affords youth a space to contest harmful portrayals of their identities (LeBlanc et al., 2016). These forms of reproduction and performances are examples of culturally sustaining pedagogy (Freire, 1968/1970) from which third space may emerge as youth discursively reflect on, grapple with, and make sense of their diasporic identities and experiences (Jones & Curwood, 2020).

Conceptualizing Identities and their Markers

Another dominant framing that characterizes the public as a tool and means for collective imaginings and resisting is from the perspective of race, ethnicity, language, and identities (Kiramba et al., 2021; Omogun & Skerrett, 2021; Smith, 2022; Skerret & Omogun, 2020; Smith et al., 2020). Amongst these conceptualizations, race plays a central role because this is deeply entrenched in our lives and is articulated through various institutions such as legal, financial, health, and education systems (Price-Dennis & Sealey-Ruiz, 2021), with its complications further exacerbated by the transnational identities of immigrant youth. In short, race is a fundamental axis of social organization (Omogun & Skerrett, 2021). Critical literacy tenets that foreground race as socially constructed categories (McLean, 2020) could provide youth spaces to critique and transform sociopolitical systems (Lee et al., 2021; Lee et al., 2022).

One conceptual framing that highlights race and immigration is Black diaspora theory (Gordon & Anderson, 1999). This theory proposes that stories or narratives afford diaspora people participation in the community and the telling of untold stories (McLean, 2012) through writing, co-teaching about self-decolonization, indigenous practices, and civic engagements through political participations. In this conceptual framing, Black youth immigrants are portrayed as intimately bounded by their stories. However, it has been argued that the process and product of storytelling involves a struggle to find the voice not only to talk about one's experiences but also to respond to the world (McLean, 2012). Given the consistent rise of immigration, especially to the western world, there is a scholarly uptake in terms of conceptualizing postcolonial immigrant identities and their intersection with the social construct of race and language. For instance, furthering the conceptualization of Black diaspora identities, Smith (2023) proposed the Black immigrant literacies framework. This framework, offered largely in part to challenge the perception that Black immigrant youth are the new model minority in the United States, highlights how Blackness, immigration, and languages intersect in terms of the population's literacy enactment. Similar to how the model minority myth lumps Asian youth together (Shih et al., 2019; Walton & Truong, 2023; Yi et al., 2022), Smith's framework aims to emphasize the diversity of Black immigrant youth in the, with particular emphasis on the connections of their linguistic heritage and relationship with English. This is because youth within this population came from diverse countries, with some speaking their own versions of English, Spanish, and French in addition to their Indigenous languages. Smith, thus, brings into the framing not only the linguistic challenges that youth face but also raciolinguistic ideologies (Rosa & Flores, 2017) and transnationalism. From these domains, she proposed five elements, namely: claim to the struggle for justice, myth of the model minority, transraciolinguistic approach, local-global, and holistic literacies (Smith, 2023). These elements will be briefly elaborated to show to the intersectionality of diaspora, racial, and transnational literacies.

In addition to framing literacy as a social justice issue, scholars also interpret it based on the historical and social realities of a specific population. In Smith's (2023) Black immigrant literacies framework, the element of the claim to the struggle for justice is centered on the premise that multiliteracies can facilitate "a solidarity across African, Black American, and Black immigrant populations by facilitating an understanding and hope for shared justice based on the history of colonization faced by Black peoples across the diaspora" (p. 28). Theoretically

and practically, this solidarity can be achieved by the literate engagements of the Black American and Black immigrant population, understanding the intersection of their racialized identities as a result of the similarities and differences of their histories. On the other hand, true to my framing of literacy as a public tool for communal desirings and resisting, Smith's (2023) second element centers on a collective debunking of the model minority myth. According to her, this disruption can only be achieved if youth deploy multiliterate practices that counter the "divide-and-conquer racial politics" (Smith, 2023, p. 29) that they face. This involves employing and manipulating modalities that allow them to understand the problematic notion of being designated as superior and inferior. Moreover, because race and language are at the core of this framing, Smith banks on a transraciolinguistic approach, which is the third element of the framework. Through the transraciolinguistic approach, she extends the concept of raciolinguistics (Alim, 2016; Smith, 2019)—the proposition that race and language are intertwined—and raciolinguistic perspective (Rosa & Flores, 2017)—the call to highlight how the individual and the global address the interrelationship of race and language. Her transraciolinguistic approach then centers the intersectionality and criticality of race and youth's literacy through racial, linguistic, and cultural asset framing. Furthermore, still highlighting the affordances of multiliteracies, Smith's fourth element emphasizes the connection of the local and the global in order to make the process of racialization visible to all youth. By enacting literacies that provoke these conversations, the aim is to raise youth who "advocate for one another in ways that reflect their shared understandings of how their bodies, their languages, and their literacies are racialized by societies and systems in various ways depending on context" (Smith, 2023, p. 31). Finally, the last element of the framework, holistic literacies, consolidates other forms of literacies to counter structured or prescribed literacies. In this element, youth leverage their language(s), multiliteracies, and understandings of borders to reread and rewrite their social world. Consistent with literate practices that move youth to reflect on their physical and social worlds, the last element encourages youth to "engage in literate practices that extend their understanding of what it means to be literate and to succeed in life" (Smith, 2023, p. 31). With these elements, Smith's framework consolidates other previous theorization and conceptualization of literacies to architect a lens that centers the literacies of Black immigrant youth.

Stories and Counterstories

In a similar vein and as I have mentioned above, stories, counterstories, and narratives are definitely not new when it comes to centering marginalized voices and helping youth to reconstruct their agency (Curwood & Jones, 2022; Davis, 2018; Pender et al., 2022). Some theories and conceptual dimensions, such as Black and Latina girls writing (Flores, 2021; Flores, 2023b) and pedagogies of the home and community cultural wealth (Flores, 2023a), have allowed scholars to develop and implement critical literacy activities in third spaces in order to capitalize on culturally conscious pedagogies that complement youth's desirings, given their current life trajectory. These works also highlight decolonial perspectives (Torres & Medina, 2023) and involve addressing several publics. Although there are a few conceptualizations that have emerged with these marginalized population at its core (for example, pedagogy of *acompañamiento*, testimonios), in the final part of this section, I will elaborate on a lesser-known form of storying/counter-storying, at least in the North American context.

The Kuwento

One of the ways in which stories and counterstories are conceptualized is from the lens of the kuwento (Jocson, 2008; Jocson, 2009), a framing that highlights Filipino/a/x ethnicity specific storying and meaning making. Drawn from the Philippine folk and oral traditions, Jocson (2008) positions kuwento, or story, as a cultural and sociolinguistic practice mediated by the interactions of multiple parties (for example, students and teachers in classroom settings). Although its loose English translation is ‘story’, for Jocson (2008), kuwento is conceptualized by multiple stories that “(re)shape and contribute to larger discourses relevant to multicultural and antiracist education” (p. 245). Kuwentos, therefore, become public tools that do not only disrupt thinking processes of both insiders and outsiders of a specific public, but also act as destabilizing tactics to trouble stereotypical notions attributed to ethnic or racial identities. The performance and enactment of these kuwentos—that is through uttering or recounting—makes room for exposing hegemonic systems of power and is consequently a political endeavor (Matias et al., 2022).

Important in the conceptualization of kuwentos are community narratives which are generated through ethical and cultural practices that both produce and respect collective care in a space that centers kinship and relationality (Salinas, 2023). Kuwento, therefore, can be considered as both a theory and a praxis (Tintiangco-Cubales & Sacramento, 2009) that methodologically disrupts Western constructs of research due to its emphasis on humanization (Morales et al., 2023) and its centering of the dynamics between the storytellers, the listeners, and the social lay of the land (Reyes et al., 2024). These dynamics, as opposed to one-way storytelling, prioritizes the co-construction of interactionally mediated stories (Jocson, 2008) shaped by broader sociopolitical and historical contexts (Gutierrez et al., 2023). Such mediations allow for critical discourse around identity development (Catalla, 2019; Jocson, 2008) and other struggles to flourish, while also highlighting how participants take ownership of their own narratives to preserve, or at least acknowledge, their cultural values and practices (Salinas, 2023).

It is imperative to acknowledge that kuwentos do not exist on their own. As with other discursive practices and activities, they are socially situated and co-constructed (Jocson, 2008) and aim to make connections between the global and the local (Tintiangco-Cubales & Sacramento, 2009). Because kuwentos primarily highlight transnational people’s lived experiences and since stories are more often tangentially or directly generated and affected by racial constructs, these are potential avenues to hermeneutically explore critical discourses on race (Reyes et al., 2024) and its spatio-temporal interplays (Umel, 2022). Complementing the conceptualization of kuwentos with racial and ethnic discourses, as well as stories on shared histories and identity building, not only surfaces binding forces but also reveals affectations that complicate these discourses (Jocson, 2008).

It is interesting to note though, despite the more often heavy (and negative) discourses that permeate conversations on race and ethnicity, manifestations of kuwentos are framed from an emancipatory perspective and center emotions and relations. Jocson (2008), in her conceptualization, posits that kuwento is foregrounded on the premise of empathy. This essentially means seeing through and understanding someone else’s perspectives. It is through

this empathy and understanding that a discourse participant or storyteller develops their awareness of one's identity and their social reality. As a consequence, they affirm their identity in relation to the construct of others and their social environment which results in empowerment. Finally, and perhaps more importantly, in the process of engaging with these discourses or storytelling, humor is at its core. This emphasis on humor in knowledge-making, identity negotiations, and community building takes entertainment to the forefront of *kuwentos*. Similar to other cultures, humor is an important component of the storying of the everyday lives of the Filipino/a/x. Prioritizing this cultural practice and form of meaning-making through humor "challenge[s] the majoritarian stories of racial privilege" (Solórzano & Yosso, 2002, p. 30) and may also be considered as a form of radical self-care (Salinas, 2023). The conceptual framing of *kuwento* then, with its cultural elements and components mentioned here, could be a form of critical storying and counterstorying deployed by Filipino/a/x to speak back to a particular public.

Conclusion

In this paper, I attempted to synthesize established and emerging conceptual framings that put forward ways to understand, problematize, and take into consideration the complexity of literacy practices that youth deploy. My exploration of these concepts led me to three general categorizations: *literacies as ecologically and materially situated and enacted*, *literacies and their enactment as influenced by both physical and ideological borders*, and *literacies as medium and means for communal desirings and resisting*. In these conceptual framings, there are indeed intersections in terms of how scholars attempt to make sense of and widen definitions of literacies, specifically as deployed by transnational and minoritized youth. Expanding on the general sociocultural assumption that we perform our literacy practices as we participate in our social world, the ecological and sociomaterial framings of literacy aim to move forward from this view. One of my main takeaways from this framing is that materials and other non-human objects, as well as institutional and felt forces, must be taken into consideration as we attempt to rationalize organic engagements of humans with literacies. Secondly, the conceptualizations within these theoretical orientations highlight material entanglements instead of focusing solely on the humans.

On the other hand, through the concepts related to border thinking or pedagogy, theory building within this dimension underscores troubling the notion of time and space, identity construction, and even some harmful aspects of literacy. The notions of ideological borders also lend well to the conceptualization of literacy as medium for communal desirings and resisting. In concepts related to this framing, the binding principle is critical literacies engagements. This can be manifested or produced in various forms, either material or non-material representations. Although the presence of various social issues drives these communal desirings and resisting, the ways in which these are approached are both unique and similar when taken from ethno-racial perspectives. Nonetheless, theory building within this approach aligns with the conceptualizations of entanglements and assemblages.

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TUTORIAL BOOKING AND TRACKING APPLICATION INTERACTIVITY: A MULTIMODAL SOCIAL SEMIOTIC ANALYSIS FRAMEWORK

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Abstract

Electronic texts can be highly interactive. Forms of interactivity, such as hyperlinks, shortcuts, or tags, are not only signs that confer meaning on the e-page but also space for actions and changing textual situations. Here, e-page interactivity and textual interaction become two different realms, making a gap between text analysis and multimodal analysis. This case study aims to analyze the interactivity of the online tutorial booking and tracking application called 'ASP tutTrak' using a social semiotic multimodal framework for text and image analysis. The application is currently used in the Academic Success Center (ASC) of a tertiary level institution in the United Arab Emirates, and it was designed by the Information and Communication team of the same institution. The theoretical framework of the study presents a multimodal social semiotics analysis of sites, signs, and images of the 'ASP tutTrak' application through three metafunctions of communication (Halliday, 1978; Kress and Van Leeuwen, 2006). Since the application under consideration is in the academic domain, this study adapted Chou's (2003) framework for interaction types for learner-interface and learner-content. Analysis of five sample pages indicates that the interactive meaning potentials of the digital text, interface, and content are high, and the application is interactive.

Keywords: application, interactivity, interaction, multimodality, semiotics

Introduction

In one of his interviews, Van Leeuwen explained:

The difference with the new technologies is that they have artificial intelligence built into them. Things that you had to know how to do before can now be outsourced to the machine. This was not reflected in our definition of “medium” in Multimodal Discourse ... There we saw media as purely material, tools and materials. In modern media, the immaterial – knowledge – has become material. (Anderson et al., 2015, p. 105)

The above quote implies that machines can now handle functions that previously required human knowledge and skills. Tasks like data processing or decision-making can be delegated to Artificial intelligence (AI) systems. This is a shift in the understanding of media, particularly in how knowledge and information are represented and utilized.

Through digital platforms, users can write, forward, create, generate, animate, or present texts and give feedback by writing, rating, or sharing. To produce each action, the user needs to act upon the text: to interact. Thus, if interactivity reflects the active relationship between users and e-texts, then hypertextuality is a key mechanism enabling this interactivity. Hypertextuality refers to the structure of digital texts that allows users to navigate non-linearly through interconnected content via hyperlinks. It enhances interactivity by giving users control over their reading paths and often incorporates various media types for a richer experience.

The concept of ‘interactivity’ can be understood in threefold. It can be interpreted as the interaction between two or more people, the interaction between people and computers, and the interaction between people and networks, screens, software, or hardware. Different types of social interactions and human-computer interactivity often conceptualize ‘interactivity’ as an ordinal variable, where face-to-face communication represents the highest level and user-to-system interaction the lowest (Strommer-Galley, 2010). To move from the abstract concept of ‘interactivity’ to its effects, design, and operations, we first need to understand the two phenomena it equally refers to: interaction between users and the application interface, and interaction between users and the content provided within the application.

According to Halliday’s *An Introduction to Functional Grammar*, language is a human communication system and medium for people to model and represent their world of experience, manifested by the element of ‘process’ in a clause. Kress (2010) also gave a similar interpretation of human communication and explained that “communication is focused on social (inter-)action in a social relation of me with others, as my action with or for someone else in a specific social environment, with specific relations of power” (p. 49). So, if the language and communication between humans is an *interactive process and action*, what is communication between humans and computers?

Carroll and Dahlstrom (2021) and Stromer-Galley (2010) explain that interactivity occurs as a ‘product’ when technological features allow humans to interact with a computer system or interface. This would mean producing a message, creating or opening a hyperlink, animating

pictures, annotating texts, filling up surveys, and making graphs, to name a few. Interactivity as a product, consequently, will also be the *affordance* of the medium, which will be activated through the user's clicks or touches to the screen, causing textual changes with every performed step. The *medium* refers to the digital platform or interface of the application that facilitates user interaction. In Adami's (2015) view, the way a museum's interactivity shapes what visitors can engage in reflects how a website's interactivity determines what users can accomplish on that site.

In a 'product' view of interactivity, the user deals with the digital platform: the site and the embedded signs to be acted upon for effects. In other words, the interactivity as a 'product' is the user's interaction with the computer interface and the electronic content. As Chen and Cheung (2022) mentions, "interactivity is defined as the affordance of the text with multimodality to be acted upon, realizing the full capacity of hypertextuality, and thus, meaning-making" (p. 20). As for educational applications, the meaning-making process is embedded in the affordance of interactivity to make the learners' learning process more manageable. This approach highlights the importance of understanding how different modes of interaction within educational applications contribute to constructing meaning for learners. To explain meaning-making as a social practice in the digital platform of academic application and through different modes, multimodal social semiotics is what this study will consider for the theoretical framework. Multimodal social semiotics helps to explore how learners navigate and interpret diverse modes of interaction, considering factors such as individual background, cultural context, and prior knowledge (Kessler, 2022; Ponzio & Deroo, 2023). This perspective acknowledges that meaning-making is not merely an individual cognitive process but a dynamic interplay of social interactions and contextual influences.

This understanding of meaning-making highlights the necessity for the specific elements that facilitate interaction within digital platforms to be examined. By focusing on the semiotic resources available in educational applications, insights will be uncovered regarding how these resources shape learners' experiences. Investigating the interactive features of the 'ASP tutTrak' application will provide insights into user engagement mechanisms and how social and contextual factors influence these interactions.

The research questions guiding this study are the following:

1. What are the interactive semiotic resources of the "ASP tutTrak" application in terms of user-interface and user-content interactions?
2. How do the interactive semiotic resources convey meaning to the user in the "ASP tutTrak" application?

Literature Review

Interactivity in digital educational applications has emerged as a critical factor in enhancing learner engagement and facilitating effective knowledge construction. Van Leeuwen (2005) emphasizes the transformative role of technology. He notes that advancements in artificial intelligence have shifted how knowledge and skills are represented, enabling machines to perform tasks previously reliant on human expertise. Several experts in the field share this

viewpoint and highlight the need to reconsider the concept of interactivity, which can be understood as the active relationship between users and digital texts, particularly through hypertextuality (Ni et al., 2023; Ponzio & Deroo, 2023; Wong, 2019). Hypertextuality is a foundational aspect of digital communication that significantly impacts how information is consumed, understood, and interacted with in educational and other contexts. (Strommer-Galley, 2004. Its non-linear structure empowers users to explore information in a way that suits their individual learning styles (El-Masry, 2024). Moreover, hypertextuality involves linking various pieces of information, whether they are articles, images, videos, or other multimedia elements. These links (hyperlinks) create a web of related content, making it easier for users to find relevant information quickly (Lam, 2014). As Almumen (2023) explains, the ability to interact with hypertextual content enhances user engagement, making the learning experience more dynamic and interactive. This combination of hypertextual navigation and interactive features fosters a more immersive and user-centered experience. Nikonorova (2022) notes that hypertextuality and interactivity enhance the meaning-making process by allowing users to make connections between different pieces of information. As users navigate through hyperlinks, they can see relationships and context that contribute to a deeper understanding of the subject matter.

Each interaction can be seen as a semiotic act where users interpret signs and symbols to navigate and engage with the content. When users interact with digital interfaces, they respond to the information presented and create new meanings through their actions. For example, clicking a hyperlink can lead to a new page that offers additional context, changing the user's understanding of the content, whether textual, visual, auditory, or gestural. Users interact with various modes simultaneously, such as reading a text while watching a video or listening to audio while navigating a webpage. Hence, interactivity empowers users by granting them agency in their learning and meaning-making processes (Kessler, 2022; Ponzio & Deroo, 2023).

While hypertextuality promotes a sense of exploration and discovery, interactivity promotes active engagement with digital content, including clicking links, filling out forms, and manipulating media. As Kessler (2022) explains, users choose how to navigate and interact with content, and with this, they bring their backgrounds, cultural contexts, and prior knowledge into the interpretation of signs.

This aligns with semiotic perspectives that highlight the role of culture in shaping how signs are understood (Kessler, 2022; Lomas, 2019). Different user groups may interpret the same sign differently based on their cultural contexts, making it essential for digital content designers to consider diverse user perspectives. As Wong (2019) notes, interactivity and semiotics together provide a robust framework for understanding how users engage with digital content and construct meaning. By analyzing the semiotic resources embedded in interactive environments, researchers and educators can gain insights into the complexities of user engagement, the processes of meaning-making, and the implications for designing effective digital learning experiences.

As many scholars have highlighted, technological advancements have revolutionized the ways knowledge is represented and accessed, necessitating a re-evaluation of traditional concepts of interactivity (Lawes, 2019; Ni et al., 2023; Wong, 2019). This evolution emphasizes the importance of multimodalities, which refers to the integration and interplay of multiple modes of

communication within digital environments, such as text, images, audio, and gestures (Kessler, 2022). In this context, semiotics plays a crucial role in understanding how these diverse modes function as signs that convey meaning (Lawes, 2019).

By integrating multimodalities and applying semiotic analysis, educators can better understand how diverse signs and modes of communication shape meaning-making processes. This ongoing evolution in digital education necessitates continual reassessment to ensure that educational tools effectively meet learners' needs.

Theoretical Framework

Derived from the structural linguistics of Saussure and Peirce's phenomenological pragmatics, semiotics significantly impact how we approach critical theories of primary media forms today (O'Neill, 2008). Social Semiotic Theory was developed by Kress and Van Leeuwen (2006) based on Halliday's (1978) idea of language as a semiotic system for meaning-making. This provides a starting point for examining other semiotic systems called *modes*, including images, audio, and video. Kress (2010) describes the mode as a socially and culturally shaped and shared semiotic system. According to Halliday (1978), it fulfills three metafunctions of human communication: ideational, which represents meaning about real-world events; interpersonal, which represents social relations of communicators; and textual, which is text forming complex semiotic unit for meaning-making. Mirroring the three metafunctions, Kress and Van Leeuwen (2006) developed a theoretical framework called "Visual Grammar". The *representational* meaning, which is revealed in the story of the image; the *compositional* meaning, which is shown in the layout of the image and the *interactive* meaning, which is the viewer's perceptions of the image. The theory has four related assumptions. As Wong (2019) explains (as cited in Fordjour, 2021), the first assumption is that meaning-making is multimodal, implying that it simultaneously occurs through several modes. Second, semiotic resources are shaped by the social context, which means the semiotic resource is informed by the culture where the actions occur. Third, signs are motivated by individual motives, which means people consciously draw an aimed meaning in a social context. Finally, the intentions of the sign-maker guide their semiotic choices, meaning individuals employ concealed motives in all semiotic resources to achieve specific goals. This study will use the metafunctions of both theories (Social Semiotic Theory and Multimodality Theory) to give detailed explanations and analysis of both textual and visual-image communications (Table 1). Visual, linguistic, and kinesthetic elements are crucial in how users interact with digital applications. Examining these elements provides a comprehensive analysis of how different modes contribute to meaning-making, highlighting the importance of a multimodal approach in understanding user interactions in digital environments. By prioritizing the interactions among visual, linguistic, and kinesthetic modes, the framework acknowledges that meaning is not merely derived from isolated elements but emerges from their collaborative functioning. This perspective explores how users navigate and construct meanings through interactions with various semiotic resources.

An essential aspect of this framework is its recognition of the role of cultural context in shaping the interpretation of meaning. By examining the cultural nuances that inform user experiences, the study highlights how diverse backgrounds can influence interface design and functionality perceptions. This cultural sensitivity enhances the analytical depth, allowing for a

more comprehensive understanding of how different user groups may engage with the application.

This analytical framework offers several strengths that enhance the depth and rigor of the study on the ASP tutTrak application. The multimodal perspective recognizes that meaning-making is not confined to one form of communication but emerges from the interplay of multiple modes. By examining how modes interact, the framework provides a richer understanding of how users engage with the application.

The framework also highlights how users navigate the application and engage with the content by exploring learner-interface and learner-content interactions. This focus on interactivity allows for an in-depth analysis of user behavior and preferences, revealing insights into how effectively the application meets user needs and facilitates learning. Understanding learner interactions can inform improvements in the application design, enhancing user experience and satisfaction. By categorizing interactions as learner-interface and learner-content, it also highlights the various ways users can navigate, manipulate, and respond to the application’s features.

Halliday’s ideational, interpersonal, and textual meta-functions provide a structured approach to analyzing communication. This organization helps identify the specific roles that different elements play in the meaning-making process. Therefore, by integrating theories of multimodality and social semiotics, this framework enriches the analytical depth of the study. It allows for the exploration of what is being communicated and how and why it is being communicated in specific ways. This depth enables a more nuanced understanding of user interactions and the implications for educational practices. Its strengths lie in its comprehensive, contextual, and dynamic approach to analyzing communication, ultimately enhancing the understanding of user interactions in digital educational environments.

Table 1. Adapted Multimodal Social Semiotic Analysis framework of the ‘ASP tutTrak’ application.

Dimensions <i>Multimodality Theory</i>	Ideational function Representational	Interpersonal Interactional function		Textual function Compositional
		Types of Interaction		
		Learner-interface	Learner-content	
Visual				
Linguistic: <i>reading & writing</i>				
Kinesthetic				

Mode, as a socially and culturally shaped and shared semiotic system, is realized by its medium: ways and output of information that can be realized through text, screen, sound, and movement. Medium gives mode *materiality*, which means that different modes of communication (like text, images, sound, and movement) become tangible through their specific mediums. Materiality refers to the physical presence or form modes take, allowing users to

perceive and interact with them. Liu and Lin (2021) mention that “the materiality of speech is sound happening in a sequence in time which yields a certain physical sensation. On the contrary, the materiality of the image is a graphic substance that is simultaneously present in space” (p. 247).

The meaning-making affordances of image and text are different, and therefore, they interact synergistically in the construction of meaning in digital spaces (Blitz-Raith & Liu, 2017). As Liu and Lin (2021) explain, every semiotic system has a unique method of creating meaning, and when they coexist, they collaborate to generate inter-semiotic meanings. Hence, visual, linguistic, and kinesthetic modes are semiotic systems that co-occur while operating electronic spaces. They will be used as dimensions in the framework of this study (Table 1).

Website pages are visually complex digital spaces that construct meaning through visual, audio, gestural, spatial, and linguistic modes, thus making it a multimodal platform. Chou (2003) suggests four types of learner interactions and nine interactivity dimensions with their interactive functions in learning and analyzing web systems (Appendix A). Chou (2003) illustrates types of interactions through the following categories: learner-interface, learner-content, learner-instructor and learner-learner. These interaction types help to categorize relationships between participants, including system, interface, content, and learner. The present study aims to conduct a multimodal social semiotic analysis of an application that is only a tutorial booking and tracking domain and is not designed for educational purposes (teaching, assessments, educational materials, etc.). Therefore, it will use Chou’s (2003) learner-interface and learner-content interaction types as its analytical framework and not consider the other two types. Learner-interface and learner-content interaction are represented in this framework through the lenses of the interactivity dimension. This framework will help analyze the interactivity of this application by taking into consideration its functionality with the interface (fixed-frame design, site map, keyword search, downloading, status tracking, and so on.) and content (links to other sites and educational materials, multimedia presentation, user guidance, individualized instruction, and so on).

Method

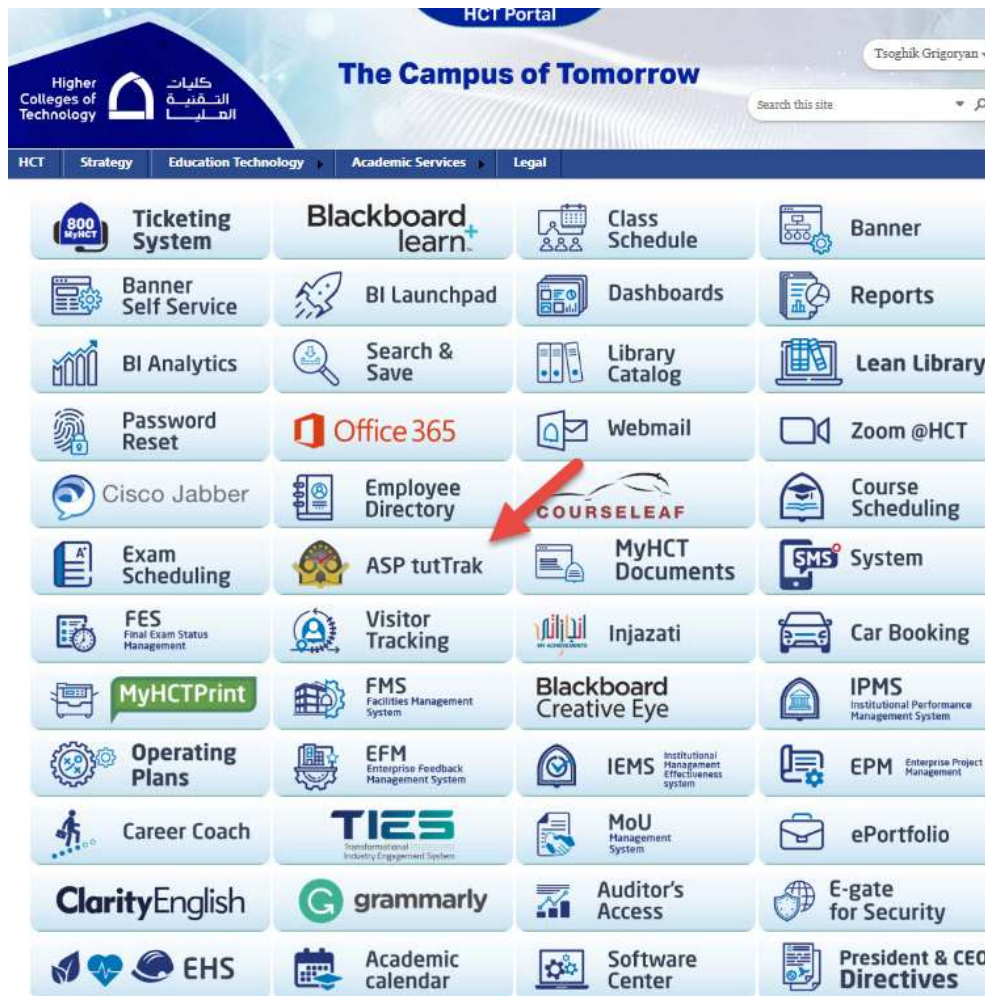
Following the theoretical framework discussed above, this research used a combination of the textual, visual, and interactive analysis of the Academic Success Program (ASP) tutorial tracking and booking app called “ASP tutTrak”. The research used a qualitative approach and case study design. Case studies are selective and focus on specific aspects while giving a full account of the phenomenon under examination (Stake, 1995). In this study, ASP tutTrak application constitutes the case. This single application was chosen as the data source that offered practical analytical units and the possibility for examination from the perspective of interactivity.

The Tool: ASP tutTrak Application

ASP tutTrak is an academic tutorial booking and tracking application designed for students, faculty, and staff to book, administer, and refer students for tutorials. It can also be used to give post-tutorial feedback and track booked and completed tutorials in Academic Success

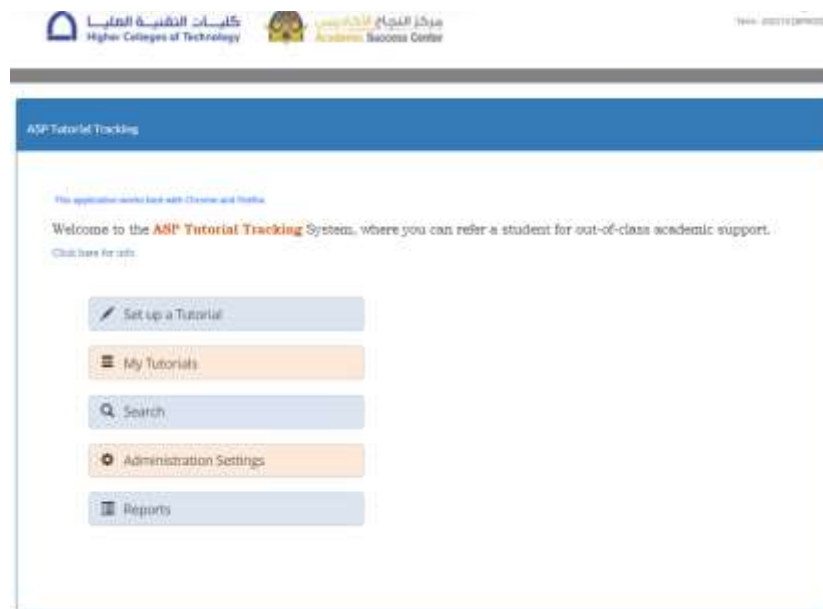
Program. The application is currently used in all Academic Success Centers (ASC) of a tertiary level institution across 16 men and women campuses system-wide that exist in all emirates of the country. The application was designed by the Information and Communication team of the same institution under the supervision of the program manager. The application is easily accessed through the institution’s portal page called “application shortcuts” (Figure 1).

Figure 1. Application shortcuts on the institutional portal page.



As Figure 1 shows, the “application shortcuts” page includes shortcuts to all applications used in the institution, making it easy for users to locate and use the needed applications with a click. The ASP tutTrak application is indicated with a red arrow in Figure 1. The second step of the application use is straightforward, as the list of offered services is on the first page of the application (Figure 2).

Figure 2. First/main page of ASP tutTrak, a Tutorial Tracking application.



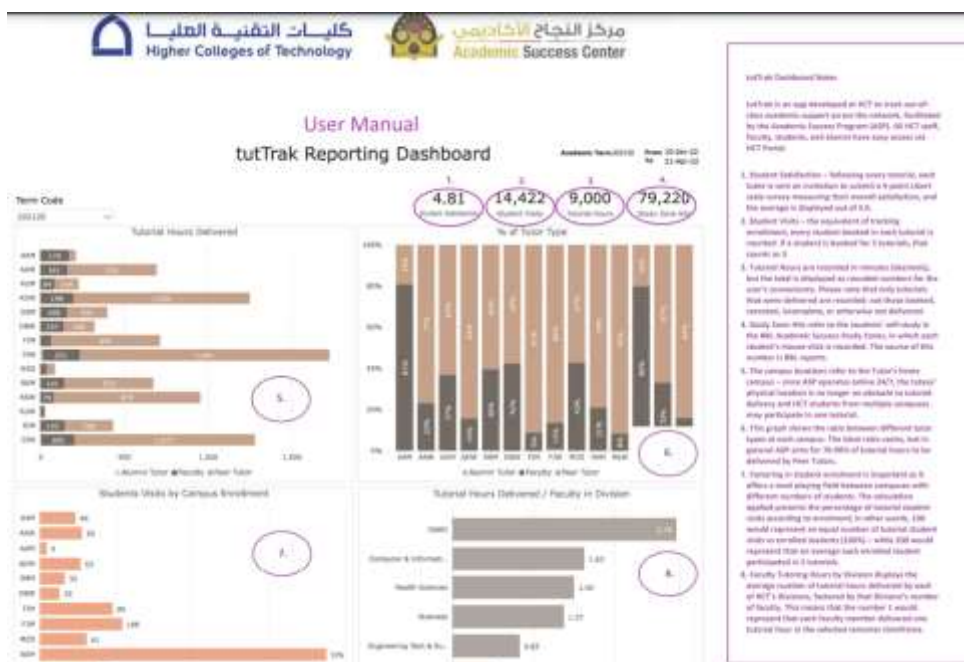
As shown in Figure 2, registered users, who are the students, instructors, and staff of the institution, can set up tutorials, track their booked and completed tutorials, search for available tutorials, and run different types of reports regarding their tutorials over a period of time.

Figure 3. 'ASP tutTrak' tutorial booking page.

Figure 3 is the illustration of the tutorial booking page through which students book tutorials by filling in the boxes. As soon as the student completes the tutorial booking, the system sends an email with the details of the tutorial—date, time, location, tutorial code, tutor name, and tutorial need—to all parties involved: the tutor, tutee, ASC coordinator, and the ASC administrator. Every tutorial is generated with a unique code that is shared through the email. The code is used by the tutor and the tutee to access the tutorial room in a Blackboard Learn course named “Tutorial Zones”. After the tutorial ends, the tutor completes the attendance through ‘tutTrak’ and writes comments about it for the requester, students, and system records. After the tutor completes the tutorial and submits the comments, the tutee receives an email about it where they can give feedback about the tutorial.

TutTrak also generates various reports about tutorial booking frequency, booked tutorial history, campus-based or across-campus comparative reports, infographics, and so on (Figure 4).

Figure 4. ASP tutTrak reports.



As Figure 4 illustrates, detailed reports can be run through ASP tutTrak, combined with text explanations and graphs/charts. All registered users can run these reports for their professional portfolios, research, progress checks, department meetings, and other reasons.

Figure 5. Awareness-raising e-poster.



The application also runs video advertisements and awareness-raising posters (Figure 5). They are sometimes in two languages, English and Arabic, to make the message understandable for students in their mother tongue. Women's campuses run the advertisement with a female student as a representative, and men's campuses run the same advertisement but with a male student as a representative.

The Participants

The participants, who are the users of the ASP tutTrak application, are the faculty, staff and students of the institution. This tertiary level institution has men and women campuses in all emirates and Academic Success Centers in each campus accordingly. In each campus the center is run by a coordinator and an administrator. All centers are supervised by the ASP program manager.

The participant students are 17-25-year-old Emirati male and female learners who enter the institution in pursuit of their undergraduate degree. The institution has Business, Engineering, Education, Computer Information Systems, Health Sciences, and other departments. Students can volunteer to book tutorials to improve their content knowledge and academic skills through the tutTrak application and become tutees. Tutors are also students

whose GPA is 3.0 and above and who volunteer to take a training course and become peer tutors (PT). Faculty can volunteer to tutor and become faculty tutors (FT). Both faculty and students can book and deliver tutorials. The staff is also registered in the 'tutTrak' and can run workshops and sessions or participate in tutorials. So, the tutTrak application is open for all institution members regardless of their role as a student, faculty, or staff.

Process

The data sources of this study include the above-discussed screenshots of the tutorial booking application pages and an image from a video clip, one of the center's awareness-raising advertisements. The discussed pages were purposefully selected, given the recurrent structure of the application pages. Departing from the assumption that application constitutes a communicative act, this paper will examine proposed pages for analyses, identifying the actors, their social role, their implied communicative actions, and the design underlying the application's composition and content (Michelson & Valencia, 2016). Then, this study will concentrate on rhetoric, design, ground, and interpreter suggested by Kress's theory. Next, a microanalysis of pages will be run to examine the conveyed discourse of overt and covert messages in the language, image, and layout of those pages. To summarize, since multimodal features of the application allow detailed analysis through more than one semiotic mode, this study will try to analyze the tutTrak application using multimodal social semiotic analysis. It will use multimodality theory, three metafunctions of communication theory, and look into types of interaction through Chou's (2003) learner to interface and learner to content interactions. Since this study has chosen five pages to look at (Figures 1, 2, 3, 4, and 5), four pages out of which being the institutional portal page and the ASP tutTrak application pages (Figures 1, 2, 3, and 4) and one image (Figure 5), this study will conceptualize both Halliday's (1978) and Kress and Van Leeuwen's (2006) models for better understanding of communication and image analysis (Table 1).

The selection of five pages for the analysis of the ASP tutTrak application was based on their representational significance and functional diversity within the context of the tutorial booking and tracking process. Each page was purposefully chosen to showcase key interactive elements that exemplify core features and user interactions of the application. The portal page serves as the entry point, highlighting the layout and navigation options available to users, while the main application page illustrates the initial user experience and the variety of services offered. The tutorial booking page is critical for understanding how users engage with the system to set up tutorials, providing insights into user-interface interaction dynamics. Additionally, the reports page reflects the application's capability to generate data-driven insights, underscoring the learner-content interaction dimension. Finally, the awareness-raising poster encapsulates the promotional strategies employed within the application, enhancing the understanding of how visual and textual elements work together to communicate key messages. Together, these pages represent a comprehensive overview of the application's functionality, interactivity, and user engagement strategies, making them ideal for a multimodal social semiotic analysis.

Data Analysis

Detailed analysis of all presented sample pages will be discussed under three metafunctions and exemplified in the conceptual framework (Table 2).

Table 2. Populated Multimodal Social Semiotic Analysis framework of the ASP tutTrak application.

Dimensions <i>Multimodality Theory</i>	Ideational function Representational	Interpersonal Interactional function		Textual function Compositional
		Types of Interaction		
		Learner-interface	Learner-content	
Visual	Interactive signs (F. 1) Portal background image Linguistic – text: title, subtitles Signs: icon (magnifying glass, clock, house) Index (arrow, plus, underline) Symbol (asterisk) Poster image Graphs and bar charts	Fixed frame menu (F.1, F.2, F.3) <i>Choice</i> – drop down menu <i>Online problem diagnostics</i> -help boots <i>Monitoring info use</i> – reports, infographics	Links to related pages (F.1, F.2, F.3) App shortcut icons and within-page embedded links Adaptability through individualized spaces,ease of adding info.	<i>Information value:</i> icons, signs, indexes, shortcuts in the header and banner that are important <i>Elements:</i> Image size, color contrast, sharpness of focus, place of the image on the space
Linguistic: reading & writing	Titles, subtitles, categories, sentences Icon, tag, symbol, and logo names and descriptions	<i>Writing for action:</i> fill in gaps, writing time, aim, and so on <i>Reading for instructions:</i> to fill in gaps, to choose and write the needed information	<i>Writing to search:</i> keywords to find the needed information <i>Reading for content:</i> information, steps, rules and regulations, infographics, and so on	<i>Saliency:</i> elements in written format, slogans, pop-up titles, instructions, illumination, and so on
Kinesthetic	<i>Interactivity for 'action':</i> Generate, monitor, hover over icons, write and fill in, submit, navigate, scroll, click, highlight, select, copy, paste, and so on.			

Ideational/Representational Function

Ideational/Representational metafunctions have to do with patterns of representation, in other words, the way experience is enclosed visually, which is carried out by narrative or conceptual structures (Stoian, 2015). Figures 1, 2, 3 and 4 are conceptual structures, because they represent users in terms of their class, structure, or meaning and Figure 5 is a narrative structure

as it presents an unfolding action and forms an oblique line indicating directionality, called vector (Kress & Van Leeuwen, 2006).

The portal page, illustrated in Figure 1, presents 48 interactive signs equally distributed on one page. The top row ‘Campus of Tomorrow’ is the title and the ‘HCT Portal’ in blue above the title is the header of the page. On the left corner we see the logo of the institution in a bent triangle shape with the institution name in English and Arabic next to its sides. In the representational metafunction the triangle is symbolic as an abstract shape. The prevailing color is blue since it is the color of the institutional logo and portal background. The page title and background match by making the user observe the ‘magic of tomorrow’s campus’ (page title) through futuristic vector images by using linguistic (portal title) and visual modes (portal background design). “The relation between the pictorial and textual is one of extension and complementary, where the content of the image adds further information to that of the text and vice versa” (Van Leeuwen, 2005, p. 230). The title and the logo on the banner are static and syntagmatic, thus they are not interactive. On the right, on top of each other, two paradigmatic and interactive drop-down boxes offer a choice for the user for various commands. The user can choose to click on the corresponding command to be redirected to the profile page or other user-related pages. The symbol on the right that resembles a magnifying glass is a lens that symbolizes the ‘search’ button. This kinesthetic mode is realized through the medium of typing and has the affordance of searching for the needed information. The upper part of the page is then separated with five paradigmatic windows on the menu bar, where three categories (HCT, Strategy, and Legal) are hyperlinked to other pages, and with a click, the user abandons the portal page and needs to click the ‘back’ arrow to go back to the page again. The other two bar windows (Education Technology and Academic Services) that show an arrow next to them have drop-down menus that offer a choice of spaces that the user can choose from and click to be redirected. The arrow next to the subcategory bar means there is a choice if you click on it.

The 48 application shortcuts, each with a small picture next to them, index the virtual place where the user can find all the needed information about the chosen field. They are all paradigmatic signs, meaning ideationally, the application shortcuts portal page is dense with interactive sites and signs in various forms. These forms are symbols, dynamic elements, and drop-down menus that require a lot of actions, such as clicking, choosing, typing, and searching to simply access a new text or space, which in itself is realized through labels, category bars, shortcuts, windows, and so on.

Page density is not high in Figures 2, 3, and 4. Figure 2 represents five window bars with a text and a symbol. The exciting part of this page is that even if users do not understand the text, they will understand the sign. For example, the pen in front of the first bar, ‘Set up a tutorial,’ hints to the user that if they click on that bar, they will have to write, fill in the gaps, type, and so on. The same can be said about the other bars: four lines that resemble a blank notepad stand for “My tutorials” and logically would mean records or history. The magnifying glass stands for ‘search’ of information. The signs, such as those like the notepad or magnifying glass, are icons because they are similar to what we already know about that object. Icons used on interactive pages make it easy for the user to orient in the space and make logical inferences about what each icon stands for. The third bar sign is “Settings,” commonly used on all web pages. This sign is an index because it is recognizable, not because it resembles any real object, but because we

understand the relationship between the image and the concept it stands for. The last bar shows a filled-up notebook sign for “Reports,” which means the users can generate reports if they click on it. The explanatory text above the bars in Figure 2 makes it straightforward for the user that the page is for operational use and has commands through bars that require action for effect. The blue text under the instruction sentence that says “Click here for info” is written in blue to invite attention and to indicate that the text is hyperlinked and paradigmatic, meaning it is interactive and can help the users find answers to their questions if needed. This means the signifiers (the signs on the sites) have their symbolic meanings as signified, commonly perceived and used in the tutorial application system by the users of that institutional society.

Unlike Figure 2, where users are only required to click on the bars and choose what they need, Figure 3 follows a more complicated kinesthetic mode of communication because it includes several spaces for the user not only to click but also to type in text, fill in information, and complete submissions to get the effect. While the Figure 2 page affordance is finding, locating, and choosing the needed information or page, the Figure 3 page affordance is completing the gaps with the required information to submit it for the final result: booking the tutorial. Figure 3 has eight red asterisks in front of the bars. These are symbols because we know the meaning of the image only because of convention; that it is something we have learned (Harrison, 2017). We have learned over practice that this sign of asterisk means essential and that without filling in the boxes marked with that sign, the user will not be able to complete the submission successfully. The small clock signs on the bars that say “From time” and “To time” are icons as they relate to what we already know or conceive about the object or person (Harrison, 2017). The clock here alerts the user to register the time of the start and the end of the tutorial.

The lower side of the page that is entitled “Student details” has two index signs: a green plus sign and a blue arrow. We understand that the plus sign means adding (information and details), and the arrow implies direction. The green plus index means the user can add student names in the box by clicking on it, and the blue arrow index showing down means the names, if added, will appear in that direction in the box.

Another difference of Figures 2, 3, and 4 from Figure 1 is that after clicking into the shortcut of the application, the university blue logo is accompanied by the ASP logo on all of its pages, signifying that the user is in the domain of the ASP tutorial booking system. The ASP logo is presented with two people/students happily raising hands for academic success with several stars, a red tick above, and an open book in front of them. Like the institutional logo, the ASP logo also has its name represented in English and Arabic. The logo image is analytical because the represented participants (two people hands up) are displayed in terms of a “part-whole” structure (Harrison, 2017). The “whole” is the carrier. In this case, it is the image of two people (who are most likely happy students) who succeeded academically because of taking tutorials. The stars, the tick, and the book are “parts” or attributes.

Figure 4 is a report that includes still images, graphs, and bar charts. These are analytical images in which the graphs are carriers, and their segments are *attributes*. They are also analytical processes that give the image technical and scientific resonance.

Unlike Figures 1, 2, 3, and 4, Figure 5 is a narrative image that allows the viewer to create a story about the represented participants because the image includes vectors of motion (Harrison, 2017). This is the main image on the site that, if clicked on, plays a video about two students who help each other to consult ASP for tutorials and boost their academic success. Unless clicked on, it stands as an image. This image has several vectors (Kress 2010). One is the diagonal lines created by the students' hands holding the books. The vectors in this image create a strong interaction between the hands and the books, which are the represented participants. Smaller vectors are formed by the two books, which provide supplementary action elements. The image is combined with text, which creates an ideal/real system (Harrison, 2017). The image has *embedding*, which is one of the aspects of representation metafunctions (O'Neill, 2008). The image expresses multiple processes by showing out-of-focus books in the background. This is a conceptual structure or a symbolic method of books symbolizing education, learning, tutoring, and research embedded within this action process. The action of this image is motivating students to sign up for tutorials.

Interpersonal/Interactional Function

“The interpersonal metafunction enacts exchange, which includes expression of personalities and personal feelings on the one hand, and forms of interaction and social interplay with other participants in the communication situation on the other” (Anderson, et al., 2015, p. 4). The 48 application shortcuts on the portal page, in Figure 1, signal that the portal is syntagmatically connected with a range of recent networking options. The same can be said about Figures 2, 3, and 4 since all pages represent the complex dynamism of the banners, labels, icons, indexes, symbols, and hyperlinks to communicate a certain degree of interactivity of the application. The overwhelming blue color on the portal page and the combination of yellow and orange of the ASP tutTrak domain, modular layout, and font contribute to the shape identity values of the tutTrak application. Besides shaping the identity of the institution and the application, all of those mentioned above will shape and project the identity values of the users, who will be accustomed to and willing to use the embedded site features (Adami, 2015). If looking at pages in Figures 1, 2, 3, and 4 from the paradigmatic aspect, all hyperlinks, interactive icons, and sites enable the users to access texts or other spaces within the institutional domain. Interpersonally, this shapes a directionality towards the institution with recursiveness.

If one looks at the interpersonal and interactional functions of the application pages through the dimensions of interactivity between the *Learner and the interface*, it will become clear that the interface is entirely interactive. Pages give the learner a choice in all sections through drop-down menus, which come in a fixed-frame menu design. Pages have search engines, allowing learners to search for the needed information through keywords. The sites show responsiveness to learners through online problem diagnostics and hints: “Click here for more information” and “The application works best with Chrome and Firefox” (Figure 2). Learner-to-interface interaction is high through monitoring information used through the Reports page that the application generates (Figure 4). Learners can track their tutorial status, progress, and completion.

If one looks at the interpersonal and interactional functions of the application pages through the dimensions of interactivity between the *Learner and the content*, it becomes evident

that learners have ample access to all educational sites through 48 shortcuts and within-page embedded links. The platform bears adaptability through individualized learning spaces, which are the tutor-tutee spaces for tutorials, emails, and feedback pages. Another dimension of Learner-content interaction is the ease of adding information that learners contribute to learning materials by saving tutorial videos in the video bank for other tutee references.

The above explanation looked at how the application pages of the tutorial choosing and booking system interact with and engage with the user/learner through hyperlinks, signs, and other interactive features.

Figure 5 image engages the users through four aspects of the interpersonal metafunction: visual demand, intimate distance, frontal and medium vertical angles. The visual demand of this image is to create a direct address for students to book tutorials for higher academic achievement. The imperative sentence, “Book a tutorial and improve your learning experience,” stands in the middle of the page as a central message to the user. The student’s direct look and smile make the users feel optimistic about the call and motivate them to action. The student is dressed in national Emirati clothes, which suggests that producers wanted to add gender and national meaning to it —elements that are not included in the text. This advertisement is only run on female campuses and is directed to female students.

Since spatial distances are related to emotions and distance, Kress and Van Leeuwen explain that the relations between participants in images and the viewer are imaginary (2006). Hence, in the Figure 5 image, the smiling student is represented as a friend, classmate, or someone of the same nation, rank, level, or status as the learner users. This representation will create attraction and a sense of motivation.

The horizontal angle shows if the image producer and the viewer are involved with the represented participant. The frontal angle says: “What you see here is part of our world, something we are involved with” (Kress & Van Leeuwen, 2006, p. 143, as cited in Harrison, 2017, p. 54). In the case of this image, the vertical angle creates involvement of the presented character with the viewer, and the horizontal angle creates equality and an emotional connection to listen to her call.

Textual/Compositional Function

Textual and compositional functions relate to “how representations and communicative acts cohere into the kind of meaningful whole we call text” (Kress & Van Leeuwen, 2006, p. 181, as cited in El-Masry, 2024, p. 6). Meaning in this metafunction is built by three interrelated systems: *information value*, *salience*, and *framing*. In all pages in Figures 1, 2, 3, and 4, the important information is stored on the top part of the page as a header, which includes domain names, logos, and the vital sections the page needs the user to concentrate on and use the page for: for instance, tutorial details, tutorial attendance, and so on. The place for the user to work (kinesthetic mode), such as typing, filling in information, completing, or submitting, is in the front or middle of the screen. That is to say, the banner is salient and dynamic with blue, yellow, and orange colors against grey or white. Within pages, the banner has a salient position and is interactive. All pages can be scrolled vertically up and down and display multimodal text

combining symbols and writing. Information on pages is not redundant, which makes the content coherent across sites. The aesthetics of interactivity is highly deployed at a syntagmatic level.

” Similarly, the paradigmatic plane shows the symmetry of power shaped towards the producer and users/learners. This means the users can provide feedback and access other institution pages quickly through the ASP tutTrak application, though they are only given access to institutionally approved pages. The relationship between sites and signs is cohesive with limited scope. The reason is that the tutTrak application does not allow third-party expansion, and interactive affordances are restrained within the institution and are only connected with tutorial booking and tracking.

The tutTrak application is equipped with the multimodal dimensional framework of textual, visual, and kinesthetic modalities. Because of its rule-oriented structure, it is highly interactive, cohesive, and user-friendly.

Figure 5 image uses all three information value types to transfer its rhetorical message to viewers. The text on the left represents the *given*, which is the program's call. In contrast, the woman on the right represents the students of the same nationality, gender, and occupation entitled to apply for the tutorial service. The image has a margin system with hands holding books as the basis of education and academic success. Most importantly, the text combined with the image serves the purpose and creates an ideal system (Harrison, 2017).

The representative size of the students in the foreground and the books in the background contribute to the rhetoric of the image that tutorials as extra help will be beneficial for academic achievement. The viewer here will be attracted to the action inherent in the central image as a hook.

Though the image does not have any framing with darker colors or lines, its dark font color on the background manages to cut it apart from the whiteness of the overall web page. The text is placed directly in front as a slogan on a white background to make it more visible and eye-striking for the reader. Though the image is not a photograph to convey emotions and results that are more realistic, the cartoon character is no less impressive with its emotional expressions and salient enough to capture attention.

Discussion

The purpose of this study was to investigate the interactivity of the ASP tutTrak application through the Multimodal Social Semiotics theory and answer the proposed research questions.

1. What are the interactive signs, sites, and images of the “ASP tutTrak” application in terms of user-interface and user-content interactions?

As the data analysis showed, interactive signs, sites, and images used in the application are various and multivariate. The application has embedded symbols, signs, indexes, and logos, sometimes accompanied by English and Arabic texts. All pages have interactive hyperlinks, tags,

tracking and searching bars, and so on. In terms of user-interface, the data analysis showed that the application gives the learner ample choice for different operations within the page, such as site map, keyword search, data search, registration, submission, and so on. Learner-content interaction, similarly, gives the learners non-sequential access of choice. This includes multimedia presentations, such as graphs and charts, that can be generated using different category choices. It also provides responsiveness to users and adaptability through hints, searches, and help bars. The application showed syntagmatic and paradigmatic features. Notably, the paradigmatic features were entirely enumerated, making the application stand as interactive.

The analysis revealed that the application employs various interactive signs, symbols, indexes, and logos, often accompanied by English and Arabic texts. This multilingual approach not only enhances accessibility but also reflects the cultural diversity of users, highlighting the importance of cultural context in interpreting semiotic resources (Nicholas & Oak, 2018; Ponzio & Deroo, 2023;). The richness of interactive hyperlinks, tags, and search functionalities allows users to navigate the application fluidly, underscoring the significance of hypertextuality in enhancing interactivity and user engagement (Almumen, 2023; Chen & Cheung, 2022). The interface design enables users to choose from various operational options, such as site maps and keyword searches that facilitate non-linear navigation catering to individual learning preferences (Kessler, 2022). This flexibility aligns with findings from recent literature that emphasize the necessity for educational applications to provide user-centric designs that empower learners (Fjørtoft, 2020; Ni et al., 2023; Nikonorova, 2022).

2. How do the signs, sites, and images communicate meaning to the user in the “ASP tutTrak” application?

Descriptive data analysis showed that the application's signs, sites, and images communicate meaning through three metafunctions detailed in the study framework. As a result, it became clear that sign-making in this application is varied when viewed through the richness of the actual semiotic world. The application is rich in text, signs, and images, which communicate meaning within the educational frame.

In addressing how signs, sites, and images communicate meaning within the ‘ASP tutTrak’ application, the analysis demonstrated that these semiotic elements operate within the three metafunctions detailed in the theoretical framework. Each element contributes to a complex web of meanings that reflect both the educational intent of the application and the interactive experience it offers. The findings indicate that the application is rich in multimodal resources that facilitate diverse forms of meaning-making, supporting the notion that learning is inherently a multimodal process (Ponzio & Deroo, 2023; Wong, 2019). For instance, the combination of visual elements (such as icons and graphs) with textual information creates a synergistic effect, allowing users to construct meaning in a way that a single mode could not achieve alone (Liu & Lin, 2021). This multimodal approach is crucial for effective learning in digital environments, as it caters to different learning styles and preferences, thereby enhancing overall educational experiences (Halliday, 1978; Kress, 2010; Ni et al., 2023).

Limitations

This study looked at selected pages of the application and did not expand to the process of tutorial taking, material sharing, and feedback-giving phases and pages. If analyzed, the results can help identify other emerging themes and communication. Moreover, this study concentrated on application interactivity only. Future studies could focus on multimodal analysis of applications between technical interactivity and cognitive interactions of learners with content, software, or interface.

Conclusion

The study highlights the role of interactivity in the meaning-making process, emphasizing that the application not only transmits information but also facilitates engagement through active user participation. This dynamic interaction aligns with current theories that advocate for a more participatory approach to learning, where students actively co-construct knowledge through their interactions with digital texts (Kessler, 2022; Ponzio & Deroo, 2023; Strommer-Galley, 2010).

In conclusion, the ASP tutTrak application exemplifies how multimodal social semiotics can be effectively applied to analyze user interactions in digital educational contexts. The findings contribute to the understanding of the application and underscore the broader implications for designing educational technologies that recognize the complexities of communication in the digital age. Future research should continue to explore the interplay between technical interactivity and cognitive engagement, particularly how learners interact with content, software, and interfaces to construct meaning in varied educational contexts.

Appendix

The framework for interaction type, interactivity dimensions, and interactive functions in learning web systems (Chou, 2003, p. 271).

<i>Types of interaction</i>	<i>Dimensions of interactivity</i>	<i>Interactive functions in learning Web systems</i>
Learner–interface	<ul style="list-style-type: none"> • Choice • Non-sequential access of choice • Responsiveness to users • Monitoring information use 	<ol style="list-style-type: none"> 1. Fixed-frame (menu) design 2. Site map 3. Keyword search 4. Database search 5. Online problem diagnostics 6. Software downloading 7. Online registration 8. Grade status tracking 9. Assignment completion tracking
Learner–content	<ul style="list-style-type: none"> • Choice • Non-sequential access of choice • Responsiveness to users • Adaptability • Personal-choice helper • Ease of adding information • Playfulness 	<ol style="list-style-type: none"> 10. Links to related educational sites 11. Links to related learning materials 12. Multimedia presentation (text, graphics, animation, audio etc) 13. On-line quiz for self-evaluation 14. Push media 15. Individualized learning database 16. Individualized instruction 17. Individualized test/quiz 18. Frequently-asked-questions (FAQ) 19. On-line help on content 20. User guidance on system 21. Study guidance 22. Learner contributing to learning materials 23. Educational games 24. Jokes 25. Sweepstakes
Learner–instructor	<ul style="list-style-type: none"> • Facilitation of interpersonal communication • Ease of adding information 	<ol style="list-style-type: none"> 26. Email to instructors 27. Email to Web master 28. Bulletin board systems (BBSs) 29. Chatrooms 30. Online voting 31. Online survey 32. Comments on the sites, course, instructor, etc
Learner–learner	<ul style="list-style-type: none"> • Facilitation of interpersonal communication • Ease of adding information 	<ol style="list-style-type: none"> 33. Class roster 34. Email to other learners 35. Bulletin board systems (BBSs) 36. Chatrooms

The first type of interaction, *Learner-interface*, is represented as interactive through choice, non-sequential access of choice, responsiveness to users, and monitoring information use. The second type of interaction, *Learner-content*, is demonstrated through the same lenses of interactivity, but with four more dimensions added: adaptability, personal-choice helper, ease of adding information, and playfulness. The framework also suggests interactive functions in learning Web systems for each of the types of interaction and interactivity dimension.

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A THEMATIC LITERATURE REVIEW OF DECOLONIZATION AND ABOLITIONIST APPROACHES IN COMPUTING EDUCATION

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Abstract

This scoping review explores the role of critical and culturally responsive pedagogy in addressing disparities in access to and participation in computer science (CS) education. Despite ongoing efforts to increase diversity, many groups, including women, remain underrepresented in CS. This review draws on Paulo Freire's foundational ideas on critical pedagogy, advocating for a dynamic and ethical approach to teaching that prioritizes critical thinking and community involvement which can contribute to increased diversity in computer science. The review also examines various interventions in literature which incorporate critical, decolonial, and abolitionist pedagogies in CS education. Addressing both the technical and social dimensions of computing, educators can equip students with the tools needed to challenge and transform existing power structures, contributing to a more just and equitable society.

Keywords: critical pedagogy, decolonizing computing, abolitionist pedagogy, computing education, inclusive curriculum, algorithmic bias

Cultivating Inclusion through Critical and Culturally Responsive Pedagogy in Computer Science Education

The field of computing has been striving to increase equality and representation of minorities in the Computer Science (CS) community (Pournaghshband & Medel, 2020) since as early as the 1970s, as reflected in ACM President's Letters (Sammet, 1975). With many cultures, races, and genders underrepresented, the CS field has a pronounced participation gap (Lunn et al., 2022). Women are one of the most notable groups in these marginalized categories. Even though they constitute 50% of the total population, only roughly 30% of females are enrolled in universities to study Computer Science (Garcia-Holgado et al., 2019). With these discrepancies in mind, researchers are making constant efforts to make computer science a more diverse and inclusive field. Therefore, the study of critical pedagogy and algorithmic literacies in relation to computing science teaching has been an emerging area of research (Everson et al., 2022; Ladson-Billings, 1995; Morales-Chicas et al., 2019; Ryoo, 2019).

To build historical context, Paulo Freire is considered a founder of critical pedagogy. He firmly believed that education is not limited to teaching students about facts (Giroux, 2010). Freire's perspective on teaching stems from the idea that it is not about transferring knowledge by applying a standard, impersonal method to all students (Giroux, 2010). Instead, his theory dictates that instruction should be a dynamic and ethical practice that fosters critical thinking and encourages active participation in the community (Giroux, 2010). As stakeholders in education, students and educators must understand the societal challenges in computing and be motivated to resolve them. Especially with the harmful nature of technology and its immense impact on lives, the social responsibility of computer scientists becomes even more paramount. As a result, an ethical and justice-aware classroom that recognizes problems and promotes analytical thinking can ensure the responsible growth of students (Giroux, 2010). Therefore, including these learning objectives in computing curriculum at both the high school and higher education levels by educators, and progressing computing courses to embed social complexities while aligning personal and communal goals, will make computer science more inclusive (Lin, 2022).

Applying critical literacies in a course can increase participation and create a sense of belonging for all students (Gautam et al., 2024). The participatory governance approach emphasizes student involvement. Tim Randolph (2024) performed an intervention that included critical pedagogical techniques in a computer science theory course. The primary purpose of the intervention was to strengthen student autonomy in an otherwise rigid course with the goal of boosting engagement and understanding. In the study, students had the ability to choose between options for certain aspects of the course. The instructors presented students' choices and highlighted the advantages and disadvantages of all options. The students then agreed upon a decision through a guided discussion in the class. Students reported renewed motivation and less confusion through these practices. The researchers showed that this intervention helped students who are traditionally disadvantaged.

In addition to Randolph's views on a less rigid course syllabus, Everson et al. (2022) also supported this preference, contrasting it with strict teaching curriculums. This study used the principles of culturally responsive and sustaining pedagogy in a six-week college preparation program for minority students. The research also investigated the increase in participation of

marginalized students by including them in the discussion about social justice and "counternarratives" in computing (Everson et al., 2022). Students were given autonomy on the topics they chose for projects in the course and their presentations. Furthermore, the course content also led students to have more meaningful discussions in the classroom (Everson et al., 2022). A key component of the course was teaching algorithmic bias—a term referring to the discrimination or unfair outcomes produced by algorithms, often caused by biased data, design flaws, or societal inequalities (Danks & London, 2019). When learning algorithmic bias in classrooms, students chose issues that helped them connect with the material personally for their assignments. For instance, a student built a chatbot on mental health. In another noteworthy instance, when discussing criticisms of computing, students began to ask several questions on enhancing equity when they discovered the commonality of algorithmic bias among darker-skinned people (Everson et al., 2022). The course concluded that by engaging in social topics responsibly, students raised questions that were difficult to answer but necessary.

So, how can we ensure that diverse folx feel a sense of belonging in CS and are supported? Kevin Lin (2022) proposes a justice-centered approach and culturally responsive-sustaining pedagogy. Culturally responsive pedagogy, as defined by Ladson-Billings (1995), focuses on supporting students' intellectual and moral growth, helping them affirm their cultural identities while also developing fluency in other cultures, and encouraging critical consciousness to address societal inequalities. This pedagogy encourages educators to create an environment where minorities feel included and able to voice their concerns (Lin, 2022). Lin advocated for the importance of having instructors and teaching assistants who represent the diversity of the student population, as this ensures that students see themselves reflected in the academic environment. By fostering a sense of relatability and inclusivity, educators can help bridge the gap between students' lived experiences and the content of the course. This not only helps students feel validated, but it also enhances their academic engagement and success (Gay, 2013; Ladson-Billings, 1995; Lin, 2022).

Ryoo (2019) discusses helping marginalized students bring their unique voices to computing in K-12 education. They examined three distinct classrooms that mainly consisted of minorities in CS and found that with the right motivation and direction, most students expressed their interest in using CS for social change. Culturally responsive computing gave students autonomy over their projects in the class and compelled them to choose personal and important topics (Ryoo, 2019). Building on this, Gautam et al. (2024) also showed that integrating social issues with technical content helps students see the relevance of their work in the community. Their curriculum made students observe their surroundings, family, and friends as well as their use of technology in everyday life. The students were encouraged to interview their families, friends, and neighbours to see the various ways technology is integrated into daily activities. This implementation moved forward from just discussions in class to letting students witness the societal relevance of technology. Even in the course, students were taught the basics of loops and conditionals using scenarios that they can experience in everyday life (Gautam et al., 2024). For instance, the IF conditionals were taught in a situational way: choosing a gift for their friends within a budget. The exercise along with the way the course was structured, ultimately, highlighted the significant role that technology developers play in shaping these systems.

These research studies underscored the ethical and social responsibilities that developers have, given the profound impact their creations can have on users' lives. Developers need to be aware of how their decisions can influence society, including issues related to privacy, accessibility, and equity (Gautam et al., 2024). There were discussions in class about ethical reasoning, the impact of social power on developers, and their responsibility. Ultimately, by applying Freire's ideas, students learned to think of their consumers and the people whose lives will be impacted while using their applications. Thus, they started to think about factors like gender and age, and how these would lead to easier accessibility for all stakeholders. Computing is not a one-sided field, and it's crucial to highlight the importance of diversity in the development process to create technology that welcomes a wider audience. Developers from diverse backgrounds are more likely to design inclusive technologies, and working with a broad user base helps ensure products meet the needs of all groups (Warschauer et al., 2024).

Rethinking Computing Education Through Decolonial Perspective

Decolonial theory seeks to dismantle the hegemonic views of power, knowledge, and existence within society (Cruz, 2021). It sees that these three domains have been dominated by Western-centric and capitalistic ideals, due to colonization and coloniality (Cruz, 2021). In this respect, decolonial theory believes that Western-centrism dominates how students think about technology, conditioning them to think from a singular Western-centric perspective. In consequence, decolonial theory opts for a "decolonial pluriverse" (Cruz, 2021, p. 1854), seeking to decolonize technology by introducing other ways of thinking. For Cruz (2021), decolonization can occur in two ways: indirectly and directly. Indirectly, educators can aim to teach students about the past histories and philosophies surrounding technology, exposing students to perspectives distinct from society's Western view (Cruz, 2021). Alternatively, educators can directly decolonize technology by seeking aid from marginalized peoples, shaping curricula away from Western centrism. In this sense, decolonial theory challenges the mainstream, Western-centric influences on culture and ideals, and amplifies marginalized peoples' voices. By analyzing power structures and learning from the experiences of marginalized communities, decolonial theory advocates for more inclusivity and diversity in computing education (Cruz, 2021; Ugwudike et al., 2023).

This section of the literature review explores how educators have redesigned their computing curriculum in an attempt to decolonize it. Furthermore, this section examines the practical outcomes of these efforts, and the challenges educators faced amid coloniality.

Notwithstanding, applying decolonial theory to STEM disciplines, like computer science, presents educators with a few key challenges. Among these is potential resistance from students themselves. From a survey of approximately 400 undergraduate students from the United Kingdom (UK), Tompkins et al. (2024) report that many students were concerned about "bigoted harassment or comments" from "forcing students to engage in" decolonial-related activities (p. 11). Shahjahan et al. (2022) further stress that student resistance is "the biggest barrier to [decolonization]" among researchers (p. 98). Critics have highlighted the struggle that both students and educators may have in understanding decolonial theory. As one undergraduate student articulates:

Issues like these are difficult to address, and as such, students may not know how they would address these issues, so their input may be haphazard, politically motivated, or ineffective. Educators may struggle to distill concrete proposals from suggestions that are able to be implemented. (Tompkins et al., 2024, p. 11)

The student's view underscores the rigorous effort required to teach decolonial theory. Educators not versed in decoloniality may do little to improve the experiences of marginalized people in computing. Even more so, excessive focus on the empowerment of marginalized groups may seem infantilizing to some students, likely leading to an intensification of unfair biases and generalizations. In consequence, educators must be careful in achieving a balance in recognizing marginalized groups in the computing field. Ultimately, decolonial theory promises a more inclusive and diverse future for computing. Yet, inadequately supporting educators with the proper resources and training risks ineffectual learning outcomes or even perpetuating the inequities that the decolonial theory aims to dismantle.

Globally, decolonial theory has sparked some interest from educators. For them, decolonial theory's support for multiple perspectives can aid in producing more well-rounded students (Mdwaba et al., 2023). By reviewing various literature relating to coloniality in an African context, Mdwaba et al. (2023) provide an overview of the strategies educators should embed to decolonize computing curricula. They propose a workshop that consists of three components:

1. Focus Groups and Panel Discussions to provide a way for marginalized people to discuss specific themes in computer science education (CSEd), such as algorithmic bias.
2. Group Discussions to allow for "more personalized and detailed" discussions about specific CSEd-related ethical issues in small groups (Mdwaba et al., 2023 p. 280).
3. Selected Presentations and Multi-Country Representation where industry professionals are invited as guest speakers to discuss current events and innovations happening in the tech field.

According to Mdwaba et al. (2023), these components aim to stimulate "innovative ideas and practices in IT education" (p. 279), while also enabling students to "discover and retain their cultural identities" (p. 282). In light of their claims, adapting these components to other global contexts may allow for a more inviting and innovative computing experience for all students, deemphasizing Western influences by amplifying marginalized ones.

Much like the discussion-based workshop proposed by Mdwaba et al., Karetai et al. (2023) suggest a series of discussions focused on decolonizing computer science (CS) and computer science education (CSEd) for the Indigenous people of New Zealand. Based on storytelling and collaboration, this approximately hour-long session involves Indigenous peoples telling three five-minute stories about their experiences in colonial CS and CSEd. The students discuss these stories as well as envision what decolonized CSEd might look like and how to forward the ideals of decolonial theory. In designing this workshop, Karetai et al. (2022) hope to move "towards a thriving, equitable and inclusive experience for Indigenous and non-Indigenous learners" (p.1225).

Practically, Eglash et al. (2020) demonstrate that acting upon decoloniality can familiarize students with the perspectives and ways of thinking of marginalized groups. Leading a 2017 summer program called “Reimagine STEM” at Northern Michigan University, Eglash et al. (2020) educated 48 high school students about how the Native American tribe, the Anishinaabe, constructed their buildings and tools using arcs. Of 38 students, Eglash et al. (2020) report that 13 students had Hispanic heritage and another 13 had Native American heritage. Additionally, 8 students identified as White, while the remaining 4 students identified as Black. By comparing pre-survey and post-survey results, Eglash et al. (2020) saw an increase in “Indigenous computational thinking” among students (p. 1581). While Eglash et al. (2020) saw an increase in “more accurate and thoughtful answers” among students (p. 1581), they observed that some students could also connect the Anishinaabe perspective to computing concepts. One student noticed that the structural arcs the Anishinaabe used for their buildings were an example of iteration in computing. Other students were able to interpret the questions much more deeply, connecting Anishinaabe arcs to contemporary games and websites. Consequently, the findings of Eglash et al. (2020) illustrate how educators can diversify the perspectives shown in CS/CSEd. By introducing alternative perspectives into computing, like the Anishinaabe perspective, educators can deemphasize the influence of preferring a singular, Western way of thinking. Indeed, educators can indirectly challenge CS/CSEd’s Western-centric hegemony, encouraging marginalized students to share their own perspectives and culture, much like the Anishinaabe. As a result, expanding such decolonization initiatives to groups beyond the Anishinaabe may foster a more inclusive learning environment, replacing CS/CSEd’s Western-centric view with multiple diverse perspectives.

Roldan et al. (2022) achieved similar success to Eglash et al.’s results by conducting a ten-week teen-led program at the University of Washington. Two teens, with the help of three librarians, were tasked with developing a 3D printer curriculum tailored for children. During each week, participants - ten children and eight adults – engaged in small group activities. Despite participants initially conforming to traditional power dynamics, such as children expecting adult participants to assume leadership roles, participants began to overcome these Western-centric norms over time. The findings of Roldan et al. (2022) propose a radically different way of teaching computing education. Rather than conform to the dominant idea of children and teenagers learning from adults, students can, instead, learn from each other. In this respect, by embracing decolonial theory, educators may allow students to become fully collaborative and autonomous learners.

Despite its challenges, educational institutions should not shy away from applying decolonial theory in computing education. While many institutions have tried to decolonize the social sciences and humanities (Shahjahan et al., 2022; Tompkins et al., 2024), STEM disciplines have seen little progress. For some STEM students, decolonization is nothing but “critical race theory” (Tompkins et al., 2024, p. 9) and, therefore, has no place in computing. Others scorn the concept entirely, claiming that decolonization is “part of the insane woke ideology, which [has] no place in academia” (Tompkins et al., 2024). Yet, it is because of this student resistance that educators should seek to integrate decolonial theory into CS/CSEd. Shahjahan et al. (2022) agree, emphasizing that decolonizing pedagogy in the STEM disciplines “needs further examination... given the lack of conversations in this area” (p. 102). This call for decolonization

is echoed by other undergraduate students as well. Although admitting that decolonial theory may be controversial for some students and teaching staff, one student affirms the unique position educational institutions have for decolonization:

[Educational institutions have] an opportunity to be a leader in equality, diversity, inclusion, and decolonisation—all of which are, I would say, at the heart of what [educational institutions stand] for. It's important not to let the vocal minority who are losing their privilege stop them [from] doing the right thing. (Tompkins et al., 2024, p. 12)

Put another way, decolonial theory has the potential to revolutionize STEM, making it more inclusive and diverse. Indeed, as seen from the research done by Eglash et al. (2020) and Roldan et al. (2022), decolonial theory can empower students to become self-sustaining learners, familiar with perspectives beyond computing's Western-centric hegemony. Therefore, more research into decolonization within CSEd is encouraged and needed to explore its full potential.

Abolitionist Pedagogy Reshaping Computing Education for Equity and Inclusion

During discourse about equality in CS education pedagogies, it is essential to include abolitionist pedagogy. Abolitionist pedagogy's primary focus is to increase equality by eradicating injustice that prevails against Black folx. It can be considered a subset of culturally relevant and responsive pedagogies that inculcate the experiences that minority students live through in learning (Sadler, 2024). Abolitionist pedagogy follows the same principles as culturally relevant and responsive pedagogies so that education can faithfully mirror students' identities.

Abolitionist pedagogy encourages students and teachers to dream of a better future. Sadler (2024) described this radical imagination as breaking free from existing limitations to envision new possibilities. Jones and Melo (2021) reimagined how the experiences of Black students would change if abolitionist pedagogy were adopted. They used storytelling to connect with readers, illustrating the history and potential future of the protagonist's life. In the first story, the university's central building symbolizes white supremacy, named after someone who exploited the protagonist's ancestors. In the reimagined version, the "Ubuntu Center" became a refuge and strength for both students and the community, demonstrating how a just CS education could transform society. This vision showed that with the support of a just society, the protagonist was no longer expelled for her opinions but supported. This vision resonates with research on awe and its psychological benefits. Studies show that cultivating awe, as described by Barrett et al. (2007), can reduce the threat response in the amygdala, improving learning and emotional engagement. Keltner (2023) similarly highlights awe's power to enhance connectedness and resilience, which are essential for fostering inclusive educational spaces. Encouraging curiosity and play, as outlined by Doucleff (2021), enables learners to imagine alternative futures with emotional and intellectual investment. Together, these approaches inspire students and educators to envision scenarios that liberate Black folx and generate new opportunities for Black youth in CS, transforming both individual experiences and societal structures (Sadler, 2024).

Historically, underrepresented communities have faced challenges in gaining opportunities in CS. Research has proposed that course curricula frequently contribute to this exclusion (Jones & melo, 2021). This highlights issues with the curricula, as the contributions and viewpoints of Black and minority individuals are often ignored in academic and professional settings. A range of concepts and developments become limited because of this neglect. In addition, it leads to prejudices that support damaging stereotypes. Abolitionist education aims to raise critical consciousness to fight these social injustices and empower the community. Drawing inspiration from educators Paulo Freire (2020) and bell hooks (2014), this pedagogical approach emphasizes critical reflection, transformative justice, and collective action in addressing antiblackness in CS education. hooks' belief in education as a path to freedom and her focus on including diverse voices aligns with Freire's approach and highlights the importance of creating welcoming spaces where students can reflect, collaborate, and challenge inequalities in CS education.

In abolitionist pedagogy, using an intersectional lens can help understand how various types of oppression can overlap and affect lives (Rosenbloom, 2023). CS teachers who aim to prevent new technological systems of control from forming should try to recognize this intersectionality. However, literature shows that search algorithms produce bias that disproportionately harms young women of colour by showing stereotypical content (Noble, 2018; Rosenbloom, 2023). It is essential that programs are capable of accommodating all humans and do not discriminate based on skin colour in the least (Noble, 2018). Eubanks examined the risk and welfare assessments in social service systems and concluded that they unfairly penalize people of colour (Eubanks, 2018; Rosenbloom, 2023).

The reform for more equal structures will start in the classroom, where developers are made. Yet, current classes practice "colour-blind" pedagogical techniques. Colour-blind rhetoric focuses on treating all students the same, which erases diversity and enforces conformity to dominant white values (Ivey et al., 2021). Abolitionist educators' campaign for efforts to employ frameworks that transform white supremacy to support diverse groups of students through their curriculum. In their study, Ivey et al. (2021) suggest that CS instructors are key to identifying the root cause of this discrimination, as they are on the front lines interacting with students. The researchers conducted interviews with first-year university professors across the US over two years, compiling their observations and coding them according to Bettina Love's (2019) theory of abolitionist pedagogy. The study revealed that effective abolitionist educators use frameworks emphasizing culturally responsive teaching, critical self-reflection, and curriculum redesign to center marginalized voices and challenge oppressive systems in the classroom.

Researchers are now considering including frameworks in classrooms that will help them integrate abolitionist principles into CS education. Rosenbloom (2023) describes a dynamic approach to bring about this change by focusing on human-centred ways of understanding. In addition, increasing participation can also lead to the formation of a more inclusive framework. Rosenbloom points out that the deployment of the framework will be the responsibility of the instructors who handle and interact with the current oppressive system daily. This responsibility gives educators two choices: to reinforce a system that marginalizes groups or maintains the status quo, or alternatively, to actively reject the established norms that uphold this discriminatory system. The latter choice would mean acknowledging the contexts of oppression

in the field of technology and forming a more equitable approach. Rosenbloom cited an example of instructors teaching a course, “Algorithms for People.” The instructors talked about Operation Vula, an encryption protocol that was used to fight apartheid. This intervention made students aware of cultural diversity and how technology assisted in revolutionary movements. In the end, this instance promotes justice and reimagination of a structure that makes institutes “places of love, justice, joy, respect, well-being, and radical Black subjectivity” (Rosenbloom, 2023, p. 133).

Abolitionist pedagogy in computing education advocates for creating a new educational structure that empowers students to share their histories and cultures. It rejects the current flawed system, encourages embracing classroom diversity, and challenges dominant norms. This approach envisions a space that celebrates all individuals, free from discrimination based on skin colour.

Fostering Social Responsibility in CS with Critical Pedagogy

Critical pedagogy is a pedagogical technique to sever the traditional pedagogical power hierarchies in the classrooms. It aims to create a safe teaching space for CS students and instructors, as everyone is involved in the ethical and social implications of technology. Therefore, the university becomes one of the target zones for winning this battle against inequality and equal representation. To investigate the minds of recent graduates, Mayhew & Patitsas (2023) revealed some unfortunate results after conducting a survey with a sample size of 5500 students. CS graduates felt significantly less inclined to think of the greater good than graduates from any other major. The results underscore the gravity of the situation and highlight the need for support to enable CS educators to employ critical pedagogy techniques. Providing educators with training and appropriate resources will be effective in integrating these approaches in their courses.

To try and rectify the current circumstances, Mayhew and Patitsas (2023) also talked with some instructors to identify some common approaches that can be used to inculcate critical pedagogies in real-life practice and tie them with our community. The first overlapping theme was to focus on increasing student awareness and educating them about power structures in society. In this approach, instructors create assignments that motivate students to learn the history and socio-political contexts of technological development in their communities. For instance, one project had high school students use Scratch, a beginner-friendly, block-based programming platform, to create stories that provide counter-narratives of their communities, allowing minority students to express their personal and family histories. The students rose above the oppressive structures in the computing space and wrote their own personal stories, building a welcoming place where they belonged.

In the pursuit of generating equal opportunities, critical pedagogy ensures that people from marginalized communities can claim resources that have been conventionally denied to them. The current course syllabi usually ignore the voices of these underrepresented people. By changing these and offering more autonomy to the developers-in-the-making, open conversation can be held, and everyone can raise their struggles to grow together. For example, students can lead constructive discussions addressing the problems society has faced—and still encounters—

to fix them. To recite an example, Mayhew and Patitsas (2023) describe an instructor who applied this approach while teaching in a Brazilian village experiencing an energy crisis. By making the class relevant to the students' lives, the instructor facilitated discussions about their daily struggles with electricity, leading to a collaborative effort to create a helpful device.

Ultimately, critical pedagogy should transform the norms, values, and practices within CS to be more critically aware and socially responsible. One way to do this can be to incorporate relevant projects into the courses that encourage students to advocate for change. For instance, an instructor in a first-year university course had students read significant CS texts, like Judy Wajcman's *Feminism Confronts Technology* and Tara McPherson's "U.S. Operating Systems at Mid-Century". Special emphasis was given to understanding the topics and acknowledging that they are challenging, then discussions were held to deepen students' insights. Through this interdisciplinary combination of CS and sociology, students began thinking beyond mere coding, grasping the societal impact of technology. Additionally, the instructors also included an assignment that made students aware of the biases involved in algorithms. Using a 19th century Irish immigration dataset, students learned about basic programming concepts as well as tools to identify and understand biases, helping them see both the limitations and potentials of computer science.

Integrating critical pedagogy into computer science education represents a crucial step toward creating a more inclusive and socially responsible discipline. By addressing key goals, educators can help students look beyond technical skills to consider the broader societal impacts of their work. This approach not only raises awareness of social justice issues but also equips students with the critical thinking skills needed to challenge and transform unfair systems, contributing to the creation of a more just community.

Conclusion

This scoping review emphasizes the impact of critical, culturally responsive, decolonial, and abolitionist pedagogies to uncover the gap in computer science (CS) education. The literature reveals that incorporating critical thinking, ethical awareness, and community engagement in CS education can empower students to challenge existing power structures. Interventions such as participatory governance, culturally responsive teaching, and discussions on social justice issues have successfully increased engagement and a sense of belonging, particularly among marginalized students. However, despite these promising approaches, significant gaps remain in the literature and practice. One major gap is the limited application of decolonial theory in STEM fields like CS, where resistance from both students and educators can hinder the effective integration of these perspectives.

Additionally, while some studies have explored the potential of critical and abolitionist pedagogies, more research is needed to develop concrete frameworks and strategies that can be widely implemented across computing educational contexts. Another gap, as mentioned earlier, is the lack of comprehensive support and training for educators to effectively teach these complex perspectives. While CS educators are not expected to be experts in critical theory, providing adequate resources and institutional backing is essential in the efforts to incorporate these approaches, just as is done for topics like ethics in computing (Madkins et al., 2020).

Integrating critical, decolonial, and abolitionist pedagogies into CS education is not just morally required but is also a necessity for society's future. These approaches can help address the systematic inequalities that have marginalised students and lead to better opportunities and education (Ryoo, 2013; Vakil, 2018).

Our call to action for CS educators is to explore and refine strategies for integrating critical, decolonial, and abolitionist perspectives into CS education; educators can better prepare students to use their technical skills to contribute to a more just and equitable society. Furthermore, students and educators who engage in these critical perspectives are contributing to a shift towards a more just and ethical tech landscape. Although early adopters may face challenges, their efforts will help pave the way for future leaders who will shape the industry in ways that reflect broader social good.

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