


How nature-based learning impacts teachers: Discoveries for well-being in and with the project EXPLORE community

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ABSTRACT

Project EXPLORE (PEX) is a nature-based learning (NBL) program designed by the North Carolina Arboretum to help North Carolina K-12 teachers implement citizen science-based curricula to reconnect youth with the natural environment. Initiatives supporting teacher confidence are critical to mainstream implementation of NBL. As there is scant literature on programs' impact on teachers' well-being, the purpose of this study is to explore how participating in PEX impacts teachers' "well-being." Informed by critical feminist theory, we used an amended two-part collective memory work design. Three former PEX participants created video narratives about a memory of the program's impact on their well-being. They participated as co-researchers in a focus group to analyze the video diary entries for meanings around teaching well-being and PEX. The group discussed ways PEX supported self-actualization, relationships, and, most importantly, how PEX was a powerful tool for well-being within a neoliberal school context.

Keywords: nature-based learning, teacher stress, teacher well-being, project EXPLORE, collective memory work

INTRODUCTION

"It was a really exciting opportunity ... I think this is always going to be the project that I try to recreate every year in some way, shape, or form" (Yetta).

"It makes me look forward to teaching" (Amy).

"It's my excuse to go outside" (Evelyn).

Yetta, Amy, and Evelyn's testimonials underscore the transformative impact of project EXPLORE (PEX), a nature-based learning (NBL) program offered by the North Carolina Arboretum. While evidence suggests that environmental education programs can effectively foster children's connection to nature (Mann et al., 2021), a connection vital for their personal wellness and planetary health (Martin et al., 2020), the reality is that many teachers find themselves grappling with limited time and overwhelming exhaustion (American Federation of Teachers [AFT], 2022; Lever et al., 2017). Amidst these challenges lies a hopeful possibility: environmental education curricula might benefit students

while contributing to teacher wellness. This research investigates the promising partnership between educators and NBL initiatives, such as PEX, with the aim of uncovering how such collaborations could offer meaningful support to teachers while nurturing the next generation's relationship with the natural world.

Efforts to reconnect young people with the natural environment through K-12 curriculum and co-curriculum have grown over the past fifteen years. School garden programs, outdoor field trips, adventure programs, and school-based outdoor learning initiatives promote not only students' physical, cognitive, and psychosocial well-being but are increasingly developed to achieve nature connectedness and environmental stewardship outcomes (Waite, 2020). Such programs employ place connection, contextualization, and themes of interconnectedness, which are not new pedagogical approaches as Western education often portrays them but are central to indigenous knowledge systems (Brayboy & Maughan, 2009; Grande, 2015).

The PEX approach pairs K-12 educators with outdoor learning coaches to implement science-based curricula and foster a connection with nature among students (Project

EXPLORE, n. d.). Teachers commit to at least fifteen minutes of weekly data collection for a community science initiative supported by program resources and coaching. A recent review of 147 studies concluded that although program design and research methods varied in quality, population, and context, NBL, like PEX, supports “holistic growth” (Mann et al., 2021, p. 10). Despite successful implementation, positive outcomes, and established research, many real and perceived barriers prevent broader adoption in public education systems (Oberle et al., 2021; Waite, 2020) with teachers’ lack of confidence teaching outdoors being identified as critical to mainstream implementation (Jordan & Chawla, 2019).

Barriers to Nature-Based Learning

Teachers list systemic issues like funding, administrative support, and curriculum constraints as principal barriers to taking classes outside. Still, even in the absence of those obstacles, teacher preferences and confidence may keep students inside (Oberle et al., 2021). The NBL research network identified supporting teacher training and developing teacher confidence outdoors as critical steps to increasing NBL initiatives (Jordan & Chawla, 2019). One of the most significant barriers to teachers implementing curricular changes (taking classes outside or otherwise) is a lack of time and energy. According to AFT’s (2022) report on school staffing shortages, teachers are twice as stressed as the general population, and 62% report their work is overwhelming). Teacher burnout and fatigue negatively affect motivation, energy, compassion, and enjoyment (Lever et al., 2017) which not only impacts students but potentially teachers’ willingness to take on new methodologies or projects like outdoor learning initiatives.

However, time outside with students may be precisely what teachers need. Teacher job satisfaction is linked to student discipline, opportunities for teacher collaboration, enthusiasm, perceived autonomy, and positive teacher–student relationships, among other factors (AFT, 2022; Spilt et al., 2011; Toropova et al., 2021). Many of these—and other factors contributing to teacher well-being and job satisfaction—are indirect outcomes of NBL. For instance, although PEX provides coaching and community science-based curricula to teachers, it was not explicitly designed to address teacher well-being (Project EXPLORE, n. d.). However, teachers have reported that PEX does facilitate peer community building, professional development, and positive student outcomes (Benavides, 2016). By employing outdoor teaching methods, instructors could benefit from the restorative qualities of natural environments and stress-relieving outcomes like improved student behavior.

In fact, if outdoor education were promoted as much for teachers’ well-being as it is for students, more teachers may be willing to incorporate these practices. However, few studies take teacher well-being or their perceptions of restorativeness into account. We hope to address this gap in the literature as an improved understanding of these possible effects could support curriculum design that intentionally accounts for both teacher and student outcomes. Therefore, the purpose of this study is to explore how participating in PEX impacts teachers’ “well-being.” Informed by a feminist epistemology, we engaged in collective memory work (CMW) to collaboratively

examine the inherently subjective concept of well-being through a teacher’s perspective. Specifically, we addressed the following research questions:

1. How does participation in PEX impact teacher well-being?
2. What PEX experiences do teachers associate with their sense of well-being?

LITERATURE REVIEW

This section begins by describing the outcomes of NBL teaching methodologies and a discussion of teacher well-being. In addition, we argue that the very nature of the project and its associated research methodology called for a critical feminist epistemology.

Nature-Based Learning

There are many terms for outdoor learning. For clarity, this paper will adopt NBL, as defined by the NBL research network (Jordan & Chawla, 2019). Specifically, NBL:

1. Centers encounters and direct engagement with nature
2. Set among natural elements, either introduced or organically occurring
3. May be any subject, content, or skill set taught in a natural setting

NBL seeks to connect students with the natural world to support their well-being, development, and pro-environmental attitudes and behaviors (Mann et al., 2021). Baxter and Pelletier (2019) assert that nature-relatedness, connection to and engagement with nature, is a basic psychological need and is necessary for fully realized well-being. Among other outcomes, NBL explicitly seeks to bridge the gap in students’ well-being as they are increasingly disconnected from the natural world (Mann et al., 2021).

Outcomes of NBL

NBL, especially programs with a more relaxed structure, facilitates student connections with the natural world, each other, and their teachers (Berg et al., 2021). Other frequently cited student outcomes of NBL include improved concentration, engagement, impulse control, and prosocial behaviors which mitigate behaviors found to be disruptive in the classroom (Fägerstam, 2014; Marchant et al., 2019). Some of the most significant gains are found in children who struggle in traditional settings, like children with ADHD (Faber Taylor & Kuo, 2011), students of low socioeconomic status (Bølling et al., 2018), and youth who are labeled “at-risk” (Ruiz-Gallardo et al., 2013).

However, few studies directly examine the outcomes of NBL programs for teachers. Although, teacher outcomes are often listed with results in student-focused research including increases in motivation, job satisfaction, enjoyment, and improved teacher–student relationships (Fägerstam, 2014; Marchant et al., 2019; Scott et al., 2013). Teachers also valued strengthening their confidence in the role of facilitator or co-learner rather than instructor (Scott et al., 2013). With so much supporting research, why isn’t NBL more widespread?

Barriers to implementing NBL

Despite widely documented positive outcomes, NBL initiatives remain on the periphery of mainstream public education (Oberle et al., 2021). When surveyed, educators frequently cite systemic and administrative barriers to implementing NBL initiatives, such as supervisor support, transportation, funding, curriculum pressure, logistics, and lack of suitable space (Jordan & Chawla, 2019; Oberle et al., 2021; Waite, 2020). Beyond systemic barriers, many classroom teachers are intimidated by taking students outside or feel they lack sufficient training (Feille, 2017; Waite, 2020). Understanding and mitigating barriers to implementing NBL, especially teacher preparedness and confidence, are identified as “priority” and “game-changing” research questions by the NBL research network (Jordan & Chawla, 2019, p. 7). However, to understand the unique position of teacher well-being as a potential barrier and/or positive outcome of NBL, we need to examine the current state of educators’ mental health.

Teacher Well-Being

The opening quotes from PEX teachers address different facets of “well-being” defined as “a state of positive feelings and meeting full potential in the world” (Simons & Baldwin, 2021, p. 990) or “perceived enjoyment and fulfillment with one’s life as a whole” (Goodman et al., 2020, p. 834). As we’ll see in later sections, these are almost the exact words teachers used to describe NBL’s impact on their lives. There has been much debate on defining what “well-being” means for educators and teachers (McCallum et al., 2017) but importantly, Palmer (1998) has argued that an educator’s sense of identity, motivation, and satisfaction are inextricably linked to their profession. The following links between teacher well-being and motivation, attrition, and student outcomes illustrate the urgent need to implement stress-mitigating interventions for educators.

Burnout and attrition

The professional flip side of well-being–burnout–is marked by emotional fatigue, depersonalization, and feelings of inefficiency (Maslach et al., 2001). Teachers experience significant work-related stress at nearly double the rate of the general population (Steiner & Woo, 2021), some of the highest levels of work-related stress among professionals, and subsequently have high rates of burnout and attrition (Lever et al., 2017). High rates of stress and burnout among educators remain consistent despite an easing-off of pandemic-related instructional changes, and there are exceptionally high levels of depression in teachers of color (Steiner et al., 2022).

The effects of teacher stress and burnout also negatively impact student learning outcomes (Lever et al., 2017; Oberle & Schonert-Reichl, 2016; Toropova et al., 2021). Oberle and Schonert-Reichl (2016) described stress as “contagious” in classrooms. Harmsen et al. (2018) link beginning teachers’ stress to the staggering United States teacher attrition rate: 25%-50% of teachers leave within the first five years. The *2021 state of US teachers survey* (Steiner & Woo, 2021) found that 1 in 4, and nearly half of teachers of color, were considering leaving the profession. Teacher attrition and burnout have been described as an international problem, even injustice, that extends beyond the United States

(Toropova et al., 2021). Addressing teacher burnout will require strategies that mitigate stressors on a broad scale.

Mitigating factors for teacher burnout

A review of teacher mental health support programs found that a supportive school environment and dedicated well-being interventions can mitigate the added stressors educators face (Lever et al., 2017). Positive student-teacher relationships engender feelings of connection, effectiveness, and motivation that support teacher well-being and enthusiasm, which promotes positive student outcomes and engagement (Cui, 2022). These interpersonal relationships are vital to mitigating stress, and Gearhart et al. (2022) found peer-to-peer relationships to be particularly impactful. Though deceptively simple, enjoying giving a lesson goes a long way toward mitigating stressors that lead to emotional exhaustion (Keller et al., 2014). Finding ways to enjoy their professional time with students, colleagues, and lesson content is a way for teachers to mitigate burnout and take control of their well-being. They are also well-understood outcomes of NBL.

NBL as a Stress Intervention

There is strong potential for NBL to contribute to teacher stress reduction and combat widespread burnout (Berg et al., 2021; Fägerstam, 2014; Marchant et al., 2019), but significant barriers have prevented wide-spread adoption (Jordan & Chawla, 2019; Oberle et al., 2021; Waite, 2020). Sondergeld et al. (2014) found that when classroom teachers were supported in NBL through an integrated curriculum-based program, they were more confident, knowledgeable, and likely to continue using NBL strategies. Benavides (2016) examined PEX specifically and reported peer community building, professional development, and positive student outcomes as program benefits. Notably, these factors echo the outcomes of NBL described previously.

In addition to supporting teachers’ professional skills and critical relationships, the setting of NBL, the outdoors, may itself be a stress intervention. Time spent in nature can be particularly restorative to those with higher levels of emotional exhaustion (Hartig & Staats, 2006). Evidence shows that consciously engaging with nature for stress reduction can increase feelings of restoration (Pasanen et al., 2018). Taken together with the above burnout-mitigating factors, NBL emerges as a strong contender to support teacher well-being. Benavides’ (2016) PEX study provided a detailed account of pedagogical development but did not directly examine whether the program contributed to stress relief or restorativeness. This study seeks to address that gap in the service of teacher well-being.

Critical Feminist Theory and Education

When considering well-being, especially that of educators, a feminist epistemology offers a clarifying framework to understand the interplay between educators, self/other care, and the school system. Significantly, despite a statistical majority in the profession (Organization for Economic Cooperation and Development [OECD], 2021), women and non-binary teachers are subject to scrutiny and judgment under the performance reviews of gendered hierarchical administrations (Connell, 2009; Moreau et al., 2008).

Educators are frequently required to set themselves aside to focus on students (Bullough & Hall-Kenyon, 2011; Gustafson, 1982; Serow, 1994) in ways that mirror historic and systemic gendered oppression (Drudy, 2008; Simmie, 2023).

This project is deeply guided by a feminist epistemology from the examination of the teaching profession to the choice of a feminist methodology like CMW. The epistemology is informed explicitly by a critical feminist theory, which exposes, interrogates, challenges, and works to transform gendered and heteronormative structures of hegemonic oppression (Marshall et al., 2022; Parry et al., 2019). In teacher well-being, this lens reveals how power imbalances within education systems can affect job satisfaction, career advancement, and mental health. For example, studies have shown how the disproportionate burden of emotional labor placed on female and non-binary educators (Moreau et al., 2008; Nwoko et al., 2023) and the systemic barriers they face in accessing resources and support (Simmie, 2023) contribute to heightened levels of stress and burnout. Drawing upon the critical insights of theorists like Freire (2000) and hooks (1994), who deeply interrogated education as a means of liberation, our feminist analysis seeks a reevaluation of institutional practices and policies to foster greater equity within the education system. By centering the voices and experiences of educators through CMW, we aim to illuminate the interconnectedness between teacher well-being, structural inequalities, and the transformative potential inherent in education, specifically NBL, as a tool for empowerment.

METHODOLOGY: COLLECTIVE MEMORY WORK

This study aims to explore how participating in PEX impacts teachers' well-being. Given the highly personal and subjective nature of well-being and the complex ways that teaching interacts with individuals, society, and culture, our inquiry demanded a methodology that encourages multiple truths and layered contexts. Developed by Haug (1999), CMW is situated with participatory action research (PAR) and is rooted in a feminist theoretical framework (Johnson, 2018) based on a recursive narrative development process and contextualization/de(re)construction around a shared experience, such as PEX. "Recursive" asks co-researchers to continuously reflect upon and revisit the central phenomenon and theoretical framework to ensure the study yields meaningful results to the community of study (Johnson, 2018) with a focus on subjective learnings that can readily be put to work (Hamm, 2021). In other words, the research process focuses on individual experiences/memories and acknowledges that the experiences fit within broader societal and cultural contexts (Johnson, 2018).

Collective Research

As previously discussed, although teachers are not marginalized in a conventional sense, the extent to which they are called to set aside their physical, psychological, and even fiscal well-being represents an injustice for consideration and correction (Bullough & Hall-Kenyon, 2011; Gustafson, 1982; Serow, 1994). The collective nature of this methodology

naturally and intentionally unseats historic, dominant powers in the communities of study and power within the Academy and research itself (Haug, 1999; Johnson, 2018). To signify the importance of the collective, the "lead" researcher develops memory prompts with "co-researchers" rather than "participants." These prompts are then used to craft narratives analyzed through group discourse and the learnings from that discussion synthesized into a collective work product (e.g., collective narrative, collective biography, or video montage). As the content/data and analysis come from within the community of study, there is built-in trustworthiness/credibility in the recursive, community-driven process of CMW (Johnson, 2018).

In leveling the role of knowledge production to encompass the community of study, CMW, and other PAR models, do work on multiple fronts in a uniquely feminist way—through the creation and legitimization of new knowledge, community-oriented relations, and support systems that contribute to the critical work of the investigation (Johnson, 2018; Parry & Johnson, 2016). There is a growing body of literature on the use of CMW in education, illustrating its potential to uncover assumptions and challenge dominant discourses in teacher education (Bowler et al., 2021; Clark, 2020; Clift & Clift, 2017).

Memory Work Origins and Development

The CMW process developed initially by Haug (1999) calls for the research group to collectively determine the research objectives and create a prompt to illicit memory narratives. The narratives are usually written in third person using pseudonyms and then discussed and analyzed for their individual and collective meanings. The analysis can then be deconstructed, and the narratives are rewritten to encompass the meanings gleaned from recursive work (Hamm, 2021). Johnson (2018) proposes a more accessible, streamlined "focus group" framework wherein the narratives are analyzed in a single session, with the lead researcher responsible for developing the narrative prompt and guiding the group analysis.

It is worth noting that this application has been critiqued as a diluted version of Haug's (1999) original vision of a fully participatory and recursive research model (Hamm, 2021). However, it offers slightly more power to the lead researcher in constructing the research question and final "product," making it more accessible to researchers and populations constrained by time and logistics. In this, he establishes a "spectrum" of methodological purity (Johnson, 2018, p. 13). Teachers are constrained by time, logistics, and resources, and so, we employed this adapted iteration of CMW in our study.

METHODS

In this study, we implemented a 2-part CMW design using video narratives and a focus group to empower public school teachers to identify impacts on their well-being, develop and participate in solutions, and drive positive change for themselves and their students. Guided by Johnson's (2018) common elements of CMW, we will outline each of the methods we used along with the data analysis process and a description of the artifact the data produced. As the data

Table 1. Chronological progression of research methods

Step	Method/analysis	Who
1	Video narratives—All former PEX teachers were invited to create a 2-3-minute video narrative or anonymously written narrative about a memory of PEX's impact on their well-being.	Co-researchers self-selected from a pool of 200+ former PEX teachers
2	Focus group participant selection—All participants who submitted videos (3) were invited to become co-researchers and join the virtual focus group.	All 3 teachers who submitted videos self-selected to be co-researchers
3	Pre-focus group work—All researchers watched the individual video submissions and wrote one or two questions to guide the conversation and video analysis in the focus group.	Lead researcher and co-researchers
4	Virtual focus group—All researchers participated in a group discussion of the videos and analyzed them for meanings. The discussion around the videos is both concurrently data generation and analysis. Researchers summarized their findings and elected modes for data representation.	Lead researcher and co-researchers
5	Review of focus group analysis—The lead researcher reviewed the recording of the focus group for additional layers of context and meaning to incorporate into the group's final findings.	Lead researcher
6	Presentation—The lead researcher completed the video and manuscript summaries of the research, communicating with the other co-researchers for approval and edits.	Lead researcher and co-researchers

generation process is relatively complex and scaffolded, we characterize the research as steps in **Table 1**, as an overview.

Reflexivity

Within CMW, recursive consideration of the co-researchers' positionalities is paramount for maintaining appropriate relations among lead and co-researchers (Johnson, 2018). As the lead researcher, my¹ primary goal was to hold my identities under scrutiny for how they may interact with and impact the research. For instance, as a current PEX teacher coach, I needed to know whether that role conferred a perception of power or authority over the other teachers/co-researchers or made me positively biased toward the program. How might my other identities (female, white, cisgender, etc.) align with or distinguish me from other group members? Despite fifteen years as an educator, I have never been a traditional classroom teacher. Would this be a source of mistrust or discredit with the teachers?

Beyond signaling our identifiers and acknowledging the limits of our ability to represent (or even understand) another's truth, Pillow (2003) argues that reflexivity is a holistic embracing of "messy" engagement and discomfort (p. 193). To that end, it was not enough to consider how similar or dissimilar I was to my co-researchers; I needed to be aware that the whole design process was mine and that, despite the inclusion of co-researchers, I had a great deal of authority in the generation of the memories, the facilitated discussion, and the representation of the outcomes. Consequently, as much as I might have liked to have "shared power," research and its associated outcomes are still legitimized, for better or worse, through the researcher "in charge."

As a result, the approach to reflexivity in this undertaking was transparent as I communicated my position within the study, within the community of study, and with the data. My candid telling of the process is another layer of context accounted for in the analysis. I also kept a reflective video diary throughout the study to capture emerging concerns and reflect on the proceedings. I elected to keep a video rather than a written diary to echo the request made from the co-researchers.

Co-Researcher Selection and Recruitment

We (I in conjunction with the North Carolina Arboretum) emailed the 200+ former participants of PEX (NC K-12 teachers) to seek participation. The email included the video diary prompt, a link to a consent form, and an invitation to participate further by joining the focus group as a co-researcher. After three recruitment emails over two months, three teachers responded with videos and also elected to participate in the focus group: Yetta Williams, Amy Harrington, and Evelyn Warner (**Table 2**). Notably, they are all former environmental educators.

Narrative Prompt: Video Diaries




Informed by Johnson's (2018) "spectrum of PAR," we modified the standard approach to CMW and requested short video recordings no more than 2-3 minutes long. These video diaries answered the prompt, "Share a memory that illustrates the impact participating in PEX has had on your well-being."

For two reasons, we chose to solicit video memory narratives rather than the typical written narratives. First, we hoped submitting short video recordings would be less burdensome to working teachers than a 2-page writing assignment. Similarly, watching short videos may be less demanding than reviewing a series of written works. Secondly, edited into a compilation, the resulting video footage could be a compelling testament to teachers' experiences implementing NBL/teaching strategies and offer useful insight for prospective PEX participants. These decisions necessarily forced us to abandon the confidentiality typical in CMW narratives. However, the accessibility of video creation, especially for such an overburdened group of professionals, was a vital trade-off that supported the liberatory, participatory nature of CMW.

Although we presented the video diary as the first option, we acknowledged fear of reprisal or discomfort may prevent participation. We also offered teachers an option to participate anonymously by submitting a written narrative. None of the teachers elected this option. Indeed, even within typical CMW frameworks, some co-researchers abandon their anonymity in the focus group portion of the study as a form of empowerment (Johnson, 2018).

¹ Use of the first person refers to author one who conducted this research as part of their master's thesis. The remaining author team consisted of the participant/co-researchers and academics who served on author one's thesis committee.

Table 2. Co-researchers

Co-researcher	Photo
<p>Yetta Williams 24+ years in education Pilot teacher for PEX Advanced academic resource teacher (Jen, 2024a)</p>	
<p>Amy Harrington 22 years in education 6th-year PEX alum Teaches 8th grade science (Jen, 2024b)</p>	
<p>Evelyn Warner 7 years in the classroom 2nd year in PEX Teaches 7th & 8th grade science (Jen, 2024c)</p>	

CMW Focus Group

Per Johnson's (2018) framework, we (the three co-researchers and I), analyzed and theorized over a virtual two- and half-hour focus group as the principal data analysis applied in CMW. In addition to the co-researchers' discussion prompts, I also prepared the following literature-informed questions for the session:

1. Did you notice common language/words linked to well-being across videos?
2. How did PEX participants describe their relationship with their students in the videos?
3. What physical experiences/sensations do participants describe in the videos?
4. What role does the idea of self-direction or autonomy play in these narratives?
5. Do participants describe a change or reconnection in/with an identity?
6. Consider the video as you would a piece of media - what does the setting, clothing, movement, tone, etc. say?

In another effort to minimize the time commitment of teacher co-researchers, the focus group was held on a digital platform rather than physically in person.

RESULTS & DISCUSSION

The unique nature of CMW—simultaneous data creation and analysis—makes it difficult to present findings under the tidy “results” and/or “discussion” headers often limiting representational form. Instead, we offer a landscape-level overview of the conversation under “tributaries” and a finer-grained (albeit messier) examination under “rhizomes.” Although I wrote out our co-created analysis and selected quotes to highlight, the co-researchers had the opportunity to review several drafts to provide feedback, edits, and final approval in alignment with Johnson's (2018) CMW framework. For clarity, quotes from the teachers' videos are marked with their initials and “(video)” and quotes from the focus group discussion are attributed with initials only.

Table 3. Personal well-being concepts

Personal well-being concepts
Happiness
Passion/enthusiasm
Purpose
Identity/reputation
Contribute to science
Hope
“See with new eyes”
“Something to look forward to”

Tributaries

As the co-researchers and I wound down the focus group session, we found it helpful to capture our reactions, responses, and language in broad categories to organize our thoughts. I reviewed my notes with the group, and they all chimed in to fill in any gaps and cluster the ideas and words. However, we did not want to flatten the discourse into traditional myopic themes. Instead, we wanted our categories to serve as structure or overview, more accurately reflecting how the stories and insights cannot easily be divided into easily consumable takeaways. All the elements overlap and intersect within the narratives, like braided tributaries flowing and intersecting into a greater body of knowledge. The three categories we used were:

- (1) PEX’s impacts on personal well-being,
- (2) professional well-being, and
- (3) student well-being.

Personal well-being

Within the broad topic of benefits to personal well-being, the words and ideas that came up repeatedly can be found in **Table 3**.

In our discussion, the ideas of passion, renewed enthusiasm, and “seeing with new eyes” were linked to the rejuvenation of re-experiencing the outdoors through their students. The students’ capacity to appreciate and value natural wonders was a source of pride, motivation, and sustenance for teachers’ passion for teaching. Similarly enmeshed were the ideas of purpose, scientific contribution, and hope for the future. The teachers expressed a personal directive to not only prepare their classes for the next grade level, but to educate a generation with the critical thinking and environmental connectedness requisite to handle the climate crisis:

YW (video): I’m not worried about them in the natural world on their own, and that makes me feel proud and happy, and it gives me a great sense of well-being. I think I can die a happy, elderly woman, because there’s a whole generation of children out there that are gonna be like, “You have a problem? Let’s get outside”... Because in the long term, I need them to run the world in a safe and healthy way for everyone.

Professional well-being

Regarding professional well-being, the teachers all thought of PEX as a legitimate front or “good excuse” for the subversive act of taking students outside. Other ideas that

Table 4. Professional well-being concepts

Professional well-being concepts
“Reason to stay”
“One less thing to plan”
Relationship building
Class culture
Class management
Admin support
Increased opportunities

Table 5. Student well-being concepts

Student well-being concepts
Time outdoors
Movement
“They open up”
Opportunity to discover
Connection to the real world
Enjoy being outdoors

came up (again, emic categories in quotations) are included in **Table 4**.

We found that PEX didn’t just protect teachers’ well-being; it protected their careers as well. The renewed sense of purpose and passion acted as armor against the oppressive and stagnating atmosphere they experienced in the testing-driven, neo-liberal school system.

YW (video): I think that’s why I stay in education, and I like projects like this because I can keep exuding that [purpose and passion] through tasks like this.

There were more concrete benefits, too. Amy shared how participating in PEX helped her stand out for grants and PD opportunities like a teaching workshop in Australia. The program also builds relationships and class culture. Evelyn shared a story about a student who now informs her of every bird that comes to the feeder in her yard. Amy’s class hides a stuffed bird from her Australia trip every week. These small moments of joy, connection, and fun can increase student motivation and pro-social behavior, making class management easier (Cui, 2022).

EW (video): I’m having one less lesson on my plate that I have to plan. One less thing I have to think about management and, you know, behavior concerns because it’s become such a routine.

Student well-being

The benefits they identified for students, as seen in **Table 5**, tracked with NBL outcomes identified in the literature cited previously.

More than anything, these conversations revealed ways the teachers saw their own well-being and their students’ entangled. Teachers engage in emotional labor daily, investing time and energy into developing relationships with their students and fostering a positive learning environment (Burić et al., 2021; Vogt, 2002). This emotional labor can lead to a deeper emotional investment in their profession, as educators experience a sense of responsibility and connection to their students’ well-being (Burić et al., 2021). These pedagogical relationships contribute to teachers’ strong sense of identity.

Teachers often derive a sense of accomplishment and purpose from seeing their students succeed academically and personally (Platsidou, 2010). So, it follows that they offered these perceived “benefits to students” as examples of ways PEX supported their own well-being as educators.

AH: I’m supposed to make this about **self**-care and **my** well-being. Usually, I’m just talking about my students. So yeah, I remember, like, actively trying to say, “Okay, how does it affect **my** well-being?” and that was kind of almost hard to do.

Rhizomes

The data or insight produced by CMW is not linear, despite our efforts in making it such. Less the unidirectional flow of tributaries, a more apt analogy may be Deleuze and Guattari’s (1987) figuration of the rhizome—multidirectional tangled strands connecting nodes and branches. Discussing this data is not a map or guide but rather an invitation to “get lost” (Lather, 2007) with the research group and see where you end up.

For instance, we established the category of “PEX’s Impacts on personal well-being” but the conversation was rarely so straightforward. Within our discussion, this manifested as a contrast between the positive outcomes of time outdoors with the teachers’ relatively low bar for daily self-care as evidenced by their responses to an icebreaker prompt around their self-care that day: “I actually ate breakfast this morning” and “I don’t think anything ... But! I took a little walk down by the river with my dogs for about 2 or 3 min before I hopped on here, so ...” The following examples provide a deeper look at this collective work in action and how our insights track with critical and feminist liberatory thought, especially the critical pedagogies of Freire (2000) and hooks (1994).

Rhizomatic discourse #1: Embodied well-being

The first video we watched was Yetta’s. One of the things we identified first was, rather than answer the prompt with a memory, she went into a full-blown public service announcement/lecture declaiming the benefits of PEX and outdoor learning for students and education—clearly well-trod and deeply held talking points. She was also scratching her head, playing with an earring, and adjusting her shirt (Jen, 2024d). As the group exchanged first-takes, we interpreted all this to mean she was relaxed and in her “comfort zone.” She knows this information, and doesn’t have to think about what she’s saying, almost in “auto-pilot.” Then, it was her turn to share what it was like to watch herself :

YW: I was a little annoyed with all the scratching and touching [...] But you’re right. I was very comfortable [with the topic] at that moment. But I think, in the moment, I was shifting because I had to use the bathroom, and I realized, like there were like a million things I needed to get done. So, I just started fidgeting (emphasis ours).

This was not something she remembered until she rewatched the video. For all three co-researchers, the reflective/reflexive act of watching themselves brought rich

discussion about how educators routinely deny themselves and their bodies—waiting to pee, getting in early, staying late, working over the weekend, pushing personal projects, sacrificing their social lives, etc. hooks (1994) gave the same example, needing to use the restroom in the middle of class, to illustrate the way education, especially Western institutions, erase the body in commitment to the myth of the mind-body duality. This duality acts unevenly on the woman’s body - a vessel expected, even suited, to step aside to serve student gains (Nias, 1999; Simmie, 2023). Further, there was a new awareness and gratitude for shifting the focus inward, prompted by the realization of how rarely educators are asked about their own fulfillment. This observation highlights the pervasive neglect of educators’ holistic well-being and humanity within the education system:

AH: A lot of times, we just don’t have people even ask, “What makes you happy?”, or “What brings you joy as a teacher?”

The videos and discussion left us with a visceral understanding of how needed and liberating a NBL program like PEX can be when teachers have access to tools and pedagogies that see, honor, and connect to the whole being in an environment that has eroded bodily autonomy.

Rhizomatic discourse #2: The conscious raising of the teacher’s narrative

Seeing the three videos side by side, we noticed patterns of self-sacrifice and passion that mimicked teachers’ everyday state of being in their working lives. Despite their differences, all three videos had similar elements that morphed into a meta-, educators’ version of the “Hero’s journey,” the literary notion of the monomyth (Campbell, 1953). In it, common plot elements like a humble beginning, call to adventure, help from a mentor, etc. can be mapped against much of Western storytelling from Jane Eyre to Luke Skywalker. In the videos, every single co-researcher talked about how great PEX was for their students before addressing the prompt for themselves. Each video had evidence of fatigue after a long day and physical self-denial, more testimonies to the “legacy of repression and denial” of teachers’ bodies and the demands on them (hooks, 1994, p. 191). And yet, through all that, there was infectious enthusiasm, pride, and love. They approached making the videos the same way they approached their instruction. It took watching it all back-to-back and in conversation for us to recognize the pattern. Here’s Evelyn naming it and chiding everyone for not focusing on themselves:

EW: After watching Yetta’s [video] I was really cognizant of the “self-care” aspect, or “well-being” [focus] on us, and the first thing [Amy] said was “for my **students** well-being” and for [my video] too. You know, where teachers are the second thought. It’s our kids first. That’s why we do it.

This reflexive, recursive process, revisiting the same content with new context, is the memory work. This newly conferred self-awareness, akin to Freire’s (2000) *conscientização*, is an emancipatory product of CMW that lays the groundwork for praxis and transformation. The pattern

recognition shifted their concept of self-sacrifice within their profession. The fact that they experienced workplace hardships was nothing new. In fact, at one point they pushed back against the narrative of the “teacher mental health crisis” in spaces like social media, implying it was somewhat overstated:

AH: People are gonna reshare and comment on the worst. Even things that are funny, they’re still negative a lot. And I hate that that is portrayed so much.

Seeing the degree to which they internalized the “teacher’s narrative,” even replicating it in a video, forced a re-examination of how they had to work to mitigate their own burnout and achieve professional sustainability through the “extras” like PEX. By answering Freire’s (2000) call to dialogue our way to liberation, we unearthed their latent recognition of crisis and how they had labored to keep it at bay. Ultimately, PEX was a self-administered prescription contributing to what hooks (1994) describes as a “holistic model” of learning or teaching that allows teachers to “grow and [be] empowered by the process” alongside students (p. 21). This reflective process illuminated the profound impact of workplace hardships on teachers’ identities and their ongoing quest for professional sustainability.

Rhizomatic discourse #3: Identity renewal

This emancipatory work dovetails with the idea of identity that flowed between the categories, “personal benefits” and “professional benefits.” All three teachers began their careers in environmental education and consider this background part of their personal and professional identities. They are not alone in this; educators’ identities often intersect with their professional roles, further strengthening their perception of teaching as central to their identity (Simmie, 2023; Williams et al., 2012). In conversation, they discussed moving on to formal education where they sacrificed regular time outdoors and valued nature-based expertise for job stability and a higher wage. In the process, they left a first love, and part of themselves, behind.

Participating in PEX provided a pathway for them to live this part of themselves in an institutional environment that otherwise does not value nature connectedness—it is not on the standardized test. Not only could they bring their authentic selves to work, but they could be recognized and appreciated for it. In PEX, the teachers found the “freedom” Freire (2000, p. 48) asserts they needed to “exist authentically” and cast aside the “internalized consciousness of the oppressor,” in this case, the rigid standards of the neo-liberal education system.

Beyond reviving atrophied identities, Yetta and Amy have taken on PEX and community science as new parts of their professional identities. Amy shared that she has five bird-themed shirts in rotation for Bird Walk Fridays. She has earrings, socks, and other bird trinkets gifted by students because she’s the teacher who goes outside and does bird walks. Here’s Amy on becoming the “Birdwalk Teacher:”

AH (video): It gives me something to be known for by the kids. I’ve had kids that graduated high school and

still come back and talk about our bird walks ... it gives me something to be passionate about.

She has used her participation in PEX to carve her own niche, to “transform” (hooks, 1994). The recognition she gets for that, from students or grant committees, supports her well-being as both a human wanting to be seen and remembered and as a professional getting credit for putting in the extra miles. Taking responsibility for her own “self-actualization” and well-being is the exact kind of “engaged pedagogy” that hooks (1994, p. 15) maintains will increase an educator’s capacity to reach and empower students and further reinforce the notion that our well-being is entangled with that of our students. Thus, self-centering can be student-serving as we saw in the final discourse.

Rhizomatic discourse #4: Tools for transgression

Perhaps the most surprising insight was the degree to which all three educators universally viewed their participation in PEX as a pathway for subversion. In one way, taking their students outside felt like actively subverting testing-driven administrations that do not see or value the benefits of the outdoors. PEX is a program developed by the North Carolina Arboretum, which is itself an extension of the University of North Carolina system and was the kind of state-supported network that conferred “immediate buy-in” from principals who may be less inclined to indulge the “hair-brained scheme” of a single teacher.

AH: Can I pull this off? Is admin really gonna be fine with me doing this once a week? But if you can prove that it’s great for your kids in all ways ...

We all noted the language “pull this off,” as if taking children outside was akin to a jewel heist or, more aptly, a prison break. There was also a sense of perverse joy in using the neo-liberal drive for capitalist calculable education “performance” (Ritzer, 2020) to sway administration approval:

YW: Then have the North Carolina Arboretum do this great write up about [the PEX pilot]. Then the principals are like, “Yeah, that’s **our** program at **our** school!” So, anything that makes a school look good or a district look good. They’re not going to turn away from it, especially if it’s successful.

By explicitly leveraging PEX, these teachers have “transformed the objective reality” oppressing them in a move that proved emancipatory for them and their students (Freire, 2000, p. 49). Successfully navigating this obstacle may contribute to self-actualization through identity transformation. The challenges teachers face—inadequate resources, demanding workloads, and societal pressures—can intensify the connection between their profession and identity (Cain et al., 2023). Using one challenge (metric/prestige-driven administration) to address another (lack of time outdoors) pushes their identity past a victim of circumstance and toward becoming self-liberators.

In a secondary subversion, the co-researchers emancipate themselves from the expectation that they should always come second or last. As previously discussed, educators are frequently required to set themselves aside to focus on

students (Bullough & Hall-Kenyon, 2011; Gustafson, 1982; Serow, 1994) in ways that mirror historic gendered oppression (Drudy, 2008; Simmie, 2023). The co-researchers rejected this construction by asserting their own needs and desires in at least one aspect of their day-to-day:

EW: Yes, there's self-sacrifice ... But what matters is, "Is it worth it to me?" And to be honest, it's also self-serving. Like Yetta said earlier, I want the next generation to care about nature and care about science because I care about it. So, project EXPLORE is self-serving. I get an excuse to go outside again, you know?

This pushing the "boundaries of what is acceptable," (hooks, 1994, p. 12) to school administrators and to society's expectations of teachers' emotional labor is at the heart of hooks' call for pedagogical transgression. She calls on teachers to center their own journey toward wholeness so they can be more present and receptive to students. Current conversation around teacher well-being is often tied to feelings of empowerment, professional fulfillment, and purpose (Nwoko et al., 2023). In this case, we see PEX emerge as a powerful tool for these women to construct well-being within the confines of an imperfect environment.

CONCLUSION

Beyond knowledge creation, the goals of PAR, like CMW, are the pursuit of knowledge that actively empowers the community of co-researchers to transform the status quo (Parry & Johnson, 2016). When it came to choosing a way to represent our "results" to the community, the co-researcher group elected a video format and deemed it the most accessible and *employable* in putting liberatory tools in the hands of fellow teachers. The video, *Real teachers real talk* (Jen, 2024e), combines clips from the teachers' videos, audio from the discussion group, and photos of PEX participants. Short enough to share easily online, host on a webpage, or watch on a coffee break, this testament to the teachers' experience preserves the voices, gestures, and insights that fueled this research. It adds to a growing body of contemporary CMW that produces documentary films, training videos, and video series as research products (Johnson, 2018). Additionally, the community of mutual support and healing we forged as co-researchers outlasts this project as another "outcome" of the study.

It is difficult, if not impossible, to pithily capture the richness of CMW and its impact on us as researchers. Considering the research questions, PEX was critical to the well-being of the teachers in the study. They highlighted moments of connection with/between students and land, self-(re)discovery, and autonomy. These snapshots cannot express our renewed imperative to subvert and reimagine teachers' imposed limitations. Although state lines and coach capacity limit PEX participation, there are other opportunities to transgress for transformation within education. Educators and researchers can acknowledge the Indigenous roots of NBL learning practices and pursue reciprocal partnerships with tribal organizations. Policymakers and school administrations must take human wholeness into account and reconsider the

ways they ask teachers and students to make, transfer, and measure knowledge. In the classroom, teachers can honor their and students' well-being in small ways, i.e., by not withholding recess as a punishment, offering standing at desks, permitting bathroom breaks, *taking* bathroom breaks, and trying reading/planning outside. All of us must demand a system where teachers do not need to "get away" with movement, autonomy, and going outside.

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