Examining the Impact of Neural Education-Focused Professional Development on Educators: An Open Letter

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Abstract

This dissertation, presented as an open letter, explores the transformational impact of neuroscience-informed professional development. Specifically, the Neural Education Institutes and ongoing monthly professional learning communities (PLCs) focus on educators' professional practice and personal well-being. Through qualitative, in-depth interviews with educators who have engaged in Neural Education, the research examines shifts in grading practices, classroom environments, discipline strategies, relational dynamics, and self-perception. The central research question guiding this exploration is: *How does participation in Neural Education Institutes and related Professional Learning Communities (PLCs) influence educators' approaches to students, teaching, and beliefs?* Findings reveal that such training can foster greater empathy, equity-driven pedagogical shifts, and a more profound sense of connection between educators and learners. The series of letters serves as both a reflective narrative and a call to reimagine teacher development through the lens of neuroscience, advocating for systemic change that prioritizes the well-being and growth of both students and educators.

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My dad planted this idea of returning to school as he hugged me at my Master's Degree graduation ceremony. The seed of possibility grew in me as I learned and grew in my practice as a teacher.

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Dear Fellow Educators (and in particular, those of you who determine professional development within districts):

I write to you in my everyday voice because enough academic language is designed to silence. I am played out! I want to talk about what it is like for me as a teacher, serving as an example for teachers in general. Right now, I am back in person with families still navigating COVID. While I never stopped teaching, I learned an entirely new way of teaching virtually, using platforms and computer programs that I had to learn quickly. I stepped up and did my best with what I was given to my students because that is what I do. However, there has yet to be time to rebuild my capacity. So, when I receive an email telling me I am expected to show up and be ready to learn at a Professional Development (PD), please keep my capacity and love in mind. I do not have more time or capacity to engage in PD that does not contribute to my soul. I lack the patience for professional development that does not strengthen or build relationships with other humans. Professional Development has become like mandatory watching reruns of unpopular old shows to check off the requirements demanded by lawyers and legislators. When the PD is over, I have a pathological urge to leave the space and regret the time lost. Professional Development that provides me with little to no actionable tools to take back to my students, increase their social-emotional or academic endurance, or enhance student-teacher connections is a frustrating use of time. Unless a given Professional Development provides value to me, the training will not be well-received by me or others.

We are living in a time of profound uncertainty and upheaval. For those of you who do not have the privilege of spending much time in classrooms with students right now, I must tell you that both students and their teachers are struggling. Returning to in-person instruction has been hard for many students, even for those who have enough to eat, a safe place to be, and the support of family. The lingering effects of the pandemic, rising mental health issues, economic instability, and political polarization are infiltrating our schools. Many students enter classrooms not only carrying backpacks but also the burdens of anxiety, fear, and diminished confidence. They are growing up in a constantly shifting culture that is often divisive and frequently harsh. All of this impacts their learning.

I increasingly see students who feel lost, afraid, and anxious, having adopted a fixed negative mindset about their abilities. They doubt themselves before even starting. They are disengaged not because they don't care, but because it feels safer not to try than to risk failing in a world that has let them down in many ways.

And our teachers? They are managing all of this. They are trying to teach content while also triaging emotional needs, managing behavior, navigating curriculum mandates, and coping with the system's stress, especially with students of color and Black students (Love, 2019). This moment demands more than business as usual. It requires attention, compassion, and a collective commitment to supporting one another differently.

The increase in mental health concerns in a post-COVID-19 and the current national leadership crisis has placed tremendous strain on teachers (Duarte et al., 2023). Teaching encompasses more than just reading, writing, and arithmetic. Being a teacher also includes classroom management, directly teaching social skills, and modeling self-regulation skills. Neurally aligned educators use their breathing and calmness to support students and encourage

them to mirror these soothing behaviors. The term for this skill is called *coregulation* (O'Mahony, 2021). To effectively co-regulate with students, teachers must first regulate themselves. With the continuing increase in social pressure faced by both adults and students, it is increasingly vital for teachers to have the opportunity to remain grounded and composed.

I have found that understanding the brain structures, how the brain protects us from harm, and the connections between brain systems, bias, and equity changes how I perceive behavior in the classroom. Ultimately, knowing how brains function allows me to view a student as overwhelmed rather than needing a discipline referral, which could lead to removal from the classroom. Just as students exhibit poor classroom behavior, teachers can exhibit similar behaviors during non-neuroscience-aligned professional development opportunities, whether being off task, leaving for the bathroom, or choosing not to attend when our brain needs are unmet. Understanding how the brain works through using neuroscience in professional development creates space and fosters an environment for teachers to build the capacity, enabling them to help students learn and stay engaged.

Given the ongoing COVID-19-related impacts, the increase in mental health concerns, and an overreliance on disciplinary procedures implemented by under-supported and unprepared teachers (Duarte et al., 2023), action is necessary. In this overwhelming problem context, I need a professional development program based on science, compassion, and love. My experiences suggest focusing on Neural Education, the study of the brain in the context of teaching and learning centered on neuroscience, love, and relationships. At the foundation level of neuroscience, we understand that a brain must feel safe and understood to learn and absorb new information. Neural Education cultivates such an environment through a neural lens to view our world that connects neuroscience to learning and, ultimately, equity (neuraleducation.org, 2023).

The bottom line is that both students and teachers need safety and connection for effective learning. Just as I am intentional about creating space in my classroom environment, both in the environment and providing room for students to process, speak, and listen, I also need similar support from those in administration, including the district office.

Our schools are in crisis, and I will illustrate this in the following letters. Students and teachers are suffering and at capacity, and they need to be prepared and supported to engage with the education process. Yet, we know what to do for both groups: Neural Education to increase personal and collective efficacy, equity, voice, and relationships at all levels while decreasing fear and anxiety. Therefore, this dissertation studied the effectiveness of neural education-aligned professional development for teachers.

With all due respect,

Mary Catherine - Educator

Significance

I open with a personal-professional letter format to let you, my readers, know where I am writing from. I am reaching out to you because schools are in such a crisis (in funding, resources, inadequate curriculum, inappropriate ways of even thinking about special education, etc.) that students continue to disengage at alarming levels. Dr. O'Mahony (2021) gets to the heart of the matter: "In our nation, we have high school students dropping out every 26 seconds - that is more than a million children pushed out of school every year" (O'Mahony, 2021, p. 11). The financial impact on society is extremely costly:

> "If half the students who dropped out of the class of 2008 had graduated, they would have generated $4.8 million more in wages and $636 million in state and

> local taxes nationally in one average year of their working lives (adjusted to reflect today's costs)" (O'Mahony, 2021, p. 11).

O'Mahony confirms that the academic progress of the United States has not improved since 1971, when reading and math tracking began. Youth suicide rates have risen by 56% since 2000.

> "The sad reality is that school sucks for at least 50% of kids! Ask them. The school makes me… 'cry, sad, depressed, suicidal, anxious, feel like a failure, stupid.' These are the top results one gets when the question is aired on the web, regardless of search engine" (O'Mahony, 2021, p. 13).

As a district employee at a school district in Western Washington, I am one of approximately 200 teachers working in several schools that serve over 3,000 students. This district boasts a graduation rate of 93%, compared to the state's rate of 83%. The student population is approximately 46% white, 22% Hispanic, roughly 15% of both African American and Asian descent, and a sizable multiracial population. Despite the proximity to tribal communities, there is a low number of Native American students, and fewer than 1% of Pacific Islanders (Office of Superintendent of Public Instruction, n.d.). This district spans between two major cities, includes an island, and has a character that blends rural and small-town suburbs. Many of our students are connected to military families, meaning that families frequently move in and out of the district throughout the year.

As I write this, I reflect on a recent district-mandated training in which two individuals were flown in to connect Collective Efficacy and Mixed Martial Arts (MMA) fighting to classroom teaching. I believe this was intended to unite everyone as individuals and use individual efficacy to rally a collective efficacy. However, the overall response from me and the

intended audience could have been much better. This experience was disappointing, and I will never get back that time in these valuable preparation days before the first day of school. In a district with over 200 Neural Education Certified staff members, this opportunity could have been far more effective if the resources had been utilized to support in-house speakers, presented through a neural lens, and provided the assistance that I and everyone else need to strengthen and build the educational community in which we serve our students.

A vital component missing from the training was reflection with peers and opportunities to ask for clarification. Reflection with peers and seeking help are vital components of the educational model that make neural education so powerful for our students and their learning (O'Mahony, 2021). As a teacher and learner, I need that as well. The notion that the district office considered preparing teachers for *the fight* in the classroom is disheartening, as it does not set me up, mindset-wise, for a positive year of grace and understanding with students, families, and other staff. This training maintains the mindset of fighting and power struggles. It continues the punitive practices and recycled systemic discipline procedures that label and stratify students and teachers (Brock, 2019; Love, 2019). This punitive discipline is the same system that perpetuates the marginalization of students, pushing them out, while the system itself maintains that students at the margins are a problem (Morris, 2016). These systems of racism, ableism, sexism, and colonial patriarchy persist as the standard in most schools (hooks, 2001; hooks, 2002; O'Mahony, 2021; Williamson, 2018; Rogers-Ard & Knaus, 2021; Safir & Dugan, 2021).

One way to maximize the effectiveness of the training could be through the use of the "Me, Here, Now" brain-based learning concept. When teaching any concept for optimal learning, the teacher aligns the concept with the audience, providing deep meaning to the individuals that will serve them personally, here and now (Willis, 2014). Since such PD opportunities exist

within our current staff, this research examines what could be happening instead. More specifically, I focused on the impacts of neuroscience-focused professional development for teachers. Through interviews with educators in the district, I assessed the impact of more positively framed professional development on teachers. In particular, how did participating in Neural Education Institutes change the way teachers approach students and teaching? In what follows, I adopt a letter format to present a positionality statement and theoretical framework, provide an overview of relevant neuroscience and professional development-related literature, and then clarify the methods used to evaluate the impact of Neural Education-focused Professional Development on educators.

Theoretical Framework

Dearest Educators,

If you were to sit in my classroom to learn a new concept, we would start with an open conversation, followed by brainstorming, private thinking, or journaling about what we already know or believe we know about the given concept. This practice is standard in many classrooms, and I have observed it in numerous classrooms within my district. After brainstorming, I would introduce various sources for information on this concept, such as a funny or informative YouTube video, an article, a story, a podcast, and my personal experience with the concept. This presents an opportunity for multiple resources and voices to be shared. Students would also share their own experiences with the concept with the group, leading us to collectively and individually reflect on the concept we have just explored, sharing what we have learned, what surprised us, and what we want to know more about.

Dr. O'Mahony (2021) posits that the neuroscience of learning is essential in classrooms where teachers and students receive rudimentary yet transformative information about how the

human brain functions and how children learn. After studying cognitive science in the context of teaching and learning, I have come to understand that cognitive approach to teaching leverages the cognitive three R's (O'Mahony, 2021). The framework for this study is therefore the cognitive three R's (Reflect, Revised Thinking, and Report Out), which are also part of a tool created for learning spaces by Dr. O'Mahony (2021) that he calls the Challenge Mosaic. This tool is available as a free resource at https://nedlearning.com. My experience in writing this paper is, in itself, an example of the cognitive three Rs.

The first step in this process is to reflect on what I already know about the topic. Reflecting is based on personal experiences. Through reflecting, we encourage the brain to take ownership of the material, which fosters curiosity, purposefulness, a sense of well-being, and an informed mindset. Conceptualizing this dissertation began with my understanding of Neural Education, where I acquired knowledge about it, and the continual cycles of reflection that followed.

After reflecting on what I already know about neural education, I move to Revised Thinking. In the classroom environment, this is the time when students ask themselves and their group mates what they think they know or guess about the subject, using clues from prior learning. Revised Thinking involves experiencing added information from multiple voices and sources, building new neural connections, and examining my newly formed mental model, or how the learner now perceives and understands the topic, given this newly formed information. With this updated mental model, learners, whether teachers or students in a classroom, will revisit their understanding of the topic and engage in conversation with others in a group. This time can be as short as one or two minutes, after which the teacher will guide the class to explore multiple perspectives to begin the revised thinking process.

Reporting Out is a personalized aspect of learning that depends on the domain of study. This is where new information, surprises, fresh perspectives, and unresolved questions are shared with the entire class or group. If multiple groups have the same learning experience, they report those findings, regardless of whether they have been reported before. Reporting Out solidifies learning through the reporting process; all learners in the space, including the teacher, contribute to the collective learning journey. In this process, the community learns together and benefits from hearing the thoughts of everyone, including whether and how their thinking has evolved. In this dissertation, 'Reporting Out' refers to the interviews with participants who share their perspectives with a broader community, including you, the reader.

The three Rs are cyclical, as continued learning and discovery are crucial as we deepen our understanding of any given concept. The use of Neural Education and the cognitive Three Rs framework directly shaped this study, as it involved participants. I reflect on our journey of neural education, including revised thinking. As the participants reported to me, I now report to the learning community through this dissertation, which serves as an application of Neural Education.

Thank you for sticking with me thus far.

Mary Catherine - Educator

Literature Review

Before framing approaches to interviewing participants, I highlight literature that helps clarify the importance of Neural Education. This literature review provides an overview of neuroscience, its application in education, and neural education, concluding with a focus on the importance of neural education in teacher professional development.

Neuroscience

Dear Educators,

I want to clarify neuroscience because it is a complex term used in several fields. Neuroscience has multiple definitions, depending on the individual defining it. In the medical community, neuroscience primarily focuses on neural connections and circuitry, aiming to assist in brain imaging for disease diagnosis (Mandal, 2023). From a psychological perspective, neuroscience examines behavior in relation to the brain, nervous system, and various biological functions. It also explores aspects at the nerve cell level, including heredity, ancestral influences, instinct, and responses to other biological forms (Brown, 2020). In biology, neuroscience encompasses the study of neural processes, brain structure and function, and the interaction of the nervous system with other biological systems, along with factors such as heredity, ancestral influences, instincts, and responses to other biological entities (Gordon, 2000). The neuroscience perspective across these fields has its foundation in psychology, with an applied focus on the individual.

With the help of one of the fathers of cognitive science, George A. Miller, let me briefly clarify how the nomenclature of the word "neuroscience" came to be what it is today. Miller notes in his historical perspective on the cognitive revolution that September 11, 1956, marks the date of the conception of cognitive science, organized by the "Special Interest Group in Information Theory" at the Massachusetts Institute of Technology (Miller, 2003). This symposium was convened to present papers on topics such as memory, linguistics, coding, syntax, logic, and more. While most of the interest centered on the application of artificial intelligence (AI) in industry, Miller (1956) emphasized the interdisciplinary nature of psychology, philosophy, linguistics, anthropology, neuroscience, and computer science.

Nevertheless, it took a couple of decades to settle on what would later be known as cognitive neuroscience (Miller, 2003). It would not be for many years until the benefit of understanding neuroscience would appear in educational settings.

By the 1960s, Harvard referred to neuroscience as cognitive studies, Carnegie Mellon called it information processing, and the University of La Jolla referred to it as cognitive science (Miller, 2003). In 1976, two vice presidents of the Sloan Foundation rallied support for a new program called 'neuroscience.' The Sloan Foundation was transparent that their funds would be used for communication between disciplines. In 1978, one of the smaller grants was awarded to Michael Gazzaniga, then at Cornell Medical School, enabling him to initiate what has since become cognitive neuroscience (Miller, 2003). Cognitive neuroscience is summarized as "a unified science that would discover the representational and computational capacities of the human mind and their structural and functional realization in the human brain" (Miller, 2003, p.144).

Above, I noted that neuroscience began to focus on artificial intelligence in the 1950s and would only later impact education. The delay in applying neuroscience to education was alleviated in 1997 with the publication of a paper titled *"Education and the Brain: A Bridge Too Far" by* Bruer (1997). Bruer responded to an "opinion that was widely held at the time that neuroscience was for neuroscientists and teaching was for educators. There was an overarching idea that the two could not meet. Too many unknowns" (O'Mahony, personal correspondence). O'Mahony recently noted, "It is still like that for most neuroscientists today" (O'Mahony, personal correspondence). Horvath & Donoghue (2016) also clarify that, in this piece, Bruer cautions that the gap between neuroscientific research and educational practice is too wide to

traverse. There has been pushback and further exploration of neuroscience and the implementation of said concepts in the classroom. Dr. O'Mahony shares,

> "In the 1990s, we were guided by John Bruer's paper questioning the efficacy of connecting neuroscience with teaching and learning. Dr. Bransford and I believed that while in the past there was a great divide between research neuroscientists and research learning scientists, that space was quickly becoming populated by ideas and evidence that, indeed, a child's brain was the central objective in any learning space. Of course, while the focus was on behavior, this link was difficult to manage - we were managing classes, not brains - but as soon as we began to question the behaviorist manifesto and to include a cognitive perspective, it became clear that the bridge was indeed not too far" (O'Mahony, personal correspondence).

While this debate continues, neuroscience has a substantial presence in education, as I discuss in my following letter.

Respectfully,

Mary Catherine - Educator

Neuroscience in Education

Hi again,

Now that you have read about neuroscience, I would like to highlight its broader applications in education. Many scholars, including Dr. Bransford (O'Mahony's mentor) and Dr. O'Mahony, believe that "the bridge between neuroscience and education practice is achievable" (Horvath, 2016, p.1). Considering our definition of neuroscience from a psychological perspective, neuroscience examines behavior in relation to the brain, the nervous system, and

various biological functions. It also delves into aspects at the nerve cell level, heredity, ancestral influences, instinct, and responses to other biological forms (Brown, 2020). To accurately share knowledge about brain structures and how learning and memory function within the brain with teachers and educators, there has been limited emphasis on considering both student and teacher as whole individuals (Dubinsky et al., 2019)

We can now explore the practical aspects of creating a brain-safe environment for learners. In this context, it is crucial to recognize that the role of those assisting the learner extends beyond the classroom to include various elements that contribute to a holistic and supportive learning environment for the brain. When building a brain-safe learning environment, the primary responsibility of those who assist the learner is to provide an appropriate context and space for learning, offer support and encouragement, listen to the learner, and provide access to helpful tools (Boud et al., 2005). The environment in which learning occurs helps ensure and support maintaining a positive attitude toward ourselves as teachers and learners and is essential for overcoming the labeling, stratifying, and competitive structures systematically embedded in educational systems (Boud et al., 1989).

The terms “fixed mindset” and “growth mindset” originate from the field of psychology, specifically from the work of Carol Dweck (2019). Fixed and growth mindsets refer to people's attitudes or beliefs about their abilities and intelligence. Individuals with a fixed mindset believe that their skills and intelligence are unchangeable and cannot be significantly altered. Conversely, those with a growth mindset believe that abilities and intelligence can be developed through effort, learning, and perseverance. They tend to embrace challenges and view failures as opportunities for growth (Dweck, 2019). Neuroscience can help explain the underlying neural processes and mechanisms contributing to mindsets. For example, studies have shown that the

brain can change and adapt through a process known as neuroplasticity (O'Mahony, 2021), which aligns with the concept of a growth mindset. Understanding how the brain responds to challenges and learning experiences is especially relevant in educational contexts, as this knowledge can be applied to practical teaching approaches.

Performance-based pedagogies and mastery-based pedagogies refer to distinct approaches in education and teaching strategies. Performance-based pedagogies emphasize students' ability to demonstrate their knowledge and skills through assessments or tests, often prioritizing specific performance outcomes (Chang, 2021). This approach focuses on results such as test scores, grades, and external validation. Students are driven to perform well, often under pressure, with learning oriented around short-term goals. In contrast, mastery-based pedagogies prioritize ensuring that students fully grasp and master the material before progressing, placing value on deep understanding rather than merely meeting predefined performance criteria (Chang, 2021). Mastery emphasizes deep comprehension, growth over time, and intrinsic motivation. Mastery-based pedagogies encourage students to make mistakes, reflect, and persist through challenges to truly understand the content.

Neuroscience can provide insights into how various teaching methods and pedagogies affect learning and memory processes in the brain. For example, neuroscience can illuminate which methods are more effective for long-term retention and comprehension of the subject matter (O'Mahony, 2021). Neuroscience research supports several principles that align more with mastery-based learning across four areas. First in long-term memory formation. The brain retains information more effectively when the learning is deeply processed and meaningful (O'Mahony, 2021). Mastery-based learning encourages deeper cognitive engagement, which is crucial for encoding information into long-term memory. Secondly, mastery-based learning

involves neural plasticity and spaced repetition. Spaced practice over time enhances neuroplasticity and solidifies memory. Performance-based approaches often rely on cramming, which activates short-term memory but does not lead to durable learning. The third area is error correction and feedback. Neuroscience demonstrates that making mistakes and receiving timely feedback activate the anterior cingulate cortex, which plays an important role in learning from errors. Mastery-based environments promote this kind of learning, while performance-based settings may discourage risk-taking and error-making due to fear of poor evaluations. The final area is stress and the brain. Chronic stress, often present in high-stakes performance-focused environments, impairs the prefrontal cortex, which is essential in decision making, attention, and working memory. Mastery-based settings, which reduce pressure and emphasize personal progress, help maintain a brain state more conducive to learning (O'Mahony, 2021).

Perception of events and conditioning through experience are terms that relate to the psychological processes of perception and learning, highlighting how our experiences shape our responses to the world. The perception of events refers to how individuals interpret and understand the situations and stimuli in their environment. Conditioning through experience involves how experiences, including positive and negative reinforcement, influence an individual's behavior and responses (Zachs, 2007). Neuroscience examines the neural mechanisms that underlie how information from the environment forms associations between events and responses, and how prior experiences influence these processes (Zacks, 2007). Additionally, teachers with fixed mindsets tend to use performance-based pedagogies, while those with growth mindsets typically adopt mastery-based pedagogies for students (Dubinsky et al., 2019). Thus, neuroscience provides a deeper understanding of perceptions surrounding

events and the connections between these events and their conditioning through experience, shaping our responses to the world around us (Boud et al., 2005).

Self-reflection as part of the learning process for educators and students, along with learning through experience, both require a capacity for understanding one's thinking and learning process, critical self-awareness of values, beliefs, and assumptions, and an openness to challenging alternative perspectives (Coulson & Harvey, 2012). Literature shows that there are theoretical and empirical grounds to believe that on-the-job participation in reflective dialogue is an effective method for the professional development of teachers (van Kruiningen, 2013). Teachers need time to reflect on practices. Neuroscience consistently demonstrates that when educators engage in learning experiences beyond their initial training, new conditions are introduced that require displays of agency, meaning teachers can be self-organized, proactive, self-regulating, and self-reflective in their teaching approach (Coulson & Harvey, 2012). It is widely acknowledged in education and research that, with guidance, structure, and support, learners of all ages can effectively navigate the complexities of maximizing learning experiences (Coulson & Harvey, 2012). This understanding extends beyond students and is equally relevant to educators themselves. When teachers engage in intentional self-reflection and adopt self-regulation strategies, they are better equipped to manage the emotional and cognitive demands of their profession. These practices promote awareness of internal states, help clarify personal and professional goals, and foster resilience in the face of ongoing challenges.

In this context, addressing educator burnout requires a shift in focus toward these internal coping mechanisms. Burnout is a prolonged response to chronic emotional and interpersonal stressors on the job, characterized by three dimensions: exhaustion, cynicism, and inefficiency (Hydon et al., 2015). By cultivating reflective and self-regulatory habits, educators

can build protective factors that mitigate these effects and support long-term well-being. A study by Robinson et al. (2019) found that one essential aspect of addressing burnout was providing teachers with increased opportunities for professional development. Robinson et al. examine the effects of stress on teachers' mental and physical health as well as the impact of burnout. As teachers' burnout increases, their classroom preparedness and involvement in activities decrease, leading to an increase in criticisms toward their students. Consequently, the students' perception of the teacher often becomes negative, impacting their motivation and self-efficacy in the classroom (Robinson et al., 2019). Learner responses to educator burnout are based on the operation of mirror neurons. Mirror neurons are neurons that fire both when an individual performs an action and when the individual sees or hears another perform a similar action (O'Mahony, 2021). The discovery of mirror neurons helps us understand the people around us, our perception of situations, and how our brains respond to the perceived actions of others (O'Mahony, 2021).

Specific aspects of executive function, brain development, and the effects of sleep, stress, digestion, and exercise on cognitive processes are important for educators (Dubinsky et al., 2019). These factors directly affect the body's ability to focus, regulate emotions, retain information, and engage meaningfully in learning. For educators, understanding how these processes operate, both in themselves and in their students, can inform classroom practices, guide more empathetic responses to student behavior, and foster healthier teaching environments overall. Self-care refers to activities undertaken to enhance or restore health and well-being, is highly individualized, and represents an important step in healing (Hydon et al., 2015). Unfortunately, many teacher preparation programs still do not equip future educators with these

essential skills, which is why incorporating Neural Education into professional development is crucial in our school districts.

Neural Education as Applied Neuroscience

Dearest Educators,

The following is a brief history of Neural Education as reported by Dr. O'Mahony through personal communication (2022). In 2015, Dr. Widmann, a physical education teacher, and Dr. O'Mahony met at a technology conference. They both gave presentations independently and noticed that the same audience crowded into both sessions. This encounter was intriguing for a technology conference since neither of them focused on technology. Instead, they presented on brain systems and the importance of physical body movement within education. In 2017, Dr. O'Mahony and Dr. Widmann founded a nonprofit organization in the State of Washington to disseminate neuroscience, called the Learning First Institute for Connecting Neuroscience with Teaching and Learning, situated at Pacific Lutheran University. That summer, Neural Education evolved into a community of members that continues to grow.

Since 2017, including during a pandemic, Dr. O'Mahony and the Neural Educators comprising Neural Education have developed the nonprofit's infrastructure in preparation for exponential growth. Neural Education began collaborating with school systems to advance the field and also initiated Champion training and capacity building. Steilacoom Historical School District #1 became the first fully neural-certified system in Neural Education methods. Dr. O'Mahony and Neural Educators (Neural Education Champions) continued to present at national and regional conferences, including keynotes at Washington Associated Educators of the Talented and Gifted (WAETAG), Washington Association of School Administrators (WASA), National Center on Education and the Economy (NCEE), and they offered Summer Institutes.

Neural Education prepares syllabi for teachers to share brain information with children. For instance, in Steilacoom, Neural Education launched Family Academy to engage parents in applying Neural Education vocabulary, concepts, and strategies at home. Dr. O'Mahony and Neural Education Champions published *The Neural Teaching Guide: Authentic Strategies from Brain-Based Classrooms,* a compilation in which individual Champions contributed chapters focused on translating theory into practice (O'Mahony, 2021).

Neural Education and Champions responded to the COVID-19 pandemic by transitioning professional development to an online platform. Through a collaborative, brain-based, and neural perspective, these collaborators designed and refined a Flipped Resources method, providing various resources for deeper exploration during and outside professional development time, at each individual's pace and interest (O'Mahony, 2021). Champions adapted communication infrastructure and teaching channels to collaborate across Google Drive, Docs, Slides, and Zoom. They continued to foster partnerships with school systems and expanded their efforts beyond the state. Dr. O'Mahony (2021) published the main text, *The Brain-Based Classroom: Accessing Every Child's Potential Through Educational Neuroscience,* to explain not only how brain structure and function operate but also how the current setup of education systems and environments is contributing to the majority of challenges teachers encounter, as well as the negative effects school systems impose on students.

As stated on the Neural Education website (www.neuraleduation.org), their mission is to eliminate the barriers of stress, bias, and emotional reactivity by using Neural Education's research-based methods and practices rooted in cognitive neuroscience. This approach aims to create classrooms that foster low-stress, safe, and productive learning environments where all students can be recognized, their voices heard, and their potential realized. Neural Education

Champions and Dr. O'Mahony continue to gather data, publish findings, and co-create learning spaces with educational partners (O'Mahony, 2021; Neural Education, 2023).

Returning to the previous conversation on the importance of neuroscience more broadly, Horvath and Donoghue are not alone in suggesting that educators require greater neuroscientific literacy and that neuroscience should also be included in pre-service training (Horvath & Donoghue, 2016). The Neural Education network, however, argues that pre-service training alone is insufficient; it should be complemented by ongoing professional development. Continued education is essential to ensure that educators remain updated on the latest advancements in neuroscience and how these insights can effectively inform their teaching practices. Moreover, traditional education often centers on student behavior, resulting in punitive discipline and stratification. In contrast, Neural Education shifts its focus towards understanding the underlying reasons for student and teacher behavior by exploring the neurological aspects and examining why specific responses occur in the brains of students and teachers. Dubinsky et al. (2019) would attest that all professional development should be aligned with neuroscience frameworks to address the whole teacher. As Dubinsky et al. argued, "PD may have a more powerful impact when neuroscience is the focus. Moreover, teachers must experience this learning to create experiences for their students" (2019, p. 403). It is clear that teachers want access to neuroscientific information relevant to education; they do not want dumbed-down information (Dubinsky et al., 2019).

Recognizing that everyone is responsible for changing their brain is a powerful idea that may motivate science and non-science teachers to provide students with opportunities to engage actively with the content. Neuroscience courses for preservice and in-service teachers, provided as collaborations between scientists and teacher educators, can lead to improved science

education, pedagogy, and an enhanced understanding of neuroscience (Dubinsky et al., 2019). When given the opportunity to engage with neuroscience and learning, teachers themselves made connections by applying neuroscience concepts to understand why learner-centered pedagogies effectively promote higher-order thinking and deep learning in their students (Dubinsky et al., 2019). Teachers and researchers are encouraged by evidence that training programs affect neural change and have significant positive behavioral consequences (Coch, 2018). Additionally, from these experiences, teachers report that learning about neuroscience is welcomed and has a positive, perhaps transformational, impact on their professional practice (Dubinsky et al., 2019). This brings us back to the neuroplasticity of educators with neuroscience knowledge and a PD space that offers learners the capacity to recover, continue to build resilience, and take an active role in their own healing and, when available, do this with colleagues who may be experiencing similar thoughts, feeling, and emotions (Hydon et al., 2015).

Dubinsky et al. posit that "We can directly affect education through the teaching of neuroscience to educators" (Dubinsky et al., 2019, p. 395). As one teacher who just completed a neuroscience-aligned professional development course shared,

> "I decided that I am going to teach my students about the brain and learning on the first day of school. We are going to create neurons and demonstrate how synapses form when we learn something. Hopefully, this will put them in a growth mindset instead of a fixed mindset" (Dubinsky, 2019, p. 402).

After reviewing the background of Neural Education, the broader study of neuroscience in teaching and learning, and the implications of neuroscience in professional development, I have concluded that such approaches are indeed relevant and necessary, as other researchers and

practitioners echo. This dissertation, then, centers on how neuroscience knowledge, through the lens of Neural Education, has affected teachers' practice and approach to teaching more broadly.

Thank you,

Mary Catherine -Educator

Researcher Positionality

Dear Fellow Educators,

By now, you are probably tired of my letters. But still! We haven't fixed schools yet! I come to this research as a racially white, neurodivergent, cis-gendered woman, wife, mother, grandmother, public school educator, and high school swim and dive coach. As I write, the world is still reckoning with the long-term impacts of COVID-19, and the trauma it unearthed continues to ripple through my community, my school, and my classroom. Layered on top of that are ongoing challenges, political polarization, book bans, attacks on educators, and a mental health crisis among youth that make the work of teaching feel both more urgent and more fragile than ever. The social-emotional issues I have encountered this year in my classroom are, by far, the most numerous and severe I have ever seen in my teaching career. I see students battling anxiety to such an extreme level that leaving home and entering the school building has been extremely hard or impossible. More students are being pulled from classroom time to attend in-person and online counseling sessions (Modan, 2024). My school offers two contracted counseling services to support students during the school day. Another 18-year-old brought a gun into a school and killed many (Levenson, 2022). I wrote that horrific sentence to remind myself and other educators that the shooter and the victims were all students at one time (Lieberman, 2024). Again, in my school, parents kept students at home because of a school shooting rumor. The notion that a school is a safe place has long been a myth for marginalized

and othered students (hooks, 2001, 2002; O'Mahany, 2021; Williamson, 2018; Rogers-Ard & Knaus, 2021).

School was also not a safe place for me. I did not understand much of what was happening around me and was always set apart from the group for various reasons, although I did not want to be. I was bullied, beaten up, and generally made to feel less than by my peers and most of my teachers. However, surviving these experiences has enabled me to connect with, see, anticipate, and empathize with students' needs and struggles. Before my exposure to NeuralEd, I was teaching in a way I had no term for, which seemed counter to what other teachers approved or expected. Still, I knew that the way I was teaching connected with students and helped them perform significantly better than they had expected of themselves. I would later learn I was using neuroscience, and years later, I now have the language and science to explain why what I was doing worked. Through experiencing Neural Education professional development, which is based in neuroscience and built around individual and community efficacy, I underwent a personal paradigm shift that gave me hope. As an educator equipped with neuroscience, I have changed my classroom practice, including self-reflection, planning, and setting up my classroom environment, with a particular focus on listening to my students and their families. This shift in me led to this study on the effects of Neural Education-based professional development for teachers.

Sincerely,

Mary Catherine - Educator

Research Design

Through this research, I explored the impact of Neural Education professional development on approaches, grading, classroom environment, discipline, personal connections,

and the overall well-being of educators. Thus, through qualitative one-on-one interviews (Esposito & Evans-Winters, 2022), I gathered the experiences and reflections of professional educators and teachers who have participated in neuroscience-based professional development. My guiding research question was: How does participation in Neural Education Institutes and related monthly professional learning communities (PLCs) influence educators' approaches to students, teaching, and beliefs? In keeping with my letter-writing approach, which I use to elevate a practitioner-oriented voice, speaking specifically to educators in schools, I also report findings in the form of letters. These letters summarize my interpretations of the interviews and were shared with participants to ensure that I had adequately captured each participant's experiences, thoughts, and relevant background information.

I recruited four educators who have participated in the Neural Education Institute and are now certified Neural Educators. Recruitment criteria included educators within the Pacific Northwest who are over 18 years old, with a range of years of teaching experience, grade levels, and job roles. Purposeful recruitment began with a snowball sampling approach (Patton, 2015) with educators I know professionally, asking for referrals of others who participated in the Neural Education Institutes. Face-to-face interviews were held in person at the participant's chosen location, such as a cafe, my home, or offices. The interviews lasted from one to three hours, depending on the participant. Participants were asked a series of questions about prior Neural Education teaching experiences, formal training and workshops, certifications, integration in the classroom, and overall reflections on Neural Education as PD within the district. All interviews were recorded and transcribed using Descript; confidentiality measures include pseudonyms for participants, locations, schools, and districts. All recordings and transcriptions

were stored in password-protected files and deleted upon project completion. I took notes after each interview, further informing the findings and discussion sections.

Participants

	Jack	Crown	Delight	Noble
Age / Race	40 / white	47 / white	53 / white	52 / white
Gender Identity	Male	Male	Female	Female
Years Teaching	17	20	6	10
Level Teaching	Middle & High School	High School	High School	High School
Current Position	Principal	Teacher	Counselor	Principal
Education	Masters	Masters (ongoing Doctorate)	Masters	Masters

Starting Interview Questions

1. What is your role in the educational community in which you serve?
2. Could you tell me how you became aware of neural education?
    a. What has your experience been with neural education in schools?
3. What neural education learning have you done?
    a. Did you participate in the post-summer institute monthly sessions?
    b. If so, how effective were the workshops, training sessions, and related additional support services?
4. Have your foundational beliefs, teacher practice, and well-being practices been impacted by neural ed?
5. In what ways are you using neural education in your educational setting?
    a. How has neural education been helpful in your educational setting?

   b. How has neural education changed your grading practices?
   c. When organizing your classroom environment, how do you incorporate neuro-education?
   d. How has neural education affected your response to discipline issues in your classroom?
   e. How does neural education shape how you make personal connections with students?
6. Has neural education brought you a new awareness of your well-being? If so, in what ways?
7. Additional follow-up questions as needed.

Findings

Dear Educators,

Using neuroscience and applying the three R's, I analyzed the participants' interviews and looked for identified changes in classroom, personal interaction, and life experiences, as well as other themes that emerged from their responses. I also examined the impact of neural education professional development on teachers' beliefs, stated practices, and overall well-being. I went back and corrected the words that had been transcribed incorrectly and chunked each participant's responses in a table under the question asked. This helped me to view all the responses to each question more clearly.

I had fascinating face-to-face conversations with four educators, Crown, Jack, Delight, and Noble, who have also been through Neural Education training. I looked for commonalities and unique perspectives, which was not hard to do. These educators are on fire for students!

After reading through and listening to the interviews many times, I started to sort out themes and realized there was one solid, encompassing theme. In our conversations during our interviews, it is clear that empathy, community, and transformative education practices flourished through neuroscience-informed growth. Because my study aimed to explore the impact of neural education-based professional development on teachers, it was necessary to reflect on how each participant approached work after Neural Education-based professional development.

Letters to Participants

Dear Crown,

Thank you again for not only meeting with me but also inspiring me. Having not met you before, I had trepidation about how our meeting would go. As I waited for you at a table above a small cafe in a local grocery store overlooking the Puget Sound, I imagined who I would meet as people emerged from the stairwell. When I saw you, I knew immediately! Your vibe of curiosity was easily recognizable through your easy-going body language and curious expression. Of course, a calm man with tattoos up and down his arms who stopped to get tea on his way up to meet with me would take time from his summer and family to chat with a stranger working on her dissertation about teacher professional development. Do you realize we spoke for almost three hours? When our time was over, I was so impressed with your dedication to your students and the teaching profession. Our conversation filled my soul with excitement again for teaching and what we do for students daily.

Our interview started, and you were open and transparent. I thank you for that. You shared that you are a special education teacher at an alternative high school and that you are also working on your Ph.D. in special education. You shared what you do daily, clarifying, “I case manage, write IEPs, set goals, monitor progress, build relationships, build trust, and track well-

being. I connect with teachers who work with marginalized students to try to accommodate, modify, and make the education more specialized." But I could tell there was much more to your story and what you do. As we continued our conversation, you said some impactful things I would like to elevate.

Right off the bat, you made clear that through your own experience, struggles, and trauma in your life and the school system, you now have a superpower to see students whom the system is set up to overlook, to marginalize, to push out. In turn, you talked about pouring into those students and going beyond to inspire them to become future teachers, so that they will see others as well. There is genuine compassion in the work you do. The connection to neural education I immediately saw in how you carry yourself and communicate with me in our meeting demonstrated your ability to coregulate with others and use mirror neurons to help others feel safe and calm. You did this with your calming vibe, eye contact, thoughtful pauses, smile, and transparent conversation. This put me at ease in meeting with you for the first time, so I understand how this likely translates when interacting with students in a school setting.

Another notion you lifted was finding a community among those participating in Neural Education. You shared that you "love how encouraging it is just to rip each other off all the time. Yeah, you know it's just like, use my stuff." You love that neural education is intended to be applied by everybody. You also shared something I resonated with, which other participants reflected:

> "Some of the ways I interact with students are instinctive to me. Now, I've got language, cognitive language, and a community of people who are experts in brain-based educational methods that I can model. So neural education has impacted, encouraged, and helped me improve and grow in a way that feels more natural to me."

When we came to the subject of discipline, you prickled a bit. You shared that the traditional school discipline system did not work for you, and you did not even know how to navigate it. Within the alternative schools you work in now, there is less of a punitive discipline structure and more of a focus on the causes of behaviors, breaking down barriers, and restorative practices to move students toward the goal of graduating and, more importantly, developing skills to communicate their needs and struggles in a more adaptive way that will translate throughout the rest of their lives. You lifted a focus on making student connections versus student compliance. I connected with your explanation that for you, modeling the behavior you want to see helps lead students in the direction that is more beneficial to them through living authentically, drug-free, reflective, and fulfilled. You acknowledged that, as students build pathways and neural connections, they will likely need you to circle back and try again often. You clarified this circling back practice when you told students, “Like, I didn’t catch that, okay? Try again. Start back and try again. So that measurement, you know, it’s like a measurement, are we there yet? We’re not always there yet, so we circle back.”

During our interview, you shared that even before teaching, you began noticing the reasoning behind your actions.

> “I'm trying to respond and compensate because of that. I am dealing with childhood trauma; I'm dealing with distress, I'm dealing with my attachment styles and things, the ways I feel about myself, my need to please people, and my disguise compliance where I'm just nodding my head even though I don't have any idea what anyone's saying.”

When you shared this, I recognized the “disguise compliance” as an amygdala response of appeasing. To appease the predator until it is safe again from the perceived threat. You also

shared, “Oh, I'm going to dedicate the rest of my life to seeing all my students and learning the best ways to connect with them authentically. I don't have any other choice in the world.”

What you said was powerful in that you have found a way to use how your brain is wired to connect and lift others who might not be seen otherwise. You shared your self-care and translated self-care into modeling with me, which is essential in your life. “When I’m centered and regulated, and my life feels meaningful, and I have a sense of joy, I’ve got a sense of spirituality, and in a healthy place, I interact with students in a more responsive way.” You shared that your state of well-being creates a strong foundation for your actions and mindset. Your emotional and mental state significantly impacts your ability to engage with others, particularly students. “I’ve known that forever, and the students respond to me better.”

You also have a long-standing awareness of the truth; when you're in a good place emotionally and mentally, other people respond more positively. “And they’re like, hey, whatever you’re cooking, I want some of it. Because I can tell that you’re happy.” This is true about all of us! This metaphor you used to describe how humans are drawn to positive energy and well-being, to seeing someone genuinely happy and centered, we all want to be around that energy at a neurological level. In this genuinely centered space, an acknowledgment occurs with students, who are more willing to accept guidance and suggestions for effective change. You recognize that students are less likely to listen when they sense negative energy or inconsistency. Essentially, you make it very clear that you live and behave in a way that reflects the principles you wish to teach. You mentioned modeling key qualities like discipline, self-control, reflection, and honesty. These traits are just something you talk about in classes, and they need to be demonstrated to show what living these principles looks like in practice.

How you intentionally work to care for yourself to show up for your students as a whole and available human speaks to your daily communication with students, where you're responsible for giving kids bad news. You shared with me that you often have to communicate with students about topics they don't know or don't want to talk about or hear. You have conversations with them about their drug use, abusive relationships, homelessness, as well as other complex topics. You communicate that the pathway to happiness is slow, challenging, and frustrating. The path to joy involves doing things you don't want to do and letting go of things that make you happier a lot quicker, but go away, like drugs. You highlighted this in what you see specifically with the issue of drug use: "You need to make a case for kids not to use or continue to use drugs." You acknowledge the immediate appeal of drugs to young people and emphasize how drugs provide a temporary escape and sense of belonging. Yet, in that understanding, you see yourself tasked with trying to shift the students from a short-term to a long-term focus on consequences, warning students that while drugs seem like a solution now, they can lead to serious harm or even death over time. "And I have to make a case, which is challenging. It's like talking to someone out of using a parachute when you're about to jump, very unnatural for them." In this type of argument, or case you are pleading, you acknowledge the challenge of persuading your students to avoid drugs, likening it to convincing someone not to use a parachute when they feel like they are falling. The instinct to seek immediate relief is strong, making it a tough argument. You also acknowledge that your students have great survival instincts and can sense when someone is being inauthentic. You put them at ease by being completely authentic, believing that if your students can see that a drug-free life is not only possible but fulfilling, they may be more inclined to reconsider their choices.

You made it clear that making an anti-drug case for kids is like dealing with your younger self. You shared that you ask yourself these questions as a touch point or a way to check yourself: Would you trust yourself? Who would the younger version of you trust? Would that be someone who has never had any kind of issues? Or would you listen more to someone who has been through the wringer? You spoke about visually imagining coming back to help the younger version of yourself and realized that you had to get your "shit" together first.

One way you speak to your future self to current students is when you encourage the students you work with, students who know about the struggle of school while navigating hard life situations, to encourage them to become teachers. Like a distant memory, I saw a dark fear fall on you when you imagined a school without people who struggled. Schools with only people who did well in school and had a fairly comfortable life. "If the only people who go back to school, the people who did well in school, the whole population of students, are never gonna get seen." You became animated, bouncing in your seat when we began to rethink education, to reimagine education. "It will take more creativity, dignity, and humility. To rethink this centuries-old education model, flip it on its head, and do something different." This is, in part, why neural education has your attention. You like that there are,

> "People looking at models of education and saying we need to reimagine all this, not just for the sake of education, but for the sake of our society. And that, what school does for many people, is more harm than good. And for anybody who says, anybody who looks at any situation and says it's mostly working; therefore, it's working, is ignoring the people that it's not working for. If something is working 80% of the time, for 20% of the time, it works at zero percent of the time."

Through your experiences with trauma, experience within the education system, and connecting with neural education, you were absolute in your commitment: " Like there's no getting off of this. There is no going back. And I'm not even looking. I'm not even trying." When you said these words, it echoed within me that you have a deep dedication and resolve, a commitment and acceptance to the path you are on in learning as much as you can to show up for your students and those around you every day. You spoke about the foundation of your desire for all you do based on your struggles and survival during and after school. However, this struggle, which we did not get into during our interview, has shaped your perspective and approach within your interactions with others. "Yeah, I want kids who come into my classroom to feel like they belong." By embracing individuality in the classroom, you model the value of inclusivity and comfortability for kids who might not fit conventional molds or expectations. This is very powerful for the students you serve and other educators as it shows what an inclusive classroom looks, sounds, and feels like.

You also emphasized how student identities may be fluid: " They've renamed themselves six times, they, I, they have different pronouns than I'm used to." Your acceptance that students may constantly redefine themselves showcases the diversity and complexity of the students' self-perceptions. You also acknowledge that many students have life stories that are difficult to read. Students you serve have lived through difficult, complex, and traumatic experiences. Their backgrounds are not easy or straightforward, but they are important to acknowledge. This also means that how students express themselves can be tricky for adults. Communication for students can be through unconventional behaviors, language, or ways of thinking that challenge traditional norms. "And so when they come in and I go, more of that weirdness, more of it, more of it, I think they're like, oh god, just be me." Your quote is powerful in creating a welcoming,

non-judgmental environment where kids feel encouraged to embrace their true selves, quirks, and all.

This shows your commitment to fostering an authentic, safe space. You also acknowledge, “If I don’t see them right away, I’m trying to, and they feel that. Like, hey, I don’t quite understand what you’re all about, but I’m in, let’s go, share more.” Your commitment to getting to know your students is also about giving students the space to open up and share their experiences. You shared a story about a kid who made a shoebox instrument, so you stopped everything to play it. You embrace creativity, even when it seems unconventional. This makes space to view a student’s unique expression as an opportunity to engage and create something meaningful together. You even admit, “That doesn’t feel at all like a distraction to the whole class. We all want to play it!” Rather than seeing unconventional behavior as disruptive, you view it as an opportunity for the entire class to engage, connect, and develop more community.

Returning to neural education, you shared, “That’s nice to be like something I was rooting for, which is now backed up by science.” There is validation to your approach, what you have believed in or supported, inclusive, creative, unconventional teaching models, is now supported by specific research, which feels assuring. Knowing your practice at a most human level is backed by science and is foundational for walking in confidence within an educational system designed to push students out. With this science, we can push back and bring structural tension that will hold students in. Not only hold students in, but also get them back as educational leaders and teachers. You plant seeds daily in the students you teach to think about themselves in the future and what they can do with their gifts and talents. Thank you for your time, words of inspiration, and your work for students.

Respectfully and gratefully,

Mary Catherine

Dear Jack,

Thank you for taking time out of your busy summer schedule to meet with me. I appreciate your time, candor, and enthusiasm. I immediately noticed how the space was set up upon entering your office. Your office felt more like a place to meet with groups of people. It is set up with your desk in a far corner out of the way and a huge conference table in the center of the room, taking up most of the space. This was inviting and not intimidating. I was sitting at a table where decisions were made collaboratively with groups of people, so if this was the vibe you were looking for, you nailed it. This vibe was only made clearer when you responded that you consider yourself a "director of culture," not just at the school but in how the school and community interact.

You shared with me a profound impact right from the start of your neural education training as you entered your first year as a high school principal,

> "When I was getting the introductory training that week at a local university, it was really stressful in unexpected ways for me to change jobs. So I was going through grief and loss, and at the exact same time, I was excited and inspired by what I was hearing. And it helped me come to understand my own anxiety a lot better, which I think has helped me help staff and other adults understand that it's okay to take 10 minutes at a staff meeting to breathe with intention."

When you spoke about your experience with anxiety and how understanding the brain structure and function brought new understanding of your staff and students, I was particularly honored by how you shared how this understanding is positively impacting your own family,

children, and your relationship with your spouse. You spoke to a new understanding of how your generalized anxiety impacts your relationship with your spouse and how you react to your children. You shared that you saw with new eyes how you were fostering anxiety in your children. One way the training helped was through understanding neural pathways and the intentionality with which pathways can be developed and changed. One pathway you changed with intention was what you recalled as this daily verbal dump on your wife about the day's scenarios and how they could have gone. You recognized that your brain was wired to frame worst-case scenarios because planning for those was part of your job.

> "Well, what if somebody brings a gun, or what if this kid punches a teacher all day long, and that's really easy for that to bleed over into the worst-case scenario for an interpersonal relationship, or a conversation with the teacher, or a phone call with a parent. And so [Neural Education] helps me have better tools to reroute pathways so I don't sit and sweat at my desk, afraid of what this parent will say to me because that's only one potential outcome."

Along the same lines, you spoke about navigating staff relationships by spending time with staff you would not usually choose to. You do this intending to strengthen those neural pathways and neural connections. Jack, you shared that understanding that when avoidance of others occurs, relationships cannot occur, and the building culture becomes satellites and pockets of staff that are not getting interaction across these silos, which impacts your ability to lead and move things forward for students. This is one way the neural education training you participated in changed your movements in your educational environment. You also shared that you have more willingness and more purposeful intentions of taking time to make connections. You shared that when you were a teacher, and certainly when you were an assistant principal, you would

connect with your evaluation group, and that working with this set of people, you learned about them, and they learned about you. These were the people you made connections with. Now, everybody is your people. This was powerful to me! You shared that you have enough work to do every day that you could sit in your office and work and get a lot of work done, yet instead, you set up a system to help you filter through the office tasks to free up your time to be out in the hallways and classrooms building relationships with students. You memorized every teacher's prep time so you can make it to seven teachers a day to continue building connections.

One of the first things you did with your staff was to establish a collaboratively written expectation for each other, like an agreed-upon code of conduct. It could be an eight or nine-word sentence, and the staff worked at pairing it down so the rule was not overwhelming to get to the core of the expectation. You wanted it to be something you could always return to if there were a problem or something positive. Either way, the belief statement helps everyone, especially you, be present. This was made into a green sign: Reciprocate grace, foster resilience, be present, and practice curiosity. This sentence reflected quite the process. You shared that the staff brainstormed on a whiteboard in the library all of the stuff that they were thinking about when school was a positive, proactive, supportive, and happy work environment. They used sentences, words, and various ways to communicate ideas. You recalled how creating this motto was just a big mess. You kept encouraging them that you saw some structure. You promised them there was a nugget that could be said to be present during a meeting or throughout the day, as needed. You shared:

> "Within that (agreed upon code), you know, I'm going to put my phone down because I'm going to be here now. I'm going to be where my feet are. I'm going to engage positively with some of my colleagues. If I have a negative interaction, instead of going like that

person sucks, I'm going to be curious about why. So I think there's a lot of stuff that I learned through the experiences via neural ed."

Jack, another way you implemented and relied on brain-based practices, which was so powerful to me, was the system you implemented. You shared that time was already set aside one day a week, and you used what you learned through Neural Education professional development to elevate that time to a more meaningful experience for your students. The previous year, students shared in a survey, and through these data, you heard loud and clear that students did not feel a connection to their school. Through brain-based practices, it is understood that autonomy and voice are important to each of us, and especially students. In school, you recognize that much is defined for students, like schedules, passing periods, study content, scope, and sequence; you also clarify how these are not inherently bad. You and your staff changed your thinking about this time and gave students space to define what they need for themselves during that time, once a week. If a student needed to check in with a teacher, make up a test, or maybe take a free yoga class, meet up with some friends, or make a new friend, these were all options and important choices students were now empowered to make.

You also shared how important this unrestricted time became for your student body, in that when you took this time away to provide structured study time at the end of the semester, you received pushback from the student body. Because of the relationships you built, students had no problem giving you feedback about what they needed. They did not perceive your action of giving them space and time to buckle down and study for the last three weeks of the semester as useful. They saw it as taking time away from what they needed and could access through choice. You had given them space for their voices to be heard, though, and they used their voices to push back and be heard. You did not implement that same practice the next semester, and

students who needed study time and those who needed exercise or social-emotional time took that. Their needs were met, and their perspectives validated.

I want to note that you said that most of your staff had gone through neural education training and that without that training, you did not think that your staff would have been so ready to buy into spending an hour a week on what may seem on the outside a free-for-all. You noticed immediately that you did not have problems with students roaming the halls or being where they signed up to be. You shared that the school board came during this time, one week, and did a walk-through and found two students in the hallway, and they had passes. You recognize that they have choice and autonomy during this time and are where they want or need to be. In this way, the entire school was telling students that their choices were okay, that it was okay for students to go and do what they needed to during this time. In this way, you recognized that through neural education training, teachers understand that letting go is not only developmentally appropriate but advantageous to the focus that students demonstrate afterward. You modeled powerfully how, on a day with a messy schedule, moving seven minutes from each class to a time that enhances student mental health and school connection was well worth it.

When I asked you about punitive systems and what discipline looks like at your school, you told me you had been trained in restorative practices in another district. You saw that it worked, but it was through Neural Education training that you attained the why and saw how restorative practices work. Before your training, you would see a student do something, and then a teacher would get mad and send the student to you. Then, you would tell the student how they broke the rule. The student would then get suspended. But in your school now, where you are the principal, it is only one day instead of a three-day suspension. You shared how you communicate with parents in that the student now needs to do the heavy lifting to process, but needs a moment

because of what is happening in their brain. You understand that when students are escalated, the student's brain functions in a protective mode and is unable to process using all the structures; thus, it cannot access all brain functions, including thinking through decisions and situations. You would clarify to families that, as a school, they need them here to help them process, so the connections they make at school are not being negatively reinforced with thoughts that nobody cares about them.

When I asked you how neural education helped you shape connections with students, you quickly said that your connections with students have always been a strength, but it was the adults that you realized were part of your struggle. You used the word bravery in that neural education helps you steady yourself by learning how the brain works. You recognize now that something that you would have labeled as scary before, possible conflicts with staff, parents, or students, is not frightening.

Having worked at the district office in various administrative and program administrator roles, and now that you are a principal, you reminded me of how you understand the cost associated with continued professional development training. You also spoke to the waves, the ebb and flow of professional development, and attitudes around PD. For you, it is always cool to learn new things. You understand that we will never finish learning what it is to do this job of education. For you, professional development must have a good return on investment. Neural education is not something that you feel everyone needs training all over again every year, and there is not a budget for that as things are now in schools. For you, the basic and advanced training is enough. And you then recognized that, once trained, adults now just have to do it; implement what you have learned and revisit this learning with others over time. Part of doing neural education, you clarified, is also letting go. Change your paradigm of control to empower

others, elevate voices, and provide spaces for others to be seen as instructional coaches and leaders within the school.

Thank you again for your time and energy with me. Your vulnerability and transparency were appreciated as you navigated your first year as a principal.

Respectfully,

Mary Catherine

Dear Delight,

Thank you for taking the time to meet with me. I truly enjoyed learning about you and the meaningful work you're doing. You've had a remarkable journey leading to your current role as a counselor at an alternative high school, shaping your values, mindset, and deep commitment to your students. You shared how your journey began after high school, when you studied journalism and psychology and joined ROTC in college. Your service in the U.S. Air Force, followed by work in law enforcement and later at a local school, all contributed to your growth. Eventually, it led you to earn your Master's Degree and certification in school counseling. Today, you describe yourself as a Christian, military veteran, and an alternative high school counselor who works hard to push back against stereotypes that impact you and the students you serve.

One of the most powerful takeaways from our conversation was how much you value building authentic relationships with students. You said it best when you shared that you're "passionate about working with students and getting to know their stories, goals, dreams, and hearing what makes them happy."

At your school, you support students through social-emotional learning, small group mediation, and problem-solving with students and staff. You also collaborate closely with instructors from a technical school on the same campus. Your role involves both connection and coordination. One unique feature is that the staff from both schools participate in Neural Education training together, creating a unified, campus-wide approach.

Your introduction to Neural Education has had a clear and lasting impact. You shared how quickly you noticed changes in your peers after they attended the training; their approach shifted, and their curiosity increased. You were eager to join, and once you did, it inspired immediate application. One standout example was your creation of the "Wellness Walk." Early in the training, you recognized the importance of movement and exercise for brain function and emotional regulation. During Advisory on Wednesdays, you initiated a school-wide, 10 to 12-minute walk around campus. Staff and students now look forward to this time together each week.

The simplicity of walking outdoors, away from desks and classrooms, has opened doors to natural conversations and genuine relationship-building. You explained how this shift has particularly benefited students who struggle with social interaction or verbal expression in a traditional classroom setting. After these walks, everyone, students and staff alike, returns more regulated and ready to learn. The walk is now a vital, restorative ritual that came directly from your learning in the training.

You've even expanded this concept into a student club, where you meet one-on-one with students for walks, coffee, or smoothies. The same group of girls regularly joins, sometimes bringing their pets. This informal setting removes the pressure of traditional counseling and

allows for deeper, more comfortable conversation. You emphasized that this was sparked by leaning into individual student needs, a core tenet of Neural Education.

Your reflection on the training also highlighted how it shifted your own mindset. Coming from military and law enforcement careers, you shared that you brought some rigidity into your early work in schools. Neural Education helped you realize that your expectations weren't always aligned with where students were developmentally or emotionally. Now, you center patience, co-regulation, and creativity in your counseling. You reminded me that students must be at baseline before receiving new information and that helping them get there is a big part of your role.

During our conversation, you clarified the essential distinction between counseling and therapy, noting that most school counselors are educators first, not clinicians. Still, you found the Neural Education training complex, engaging, and deeply useful. You appreciated that it wasn’t repetitive and found it a restorative use of professional development time.

Each month, your school and the neighboring technical school meet for joint professional development focused on Neural Education. You spoke highly of the presenters, the pacing, and especially the visual strategies, like the Challenge Mosaic developed by Dr. O’Mahony, that support memory and instructional alignment with brain science. You said that revisiting Long-Term Potentiation (LTP) during each session helped you reinforce key learning and apply it meaningfully. These shared PD experiences have also strengthened collaboration between the two schools.

Your school's small size, just 152 students, offers a unique opportunity. With such a small community, your team is able to personalize support from intake to daily classroom practices. During intake, you gather essential student information, names, pronouns, background stories, and strengths, and share it with staff to help everyone begin building relationships from

the start. You described this process as creating a “village,” where everyone contributes their gifts to support students.

In your counseling space, you use tools and activities designed to foster regulation and connection, such as breathing balls, sensory items, question cards, small trinkets, and even a globe students can spin to dream about future adventures. Students leave with small items, journals, stickers, and suckers that reinforce their value and leave a positive impression.
You emphasized how much your daily work is now grounded in the neuroscience you’ve learned. For example, understanding the role of the amygdala and what happens when it is hijacked has helped you better interpret student behavior. You’ve built strategies to co-regulate with students before addressing academic or emotional challenges. As you put it, “We all know what happens when someone is dysregulated, but knowing what’s behind it more has been grounding.” You also reflected on how discipline conversations often overlook what’s happening in the brain. Neural Education reinforces the importance of understanding trauma, coping mechanisms, and the principle of “structure before function.” You said, “What I already know as an educated, trained counselor is why certain behaviors happen. Neural Education elevates my learning by helping me understand the ‘why’ behind student behavior and how to respond to it.” You shared a moment in training when you learned that the brain’s experience of social pain or anxiety can light up similarly to physical pain in fMRI scans. That insight stuck with you and continues to inform how you approach others, including yourself.

We also talked about the natural human tendency to take things personally and how Neural Education has helped you move past that instinct. You acknowledged that students are navigating years of deeply rooted neural patterns, and professional patience is essential. You admitted that there were moments you didn’t always respond as you would have liked, but you

are committed to learning and improving. One example is that you keep reminders in your office that help you practice self-care. You reflected on how your past careers built rigid thinking pathways, but you've learned it's never too late to rewire. The flexibility you now embrace, both personally and professionally, has made you a stronger, more compassionate counselor.

You spoke warmly about your relationships with your sons, your love for your dogs, and the importance of the support you and your colleagues give each other. You said it best, "It is not about me. Life is real. Neural Education is so good. The brain is complex. But what we do is basic. We bring to baseline and build trust. It doesn't need to be complex." Because of your work and continued growth through Neural Education, you now understand the importance of entering each day grounded and healthy, so you can help students do the same.

Delight, it has been truly wonderful connecting with you. Your insight, compassion, and openness are inspiring. Your students are lucky to have you in their corner. Thank you again for your time and for sharing your story so generously.

Gratefully,

Mary Catherine Pilon

Dear Noble,

I want to recognize that we took a long walk together before sitting down for this interview. We chatted and enjoyed nature and the fresh air. When we returned, we had toast and jam and refreshing ice water. In spending time in relationship and meeting our needs, we were then able to get down to the business of the interview. You have a calming, serious, yet fun

energy, which helped me start this dissertation in practice journey. Thank you for your encouragement, transparency, time in this interview, and support for my journey.

When we first met, your role in the educational setting was as a paraeducator in a Life Skills classroom, and you also held a teaching certification. You moved from a paraeducator to a special education teacher, then a leadership teacher whose job is facilitating and pointing out leadership opportunities for students at a school-wide level while working on and receiving your Master's Degree and administrative credential. At our interview, you were a principal teaching at an alternative high school! I am always impressed with how seriously you take the needs of the students you serve and the staff and families you work with.

You shared that your neural education journey began when I asked you to join me for professional development about Adverse Childhood Experiences (ACES). You shared that you went because I told you that you would love it, and you did. You referenced the "Paper Tigers" movie we watched, and how this movie opened up alternative possible education settings and modes of engaging with students was all very fascinating. The focus was on relationship building, seeing students where they are, meeting needs, and coming alongside them to help with forward movement toward positive future goals. So when I asked you to go with me to the Neural Education Course at a local university, you had no doubts that it would be worth the week during your summer.

You shared that the concepts from the institute brought together all that you had experienced in your life personally, with siblings, and students. You told me that Neural Education made sense to you, and you loved it because you were always under the impression that to be an educator, you had to be authoritative, which is not in your nature. The timing of the institute was impeccable as you were entering into your first year of teaching, and hearing the

message of being authentically you was very affirming. To understand fully that I need to be exactly who I am was a necessary message, and I love how you said, “I don’t have to be somebody I am not.” You were very excited to share that the district you work for supports in-person Neural Education and continued professional development once a month for you and your staff.

You also shared a powerful story about a student you tried to work with when you were a para. You found yourself unable to engage with this student without him escalating to a point where the police picked him up, and he would be so wrecked because you thought you were supposed to be authoritative. You reminded me that you asked me what you were supposed to do, that you were confused and had no idea what to do, and that you did not understand when to be authoritative and when that was not appropriate.

Neural Education has helped you professionally because, as you said, “I’m much more effective as an educator. It has given me more confidence when working with students. I recognize in myself, as well, how important it is to learn at baseline.” You now intentionally engage in strategies that help you stay calm to allow yourself to regulate in normally stressful situations. Neural Education has helped you recognize that allowing dysregulation within yourself makes things worse, and remaining calm and breathing, which, you clarified, “is my go-to strategy,” is very helpful no matter how bad the situation is. This technique has also helped you with your teenage son, who called with a very serious situation, allowing you to stay calm with intention.

In your work, you often bring in students who have gotten themselves into negative situations, and you shared that you can have terrific conversations with them without causing them to feel personally attacked because of what you have learned about the brain and how to

coregulate with others. Because of this, you can just talk and figure out where they are emotionally, so you can know where they are in their brain and if this is the time to solve problems or focus on emotional regulation.

You did note that you feel pretty lucky within your educational setting to work with students and staff one-on-one, which is an advantage in an alternative school setting that is not often seen in a comprehensive school setting. This opportunity to have one-on-one time with students and staff allows for relationship building, which is at the heart of what you do. You also mentioned how this is very important when testing a student and quickly noticing and understanding if the student is getting dysregulated and may need a break to converse with a frustrated staff member. You know you are getting better assessments from students because of the knowledge you learned in Neural Education about working memory, the amygdala, and the structure and function of each part of the brain. You shared that knowing that students cannot learn if they do not feel safe in their environment or are dysregulated has been transformational in your approach to teaching and learning.

Though you only teach less than half-time in your classroom due to your administrative responsibilities, you have modified your lighting by lowering the number of lights and supplying access to fidgets. These small items help students focus and play calming music and sounds. You shared how you have alternate learning spaces to provide choice and autonomy within your room, such as bean bags and headphones for sound sensory needs. You still have your own space as well, with a desk and better lighting for what works for your sensory needs. This is important in your classroom, as you shared that you just turned your educational space into a greenhouse for students. Building a metaphorical greenhouse for students helps more than one student at a time; your approach intentionally covers many.

You reflected further that you have also tried to do this throughout the entire school. When you became the principal, your thinking went big to greenhousing the entire school, thinking about a place to make students and staff comfortable. This greenhousing of the school was then done with intention, as you understood the need for all humans within this educational environment. You spoke of the desire for staff to want to be in this space, happy, feeling appreciated, and taken care of. This sometimes looks like providing food. You believe this care encourages them to work together at a deeper level for the students they serve.

You have also removed the hierarchy that often comes within schools by consistently presenting yourself as a servant leader to support your staff. This also includes supporting educators in setting up their learning environments for students. You shared that you funded this with grants to increase positive student behavior and attendance. You make a huge order to go all in and really dig into what you and your staff were learning and have learned through the Neural Education professional development. The fidgets, the lights, the rugs, and the bean bags for the whole school. To do that, you met with each teacher individually and asked what you could order for their classroom so they all had a space within the space for student breaks and self-regulation spaces. A place where students could choose to go when they are not at baseline. You even ordered extra for teachers who may have said they did not need it at first. When they saw what was happening and how it was working, they returned and said they would like it. You promptly provided those items for those teachers with more encouragement that you want to help them in their classrooms, to continue to serve and be there for your teachers. You stated that you believe that many of your teachers were already doing a lot of neural education things without having a name for it, for brain science to back up why it worked. With more funds available, you could fully support your teachers, and they reported back to you that the support and funding were a

huge deal to them. For some teachers, the buy-in happened when they understood that this was neural science with tangible and concrete actions that were not punitive in nature.

Speaking of being punitive, you shared that when you meet with a student, you try to look at the student and think about how you can help the student. To suss out why the students are doing what they are doing. You use the words discipline and punitive measures as entirely different. Discipline through your understanding is more of an opportunity for a growth mentality. For example, you shared an example of a student who comes in, and you are responsible for searching the backpack for drugs, which you find. You intentionally choose to talk without judgment and support positively about the skills and choices the student is doing right. The consequence of having drugs is seen as a need for intervention and support. You, your counselor, and staff work with a local drug rehabilitation center with a space to process students within the building itself. Counseling occurs, and oftentimes, these supports work with the court system to keep students in school through daily check-ins, progress monitoring, meeting with family when appropriate, and other counseling services.

This is very much in line with the function of your school, which you shared, which is to create an educational environment for students who don't necessarily do well in a comprehensive school. You explained that a comprehensive school has larger classes, a strict schedule, a focus on tardiness, and compliance-based rules. You manage and operate systems within an alternative high school, so it caters to the individual student and what these students need. The classes are smaller, and the schedules are more relaxed; the students go to school for only half the day.

One stipulation you shared is that students must attend once a week or make some sort of contact once a week. Some students who attend this school are struggling socially. Maybe they are on the autism spectrum, and so they may have a really hard time in a comprehensive school

because they have difficulty reading social cues and end up being in a situation where they could get bullied. Some students have been shot in a drug deal gone bad. There are students at your school who have experienced homelessness. Grandparents are raising some students because their parents are on drugs, and they don't have anybody else. Your school has a lot of students who have a lot of needs, and you made it clear that they, like all students, need to know they matter and are important and that there is at least one caring adult who is really invested in them. All of this has improved their chances of graduating.

You also spoke about how you focus on adult interactions with your staff. All your relationships and interactions are, first and foremost, the task of keeping your brain calm so your staff and students can also experience thinking brains. You understand the staff as individuals so they feel comfortable coming to you and talking about things. This is very helpful for you when a situation arises where you can see the situation may freak the staff member out, so you clean up as much of it as possible before you talk to the staff member. When we met, you shared that you were cleaning up a situation that would cause a paraeducator to worry their job was on the line. You were working that situation out as much as possible to avoid that. You are serious about wanting your staff to feel like the place they work and contribute their talents cares about them as well as how they feel, and they will not be cast aside. You know the district supports our Neural Education professional development for our students, but these lessons also matter to our staff.

When you were hired as the principal, the school had discipline issues, and you felt you were brought in to help. You thought about what it would look like if you went in and put the “smackdown” on everything, there would be tremendous failure. “So my first task,” you said, “was just to learn everybody's names.” You got a printout of all the student and staff pictures

and, with intention, learned everyone's names and addressed them by their names daily. "When students come in the door to school, I greet them by their name to help them recognize I am personally invested in them as a human."

This relationship mentality, growth mentality, or brain-based paradigm also centers on the importance of learning names and about the humans within your school. You shared an example of a Senior Interview, a state graduation requirement that includes student interest, community involvement, and future career goals that could have gone horribly wrong had your neural education not been present. This senior came to his senior interview, a graduation requirement, with a shirt on that had the F word on the back. You did not know the student very well, but you did know he was the lead vocalist in a band. A staff member came to you and informed you that the student's shirt was inappropriate, but you pushed back, saying that you did not think it was at the level of inappropriateness to put the student's graduation at risk. You shared that you had an excellent conversation with the student, and in five minutes, you knew you could have the student turn the shirt inside out, but that was not the point of the conversation. It is all about relationships and the students knowing you care about them. These are examples of how you approach students with a neutral education mindset.

You shared that because of Neural Education, you are a completely different educator than you would be otherwise, not just as an educator but in your own personal quality of life. You don't go to work worried that there will be a conflict caused by your inability to work with a student. You go to school every day and help kids. You don't spend your days worried that students will not follow the rules. You get to go to your job and know that you are effectively helping people, which is very satisfying. You shared that this fills your bucket!

As you reflected on your own mental functions when you are not at baseline, you shared that you continue to work on your own strategies and recognize with intention when you are not regulated. You stated that the main thing is recognizing the state of your body and brain, the impact of your sleep patterns, what you are eating, and making time for exercise, and that, just like for your students, you have to be intentional about caring for the state of your being because all of it is interrelated in your wellbeing and how well you interact with others. We spoke earlier about wrap-around services for students, so caring for your being and neural education is like wrap-around services for your brain. You stated, "A healthy brain is a healthy person, making better choices, learning better."

A key part of your job is working with adults; the responsibility of helping everyone stay regulated and grounded remains constant. The brain is the brain, and Neural Education still applies. When having conversations with parents, first and foremost, they are people, too. Usually, you call them because their child has done something that the parent will not be happy to hear about. So, usually, you start with having a good interaction with the student. That way, when you call the parent, that conversation is the first thing you discuss. You get to report a really good conversation where the student was super respectful, and you emphasize the positive characteristics of the student. Then, with the parent, you approach the situation as a team, helping these students, and for the parent, it is vital that you let them know how you love that they are working with you in supporting the student's education. Your whole goal is to keep the conversation going at baseline, confirming a team endeavor, and we both want the same thing. You were adamant about how huge a part of your job is in recognizing how the brain affects every person.

I appreciated our conversation and how you reflected on how you were as an educator before Neural Education and after. The interactions you had with students, your personal journey through life, and the confidence you now have in your work. You shared that the more you worked with Neural Education, the more it sank in and became a part of who you are; Neural Education has changed you. I leave you with your most powerful quote: “It’s cool because it didn’t change me where I couldn’t be myself. I could be more myself and comfortable with being me so I could do a good job.”

Respectfully,

Mary Catherine

Discussion

Dear Educators,

At this point in our time together, we have reached the point where we can make sense of our findings. We know now that to effectively teach, self-work must be present, a theme echoed by all participants in this study. Several factors contribute to educators not being fully present in schools, including personal challenges, systemic pressures, and a lack of adequate resources. These issues not only impact the well-being of educators but also could cause harm to both children and adults within the school environment. When educators are not fully engaged, it creates a ripple effect that undermines the quality of education and the emotional safety of students. Furthermore, the persistent shortage of resources exacerbates these challenges, making it even more difficult for educators to meet the diverse needs of their students while maintaining their own well-being.

1st finding: Need to be present

To be truly present for students, educators must start with self-awareness and intentional self-care. Crown reminds us that when we are centered, regulated, and living lives filled with meaning, joy, and spirituality, we engage with students in a far more responsive and compassionate way. Our personal well-being sets the tone for our interactions, and our emotional and mental state directly impacts how we connect with others, especially those who look to us for guidance. When we are in a healthy space, we are better able to create an environment where students feel safe enough to receive feedback and consider change. However, students who sense negativity or inconsistency are far less likely to engage with school or staff. Effective regulation with students begins with our own self-regulation; we cannot co-regulate with others until we have developed the capacity to ground ourselves.

All of the participants emphasized the importance of authenticity. Students, especially those from vulnerable backgrounds, need adults who are consistently and genuinely present. When authenticity is lacking, students often feel unsafe, which can lead to escalated behaviors, sometimes to the point of requiring police involvement. This impacts the student and staff as well as the broader school community. By being real and present, we meet students where they are, supporting them positively as they move toward their future goals.

Jack echoes Delight in encouraging us to explore new, sometimes unconventional ways to build connections with students. Not every student responds to traditional approaches. Finding joy in the discovery process, in finding that unique key that unlocks trust, can open pathways to meaningful relationships that might otherwise be missed. When we operate from a place of presence, grounded in self-care, inspired by creative connection, and guided by knowing who we are, we become more effective and confident in our work with students. We also develop the ability to recognize dysregulation in others and respond with a calming presence. In doing so, we model emotional balance, helping students learn to regulate themselves by reflecting the steadiness we offer. In echoing Neural Ed, participants highlighted the importance of presence, which could be elevated in future research and professional development to educators to more fully clarify what presence means and how to strengthen it.

The difficulties in being present

As the participants and I continued our conversation about the current state of education, Crown described the education system as one built with structural tensions that often excludes students. As educators, participants talked about constantly pushing back against the educational system's structural forces, such as rigid policies, biased discipline practices, and narrow definitions of success, that tend to push marginalized students out of school. Participants' daily

work involves resisting these forces to keep students engaged, included, and supported. But that kind of resistance against systems not built to serve all students, can become deeply exhausting over time. I agree with participants' recognition of the impacts of trauma on students, how trauma manifests behaviorally, and in how students come to identify with the world around them.

Jack spoke about the impacts of trauma in his own life when he brought attention to the personal toll this work as an educator can take, describing the experience of "bringing home the day" and unloading the unresolved trauma of the day emotionally onto his spouse. There is a constant undercurrent of anxiety and fear, from conflicts with other staff, parents, or challenging student situations. The participants and I agreed that educators also often face a lack of autonomy and choice in their daily routines, which adds to frustration and fatigue, creating a barrier to being present. Still, there are bright moments, and learning new things can be exciting and reinvigorating.

Another barrier to being present is budget difficulties. Limited resources make professional development and the completion of assigned tasks harder and eat away at our precious time. Delight speaks to the tension between her own internal timeline for student progress and the timeline students are actually able to manage. This dissonance can cause frustration and stress. Rigidity in thought, whether institutional or personal, adds another layer of difficulty. It doesn't help that in this state and across the country, public education has never truly been fully funded. The pandemic only worsened funding, deepening the cracks and creating even more instability in a system already stretched thin. This is exacerbated further by cuts in education at the federal level currently. Jack discussed, and most of the participants struggled with, the pressure of navigating conflicting expectations between the traditional authoritative

paradigms of education we experienced as students that still persist, versus more brain-aligned, empathetic approaches that encourage us to reconsider how we interact with students.

Middle school is already a deeply challenging time for students socially, emotionally, and physically. The absence of a present, caring adult can cause damage that lasts a lifetime. I have stories of teachers who negatively impacted me by being emotionally or mentally absent, and I have rarely met an adult who doesn't have at least one such story of their own. The students I work with each day need me to be fully present, not just academically but as human beings.

Many factors make it difficult for me to be fully present, even though I know how vital that presence is for students. One of the biggest is an invisible disability of PTSD exacerbating ADHD, commingled sensory input sensitivities, which I manage every single day. To be fully present requires me to be intentional about my energy, how I take it in, how I spend it, and how I respond to sensory input. At the same time, this disability is also a superpower. It allows me to connect deeply with students navigating similar challenges, especially those overwhelmed by the sensory demands of school. Meeting my needs means tasks often take longer, like this dissertation. I have learned to honor my pace. At home, life is full. I share my space with two dogs, a husband, an adult son, and two teens we have taken in, young people who society has failed on multiple levels and labeled as unhoused. I also support aging parents and stay connected to my adult daughter and grandson, who don't live with us but are still a big part of my life. As a practicing educator working toward a doctorate, juggling all of this pulls on my energy and my brain in so many directions. The truth is, in today's social context, endless aspects impact a teacher's ability to be present. So I compartmentalize, prioritize, and show up the best I can, every day, as do most teachers.

2nd finding: Ways of being present

During the interview, Crown brought us back to the science behind what educators are doing, specifically the neuroscience of mirror neurons and the confidence that comes from knowing our educational practices around neuroscience are grounded in solid research. Education is about creating an environment that is supportive, inclusive, creative, and yes, unconventional. We lean into what science tells us about human connection, and we know that when we create spaces for students to connect deeply, they thrive. One of the biggest challenges in today's world is the disconnection from technology, especially concerning cell phones and social media. Jack emphasized the importance of understanding neural pathways and the intentionality required to change and develop them. Moving through spaces with purpose, being present, making connections with intention, and encouraging others to do the same. Putting the phone away is a small but powerful act that helps foster these connections. It is about finding ways to give students the choice and autonomy they crave, even within the structure of the school day. It is about elevating voices, empowering others, and creating spaces where people can be seen and take on leadership roles. Delight takes this further by highlighting the importance of walking with others, syncing our nervous systems, and offering a safe environment for connections and conversation. Something as simple as a "wellness walk" can create moments of genuine connection. Noble talks about intentionally engaging in brain-aligned strategies to better navigate situations that once felt stressful. These strategies are all part of creating a more grounded and connected experience for students and us as educators.

Self-care practices

Crown starts by emphasizing the importance of ongoing self-care and the pursuit of knowledge, particularly in Crown's own journey toward earning a doctorate. Crown talks about

the balancing act of continuing education while prioritizing family time and connecting with others committed to growth. “Being in community with others on the same path is critical for staying motivated and grounded.” Jack, however, pushes the conversation deeper by reflecting on the need to take intentional pauses. “Sometimes, you must breathe with intention, not just to stay grounded but to create meaningful connections.” Jack also stresses the discomfort of personal growth, advocating for the value of spending time with people who might challenge you. “Avoiding people doesn’t help you grow,” Jack adds. “You have to face discomfort to build relationships, and that’s where real growth happens.” This aligns with Crown’s point about community, but Jack acknowledges that, for many, the brain is wired to protect us from perceived danger, which often leads to avoidance. “Your brain wants to keep you safe, but pushing through that instinct and being intentional with your interactions is key to not isolating yourself, especially in professional spaces.”

Delight chimed in with a more physical approach to well-being, emphasizing the role of movement and exercise. “Neural Education professional development has always been restorative for me. It’s like a reset that recharges me mentally and emotionally.” Delight also suggests that visual reminders in the environment, simple visual cues to remind you of your self-care, are vital in staying on track. Delight points out the importance of taking intentional connection time, whether through small daily interactions or more structured moments of joy. “I find time in prayer and meditation essential. It keeps me centered and reminds me why I do this work.” This sentiment is echoed by Noble, who brings a deeper awareness to the environment itself. “Your workspace has to support you, including lighting, sound, and airflow. These environmental factors are just as important as the work itself. If you’re sensitive to sensory input, the space should meet your needs, not add to your stress.” Noble believes in the power of

consistent, brain-aligned professional development, and often reflects on the simple yet profound idea that "a healthy brain is a healthy person, making better choices, learning better." Noble suggests that caring for yourself in these subtle ways is just as important as caring for your students. "You can't give your best to others if you don't take care of yourself first."

My life as an educator means living with intentionality in every aspect of my life. I make time to meet my sensory needs through yoga, prayer, and engaging in my church community. Singing and worship are restorative practices that help center me. Just as Crown mentioned the importance of family, I intentionally spend time with my daughter, grandson, husband, and other children to maintain those crucial connections. Quiet time is also vital for me, as is sleep, which I prioritize to keep my mind and body functioning at their best. During the school day, I take breaks when needed and use my personal time off to recharge. I check in with my doctor regularly. Clear, honest conversations with my peers and trusted adults help me stay connected and supported. Using what I know about brain structure and function helps me to understand where I am each day, moment by moment. This self-awareness prevents me from falling into self-deprecating thought patterns, especially when I can't meet my own productivity standards. Surrounding myself with positive, trustworthy, and understanding people is key to maintaining balance. This balance is a cycle of care that feeds into each other, my own well-being, and my relationships.

All participants, including myself, demonstrated their dedication to the humans we interact with daily through our daily actions. These actions suggest better habits for health and mind, a desire for continued education and professional development, a need for community, and fostering authentic relationships and connections with others. I keep a stable sleep schedule so that I can be present directly with my students. Take my medications. Stick to a daily routine.

Take a few minutes between classes to take care of my needs, usually a few quiet minutes at my desk, to prepare myself for the next group of students I will be engaging with. I dress appropriately, yet comfortably, so I can remain comfortable in my own skin as unpredictable stressors occur. Everything I do during the school day is focused on managing my energy to stay present for my students. As I mentioned, I use my personal days when I am aware I am not functioning well for my students and need a break to regroup and restore.

3rd finding: Importance of Neural Education Professional Development

The importance of professional development (PD) and practices centered on Neural Education has never been more relevant in our schools. At the core of Neural Education is the belief that learning is deeply tied to relationships and how we design the learning environment and the experiences we offer our students. As Crown puts it, “When we create kinesthetic spaces, when we lean into the concept of productive stress, we engage the brain in a way that promotes deep learning.” The key here is to design environments where learners are not simply passive recipients of information but active participants in their own learning. Creating disequilibrium, those moments of cognitive discomfort, act as a hook, a doorway into curiosity, and a way to engage the brain. Delight adds to this by emphasizing that the environment plays a crucial role in the affective experience of the learner. “When you think about the brain and body being in the space of learning together, you’re creating an environment that maximizes the brain’s capacity,” she says. This is more than just providing physical space; it is about intentionality in creating an environment that supports emotional and intellectual engagement.

A key component of Neural Education is providing intentional choice and autonomy for students. When learners have the agency to guide their own learning, the brain and body are fully aligned, and attention follows. Noble echoes this when she reflects on how these principles

translate into the classroom. “Neural Education isn’t just about the content,” she explains, “It’s about creating individualized experiences that maximize brain capacity.” She highlights that this approach leads to a classroom where learners feel empowered, and it builds a foundation for them to thrive. This is especially important in today’s context, where educators are constantly adapting their practices to meet the needs of diverse learners. The field of Neural Education is ever evolving, and Jack points out that what sets this approach apart is its reliance on research rather than fixed curricula or scripted lessons. “We don’t follow a pre-designed curriculum, we follow the research, and we adjust based on what the data tells us about how students learn best.” This flexibility allows educators to push against traditional practices and adopt strategies supported by neuroscience, including practices that promote metacognitive feedback and retrieval, which help strengthen neural pathways.

The concept of retrieval practices is especially impactful. Rather than relying on passive review methods, we use braindumps, where students retrieve everything they know about an idea and put it on the board. This act of retrieval is more productive than flashcards. Studies, including FMRI scans, have shown the tangible effects of such practices on the brain, reinforcing the idea that learning is not static. Neural plasticity is at the heart of this, and when students engage in practices that promote active recall, they strengthen their neural networks (Carey, 2014; Zadina, 2014).

As Neural Educators, we understand the importance of centering students on the margins in our educational practices. We need to be intentional about where we place our focus. We should prioritize the needs of students who are most often overlooked or underserved. Designing learning environments that support underserved and overlooked students creates stronger, more inclusive schools that benefit all students.

Reflecting on the role of professional development (PD) in supporting inclusionary practices, one of the most powerful aspects of Neural Education is its integration of experiential games, collaborative teamwork, and immediately applicable teaching strategies. The aforementioned practices were modeled for us during PD sessions, demonstrating how they translate into real classroom moments. Learning feels more authentic and impactful when educators are taught using the same methods they are expected to use with students. This kind of direct modeling ensures that teachers not only understand the strategies but also experience the strategies firsthand. Mirroring effective teaching practices in PD is a critical component. When PD is experiential and aligned with how the brain learns, it builds both knowledge and a sense of ownership and confidence among educators.

As we consider the landscape of education today, it is clear that creating environments that support the brain's natural learning processes, through intentional design, choice, autonomy, and retrieval, is essential for helping students and educators thrive. Neural Education is not just a set of strategies; it's a mindset shift that aligns with how we now understand the brain functions best. The challenge is that we must be consistently reflective and adaptable in our practices, pushing against outdated systems and embracing new research-based approaches that center students and their needs.

Mary Catherine Pilon

Dearest Educators,

The findings of this study clearly highlight the essential role of educators' presence, self-awareness, and intentionality in fostering positive learning environments. We see that when educators engage in consistent self-care and self-regulation, they create a foundation for

authentic connections with students. This presence is not just about being physically in the room, but about showing up fully, emotionally and mentally, grounded in practices that allow us to meet students where they are. As we've discussed, factors such as trauma, systemic pressures, and inadequate resources often challenge our ability to be fully present. However, by cultivating our own well-being and intentionally staying grounded, we can better navigate these challenges, allowing us to foster an environment where students feel seen, heard, and supported.

Furthermore, integrating Neural Education practices into our daily teaching is not just a method, but a mindset that aligns with the latest neuroscience. By intentionally designing our classrooms with student choice, autonomy, and experiential learning in mind, we create spaces where students thrive. The research backs this up, showing how practices like retrieval and metacognitive feedback strengthen neural pathways and foster deeper learning. As educators, we must continue to evolve, pushing against outdated paradigms and embracing research-backed practices that meet the diverse needs of all students. Our work as educators is not only about teaching content, but also about creating an environment that nurtures the whole child, emotionally, socially, and cognitively. By adopting Neural Education strategies and committing to self-care, we can transform the classroom experience for both ourselves and our students, making meaningful progress toward more inclusive, effective, and sustainable educational practices. We keep moving forward!

Thank you to Crown, Joy, Delight, and Jack!

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Mary Catherine Pilon

References

Bennett, E. L., Diamond, M. C., Krech, D., Rosenzweig, M. R. (1964). Chemical and Anatomical Plasticity of Brain. Science, New Series. Vol. 146. No. 3644 p.610-619

Best, J.R. (2010) Effects of Physical Activity on Children's Executive Function: Contributions of Experimental Research on Aerobic Exercise. Developmental Review. 30. P.331-351.

Boud, D., Keogh, R., Walker, D. (2005 digitally transferred reprinted in 1994) Reflection: Turning Experience into Learning. P.15–40.

Brock, R. (2005). *Sista Talk: The Personal and the Pedagogical* (Counterpoints No. 145). Peter Lang Publishing.

Brock, R. (2019). *Sista Talk Too* (Counterpoints No. 530). Peter Lang Publishing.

Brown, J. S., Collins, A., Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher.* V.18. no1. P.32–42.

Brown, R.E., Donald O. Hebb (2020). Organization of Behavior: 17 years in the writing. *Mol Brain* 13, 55. https://doi.org/10.1186/s13041-020-00567-8

Bruer, J. T., (1997). Education and the Brain: A Bridge Too Far. American Educational Research Association. Vol.26. No.8. p.4-16.

Carey, B. (2014). *How we learn: The surprising truth about when, where, and why it happens*. Random House.

Chang, Z., Schwartz, M. S., Hinesley, V., & Dubinsky, J. M. (2021). Neuroscience Concepts Changed Teachers' Views of Pedagogy and Students. *Frontiers in Psychology, 12*, 685856. https://doi.org/10.3389/fpsyg.2021.685856

Coch, D. (2018). Reflections on Neuroscience in Teacher Education. *Peabody Journal of Education.* 93:3. P.303-319

Coulson, D., Harvey, H. (2012). Scaffolding Student Reflection for Experience Based Learning: A Framework.

Duarte Santiago, I. S., Cavalcante, S., Júnior, J. G., Costa, S., & Cândido, E. L. (2023). The Impact of the COVID-19 Pandemic on the Mental Health of Teachers and Its Possible Risk Factors: A Systematic Review. *International Journal of Environmental Research and Public Health, 20*(3). https://doi.org/10.3390/ijerph20031747

Dubinsky, J. M., Guzey, M. S., Schwartz, C. M., Roehrig, G., MacNabb, A. S., Hinesley, V., Hoelscher, M., Michelin, M., Schmitt, L., Ellingson, C., Chang, Z., Cooper, J. (2019). Contributions of Neuroscience Knowledge to Teachers and Their Practice. The Neuroscientist. Vol 25. (5). p.394-407

Dweck, C. S., & Yeager, D. S. (2019). Mindsets: A View From Two Eras. Perspectives on Psychological Science, 14(3), 481-496. https://doi.org/10.1177/1745691618804166

Esposito, J., & Evans-Winters, V. E. (2022). *Introduction to intersectional qualitative research*. SAGE Publications. https://doi.org/10.4135/9781544348544

Gordon, E. (2000). Integrative neuroscience: Bringing together biological, psychological and clinical models of the human brain. CRC Press.

Greene, R. W. (2014). *Lost at school: Why our kids with behavioral challenges are falling through the cracks and how we can help them*. Scribner.

hooks, b, (2001). all about love: new visions. New York: William Morrow.

hooks, b., (2015). feminist theory: from margin to center. New York, Routledge.

Horvath, J. C., Donoghue, G. M. (2016). A Bridge Too Far - Revisited: Reframing Bruer's Neuroeducation Argument for Modern Science of Learning Practitioners. Frontiers in Psychology. Vol.7. Article 377. P.1-12.

Hydon, S., Wong, M., Langley, A. K., Stein, B. D., & Kataoka, S. H. (2015). Preventing secondary traumatic stress in educators. *Child and Adolescent Psychiatric Clinics of North America, 24*(2), 319–333. https://doi.org/10.1016/j.chc.2014.11.003

Kennedy, B. L., Murphy, A. S., & Jordan, A. (2017). Title I middle school administrators' beliefs and choices about using corporal punishment and exclusionary discipline. *American Journal of Education, 123*(2), 243–280. https://doi.org/10.1086/689929

[LearningInAS]. (2014, October – December). Judy Willis and the relevance of LIAS principles, part 2 [Video]. YouTube. https://www.youtube.com/watch?v=VNXyLGxuaa8&t=2s

Levenson, E. (2022). *Officials say that a gunman at a Texas elementary school kills 19 students and two adults before being fatally shot.* CNN.com. https://www.cnn.com/2022/05/24/us/uvalde-texas-elementary-school-shooting/index.html

Lieberman, M., & Kim, H.-Y. (2024, December 31). *School shootings in 2024: More than last year, but fewer deaths*. *Education Week*. https://www.edweek.org/leadership/school-shootings-in-2024-more-than-last-year-but-fewer-deaths/2024/12

Love, B. L. (2019). *We want to do more than survive: Abolitionist teaching and the pursuit of educational freedom*. Beacon Press.

McEwen, B. S. (2007). Physiology and Neurobiology of Stress and Adaptation: Central Role for the Brain. Physical Rev. Vol. 8.p. 873-904.

McEwen, B. S. (2012). Brain in stress: How the social environment gets under the skin. PNAS. Vol. 109 Sup. 2. p.17180-17182

Miller, G. A. (2003). The Cognitive Revolution: A Historical Perspective. TRENDS in Cognitive Sciences. Vol. 7. No. 3. 141-144.

Modan, N. (2024, May 10). *Schools face diminished capacity to meet student mental health needs: Staffing needs and a lack of funding are making it difficult for schools to provide mental health supports, according to NCES data.* K–12 Dive. https://www.k12dive.com/news/schools-face-diminished-capacity-to-meet-student-mental-health-needs/715244/

Morris, M. W. (2016). Pushout. New York: The New Press.

Neural education. Neural Education. (2023). https://www.neuraleducation.org/

Ned Learning. NED Learning. (2018). https://nedlearning.com/

Office of Superintendent of Public Instruction. (n.d.). *Washington State Report Card*. Washington State Office of Superintendent of Public Instruction. Retrieved June 4, 2025, from https://reportcard.ospi.k12.wa.us/

O'Mahony, K. (2021). The Brain-Based Classroom: Accessing Every Child's Potential Through Educational Neuroscience. New York. Rutledge.

Patton, M. Q. (2015). *Qualitative research & evaluation methods* (4th ed.). SAGE Publications.

Robinson, O. P., Bridges, S. A., Rollins, L. H., & Schumacher, R. E. (2019). A Study of Relation between Special Education Burnout and Job Satisfaction. Journal of Research in Special Educational Needs, (19)4, 295-303.

Safir, S., & Dugan, J. (2021). *Street data: A next-generation model for equity, pedagogy, and school transformation*. Corwin Press. https://doi.org/10.4135/9781071812716

Shulman, R. D. (2019, September 15). *This is the one critical piece we're missing when it comes to learning and deep understanding*. Forbes.

van Kruiningan, J. F., (2013). Educational Design as Conversation: A Conversation Analytical Perspective on Teacher Dialogue. Teacher and Teacher Education 29. P.110-121.

YouTube. (2014, February 9). *Judy Willis and the relevance of the Lias Principles, part 2*. YouTube. Retrieved March 2, 2023, from https://www.youtube.com/watch?v=VNXyLGxuaa8

Zacks, J. M., Speer, N. K., Swallow, K. M., Braver, T. S., & Reynolds, J. R. (2007). Event perception: A mind-brain perspective. *Psychological Bulletin, 133*(2), 273–293. https://doi.org/10.1037/0033-2909.133.2.273

Zadina, J. N. (2014). *Multiple pathways to the student brain: Energizing and enhancing instruction*. Jossey-Bass.