SCHOOL OF SOCIAL WORK

Applied Educational Neuroscience: Pioneering New Pathways

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Introduce Applied Educational Neuroscience

Prevailing social control paradigm

Proposed Paradigmatic Shift and Relevance

A Pathway to Transdisciplinary Collaboration

Grounded Theory Research: Preliminary Themes
Environmental Factors

Neurosciences

Education

Psychology

Educational Neuroscience

(Adapted from Sousa, 2010)
Educational Neuroscience: An Emergent Discipline

“The Integration of diverse disciplines that investigate human learning and development.”

(Fischer et al., 2007, p. 1)
The Neuroscience Movement

• Neuroscience – encompassing neurology, psychology, and biology
• Prior to 1970s, neuroscience was examined from an individual perspective
• Since that time - Brain is a socially adaptive organ that is constantly sculpted by experiences
• Affective and cognitive processes in learning are entwined
• Brains are linked across the social synapse
  (Cozolino, 2006; Cozolino & Spokay, 2006; Immordino-Yang, 2016; Sousa, 2010)
Historical Background

1861 – Term “neurology” coined

Early 1900s
Thorndike noted relevance of brain for ed. psychology

1970s research est’d learning/neurology link exceeding psychology

1980s – cognitive neuroscience established

1990s – advanced technology – “Decade of the Brain”

Early 2000s – Educational Neuroscience established

1895 Herbert & Halleck explored potential education and neuroscience integration
Applied Educational Neuroscience Research

• Translation to practice remains at a theoretical level (Goswami, 2006; OECD, 2007)
• Early attempts indicate a dynamic physiological and social phenomenon of teaching
• Fertile for further investigation
Organisation for Economic Co-Operation Development (OECD) 2007 Report

Understanding the Brain: The Birth of Learning Science

- EN knowledge is relevant pathway
- Need for holistic learning focus
- Transdisciplinary and needs bi-directional knowledge flow
- Emotional regulation is key learning skill

Research Needs
- Stress and Learning
- Translational Research
Levels 5 & 6: Joy and passion with learning

Level 4: Child’s mindset affects learning

Level 3: Students engaging in positive learning-activity connects neurons and builds circuits; myelinated circuits correspond with skill and competence

Level 2: Achievable challenges - reducing likelihood of midbrain functioning that could reduce communication to the cognitive region of the brain and larger associated network

Level 1: Safety and reducing stressors - promotes higher cortex activation and minimizes over-activity in limbic region
What is School Climate?

- “The learning environment created through the interactions of human relationships, physical setting and psychological atmosphere”

  - (Perkins, 2006, p. 1)
Interconnected System of Care
- Strategic Planning
- Appropriate Information Sharing
- Continuous Communication Loop
- Supported Navigation through SOC
- Wraparound Support
- Family Driven & Youth-Guided Planning

SOME
Early Identification, Screening, & Progress Monitoring
Effective Individual & Group Interventions
Wellness Plans
Co-Planning Strategies with Students, Families & Community Providers

FEW
Seamless Referral & Follow-up Process;
Counseling & Support Teams; Deepened Collaboration
With Youth, Families & Community Partners

ALL
Educational Neuroscience and Trauma Sensitive Practices;
Positive Culture and Climate; Rich Social & Emotional Learning,
Mental Health and Wellness Education; Universal Screening and Early Identification

Well-being of Teachers and School Staff

(Source: Wisconsin Department of Public Instruction, 2016)
Implications for Classrooms

Stressor:

Critical life issues that exceed one’s interpersonal and environmental resources for managing them (Swick, Bowen, & Allen-Meares, 2015)

Approximately 2/3 of Americans experience some level of childhood trauma (Center for Disease Control, 2016)
Pain and Toxic Stress: Barriers to Learning
Brains in Pain Cannot Learn

1. Youth experiencing stressors come to school with brains that are in an alarm state.

2. The overly sensitized amygdala of stressed brains loses the ability to discriminate between safety and danger.

3. The amygdala falsely signals danger and hostility everywhere (Cole et al., 2005)

4. Over time, chronic stress alters the architecture of the brain (Perry et al., 1995)
Prevailing Paradigm: Pathways to Punishment

• Since the 1980s, discipline modeled after criminal justice system

• 1.9 million youth suspended and 130,000 expelled in 2011-12 (US Dept of Education, 2014)

• Increase of student arrests between 300-500% per year for mostly behaviors unrelated to safety (Theriot, 2009)
Current US Education Delivery Model:

• Prevailing philosophy of Western education delivery has been a transmissional model focused on assessment (Gitterman, 2004; Light, Cox, & Caulkins, 2009)

• Focused on individual cognitive processing (Immordino-Yang & Damasio, 2007)

• Outward behavioral changes vs. social connections and unconscious responses
Social and Affective Neuroscience of Learning

Brain is experience-dependent

Neurochemistry of learning and memory are interwoven with the primitive survival circuitry

Emotions focus attention on what is important

Learning is part of an embodied system

Learning occurs in a matrix of relationships

(Cozolino, 2013; 2014; Geake, 2009; Immordino-Yang & Damasio, 2007; Sousa & Tomlinson, 2011)
Learning and Modern Attachment Theory

Right hemisphere neurobiological systems involved in processing emotion, stress modulation, and self-regulation

Nonconscious

Implicit interactions

Intersubjectivity

(Cozolino, 2013; 2014; Schore, 1994; 2013; Schore & Schore, 2008; Siegel, 2012)
Learning occurs amid various attachment patterns

Safe connections align with the neurobiological processes that support learning

Secure attachments = gateway to emotional regulation and learning

(Cozolino, 2013; 2014; Schore & Schore, 2008; Sousa & Tomlinson, 2011)
Features of “Tribal” Classrooms

Learners feel protected and valued by a leader in the learning setting.

There are efforts to eradicate shame and fear.

Educators respect the inner and outer worlds of students.

Recognizes individual assets of each student as integral to the class.

Worthy challenges and high expectations are a sign of respect.

Democratized decision-making.

(Cozolino, 2013; 2014)
“Although teachers consciously focus on what they are teaching, the evolution and structure of the brain suggests that who they are may be far more important to their students’ learning.”

(Cozolino & Spokay, 2006, p. 11)
A Paradigm Shift

- Driven by agents of change
- Transformation of one theoretical perspective to another
- Supporting behavioral health in our education institution requires a paradigm shift
Burrell and Morgan Framework (1979)

- Radical Humanism
- Radical Structuralism
- Interpretive
- Functionalism

Sociology of Radical Change

Subjectivity

Objectivity

Sociology of Regulation
<table>
<thead>
<tr>
<th>Functionalist</th>
<th>Radical Structuralism</th>
<th>Radical Humanism</th>
<th>Interpretive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Quo</td>
<td>Emancipation</td>
<td>Emancipation</td>
<td>Status Quo</td>
</tr>
<tr>
<td>Social Order</td>
<td>Oppression Addressed</td>
<td>Conflict</td>
<td>Social Order</td>
</tr>
<tr>
<td>Consensus</td>
<td>Conscientization</td>
<td>Recognizes Human Potential</td>
<td>Social Integration and Cohesion</td>
</tr>
<tr>
<td>Social Integration and Cohesion</td>
<td>Change through political and economic conflict</td>
<td>Humanize Social Patterns</td>
<td>Holistic Understanding of the Human World</td>
</tr>
<tr>
<td>Efficiency</td>
<td></td>
<td>Co-Creators within a Shifting Social Structure</td>
<td>Co-Creators within Regulated Structures</td>
</tr>
<tr>
<td>Rational Explanations</td>
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A Transdisciplinary Science
Study Impetus

• Quest for a shared conceptual framework for the social and affective dimensions of applied educational neuroscience to promote a positive classroom and school climate
Research Problem

• Positive School Climate linked to improving student outcomes (Gerlach & Hopson, 2013; National School Climate Center, 2007)

• Applied educational neuroscience is sought as a potential practice pathway

• Unifying conceptualization of social and affective dimensions of educational neuroscience remain unformed
To describe how practices, based on the social and affective dimensions of educational neuroscience principles, unfold in classrooms taught by teachers who espouse these principles.
Research Questions

(1) How do teachers, school administrators, and students describe educational neuroscience?

(2) What practices do teachers use in the classroom to apply educational neuroscience principles?

(3) How do students respond to these practices?

(4) What classroom interactions are associated with these practices?
Rationale and Significance

• Empirically-Informed Interventions for serving all youth, especially those impacted by stressors
• Building an Evidential Bridge: Linking Science to our heuristic ways of knowing
• Informing Education and School Social Work Practices
Attachment Theory

Teacher who espouses EN principles - Integrates into artistic application of practices

EN Knowledge: Social and Affective Neurosciences

Principles

Ecological Theory

Co-Created Classroom Climate Teacher, Administrator, and Student Relationships

Psychosocial Processes

Teacher, Administrator, and Student Relationships

EN Practice

EN Practice

EN Practice
Methodology

- Grounded Theory Design (Charmaz, 2014)
- Classroom members will adapt to the shift in social processes and co-create new interpretive meanings
- Series of complex, evolving psychosocial interactions
Participants and Data Collection

Three Midwest US general education classrooms where teachers espouse EN principles

Four phases of Data Collection:
Teacher, Student (4-6) and Administrator Interviews
Classroom Observations (at least 2)
Classroom Artifacts

Purposive Sampling Strategy (Padgett, 2008)
Data Collection and Analysis: Four Stages

- **Phase 1**: First interview with teacher. Describing perceptions of EN.
- **Phase 2**: Classroom Observations. Identifying incidents that exemplify EN principles.
- **Phase 3**: Interviews with students involved with EN incidents.
- **Phase 4**: Interview with teacher exploring incidents. Interview with administrator-describing EN perceptions.
Preliminary Results

- Shifting Organizational Culture
  - Teacher Valuing the Whole Student
  - Honoring Relationships
  - Trusting through Predictability
  - Learning Mind-Body Connections for Self-Regulation
  - Regarding Emotions as Integral to Learning
  - Teacher Self and Co-Regulating

Regarding Emotions as Integral to Learning

In regards to emotions as integral to learning, the results suggest a need for incorporating emotional intelligence and regulation into the educational process. This approach not only enhances students' academic performance but also fosters emotional well-being. The findings highlight the importance of valuing the whole student, including their emotional, social, and cognitive development, to achieve comprehensive educational success.
Shifting Organizational Culture

“This is not a packaged program; this is just implementing what we know about science and the brain into education.”

“You can’t just open up a package and implement this; it’s more of a deeper understanding of how we develop…”

~School Administrator
Regarding Emotions as Integral to Learning

1. “I do lessons the whole first week of school….why feelings come before thinking, so the kids get a really strong understanding of how we feel first. We talk about all of those emotions that we do feel....we make it very clear that we feel first and it’s ok-whatever way we do feel-we talk about perception.” ~Teacher
Teacher Valuing the Whole Student

1. “A lot of these kids wanna just be heard and so they want someone to listen to them, and there’s time for that in the first quarter, and we do a lot of that. And, then I see it pay off in a lot of ways.” ~Teacher

2. “Normal teachers don’t let us do this—they don’t let us take a lap if we get mad. They tell us to calm down. They don’t think about what’s going on in our brain. They don’t think about how mad we are, how mad we can get, especially if you’re, like our age going through puberty and stuff. You get really mad; you get really scared. Everything happens; your amaygdala goes off; you get alarmed and crazy and stuff. Ms X lets us take a lap, go get a drink of water, when it’s convenient for us.” ~Student
Honoring Relationships

"The teacher would say to me, ‘I don’t want you to address this, I’m going to address it later; I just need the student to be here’…but then as the year continued, those referrals were less and less…." ~School Administrator

“This student who is new in the last two weeks, he’s learning how to be in Room # -like everyone’s engaged during math-that’s what we do, it’s not an option, and he’s learning that and he’s seeing that and their examples….it’s the expectation that we will all be successful, and we’re all prepared and care about this.” ~Teacher
Learning Mind-Body Connections for Self- and Co-Regulation

1. "Like, you know, such as divorce arguments, you know-when you come to school you can actually have an opportunity to be happy. So our classroom is-it’s the best classroom I’ve been in so far cuz I’ve never been in a neuroscience classroom….I was in stress a lot, so it really helps you because you can actually be like-wow, this is how my brain works! I’m gonna work on that, you know, to keep my brain healthy. ~Student
Trusting Through Predictability

“I’m really purposeful with time. Math is from 9 – 9:55 and for those kids who hate math and that’s a trigger-like just know that it’s 55 minutes, and if you need a break during that time, you’re free to do so, but I’m not gonna drag it on after specials, and I’m not gonna bring it up at the end of the day. This is our Math time and if we don’t get to it, then we’ll get to it tomorrow…..there’s so much to do with testing, you could teach math all day….but those kids need to know the end point and so I’m respectful of time…and I don’t go over.”

~Teacher
Teacher Self- and Co-Regulating

“I’m a better teacher, because I’m aware of what happens. I’m aware of my own neuroanatomy, and it’s not something I was aware of. I knew some things instinctively, but I didn’t know about my pre-frontal cortex and my emotional brain and so…teacher brain state impacts all the brains in the classroom. So if I’m not mentally prepared or healthy or happy, then neither will the 30 kids in my classroom.” ~Teacher
Conclusion

• Creating a system of shared conceptual constructs for educational neuroscience
• Building the bridge to consequential and responsible practice pathways
• Elucidating holistic learning contexts that honors our biology
Questions and Discussion
References


