Micromoments in Neuroplexure: Creative (Professional) Learning

for Post-oppositional Transformation in Inclusive Education

by

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ABSTRACT

Inclusive education has been impeded by deficit-oriented policies and practices that promote standardization and lead to student segregation by ability/disability labels. Deficit perspectives are maintained across separate programs (i.e., general, special, gifted) through distinct sets of practices and extend into higher education and academia. In response to this issue, this dissertation used strengths-based strategies for collaboratively rethinking and reimagining educational practices, perspectives, and interactions towards inclusivity.

The purpose of this research was to study unexpected moments in learning events (i.e., micromoments), explore educators' responses to these events, and develop strategies for inclusive education professional learning (PL). Diverse educators and neurodivergent adults responded to task invitations based on the research questions: How might micromoments move in/with/through emergent learning events? And, how might attunement to micromoment assemblages be developed? Additional questions explored how conceptualizations of micromoment movement and attunement might transform inclusive education PL and qualitative inquiry.

The neurodiversity paradigm, activist philosophy, post-oppositional transformation theory, and creative learning concepts supported an embodied, multiple, emergent, and inter-relational study of the micromoment. Methodological-poly-experiments formulated as invitations to tasks were used as initial enabling constraints for this research-creation. Documentation from several small Zoom group meetings was used in data-weaving, which included collective speculative fabulations (i.e., storying), post-qualitative cartography in the forms of fiber art sculpture mappings, and a moving content analysis.

The neurodiversity-inspired educational perspective developed in this study supported a PL shift away from student labels toward the study and design of learning events. Attunement to micromoment movement in learning events was practiced by following micromoment dimensions, elements, and flows. This led to the development of a framework for the study of micromoments for educator PL.

This study merged creativity studies, disability studies in education, and educational research. Furthermore, this project extended post-qualitative and research-creation methodologies, offered suggestions for redefining various methodological concepts and neurotypical expectations, and introduced several new concepts for qualitative inquiry.

In conclusion, creative professional learning/unlearning strategies, including reflection on underlying educational perspectives and learning event interactions, were part of a meaningful process in cultivating inclusive education for neurodiverse teachers, students, and research participants.

DEDICATION

To the many exceptional teachers I have worked with who put students first despite multiple

societal, political, health, and economic challenges. Because of you, I keep hope alive.

To my many wonderful students. You inspired me to keep learning and creating new instructional

strategies. Most of all, you gave me the courage to become an advocate.

Special recognition goes to the teachers and students at Longview Elementary School (1996-

2005) and Paideia Academies (2013-2018) in Phoenix, Arizona.

ACKNOWLEDGMENTS

First and foremost, my deepest appreciation goes to the many scholars, educators, and crafters cited in this dissertation. Their work, experience, knowledge, and willingness to "pass down their craft" has made this research possible.

I am especially thankful for the mentorship of Dr. Mirka Koro and Dr. Ronald Beghetto, my dissertation co-chairs. From the very beginning, Dr. Koro expanded my understanding of methodology, which ignited an excitement for exploring the many possibilities in qualitative inquiry. Throughout my doctoral program, she encouraged me to continuously explore, question, create, and collaborate, and teaching by example, she offered multiple opportunities for collaborative experimenting, writing, and presenting of research. Dr. Beghetto helped me reconnect with creativity theory through creative learning concepts as well as find a distinct link between creativity and diversity, which ultimately led to this dissertation's topic and research questions. Without his concepts of creative openings and micromoments and his continued guidance as I further explored these concepts, this dissertation would not have been possible. Additionally, I am truly appreciative of Dr. Koro's and Dr. Beghetto's support of my use of unconventional research methods for this dissertation in education.

My gratitude is also extended to my committee members. Dr. David Carlson has been a constant guide throughout my doctoral program. He has been encourager and provocateur, challenging me to read, theorize, and write deeply and critically. His mentorship in academic writing, writing qualitatively, presenting, editing, and publishing has been invaluable. Dr. Sarup Mathur, as my first advisor, supported my transition to the doctoral program and academia. She introduced me to journal editing and the behind-the-scenes work of conferences. Dr. Mathur helped ground my creativity in the practicality of education, especially special education and teacher education. Dr. Mary McAvoy has guided me through the artistic and performative possibilities for this research-creation, beginning with drama methods and techniques and later with fiber art resources. I appreciate her support, especially for my use of an emergent methodology where the art techniques are initially unknown.

iv

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF TEXTBOXES

PROLOGUE

Micromoments in Neuroplexure is a creative learning dissertation that moves socially and conceptually with neurodiverse people and fibers. This dissertation did not begin with fibers, but by envisioning inclusive environments as weavings of difference and understanding weavings as everchanging groupings or assemblages. With this vision in mind, the word 'plexure' beckoned to me. Plexure means the act of weaving together and also means something that has been interwoven. It is both noun and verb, a thing and an action. Therefore, it is not something to be completed but engaged with. While designing creative (professional) learning events for co-learning based in the neurodiversity paradigm, I began to use 'neuroplexure' to describe the research as neurodiverse weavings. Later, moving with co-learners and micromoment events to explore inclusivity in learning environments, I realized that fibers, typically used for material weavings, were compatible with and stimulating for thinking through complex social issues such as inclusive education. These movements with fibers have followed me onto the pages of this written form of the dissertation.

Following the prologue, the dissertation will flow into three parts. Part I encompasses the Introduction, Literature Review, and Theory and Methods chapters. Each begins with a tie to fiber art, such as explaining why the introduction is like combing the fibers, then continues by utilizing a conventional academic writing style. Multiple education fields, paradigms, philosophies, and methodologies will be braided together in this part of the dissertation in order to prepare the reader for the neuroplexure.

Part II describes the neuroplexure and follows a rhizomatic, experimental writing style that is patterned after the theory-practice interplay of the chosen methodology and is reminiscent of the development of a textile (e.g., weaving a tapestry, crocheting a blanket). While the initial structures are described in Part I's Theory and Methods chapter, Part II continues to describe methods or practices that evolved or emerged through initial co-learning interactions. These practices then led to theory building, which led to new experimental practices, which led to more theory building. And so on.

Part III, the conclusion with implications and limitations, returns to a conventional academic writing style. Although it wraps up the written dissertation, it also leaves an invitation open for further collaborative crafting of creative professional learning events for the cultivation of inclusive learning environments.

Much like the way finding and opening my childhood box of embroidery floss changed my experience of time, the textures of memory expanded co-learner experiences of time-space-possibility during this dissertation (and maybe beyond). Past, present, and future are along a string that bends, knots, frays, and braids. Yet, through creative learning, in all its forms, educators can become co-designers for future possible learning events. I invite the reader to move through the following pages with an openness to discomfort, difference, and (neuro)divergence, and an expectation for personal creative learning and unlearning.

PART I: DESIGNING THE NEUROPLEXURE

Part I describes the rationale for and the designing of the neuroplexure. The purpose, a list of concepts, and an overview of the process are covered in the first chapter, Introduction. The second chapter, Literature Review, includes relevant scholarship in the areas of neurodiversity, inclusive education, creative learning, and professional learning. In the third chapter, Theory and Methods, the conceptual framework is described as combining post-oppositional transformation approaches to social justice, neurodiversity and activist philosophy, micromoments, and a neurodiversity-inspired educational perspective. This chapter goes deeper into the methods that were briefly introduced in the first chapter by describing the neuroplexure's professional learning community, methodological-poly-experiments, and an overview of data-weaving.

INTRODUCTION

The fibers of this dissertation are outlined in this introduction as personal connections to education and research, concepts and definitions, the conceptual framework, related concerns in education and research, co-learners and their experiences, and methodology. These segments are combed together to align diverse educational fields, theories, and methods with the dissertation research questions. This chapter then concludes with a brief overview of possible scholarly contributions and research limitations.

Figure 1

Combing the Fibers of the Neuroplexure

Contexts and Connections

Teachers develop a sense of what the whole class is doing-feeling-thinking while also picking up on specific moments where something new, or different, might be emerging (Sawyer, 2019). Because this emergence could bring both uncertainty and potentiality, feelings might vacillate between hesitancy and excitement depending on the day, energy levels, the subject, the kind of 'new' or 'different' that is emerging (Beghetto, 2013). Would this emergence be disruptive? Would it be generative? (And what would the principal think if she happened to stop in?) This kind of sensing, or attunement, could be exhausting. Additionally, moving from attunement toward engagement with the 'new/different' could be a complex endeavor (Beghetto, 2013; Sawyer,

2019). Systemic expectations and a teacher's own ideals of what education should be and do for diverse students could come into tension (Engel, 2015).

Over the years, in my many roles[1] and through multiple lived identities[2], I have also come to learn that tensions, or contradictions, do not mean mutual exclusivity. Teachers can be learners and learners can be teachers. Learning can be unlearning and unlearning can be learning (McLeod et al., 2020). Moreover, these tensions, contradictions, (ambiguities, uncertainties, instabilities) might be indications of possible movement toward inclusivity (McLeod et al., 2020). This is my hope; to witness transformation in the education system(s) toward inclusive environments for learners with all modes of thinking, learning, perceiving, communicating, and interacting.

Therefore, in this study, creative learning concepts and the neurodiversity paradigm are engaged to explore possibilities for inclusive education. Specifically, the purpose of this dissertation is to study unexpected moments in learning events (i.e., micromoments), explore how educators' responses to these events might contribute to the cultivation of inclusive learning environments, and develop strategies for inclusive education professional learning (PL). Although asset-based pedagogies for inclusive education have been explored (Armstrong, 2012; Jung et al., 2019; Lawrence-Brown & Sapon-Shevin, 2014; Rapp & Arndt, 2012), this work introduces a new perspective that combines creativity and neurodivergence in environments as generative for learning and positive interaction.

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[1] I have been an elementary and middle school teacher in dual language, gifted, special, and general education programs, all at predominantly low-income schools in a large metropolitan area, as well as an instructor for teacher education courses, teacher coach, and professional development facilitator for in-service teachers. In these roles, I felt that the segregation of instructional practices by program limited the development of inclusive education and the ability to teach all students across the 'educations'. I observed that schools set up in this way were challenged to support students, especially those with seemingly paradoxical instructional needs, such as those with extreme strengths in one area and extreme challenges in another.

[2] I am Mexican-American, a child of poverty, a middle class educator, a daughter, mother, wife, and a neurodivergent individual.

Concept Glossary

This concept glossary introduces terms and ideas that are integral to this dissertation. The glossary is especially important because many of the concepts come from multiple areas of study and several terms have been created specifically for this research. This list serves as a front-loading of vocabulary and a preview of the conceptual framework and methodological choices that follow in this chapter.

Even though vocabulary, as labels for concepts, is necessary for communication, it is important to also remember that labels create worlds or "realities," reflect power dynamics, and carry the possibility for transformation (Koro-Ljungberg, 2016). Some of the following concepts originated with other scholars and come from various fields of study. These terms are followed by a citation and a definition that reflects their use in this dissertation. Other terms are labels that I have coined for concepts that have emerged from the lure of the micromoment and during the weaving. This glossary is presented with the recognition that language is a living thing. Labels and their meanings change and are used differently over time and in different contexts. The terms listed here are highlighted for their potential for supporting transformation in education.

Actionable Uncertainty (Beghetto, 2020a)**:** A moderately intense form of uncertainty or doubtfulness that is accompanied by both a feeling of being "stuck" and a motivation to explore possibilities.

Activist Philosophy (Manning, 2016; Massumi, 2002)**:** A philosophy of activity, potentiality, and difference, especially focused on how difference alters the unfolding event. This process philosophy questions neurotypical perspectives of subject and volition and engages with neurodiversity in an active collectivity. Activist philosophy is aesthetic, political, speculative, and pragmatic.

Assemblage (Deleuze & Guattari,1987)**:** The human-nonhuman grouping, also called more-than-human, that is foregrounded in a given context and in a given moment. An assemblage is a shifting becoming-with that is always multiple and inter-related.

Co-learners: People who learn together, from/with each other. In this dissertation, registered participants are referred to as co-learners.

Collaborators: People who work together on a project. In this dissertation, co-learners who contributed to the project were referred to as collaborators.

Creative learning (Beghetto, 2013)**:** Personal and collaborative meaning-making. Knowledge that is in the process of formation during emergent learning events. Creative learning occurs in formal and informal settings with people of all ages and can include research endeavors.

Creative opening (Beghetto, 2016; 2020b)**:** During a social interaction, such as a classroom lesson, the emergence of possibilities for the exploration of concepts and ideas which might ultimately create new understandings or creative learning for one or more people. Creative openings can be planned or unplanned.

Creative professional learning: Professional learning opportunities that are designed, implemented, and experienced as creative learning.

Data-weaving: The process(es) of weaving together, further entangling, and layering, data/events/assemblages in new and different ways toward creative learning. Used instead of data analysis in this dissertation.

Deep structures (Smagorinsky, 2020)**:** Foundational social structures for a given organization that are in accord with specific value systems. In schools, these include institutionalized curricula, codes of conduct, hidden curriculum, and approved school languages.

Emergent learning event (Vasquez, 2022; Vasquez et al., 2021)**:** A happening in time and space where creative learning is emerging during the interactions between shifting assemblages. Creative learning as becoming-with is without a predetermined beginning or end.

Enabling constraints (Manning & Massumi, 2014): Limitations, guidelines, or rules that constrain actions in ways that generate creativity or enable novelty.

Guided improvisation (Sawyer, 2019)**:** Teaching techniques for emergent learning events which utilize structure with enabling constraints and improvisation with flexibility in teaching/learning and that result in creative learning. Guided improvisation can support diversity in teaching/learning.

Inclusive education (Armstrong, 2012; Jung et al., 2019; Lawrence-Brown & Sapon-Shevin, 2014; Rapp & Arndt, 2012)**:** Education that is committed to, not only the physical inclusion of traditionally marginalized groups of individuals, but the social, emotional, and academic inclusion of all people by designing deep structures that value difference, interdependence, and full citizenship. Inclusive education can be strengths-based while also assuring each student has the accommodations needed to fully participate in and contribute to the group's learning without relying on labels and diagnoses.

Methodological-poly-experiments or Poly-experiments (Koro-Ljungberg, 2016; Koro-Ljungberg & Knight, 2019)**:** Experimentation that engages multiplicity, plurality, creativity, and imagination. Not to be confused with conventional scientific experimentation.

microMemento: A memento/souvenir that serves as a reminder of a past emergent learning event and especially of its micromoment(s).

Figure 2

Several microMementos Used in this Neuroplexure

microMemory: A memory of a micromoment within a learning event. microMemories can be communicated to others using a variety of modes for expression.

Micromoment (Beghetto, 2013; 2020b)**:** An unplanned, unexpected moment, perceived as a rupture from the routine, in which creative potential emerges. Ruptures can be experienced as social-behavioral, internal, material, or societal-situational. Micromoments are a type of creative opening. Micro denotes not only the miniscule conception of the event in time, but also in space, relationality, and reality(ies).

microMoment-ing: The collaborative (re)creation of micromoments and an exploration of their possible movements. microMoment-ing is a speculative practice that might include role-playing, storying, or fabulation (i.e., ideas explored through fictional stories).

microMovement: The movement of a micromoment, which might or might not, develop into creative learning. microMovements can be mapped using various forms of nontraditional cartography. microMovement mappings are focused on the event as a socio-material happening, rather than on movement bounded in geographical space.

Figure 3

microMovement Sketch from this Neuroplexure
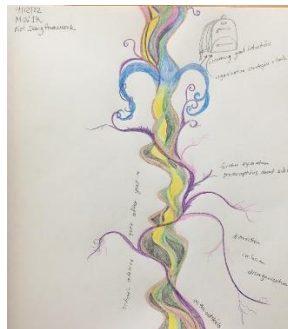
Neurodiverse (Walker, n.d.) **:** A wide range of modes for learning, thinking, communicating, and interacting or behaving.

Neurodiversity-inspired educational perspective: An educational perspective inspired by the neurodiversity paradigm that differs from neurotypical schooling perspectives by, (a) a shift from thinking about students as being (i.e., a focus on static attributes) to becoming (i.e., dynamic

multiplicity in humanness), and (b) from learning as the attainment of knowledge to learning as a becoming-with (i.e., more-than-human assemblages) in emergent learning events. The *neurodiversity paradigm* holds that there are multiple ways of being, thinking, knowing, learning, communicating, and interacting which are all valuable to society.

Neuroplexure: The act of weaving together neurodiverse and multiple modes of knowledge. A form of multi-textured, multi-media research-creation specifically attuned to neurodiversity. Refers to the process as well as the tangible 'weaving' that can be interacted with further. A neuroplexure is a kind of research-creation.

Neurotypicality (Manning, 2013; 2016; Smagorinsky, 2020; Walker, n.d.)**:** A dominant perspective of normality in ways of being and knowing, upheld in societal structures (e.g., governmental, medical, educational, recreational) through policy and practice, written and unwritten rules. A value system that can lead to ableism.

Post-oppositional framework (Keating, 2013)**:** A framework, or theorizing, about social justice that supports the transformation of all parties by including multiple directions, disciplines, and perspectives in the conversation.

Research-creation (Manning, 2016)**:** Arts-based research that follows an activist philosophy and is based on four propositions, which are (1) art is a process and not a product, (2) making is thinking and concept creation is a practice in that it occurs in everyday lived experience, (3) research-creation constitutes new processes, and (4) new processes often create new modes of knowledge which cannot be judged according to current qualitative research standards.

The 'educations' (Vasquez, 2023): Includes all siloed fields within education. This dissertation especially makes note of the separation between general, gifted, and special educations.

Conceptual Framework

Several of the concepts listed above were integral to the development of the conceptual framework for this dissertation. Most important were Erin Manning's (2013, 2016) concepts of

activist philosophy and neurodiversity, AnaLouise Keating's (2013) concept of post-oppositional

transformation for social justice, and Ronald Beghetto's (2013) concepts within creative learning,

especially the micromoment. These concepts, described in Figure 4, were used to conceptualize

micromoments in inclusive environments.

Figure 4

Aligning Theories for a Conceptualization of Micromoments
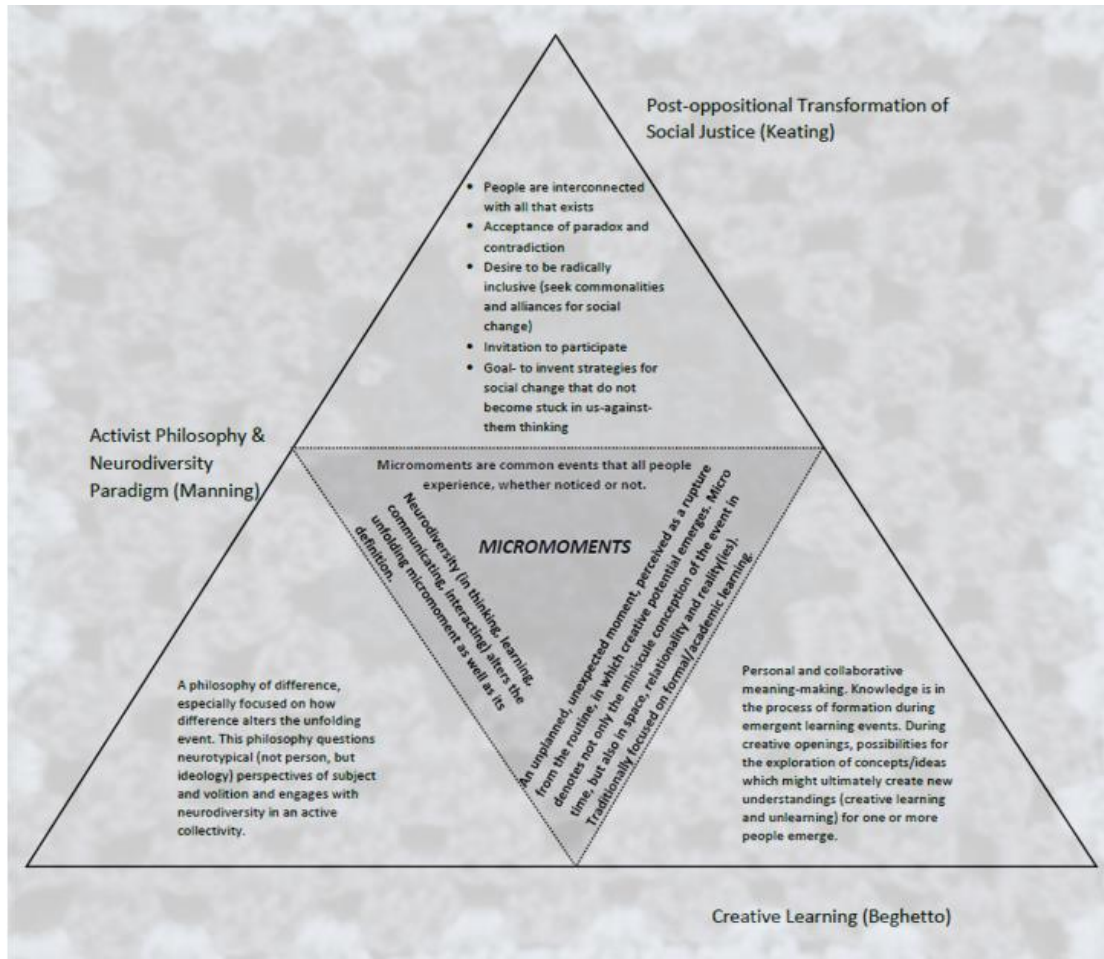
First, an activist philosophy, as a philosophy of activity, potentiality, and difference, is

especially focused on how difference alters an emerging event. This philosophy engages with

neurodiversity in active collectivities where movement in the assemblage creates the event as the

assemblage is also being created by the event (Manning, 2013, 2016). In accordance with this

philosophy of more-than-human assemblages, people acknowledge that they are connected to all

that exists when studying events using a post-oppositional transformation lens. Additionally,

9

because of this entangled inter-relatedness, they accept paradox and contradiction, desire to be radically inclusive by seeking commonalities and alliances for social change, and offer invitations to participate in transformative moves. The goal then is to invent strategies for social change that do not get stuck in an us-against-them mindset (Keating, 2013). The unfolding events that are studied in this dissertation are micromoments, which can be integral to creative learning (Beghetto, 2013).

By weaving these concepts together, an expanded conceptualization of micromoments was created. Micromoments are common events that all people experience, whether or not they are noticed, and neurodiversity in thinking, learning, communicating, and interacting alters the unfolding micromoment. Therefore, the study of micromoments in inclusive learning environments could bring new insights and transformative possibilities to educator attitudes and educational practices. Entering this often-uncomfortable space, beginning from an activist philosophy, and working from a post-oppositional transformation approach, the intent is not to change the system by dismantling or breaking it, but by working beyond the system to envision new practices for inclusive learning.

<div align="center">**Concerns in Education and Research**</div>

Traditionally, the micromoment has been studied in neurotypically designed academic settings and focused on formal instruction, especially verbal interactions between teachers and students during subject matter instruction (Beghetto, 2013; Tanggaard & Beghetto, 2015). Although designed as neurotypical learning environments, these spaces are comprised of neurodiverse students; people who think, learn, communicate, and interact in many ways (Smagorinsky, 2020; Shume, 2020). Because of this, even in the most rigid neurotypical learning environment, there are sparks of difference, new ideas, new perspectives, new ways of solving problems and different ways of thinking. These sparks are micromoments that can lead to creative and divergent learning. Because micromoments are somewhat enveloped in feelings of uncertainty and discomfort (as well as excitement), those in authority can be hesitant to follow where they might lead. Furthermore, with current standardized, convergent, and deficit-oriented educational deep structures in the United States, educators might block, divert, or misinterpret

student led micromoments (Beghetto, 2013; McAvoy, 2018; Sawyer, 2019; Smagorinsky, 2020), which sometimes results in labeling students and changing their educational placements (Siuty, 2019). In this dissertation, a strengths-based study broadened the conception of micromoments to encourage the exploration of social, emotional, and behavioral ramifications of micromoment interactions (Beghetto, 2020a).

Additionally, the study of micromoments and the neurodiversity-inspired educational perspective has implications for higher education where knowledge production endeavors often limit who can be knowledge makers as well as what kind of knowledge is acceptable (Harney & Moten, 2013; Manning, 2016). Vasquez and colleagues (2022) explored the similarities between schooling and research methods, finding that both tend to still and extract from a preconceived segmented world, which removes "the body from thought, from learning… the material from the ecology of experience" and privileges "the cognitive over the affective, embodied, and experiential" (p. 97). The neurodiversity-inspired education perspective developed in this dissertation attends to these and other educational and research concerns related to inclusivity.

Methods and Research Questions

Micromoments in Neuroplexure invited participants, or co-learners, to engage in creative learning through neurodiverse tasks that opened the way to explore and respond to the following research questions:

1. How might micromoments move in/with/through emergent learning events?
   a. How might attunement to micromoment (more-than-human) assemblages be developed?
2. How might inclusive education professional learning transform with micromoments in neuroplexure?
3. How might qualitative inquiry transform with micromoments in neuroplexure?

This neuroplexure attended to Manning's (2013, 2016) call for research-creation and Koro-Ljungberg and Knight's (2019) call for methodological-poly-experiments (see also Koro-Ljungberg, 2016). Research-creation operates from onto-epistemological foundations that do not separate research into methods, stages, and phases. Rather, the design of research-creation

'projects' involves decisions about which enabling constraints to introduce and when as well as how to respond to other enabling constraints that arise during the event. Through its developing processes, research-creation did "…encourage modes of *temporal* and *material* attunement…in which slowness comes from the work of defamiliarization and the time it takes to *ask questions differently*" (Loveless, 2019, p. 107). While asking questions differently, research-creation opened knowing to more than the neurotypical avenues (i.e., reading, writing, memorizing) and included modes of knowing through the senses, which are most often connected to art in Western society.

Research-creation requires careful design of the initial enabling constraints and methodological-poly-experiments served as a generative technique for enabling constraint development. Poly-experiments were created as invitations to co-learners for engaging with tasks for micromoment study. Additionally, poly-experiments supported researcher attunement to emerging enabling constraints throughout the research-creation. Koro-Ljungberg and Knight (2019) stated that "…experimental methodologies operate as continuous relational decisions, movements, performances, and onto-epistemological events constructing different forms, copies, and differentiations of individuals and their surroundings" (p. 4). Further, methodological spaces conceived of in this manner are fluid, can support multiple methods occurring simultaneously, and are, therefore, compatible with neurodiverse and inclusive methodologies (Koro-Ljungberg, 2016).

In this fluid space, the neuroplexure became a data-weaving. Rather than a predetermined analysis, this data-weaving was an entangling and layering of data in new and different ways toward creative learning. It is important to note that based on the onto-epistemological foundations of this research-creation, data are not viewed as extractible information or artifacts but are understood to be the events and their dynamic assemblages. Multi-method, process, and assemblage focused research studies, such as those that occur during data-weaving, "bring qualitative inquiry more closely into a complexity that resembles reality…" and should increase rigor and praxis (Morse, 2018, p. 804).

The data-weaving materialized in several ways. Beyond the Micromoments in Neuroplexure website, online, hybrid, and in-person collaborator contributions were woven together in various formats, including collective speculative fabulations, fiber art sculpture mappings, and an interactive and speculative flow chart called a moving content analysis. The first format resulted directly from one of the co-learner invitations to engage with micromoments. Collective micromoment speculative fabulations were stories that began with a microMemory. Then two or three collaborators reimagined new endings, resulting in multiple micromoment versions. The other two formats were determined after compiling collaborator contributions and by following the data-weaving precepts more literally. Fiber art sculpture mappings were a way to study the dimensions, elements, and movements of micromoments using yarn and structures, and the interactive flow chart extended a conventional content analysis into a three-dimensional form for speculative interaction. These three formats engaged data/events/assemblages in multiple 'reprocesses' and comprised the data-weaving of the neuroplexure.

This work was only possible because of the co-learners and collaborators. Fifty people interested in the educational and research issues described above became a community of learners during this dissertation. The micromoment contributions from twelve collaborators formed the basis of the data-weaving. These co-learners included educators from preschool to higher education levels, preservice teachers to teachers with years of experience, and self-identified neurodivergent adults.

Potential Connections to and Directions for Research

This dissertation contributes to the fields of qualitative inquiry, neurodiversity studies, creativity studies, and teacher PL for inclusive education. These contributions are in the forms of concepts, practices, and underlying assumptions that make connections between fields and offer possibilities for future research. Many of these contributions are discussed in further detail in Part II, under the chapter called Neuroplexure as Qualitative Inquiry.

In the field of qualitative inquiry, research-creation, post-oppositional frameworks, and methodological-poly-experimentation provided generative directions for neurodiversity and

creativity studies as well as educational research. Utilizing art practices and processes and inviting diverse individuals to explore commonalities as well as neurotypical structures in education produced a space for reflection, self-evaluation, empathy building, and planning for change in practice. Additionally, incorporating a neurodiversity-inspired education perspective with underlying assumptions that shift educator views on thinking, learning, and development opened up the research space for multiple modes of interaction, which was aided by the use of methodological-poly-experimentation. Any of these techniques could be further explored in neurodiversity studies and creativity studies to promote inclusivity, change in practice, and social transformation.

Also within qualitative inquiry, this neuroplexure's use of fiber art practices for mapping movement in multiple dimensions builds on Knight's (2016) inefficient mapping, Rousell's (2021) immersive cartography, and Tanggaard and Beghetto's (2015) Ideational Pathway Diagrams (IPD). The cartographic practices in the data-weaving were less tied to physical space or geography than inefficient mapping, and more attuned to collective movement. The fiber art sculptures and moving content analysis incorporated an immersive and speculative aspect at a smaller scale than Rousell's (2021) architectural structures. Furthermore, this neuroplexure used dimensions and elements to study micromoments that were additional to those used in the study of ideas in IPD.

In Neurodiversity Studies, this neuroplexure extends current research by moving away from with a heavy focus on autism, or any specific diagnosis or classification based on an "imaginary ideal of a cognitive normal subject," which is counterproductive to inclusive education (Rosqvist et al, 2020, p. 228). This dissertation reinforces the neurodiversity paradigm in educational spaces and attends to concerns about research that uses the term neurodiversity but continues to separate individuals by diagnoses (see also Vasquez, 2022; Vasquez, 2023; Vasquez et al., 2021; Vasquez et al., 2022). Additionally, using multiple modes for engagement and expression generated a more inclusive research environment and engaging groups of neurodiverse individuals expanded the possibility for diversity of perspectives, discussion, and creative learning.

Various contributions are made to creativity theory, research, and practice. First, this work builds on theory that moves creativity out of individual minds and into collaborative experiences (Glăveanu & Clapp, 2018). Knowledge ownership and creation is attributed to all involved in the event rather than being restricted to those in authority roles, such as the teacher in the classroom or the researcher in a study (Beghetto, 2019). Furthermore, process or experience is privileged over product or outcomes, which are typically targeted for study (Glăveanu & Clapp, 2018; Vasquez et al., 2021). Most markedly are the contributions to the theory of micromoments. During the neuroplexure, a definition of micromoments that focuses on inclusive environments and an in-depth description of micromoment dimensions, elements, and flows were developed.

Contributions to the fields of inclusive education and teacher PL include the intentional blurring of the 'educations' through recognition of ableist and separatist school structures and the implementation of creative professional learning techniques based on the common event of the micromoment (Vasquez, 2023). Additionally, this study intentionally engaged people from diverse backgrounds and included educators and neurodivergent adults for the purpose of learning from and with each other. During these PL opportunities, unlearning and learning occurred simultaneously as co-learners began to rethink their preconceived ideas about 'othering,' inclusion, and learning. Through these engagements, techniques were developed for studying micromoments in ways that might cultivate inclusive educational environments. Further development of these and similar techniques for use with small professional learning communities (PLC) could be fruitful for research and educational change.

This neuroplexure has the potential to contribute to many fields, crossing boundaries, through its dedication to neurodiversity and study of micromoments. As with all emergent events, this exploration of micromoments continues to move, grow, and evolve as it will, in collaboration with the more-than-humans that implicate themselves in this work towards inclusivity.

Limitations

There were several limitations and tensions throughout this neuroplexure. This section will highlight some of the limitations of the methodology and context. A more detailed description can be found in Part II, under the chapter called Neuroplexure as Qualitative Inquiry.

The neuroplexure, as a form of research-creation that uses methodological-poly-experiments, limited the focus and scope of the project. Research-creation limits findings and implications to theoretical and pedagogical outcomes. First, theory and practice are intimately tied to a specific context and cannot be directly applied or generalized to another. Therefore, this work does not satisfy conventional standards for evidence-based practices in education. Second, because the project offered a variety of options for engaging and contributing, this required co-learners to be open to taking some risks and trying out new ideas and practices. This openness to creativity and improvisation might have limited co-learner comfort, and therefore, participation.

Additionally, there were other constraints for collaborator participation. Even with an attempt at inclusive design, this neuroplexure was not accessible to all individuals who might have been interested in participating. The use of a website as the central location for communication limited participation to those able to access the internet and work online. Also, the study's enabling constraints were designed as optional invitations and there were no stated deadlines, resulting in variable levels of engagement. While all registered members, or co-learners, were engaged at some point by signing the consent form on the website, not all co-learners became collaborators.

Other methodological constraints included tensions and challenges in translating nonrepresentational research and embodied knowledge into words and in communicating this work to a wide audience. First, because there is always an element of interpretation when making meaning and communicating creative learning, even nonrepresentational methods tend to have aspects of representation. Parts of a sculpture or a microMemento were reminders of an idea or event, which might then also represent that idea or event. In this way, the work was more-than-representational (Shannon & Truman, 2020). Even with more-than-representational research, though, embodied knowledge was felt and understood in the body in a preverbal way. It was,

16

therefore, a challenge to communicate this kind of understanding of micromoment movement through words, which were insufficient and sometimes contradictory to the embodied knowledge. For example, the English language uses binary terms, such as behavior and misbehavior, or compliance and noncompliance, making it difficult to express the sense of behavior or compliance without having to specify a binary value. Additionally, behavior or compliance might not have been the best words to express what was learned, but they were the most recognizable for the wide audience.

Bringing together concepts from a variety of educational and research fields added to the difficulty in choosing words. Although, there are terms that are similar across fields, they might have certain nuances or histories that make them dissonant in usage. When communicating using terms, it was necessary to choose those that best fit the majority of the audience while also connecting them to similar terms with which other segments of the audience might be more familiar.

Furthermore, major contextual limitations resulted from the COVID-19 pandemic and the implementation of the research within neurotypical education and research structures. Because this dissertation occurred during the COVID-19 pandemic, recruitment, enrollment, and engagement occurred mainly online and across various time zones. Most research interactions with collaborators also occurred as schools were beginning to return to in-person learning. This meant that educator time and availability to participate was limited. Very few contributions were made asynchronously and small synchronous meetings, through the Zoom groups, usually included only two to three people.

The neuroplexure, operating from the neurodiversity paradigm, was in constant tension with neurotypical structures in education and research. The format of the dissertation, typical expectations for interacting in research, collaborator experiences in neurotypical schooling all produced a desire for comfort in the status quo. For instance, the neurotypical expectation for interpretation and translation by the researcher contradicted basic underlying assumptions of research-creation. The tension between how much creative, experimental writing and how much academic, third person writing for the dissertation also involved balancing audience expectations

and understanding. Additionally, the collaborators seemed to expect to participate in recognizable ways, such as through Zoom meetings, through interviews by answering questions, and using written and spoken language, even though the tasks were presented as open-ended and flexible. Furthermore, there was an attempt to decrease the power differentials between researcher and participant, yet this was a challenge, partially due to assimilation of the neurotypical expectations listed above.

Summary

In this first chapter, relevant education and research issues, theories, and methods were described and aligned to the research questions. The purpose for studying micromoment movement was explained as a way to contribute to educators' understanding of learning event interactions and to develop PL techniques for inclusive education. At the most basic level, this work's intent is to use the study of micromoments to help teachers uncover their beliefs about teaching and learning and view classroom interactions from multiple perspectives, both of which could lead to more inclusive teaching practices. Moreover, this study of micromoment movement in learning environments was introduced as being designed from a post-oppositional approach and as utilizing research-creation and methodological-poly-experiment methodology. These study design choices were made after considering neurodiverse modes for interaction and inclusivity issues in education and research. Finally, several possibilities for contributions to scholarship as well as limitations of the study were outlined.

In preparation for the following chapters on scholarly literature, theory, and methods, it is crucial to keep neurodiversity and inclusivity in mind as the underlying passion for this work. Taking the rally cry, "Nothing about us without us" seriously, this neuroplexure aimed to include participants from as wide a range of intersectional identities and background experiences as possible and was specifically designed to be accessible for participants from a range of neurodivergences. In this way, diverse collaborators became valued members of the Micromoment in Neuroplexure learning community. As Moore (2016) stated, "…if inclusion and diversity is something that just *is*, then it is also something we live, something we are, and

something we believe in together. And it is through this common goal that we can also be unified:

we can be <u>one</u> without being an *other*" (p. 6).

Figure 5

Many, Diverse Fibers Twisted Together Become a Strand

LITERATURE REVIEW

This literature review is like a "handing down" and a "picking up" of various lines of research, or "crafts." New ideas and new scholarship can result from "picking up" the craft from those who have spent time and energy in their areas of expertise. The following sections include literature that support the purpose and design of this neuroplexure and cover the areas of neurodiversity, inclusive education, creative learning, and PL. Similar to working with fiber, learning more than one craft can build skills and techniques that transfer; skills learned for sewing are also used in weaving and crochet. Each of the following fields have perspectives, techniques, or information that is useful for the others, and when merging fields, have the potential for transdisciplinary innovation.

Neurodiversity

The neurodiversity paradigm was established by individuals in a social justice movement towards inclusivity. This section briefly outlines the history of neurodiversity and describes its potential for inclusive education, including PL for inclusive education.

The Neurodiversity Movement

Neurodiversity is a term first used by Judy Singer, an anthropology and sociology student, and Harvey Blume, a writer, in the late 1990s (Silberman, 2016). Both were on the Independent Living on the Autism Spectrum (InLv) mailing list. This early online community believed in neurological pluralism and welcomed individuals with learning disabilities, attention deficit hyperactivity disorder (ADHD), and other neurological "cousins." Early autistic culture members hoped that "the concept of honoring neurodiversity would spread through the disability rights community as a rallying cry, as phrases like "Black is beautiful," "Gay is good," and "Sisterhood is powerful" had helped mobilize mass movements in the 1960s and 1970s" (Silberman, 2016, p. 453). Over the years, the concept of neurodiversity has engendered new ways of communicating about difference by celebrating neurological and behavioral diversity across humankind, emphasizing that there is no one normal or average way to be human (Armstrong, 2015; Silberman, 2016).

20

Although the most simplified meaning of neurodiversity is the neurological variance across a species, usually referring to the human species, it has taken on varying significance to different groups. The Autistic Self Advocacy Network's (ASAN) position on neurodiversity states:

> Neurodiversity means that no two brains are exactly the same. Every person has things they are good at and things they need help with, and there is no such thing as a "normal" brain… people with brain-based disabilities (like autism, intellectual disabilities, learning disabilities, or mental health disabilities) should be accepted and included in society just like neurotypical people (people without brain-based disabilities). (ASAN, n.d.)

Achieveability (n.d.), an organization that provides neurodiversity research for practical contexts in education and other fields, defines neurodiversity by comparing it to biodiversity and references evolution when stating that it includes "the whole human race, and the infinite variation in neurocognitive functioning that has evolved within our species."

Additionally, various scholars have highlighted the celebratory nature of neurodiversity when focusing on the strengths, or genetically selective enhanced capabilities, that often co-occur with neurodiverse disabilities, such as 'dyslexic pattern recognition,' or 'ADHD creativity,' but have also criticized diagnostic procedures by noting the presence of overlapping characteristics across specific conditions (Cooper, n.d.; Kaufman, 2013; Kennedy & Banks, 2011; Masataka, 2018; Saltz, 2017). For example, common diagnostic characteristics for both ADHD and Autism Spectrum Disorder (ASD) might include poor social interaction and inattentiveness. Scholars who celebrate neurodiversity shift paradigms from a deficit model to a strengths-based model and rely on this shift to advance disability rights and change in practice.

One such scholar in the field of education, Armstrong (2017), considered neurodiversity the future of special education and has therefore developed a strengths-based educational framework for inclusive education (see also, Armstrong, 2012). He believed that a special education grounded in neurodiversity would focus on diversity instead of disability, assessing strengths and challenges instead of testing to detect deficits and disorders, building on strengths

instead of remediating weaknesses, and developing human potential instead of covering sets of standardized skills and objectives (Armstrong, 2017). With this paradigm shift, underlying theoretical foundations would also be disrupted as the 'educations' would rely less on genetics and neurobiology and more on evolutionary psychobiology and social-ecological theories. Nevertheless, the focus on diagnosis and categorization has been preserved, whether in support or in opposition, through educational models that continue to center the (human) brain as the site for cognition.

Currently, the 'educations' function from a deficit model, where the brain is considered damaged or disordered if the person thinks, learns, communicates, or interacts in ways that are perceived to be outside of expected norms. Through the neurodiversity paradigm, human variation of brain functioning is considered a neutral fact, calling into question what affordances are provided by the requirement of professional diagnoses (Armstrong, 2017; Jaarsma & Welin, 2012). Although many in the neurodiversity movement are accepting of individuals who self-identify, the movement's fundamental goals revolve around creating a community for individuals with acknowledged brain-based disabilities, increasing social inclusion of individuals with these disabilities, and increasing the provisions of accommodations across society at large (Sarrett, 2016). The neurodiversity movement, then, could be characterized as brain and humancentric, which follows mainstream, neurotypically privileged, assumptions. In the definitions above, the salient terms are brain and neurocognitive, with the assumption being that cognition occurs in the brain or mainly in one bodily system, that neurodiversity pertains specifically to humans with disabilities, and that diagnoses, whether formally or self-identified, serve as admittance tickets to the (specific disability) community. Even though this neuroplexure focuses on similar social justice issues through inclusive education, it diverges from the neurodiversity paradigm assumptions of cognition stated here.

Neurodiversity Studies

This neuroplexure also extends on some of the burgeoning work in Neurodiversity Studies. Being that neurodiversity is a fairly new term, there is limited published scholarship on

the topic. A Google Scholar search using the keyword neurodiversity, for all years, no patents or citations, yielded only about 8,870 results, about 100 times less hits than for keywords such as feminism or queer. Publications using the word neurodiversity covered topics ranging from the neurodiversity movement, autism, and twice-exceptionality (i.e., giftedness with disability) to neuroscientific studies on mice, human-computer interaction, employment, talent development, and education. While the term is now being used across various disciplines, only recently has a volume been published with the purpose of introducing a specific field of research called Neurodiversity Studies (Rosqvist et al., 2020).

The editors of *Neurodiversity Studies: A New Critical Paradigm* (2020) compiled sixteen chapters under the section headings "Curing Neurodivergence/Eugenics," "Neurodivergent Wellbeing," "Cross-Neurotype Communication," "Neurodiversity at Work," "Challenging Brain-Bound Cognition," and "Moving Forward." Early chapters considered the history of the neurodiversity movement and disability issues such as language and stigma and prevention and cure discourses. In other chapters, authors considered how to improve interactions between neurodivergent and neurotypical people or ways to bridge the two "worlds." Final chapters included discussions on issues in research such as collaboration with autistic scholars, designing autistic research spaces, and theory on cognition, empathy, and agency. Most of the chapters are essays and are predominately autism-focused, yet they bring many neurodiversity related issues to the table and unify scholars under the neurodiversity movement without over-defining what Neurodiversity Studies should or should not include.

Chapman (2020), author of the chapter entitled "Defining neurodiversity for research and practice" stated that "neurodiversity is likely what philosophers call a 'moving target', meaning that the concept will continue to change and 'move' due to complex interactions between those who are categorised by it (including both neurotypicals and neurodivergents), as well as the various relevant institutions it challenges and responds to (psychiatry, education, etc.)" (p. 219). Instead of offering a definition for neurodiversity research, Chapman (2020) explains that the concept is epistemic in that it can be used to "access and generate new forms of knowledge" and to

reimagine a more compassionate and humane world (p. 219). It is in this spirit that a neurodiversity-inspired educational perspective is developed in this neuroplexure. This perspective rejects the human-centric, brain-bound cognitive, and diagnoses-dependent scholarship and moves toward a more fluid conception of neurodiversity, which might serve not as a hope for an inclusive future, but as a lived reality for an inclusive today (See Theory and Methods).

Inclusive Education

There are many visions for inclusive education. Some envision inclusive education as all-encompassing, and others view it as another possible field within the 'educations'. This section includes the presentation of full inclusion ideology with an emphasis on intersectional disability, as professed by many current inclusion education scholars (Jung et al., 2019; Moore, 2016; Rapp & Arndt, 2012; Villa & Thousand, 2005). A brief review of pertinent policy regarding inclusive education in the United States as well as a description of the state of current inclusionary teaching practices will follow. Finally, this section concludes with a delineation of some of the current gaps between ideology, policy, and practice.

Inclusive Education Ideology

Inclusive education is often perceived as a type of special education where students with disabilities learn alongside students without disabilities. The vision for fully inclusive education, though, is less a vision for a new, improved special education and more of a critical pedagogy, a socio-cultural issue, and a call for a strengths-based educational system that values human diversity (Armstrong, 2012; Artiles & Kozleski, 2016; Lawrence-Brown, 2014). From this perspective, educators must rethink definitions for intelligence, normality, identity, and classroom management, and develop learning environments where all students experience full citizenship and belonging (Lawrence-Brown, 2014; Rapp & Arndt, 2012).

There is no one way to develop inclusive educational environments, but there are some underlying premises to inclusion ideology that can support educators in exploring and developing

24

many programs and practices that might enact educational inclusion in their settings. Jung and colleagues (2019) envisioned successful inclusive environments as open, welcoming environments where each student receives necessary supports without labels (i.e., specific learning disability, at-risk, English learner) and where general educators take on the responsibility for all students (see also, Armstrong, 2012). Villa & Thousand (2005) stated that inclusive education "… is about embracing everyone and making a commitment to provide each student in the community, each citizen in a democracy, with the inalienable right to belong" (p. 5). Therefore, disability-informed teaching and positive teacher-student relationships are necessary for cultivating supportive and inclusive learning spaces (see Mathur et al., 2018). Additionally, inclusive educators function from the assumption that living together and learning together, rather than independently, is beneficial to all.

To develop this kind of environment, educators need to rethink neurotypical perspectives on intelligence, stop categorizing students as either normal or disabled, general education or special education students, and engage in more first-hand experiences with disability (Rapp & Arndt, 2012). For example, intellect can be viewed as more than just the ability to read, write, listen, and speak in standardized ways, and instead viewed as multiple and situational (Lawrence-Brown, 2014; Rapp & Arndt, 2012). "Being able to think of many different ways to solve a problem is intellect… to see the positive in situations and people is a valuable way of thinking… to imagine intricate settings and plots for play is intellect" (Rapp & Arndt, 2012, p. 129). When rethinking intellect, one must also revisit the use of developmental stages. Developmental stages can be viewed as guides, not requirements, and typical development should not be confused with "*normal* or *acceptable* development. It may be that most children develop a certain way, but not all do, and those who do not, may not be in trouble. They are different or *atypical*, and that is okay" (Rapp & Arndt, 2012, p. 98).

Further, a shift in understanding developmental guidelines has implications for how educators understand identity labels, which are often tied to interpretations of typical development. Inclusive educators recognize that an individual is not defined by only one attribute,

but many (i.e., disability, race, ethnicity, language, gender, sexual orientation, experience) and that segregation by one attribute marginalizes individuals (Jung et al., 2019). This perspective follows an intersectional framework for identity. Artiles (2015) wrote that even when thinking with intersectionality, educators must "remember that student identity intersections are not fossilized demographic markers; indeed they are fluid and dynamic" (p. 14). For example, a person's disability identity might be more pronounced in one setting at a given time, while language and gender might be in another setting.

Related to identity and labeling are the tensions between diversity and individuality, which are important to address in the design of inclusive education environments. Although labels secure specialized services, they can erroneously lead to treating individuals with similar diagnoses as all the same (Rapp & Arndt, 2012). For this reason, inclusive environments are often less about matching labels to strategies (e.g., dyslexia to intense phonics instruction, autism to Applied Behavioral Analysis), and more about incorporating strategies that work for many students.

Inclusion scholars cite a variety of instructional and classroom management strategies that work for many students, including use of the zone of proximal development, response to intervention (RTI), universal design for learning (UDL), and differentiated instruction (Rapp & Arndt, 2012). Inclusive classrooms provide pedagogical strategies such as those listed here, as well as promote collaboration or cooperative learning through a curriculum that is "rich, engaging, multilevel, and culturally responsive for all students" (Lawrence-Brown, 2014, p. 19, see also Artiles, 2015). Educators who develop a community of learners focus on high quality engaging instruction with clear routines and expectations and recognize that all behavior is communication (Lawrence-Brown, 2014; Rapp & Arndt, 2012; Smith, 2014). "Learning how to differentiate your instruction is a classroom management tool, because good instruction is engaging, exciting, and reduces off-task behavior" stated Rapp and Arndt (2012, p. 117).

It is within these classroom cultures that students can experience full citizenship. Inclusive educators support full citizenship when they believe that each student is a unique

individual who can think, learn, and contribute to the classroom community as much as they are supported by the same community (Rapp & Arndt, 2012). The belief in reciprocity of relationship is very important for revising current views of individuals with disability as economically and socially draining. Rapp and Arndt (2012) stated:

> A true inclusive community, where all members are full citizens, understand that everyone is competent, that everyone is a thinker. In these communities, everyone is seen as an individual, not automatically the same as others who share their age, grade level, or disability label. In these communities, everyone believes that she benefits from interaction with everyone else- everyone is a teacher and everyone is a learner. Finally, in these communities, everyone shares a location where risks can safely be taken without fear of discouragement, criticism, or failure so that mistakes can lead to growth through encouragement, constructive critique, and success. (p. 101-102)

Full inclusion ideologies take a critical look at pedagogy, acknowledge socio-cultural aspects of education and identity, and call for a valuation of human diversity in all its forms. Inclusion promotes equity, reimagines least restrictive environment (LRE), takes advantage of educator strengths through collaboration for instruction, and honors student aspirations (Jung et al., 2019; see also, Armstrong, 2012). While this vision for inclusion is laudable, it is also important to remember that education systems in the U.S. were built on certain assumptions that have led to the designation of specific services as beneficial for specific categories of students (Lawrence-Brown, 2014). Although various policies have been enacted to improve inclusive education for students from marginalized groups, such as those with disabilities, those assumptions about intelligence, normality, and identity continue to exert influence across educational systems.

Inclusive Education Policy

Inclusive education ideology, as a disruption to the normative assumptions that have led to educational inequalities, traveled quickly across the Western world after the Declaration of

Salamanca in 1994 (Artiles & Kozleski, 2016). The United Nations Educational, Scientific, and Cultural Organization (UNESCO) set forth the declaration stating that every child had diverse sets of needs and that students with disabilities must have access to regular schools and effective, nondiscriminatory education (Artiles & Kozleski, 2016). The hope was that "learning and developmental pathways mediated by socioeconomic status, gender, language, ability level, race, and ethnicity, among others, would be addressed and leveraged in inclusive educational systems" (Artiles & Kozleski, 2016, p. 3). UNESCO has developed inclusive policy actions across various areas of concern, one being teacher education (Forlin & Sin, 2017). UNESCO recommends pre-service and in-service professional development (PD) in teaching strategies and materials for students from diverse populations, including the use of individualized, strengths-based instruction (Acedo, 2011).

Prior to the Declaration of Salamanca, though, the U.S. had already begun a trajectory toward inclusivity through civil rights movements and through disability policy, such as the Rehabilitation Act of 1973, Public Law 94-142: The Education of All Handicapped Children Act of 1975, later renamed Individuals with Disabilities Education Act (IDEA) in 1990, and the Americans with Disabilities Act (ADA) in 1990 (Artiles & Kozleski, 2016; Lawrence-Brown, 2014; Rapp & Arndt, 2012). Section 504 of the Rehabilitation Act of 1973 required federally funded organizations, including schools, to provide equal opportunities to individuals with disabilities (Osborne & Russo, 2007; Rapp & Arndt, 2012). Individuals with disabilities could no longer be excluded from participating or benefitting from programs or activities and must, therefore, be provided with accommodations. Additionally, ADA extended equal opportunity to include accommodations for employment, transportation, government, and more (Rapp & Arndt, 2012).

More specifically to special education, IDEA introduced the concepts of free and appropriate education (FAPE), disability qualifications, LRE, individualized education programs (IEP), and procedural due process (Osborne & Russo, 2007; Rapp & Arndt, 2012). The intent of FAPE was to ensure that schools could not exclude students with disabilities and that students with disabilities were appropriately documented, or labeled, for services. LRE ensured that

students be placed in the most appropriate learning environment for their individual needs, balancing special services with general education, and that students not be segregated from nondisabled peers (Osborne & Russo, 2007). IEPs and procedural due process ensured that parents were included in educational programming decisions and that each educational program was designed specifically for the individual student. (Osborne & Russo, 2007).

Although the intent of these policies was to increase inclusion, the outcome has been a myriad of paradoxes and challenges. Rapp and Arndt (2012) explain that even though IDEA was a positive move toward inclusion, its use of disability qualifications supported a deficit perspective of education, a lack of personnel training, and an LRE continuum. Educators usually envision an LRE continuum where general education lies at the far, desirable, end. Despite general education being a desirable goal, it is often believed that not all students belong there. This mindset follows the mainstreaming perspective in which teachers and other school professionals (e.g., school psychologists) are placed as gatekeepers to programs, such as special, general, and gifted educations, to ensure readiness by perceived standards of normality (Siuty, 2019).

Further, the separation of school bureaucracies makes the implementation of inclusion challenging, especially when each program has its own administration and policies (Artiles & Kozleski, 2016; CEC, 1997; Vasquez, 2023). In this way, policies can counteract each other during implementation, and their original purposes can lead to undesirable outcomes. For instance, general education policy such as No Child Left Behind (NCLB, 2002), which was purportedly designed to help marginalized students, has not been shown to close academic gaps. Rather, the mandate to report student achievement by disability, race, and other attributes, led to unethical diagnosing of disability in hopes of altering school ratings and further increased the disproportionality of students of color in special education (higher rates) and gifted education programs (lower rates, Artiles & Kozleski, 2016).

Although, "within the U.S., inclusive education has been advanced as a reform of special education, a policy mandate that is regulated and monitored by governments, as well as a social movement that is advanced by a variety of advocates and interests," educators most readily

connect the term inclusion to special education (Artiles & Kozleski, 2016, p. 8). Because special education policy compliance carries a certain level of weight at schools and because of the contradictions between policies, most educators are encouraged to focus on complying with the letter of the law rather than the spirit of the law. Rapp and Arndt (2012) stated that "to act within the spirit of these laws means to act according to the intention of those who wrote them. The authors of these laws believed that persons with disabilities deserved equal opportunities, and that they are valuable citizens in the community, in the workplace, and in the classroom" (p. 56). As a result of the constraints listed above, special education and special educators can become mired in paperwork, deadlines, and budgeting issues in order to meet the letter of the law, while inclusive education and inclusive educators focus on meeting the needs of every child in a carefully cultivated learning environment.

Inclusive Education in Practice

The policies listed above have often been adapted, distorted, or have completely lost their original intent when translated to practice. Yet, educators are responsible for implementing policy using the spirit of the law, based on an inclusive ideology. Although there might be some model schools or classrooms where full inclusion is being implemented successfully, the overall climate in U.S. educational systems runs counter to inclusive education. Inclusive education is often seen as a disruption to the status quo and for that reason can be uncomfortable for many educators (Forlin, 2010). The current state of education reflects the contradictory sets of policies and segregated educational programming. Further, a heavy fixation on test-oriented curricula and classroom recitation scripts (e.g., IRE- teacher-initiate, student-respond, teacher-evaluate) has become standard and expected by many administrators and parents alike (Artiles, 2015; Forlin, 2010). These practices, for which teachers have been trained, evaluated, and rewarded for using, run counter to effective instructional strategies for inclusive classrooms. They do not allow for divergence, operate from and promote narrow definitions of normality, and contribute to a classroom culture that prizes sameness (Beghetto, 2013; Sawyer, 2019). Moreover, teachers

who understand the benefit of incorporating strategies for diverse learners are often dissuaded by systemic structures and policies.

Yet, teachers hold a powerful position. Forlin (2010) stated, "without radical educational reconstruction that acknowledges that inclusion while accommodating the needs of diverse students also requires accepting and valuing different outcomes, preparing teachers for inclusion has to rely on developing positive dispositions, providing teachers with a repertoire of skills and strategies and trusting that teachers will be able to implement at least some of these in their classrooms" (p. 250). To that end, the ideology section of this chapter contains a list of strategies that teachers might add to their repertoire of skills. Further possibilities for teacher PL for inclusion could include delving deeper into teacher dispositions on inclusion.

What are teachers' attitudes towards inclusion and how does that affect their current practice? There is a link between teacher beliefs about inclusion and use of inclusive practices, and those beliefs and practices influence the quality of classroom instruction (Mitchell & Hegde, 2007). Research indicates that attitudes about inclusion do not seem to differ much between elementary and secondary teachers (Ross-Hill, 2009), but differences do appear based on a teacher's inclusion experience and special education training. Teacher self-efficacy for inclusion, in one study, increased for teachers having taught inclusion for more than 10 years, but less than 20 years, and for teachers who attended teacher preparation programs requiring more than two special education courses (Lee, 2013). But, in another study, teachers with high levels of education and degrees, not special education or inclusion specific, still felt uncomfortable with teaching students with disabilities in their classrooms (Mitchell & Hedge, 2007).

Other studies specifically examined teacher attitudes pertaining to the inclusion of students with specific disability labels. When studying teacher attitudes about the inclusion of students with autism spectrum disorder (ASD) labels, researchers found that elementary teachers, female teachers, and special education certified teachers tended to have more positive attitudes (Chung et al., 2015). In a study about teacher attitudes towards inclusion of students with social, emotional, and behavioral difficulties (SEBD), results indicated that teachers with

31

positive beliefs and high self-efficacy also had a higher level of willingness to work with students with SEBD using inclusive practices (MacFarlane & Woolfson, 2013). Interestingly, teachers with more experience working with students with SEBD labels tended to have fewer positive feelings and were less willing to work with these students (MacFarlane & Woolfson, 2013).

As evidenced in the above literature, beliefs and attitudes can be influenced in many ways, including by prior training, previous experience, and perceptions of students with certain labels. Because beliefs and attitudes are vitally important to how teachers choose to implement inclusive practices, it is imperative that they are considered when planning for and implementing PL. In the studies described above, hands-on experience in inclusive environments and critical teacher reflection on discrimination, unfair practices, and biased behavior were recommended strategies for increasing positive attitudes about inclusion, which in turn should influence changes in teacher practice (Chung et al., 2015; Mitchell & Hegde, 2007). Additionally, another promising approach is creative learning as a format for PL that is personally and collectively meaningful and creates a safe space for unlearning attitudes and beliefs that do not serve the goal of inclusive education.

Creative Learning

Before considering creative professional learning approaches, it is imperative to first discuss creative learning. Creative learning is posited to occur intrapsychologically and interpsychologically, or in a complex entanglement within a person and between a person and their environment, including other people, animals, objects, histories, and socio-cultural contexts (Beghetto, 2020b; Beghetto & Vasquez, in press). This process begins when a learning stimulus is encountered, which engenders creative openings, possibilities for emergent concepts and ideas that ultimately create new understanding for one or more people (Beghetto, 2020b; see also, Beghetto, 2016). In formal settings, creative learning tends to occur most in classes and trainings that are designed for divergence (Beghetto, 2013; Davies et al, 2013; Glăveanu & Beghetto, 2017). These spaces honor difference, rather than sameness. When the same skills are taught the same way at the same time, the environment becomes convergent. Convergent

learning environments usually result in the teaching of shallow knowledge through deficit-focused instruction (Glăveanu & Beghetto, 2017; Sawyer, 2019, Zhao, 2016). Alternately, the divergent classroom opens itself to many possibilities, not only for learning academic concepts in diverse ways, but by accepting and valuing diverse ways of learning (Sapon-Shevin, 2014). In these learning contexts, it is evident that the more diverse the perspectives shared, the more possibility for creative learning, and the more open to diversity of being and thought, the more students will be open to sharing their diverse perspectives (Beghetto, 2020b).

To better understand creative learning environments, educators can explore 'teaching for creativity' strategies (Beghetto, 2013). When teaching for creativity, teachers guide students in developing awareness of personal insights and in developing various formats for sharing these insights with peers and the greater community (Beghetto, 2013). In this way, learners are positioned as knowledge-creators and generators of new modes of knowledge. Teaching for creativity is an approach that cultivates a learning environment where difference is valued and encouraged.

Scholarly literature notes that teachers are not teaching for creativity, even though they say they value it (Bereczki & Kárpáti, 2018). Many barriers, in the forms of deep structures, ideologies, policies, and practices have already been discussed in this dissertation. Additionally, teacher PL experiences usually do not model the art of teaching for creativity. This art has also been called disciplined improvisation or guided improvisation (Beghetto & Kaufman, 2011; Sawyer, 2019). Through guided improvisation, a teacher learns to balance the need to cover material with their students' needs for engagement and meaningful connection-making as well as to balance lesson planning with the flexibility needed for lesson implementation (Beghetto & Kaufman, 2011). Sawyer (2019) explained:

> I call this pedagogy *guided improvisation* because the students engage in open-ended activities, where they have freedom to improvise their own path through the material. But their actions aren't completely free and unconstrained. Student action is guided by

structures, called *scaffolds*, that guide student knowledge construction toward curricular

goals, while teaching the knowledge that they need for creativity. (p. 35)

Educators at all levels and settings can learn to design creative learning environments using guided improvisation, where students have the flexibility to learn material in engaging and personally meaningful ways. It is important to note that this is not an environment that is chaotic and unstructured, but an environment with carefully designed enabling constraints that set the parameters for learning. The students, though, are not the only ones moving improvisationally through their learning path; the teachers are also improvisationally responding to the movement in the learning event. Sawyer (2019) stated, "…learning is most effective when the teacher improvisationally responds to each student's needs in each moment" (p. 36). With this kind of teacher guidance, students, who all come to the classroom with differing backgrounds, identities, and modes of perception, can chart diverse paths to creative knowledge.

Creative learning environments could be developed through guided improvisation and by educator attunement to creative openings and the possibilities arising from actionable uncertainty. Beghetto (personal communication, May 15, 2022) defined creative openings as "planned or unplanned (micromoment) openings that can result in new and meaningful (creative) contributions to one's own and others' learning." Educators who use guided improvisation have planned yet flexible lessons. When utilizing enabling constraints to frame learning, educators can intentionally plan for creative openings and prepare for micromoments. Teachers who practice attuning to micromoments, then can decide whether to redirect students, effectively shutting down the micromoment, or improvisationally guide students through to creative learning (Beghetto, 2009).

Moving from micromoment to creative learning takes a shift in mind set. Some of these shifts are:

Be open to unusual questions and ideas. Expect to be surprised. Build an environment of

trust and safety. Support students in standing out against conformity. Reward curiosity

34

and exploration. Build intrinsic motivation. Guide students in a reflective awareness of their own assumptions…Require students to generate lots of ideas, not only just one right answer. Give students time to think and time for incubation. Encourage risks and support mistakes and failure… (Sawyer, 2019, p. 36)

Educators who take on this mindset accept and deal with uncertainty. What might a student say or do in a more flexible setting? How much time will be 'lost' exploring or making mistakes? What might happen when a student is encouraged to not conform? Although uncertainty can feel uncomfortable, it can also be generative. With guided improvisation practice, uncertainty can be perceived more positively as a feeling of possibility (Beghetto, 2017).

Actionable uncertainty, "… a state of doubt that rises to a level of awareness whereby we find ourselves at an impasse *and* feel the need to explore and enact new possibilities," is often experienced by educators who teach for creativity through guided improvisation (Beghetto, 2020a, paragraph 4). Educators who teach for creativity through guided improvisation find themselves dealing with actionable uncertainty often. Additionally, students who learn through guided improvisation also experience actionable uncertainty. Individual and collective responses to actionable uncertainty determine whether a micromoment will lead to creative learning.

Professional Learning

Creative learning and its precepts and strategies are not reserved for young students, but also have important implications for teacher PD and the teacher-learner. Relevant literature on effective teacher PD, PL for inclusive education, and examples of creative professional learning for inclusive education comprise the following sections of this chapter.

Effective Teacher Professional Learning

Professional development (PD) and professional learning (PL) are terms often used interchangeably, but some scholars differentiate between them by defining PD as a passive activity and PL as "interactive, sustained and customized" activity (Scherff, 2018). Alternately, Darling-Hammond and colleagues (2017) described PL as happening within PD. They stated that

35

PD is "structured professional learning that results in changes in teacher practices and improvements in student learning outcomes" (p. v). In this dissertation, PD usually refers to an organized program and PL refers to the learning that occurs or might occur.

Darling-Hammond and colleagues (2017) further deduced the prevalent features of effective PD by reviewing 35 studies that linked PD to practice and student outcomes. According to this report, effective PD incorporates active learning, supports collaboration, offers feedback and reflection, is of sustained duration, and includes the use of models for effective practice, coaching, and content focused learning (Darling-Hammond et al., 2017). These features of effective PD are also mirrored in Dunst and colleagues' (2015) metasynthesis of 550 teacher in-service studies. For those studies that showed improvement in teacher and student outcomes, effective strategies were found to include active, authentic teacher learning experiences, opportunities for teacher reflection, coaching, feedback, and extended follow-ups. Therefore, PL through active, reflective, collaborative, and sustained methods has been shown to be more impactful than with didactic, decontextualized PD.

Many of the listed effective strategies for teacher learning are often incorporated into PLCs. While participating in a PLC, teachers are "active collaborators within a supportive and understanding team" (Forlin & Sin, 2017, p. 10, see also Mathur & DiGangi, 2016). Teachers not only receive support, but also provide guidance to others during PL experiences. It is important that PLCs have adequate resources, follow a coherent set of practices, and are responsive to both teacher and student needs across varied learning contexts (Darling-Hammond et al., 2017). In this way, PLCs support educational transformation that begins with teachers and their immediate contexts (see Mathur & DiGangi, 2016).

The PLC model has often been implemented at individual school sites but can be effective beyond school settings as well (Forlin & Sin, 2017). These PLCs can be structured around networks for connecting teachers based on content area or shared concerns and can occupy a 'third space,' which is not fully at a university or within a given school or district but operating as a fully autonomous site (Darling-Hammond et al., 2017).

36

Professional Learning for Inclusive Education

The effective PD strategies listed in the last section have been found to increase teacher and student learning, but they are not specific to inclusion or the ideology-policy-practice gap in inclusive education. Additional strategies for inclusion-specific concerns must also be addressed because "as classrooms become more heterogenous teachers require different skills and pedagogies if they are to ensure that all students are able to access the curriculum" (Forlin, 2010, p. 5). While inclusive education tends toward interdisciplinarity and a blending of differences, the 'educations' keep siloed beginning with pre-service training and on to physical classrooms, administration, and PD (Forlin, 2010, Kurth & Foley, 2014; Rapp & Arndt, 2012).

This separation causes multiple challenges. Teachers come from a variety of backgrounds and experiences, including from teacher preparation programs with a wide range of foci and pedagogies. Although some programs have moved to dual certification for special education and general education and may even include field placements in inclusive classrooms, many teacher education programs continue to operate separately. Additionally most general education pre-service teachers are required to take only one or two courses in special education (Allday et al., 2013; Kent & Giles, 2016; Kurth & Foley, 2014; Oyler, 2011). Because of the historical separation between special education and general education, many pre-service teachers have also had few interactions with individuals with disabilities in their own schooling experiences (Rapp & Arndt, 2012). Furthermore, both pre-service and in-service special education training is typically from deficit-focused perspectives.

Therefore, it is very important for ongoing in-service teacher PD to include, not only special education information, but ongoing formal and informal experiences with and discussions about disability and inclusive learning environments. Consequently, Forlin (2010) proposed that all faculty be included in PL experiences to:

> …encourage a deeper questioning of normative assumptions in relation to the purpose of education in each curriculum area. It would also allow the new demands for knowledge

37

to be articulated within a wider debate about societal and political commitments to education in order to provide more equitable educational opportunities for traditionally disadvantaged groups. (p. 8)

Three societal and political educational issues that must be addressed when planning for inclusive education PL are relevant to this discussion. First, inclusion advocates must consider who has the privilege to become a teacher. Teacher education programs have admissions requirements and selection processes, and like all programs in higher education tend to work on foundations built around privilege, entitlement, and elitism (Forlin, 2010; Rock et al., 2016). One example is the low rate of people of color entering the profession (Rock et al., 2016). Additionally, only 4.6% of U.S. preschool to post-secondary educators have disabilities/are disabled compared to 26% of all U.S. adults (Bureau of Labor Statistics, 2016; Centers for Disease Control and Prevention, 2018). Students who have been admitted to teacher preparation programs, have graduated, and have obtained a teaching position have also, most often, personally experienced segregated schooling, meaning that they grew up with and were educated with students who are mostly like themselves. They have had limited experience with diversity (Rapp & Arndt, 2012).

Second, inclusion advocates need to consider who is included in inclusive education. Some schools might include only students with disabilities who can 'function' with few accommodations in the general education setting, others will include students with any disability and level of need for accommodation or modification (Jung et al., 2019). Furthermore, what began as an education for students with disabilities initiative, has expanded to include all marginalized students (Sapon-Shevin, 2014).

Inclusive education, while initially focusing on providing for students with disabilities in mainstream schools, now encompasses a much broader definition that refers to all children who may have been historically marginalized from meaningful education, who come from varied multicultural and multi-diverse backgrounds, or who are at risk of not achieving to their potential. (Forlin, 2010, p. 4)

38

Moreover, from an intersectional approach, it is important to acknowledge the intersectional social identities of students, meaning that a student with a disability is defined by more than the disability; their experiences are also defined by gender, race, and other identities that cannot be separated (Artiles & Kozleski, 2016; Sapon-Shevin, 2014).

Third, advocates must consider when and where PL occurs. Most PL is assumed to occur during teacher education programs, post-degree courses, or planned school and district in-service trainings (CEEDAR, n.d., Swift Education Center, n.d.), but there is much informal, unplanned learning that occurs daily between colleagues and between teachers and students (Forlin, 2010; Grosemans et al., 2015). This unplanned learning occurs within the context of daily practice and is shaped by the school and classroom cultures.

Additionally, because informal learning occurs, it is important to think about teacher perceptions and attitudes as these will direct the kinds of practices teachers will pick up from others. A positive teacher attitude towards students from marginalized groups is key for successful implementation of inclusion and those attitudes can be affected by engaging with diverse people, including people with disabilities and self-advocates (Forlin, 2010; Mitchell & Hegde, 2007; MacFarlane & Woolfson, 2013). PL for inclusive education should use non-threatening, values-based approaches for reflecting on personal beliefs and values about diversity, for developing empathy by engaging with diverse people in authentic situations, and for overcoming prejudices formed due to a lack of understanding or experience (Forlin, 2010, McLeod et al., 2020).

Examples of Creative Professional Learning for Inclusive Education

Although inclusive education has often been considered supplemental to school PD agendas, there are several examples of models that support teachers in transforming learning environments for inclusivity (CEEDAR, n.d.; Wei et al., 2010). For example, Action Research (AR) and Collaborative Inquiry (CI), as in-depth, ongoing and practitioner generated, are impactful models for inclusive education PL (Deppeler, 2010; Song, 2010). Other innovative models and

strategies include the inclusive pedagogical approach in action (IPAA), creative learning (CL), problem-based learning (PBL), the incorporation of students into teacher PL experiences, and online disability discussions (Ashman, 2010; Brennan et al., 2021; Davis, 2013; Jones, 2010; Kaikkonen, 2010; Sin et al., 2010). Some of these formats are highlighted in this section because they not only demonstrate some of the features of impactful teacher PL experiences but might also offer solutions to the problem of an ideology-policy-practice gap in inclusive education.

First, AR is a cyclical, practice-based research model that has been shown to improve teacher practice and student learning especially when including critical self-reflection for inclusion teachers (Song, 2010). CI is considered one form of AR and has been found to support teachers in understanding, articulating, and making changes to their own practice, leading to positive impacts on student learning (Deppeler, 2010; see also, Svendsen, 2020). Successful CI relies on effective teacher collaboration and willingness to engage in direct study of the challenges they face in their teaching positions (Constantinou & Ainscow, 2020). In CI, teachers work together to decide on a problem of practice, then follow a research cycle comprised of three steps: gathering evidence, discussing evidence collaboratively, and investigating practice (Deppeler, 2010). During CI, teachers "…encourage and support each other; they build a sense of identity and belonging that profoundly impacts school culture; they become increasingly efficacious; and they accept greater responsibility for more effectively confronting educational challenges" (Adams & Townsend, 2014).

Another collaborative and practice-based approach to teacher learning uses the inclusive pedagogical approach in action (IPAA), which supports teacher examination of their own attitudes, assumptions, and pedagogy (Brennan et al., 2021; Florian & Spratt, 2013). Using the IPAA framework, teachers assess whether they believe in transformability, which is the belief that capacity to learn is flexible and not pre-determined, whether they feel able to teach students with disabilities (i.e., teacher efficacy), and whether they believe that learning difficulties are teacher problems to solve rather than student problems (Brennan et al., 2021). The goal of IPAA is to support teachers as they develop and "implement teaching approaches in a way that avoids the

exclusion of any learner" (Brennan et al., 2021, p. 1543). This is a challenge when classes contain complex learner variability. IPAA is a tool that can be personalized for a specific classroom yet utilized reflectively and collaboratively in PLCs.

The CREANOVA was another example of PL for inclusive education where collaboration was paramount. This project, implemented in Scotland, Spain, Finland, and Italy, developed diverse and creative learning environments for PL through multi-professional collaborations (Davis, 2013). Children and adults from various child services related professions were co-learners in these creative learning contexts. Through collaborative experiences, barriers between professions were broken, standardized approaches were questioned, and inter-relational problem-solving approaches were developed. Collaborators used storytelling, entrepreneurship, and other creative ventures to connect diversity and tolerance to creativity and innovation (Davis, 2013). Using creative learning strategies in this manner made both formal and informal PL possible for school professionals who questioned the power dynamics in various teaching/learning pedagogies. Davis (2013) stated, "This research has suggested we need to create local forums for dialogue between children, parents, schools, health, social work and other services" so that they can work together to "develop flexible and creative solutions" to issues concerning children (p. 13).

CREANOVA was a large-scale example of PL for inclusive education. There are also effective strategies for collaboration and critical reflection about inclusion and teaching practices that can be used in smaller-scale projects. For instance, Sin and colleagues (2010) used PBL with case studies to elicit teacher reflection. "Cases of direct and indirect disability discrimination, disability harassment and disability vilification, for example, are therefore used as workable exemplars to inspire teachers' reflective thinking" (Sin et al., 2010, p. 238). Other researchers used online learning spaces to promote dialogue and critical reflection and to model universal design for learning (UDL) and differentiated instruction (Ashman, 2010; Jones, 2010). In one example, Jones (2010) engaged teachers in online discussions that presented divergent perspectives of disability and special education services. Teachers participating in these

discussions and experiences learned from each other and were able to link ideology to practice. Jones (2010) stated, "such online learning should give teachers the opportunity to develop the skills necessary for informed professional decision making in inclusive LRE and to create learning that allows a balance between individual student strengths, needs and preferences, and core academics" (p. 153-154).

Inclusive education PL should include effective facets for general PD, but should also address teacher assumptions, facilitate learning (and unlearning) of philosophical or ideological beliefs about humanness, teaching, and learning, and extend collaboration and reflection opportunities to include groups of people most impacted by convergent schooling, such as individuals with disabilities and from diverse cultural backgrounds. Designing for creative learning in PL also opens up additional inclusive opportunities for diverse professional educators.

Summary and Implications

This chapter synthesized relevant literature in neurodiversity studies, inclusive education, creative learning, and professional learning. It was necessary to tie in works from each field to begin to understand possibilities and implications for this dissertation on creative professional learning for inclusive education based on the neurodiversity paradigm and with a focus on the study of micromoments. Neurodiversity and inclusive education have rarely been discussed in conjunction with creative learning. Additionally, there has been limited evidence of PL opportunities implemented through the lens of creative learning. These connections could serve as generative for this dissertation and other work for inclusive education PL.

There are several other implications from the literature to discuss as well. First, education structures and practices based on the neurodiversity paradigm rather than deficit-focused paradigms, such as the medical model of disability that underlies special education, are not common in the U.S. or other westernized countries. The neurodiversity paradigm has only recently begun to be alluded to in educational settings. Armstrong (2012) was the first to bring the concept of neurodiversity to preschool to 12th grade school educators just over a decade ago. Neurodiversity discussions for higher education and academia have only recently begun. One

example being a transcontinental webinar series on transforming higher education for neuroatypicality (Bozalek et al., 2021). Neurodiversity has not been widely addressed in education, yet, educators exposed to this alternate paradigm might be better prepared to design spaces for safety and belonging, which are necessary for student learning.

Second, inclusive education practices depend on ideologies and policies, and especially on how they are enacted locally. It is important for educators to have a safe, reflective space to assess personal beliefs and practices as well as the beliefs and practices of the organization for which they work. Moreover, these reflections should extend to the exploration of the alignment between beliefs and practices, personal and organizational. This reflection is critical because attitudes and beliefs play a large role in the development of inclusive educational environments and shifts in these can lead towards intentional change in practice (Chung et al., 2015; Mitchell & Hegde, 2007).

Third, a focus on creative learning shifts the focus from cognitive and independence-oriented perspectives of learning towards the embodied, emergent, inter-relational, and multiple in the learning event. Thinking and learning is viewed as occurring through and between bodies during events that can be planned, but not fully predicted. There are multiple ways to perceive knowledge, intelligence, identity, and development as well as multiple modes for thinking, learning, communicating, and interacting. Learning environments that are designed in these ways encourage movement that is improvisational, yet guided by scaffolded structures (Beghetto, 2013; Manning, 2016; Sawyer, 2019). A shift towards creative learning from a neurodiversity perspective is important because educators can move away from viewing students as having deficits. The focus is then on solving pedagogical problems in learning events, rather than remediating students or learners.

Finally, PL for inclusive education needs to include strategies that attend to the variability in learning needs and modes of the educators themselves. Although educators come from a variety of backgrounds and training programs, the majority are from a set of narrow demographics. Most teachers are white ablebodied females (Bureau of Labor Statistics, 2016;

Centers for Disease Control and Prevention, 2018; Rock et al., 2016). Furthermore, teachers who were educated in school systems have mainly experienced segregated learning environments with peers who were similar to themselves in most ways. There is a need for educators to work with diverse people. For this reason, PL experiences could also include collaboration with diverse non-educators who can speak to alternate schooling realities. Furthermore, inclusive teacher education programs and teacher professional development programs might increase accessibility for neurodiverse individuals to become and remain educators.

Each of these implications have been considered during the design of this neuroplexure, which builds on scholarship in ways less associated with 'filling a research gap' and more associated with envisioning and enacting educational possibilities. 'Picking up' the crafts from various scholars in this chapter and weaving them with the theory and methods discussed in the following chapter produced the unforeseen result of this neuroplexure.

Figure 6 reflects the idea of 'picking up' the crafts, paralleling scholarly literature reviews for grounding new research with the passing down of a craft, in this case weaving. Studying with online instructors, I was able to learn several foundational weaving skills as well as experiment with various techniques.

Figure 6

Picking Up the Crafts to Create Something New
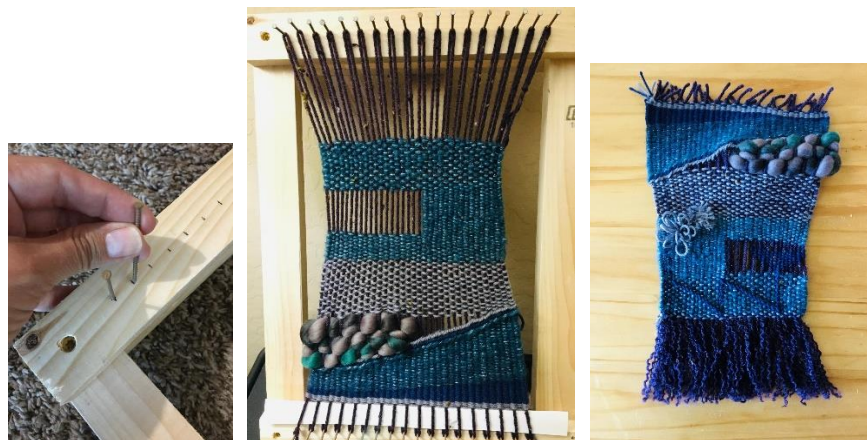
THEORY AND METHODS

In this dissertation, the conceptual framework acts as the loom, or structure, that holds the neuroplexure's shape and focus, while the methodology describes the patterns of enabling constraints used to design interactions for creative learning. For example, when preparing to create with yarn, floss, or thread, the crafter must position a structure to hold the fabric in place. In weaving, the loom provides structure, in shape and tension, as the tapestry or rug is being made. In embroidery, the hoop holds the cloth in place, enabling crafters to embellish without losing their grasp on the project. In crochet, the hands and hook offer the necessary tension lest the spacing become too loose, too tight, or inconsistent. In this neuroplexure, the conceptual framework incorporates various scholars' work in interplay. The structure of these interacting theories and concepts acts as the loom that holds the neuroplexure's shape and focus. Furthermore, this chapter provides the necessary tension(s) for the creative production of practical and theoretical developments for creative PL for inclusive education.

The second part of this chapter will then describe how the pattern for research was designed and how the enabling constraints to begin this work were defined. When crafting with fiber arts, or even sewing a garment, one might follow a purchased or borrowed pattern to produce an expected tapestry or garment. This would be efficient for what the weaver/seamstress needs. But because of the onto-epistemological assumptions of this study, there is not one expected outcome or product. There are the fibers, the structures (e.g., loom), the craft and crafters, yet no predetermined pattern. In this case, the pattern emerges through iterations, goes off on tangents, doubles back, and moves with the assemblage of the micromoment study. The intent is not to produce something that is reproducible, but to experiment with enabling constraints in specific contexts that can lead to revealing multiple modes of knowledge and that continue to perform change/transform inclusive education. Therefore, this chapter will begin to describe the enabling constraints that were part of the early pattern design for this neuroplexure. Later, Part II of the dissertation will expand further on methods while describing the research-creation as it unfolded.

Figure 7 demonstrates the structure and pattern discussed in the above paragraphs. Here, the hand provides the structure and tension, while the over-under, back and forth pattern is used to create a finger knitted band. This parallels the neuroplexure structure and pattern that will be described in this chapter.

Figure 7

Theory and Methods: Structure and Pattern

A brief description of the conceptual framework for this dissertation was presented in the introduction (See Figure 4). Therefore, the first half of this chapter delves deeper into the concepts and outlines several aligned onto-epistemological assumptions. These concepts and assumptions created the structure for the neurodiversity-inspired education perspective and the conceptualization of micromoments in inclusive education, also described here. The second half of this chapter includes explanations and justifications for the chosen methodology as well as more in-depth descriptions of the initial methods.

Post-Oppositional Transformation Approaches to Social Justice

One side of the conceptual framework for this study is constructed from the main tenets of post-oppositional transformation approaches to social justice, which requires the development of a post-oppositional consciousness. Prior to delving into these tenets, it could be helpful to review Keating's (2013) presuppositions. To begin developing a post-oppositional consciousness, one first accepts that: "social injustice exists… our educations have been biased… blame is not useful, but accountability is… we are related to all that lives… categories and labels shape our perception… people have a basic goodness" (Keating, 2013, p. 194-195).

Individuals from Western cultures have grown up in communities that operate from an oppositional consciousness. "Oppositional consciousness represents a binary either/or epistemology and praxis that structures our perceptions, politics, and actions through resistant energy- a reaction against that which we seek to transform," stated Keating (2013, p.2). Keating (2013) further explained that people are so saturated in this oppositionality that it becomes status-quo and limits their ability to imagine a new way of being, living, and learning.

People operating from an oppositional consciousness become overfocused on conflict based on categories. At the most basic level, people separate their "selves" from all others and society overall in the pursuit of self-reliance, independence, and even safety. Some of this separation occurs through narrow definitions for difference and identity which reduce the potential for seeking commonalities, or "complex connections" (Keating, 2013, p. 4). This way of thinking "posits a distinct separation between human beings and reality, divides this reality into discrete parts, and defines truth in narrow, rigid terms" (Keating, 2013, p. 6). Furthermore, this essentialist epistemology creates divisions at multiple levels, including between mind, body, and spirit. These divisions have implications for education and the labeling required to receive appropriate services.

These divisions also lead to a hierarchizing of humanness often related to a (white) supremist worldview in which there is "an overreliance on rational thought, scientific empiricism,

and hierarchical binary thinking that creates a restrictive framework that labels, divides, and segregates based on socially defined difference and sameness" (Keating, 2013, p. 36). Evidence of this restrictive framework and hierarchizing can be found in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition which is used to diagnose individuals with mental (and educational) disorders and, in some cases, to define degree or severity of disorder (American Psychiatric Association, 2013). Moreover, *disorder* refers to deviance from a defined human norm, implying a less-than-human state. As disability scholar Dan Goodley (2021) wrote, "put simply, disabled people struggle to be recognized as human in contemporary society" (p. 26).

In Western cultures, a supremist[3] worldview is also aligned with ableism and neurotypicality based on a mono-thinking or mindset for convergence (Beghetto, 2013; Smagorinsky, 2020). Assimilation into these cultures, often beginning at birth, can prevent people from noticing commonalities. They "impose unity and demand "mono-thinking" from members" (Keating, 2013, p. 94). Additionally, the status-quo stories passed between community members reinforce the belief that there is no way to change current systems and practices.

While some might accept the status quo, others are willing to work against injustices. Yet for those working towards social justice who remain within an oppositional consciousness, the road is often paved with conflict, antagonism, and reactivity, as evidenced in the usage of terms, such as fight, dismantle, and challenge. Activist scholars can feel "stuck" and unable to imagine alternatives to the systems in place resulting in internalized oppositional approaches, which are even used with other activists who are working towards the same goals (Keating, 2013).

Alternately, people who have developed a post-oppositional consciousness eschew divisions and acknowledge that they are connected to all that exists. Beginning with radical interconnectedness means one must accept paradox and contradictions and desire to be radically inclusive by seeking commonalities and alliances for social change. Post-oppositional activists extend invitations to engage in collective work towards social justice. Their goal is to

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[3] Keating (2013) explained that whiteness does not refer to a person, but a consciousness. I also refer to neurotypicality here as a consciousness or worldview, rather than an identity.

invent strategies for social change that do not get stuck in an us-against-them mindset (Keating, 2013). From a post-oppositional consciousness, one recognizes that a person is neither solidly in one group nor another. This requires a redefining of identity and humanness.

Keating (2013) described transformational identity politics as necessary for post-oppositional theories and explained the need for pushing the boundaries of identity politics beyond the space of intersectionality. Intersectionality insists on "examining the dynamics of difference and sameness" and plays a "major role in facilitating consideration of gender, race, and other axes of power in a wide range of political discussions and academic disciplines" (Cho et al., 2013, p. 787). Cho and colleagues (2013) further explain that intersectional ways of thinking can problematize sameness, difference, and their relation to power while also perceiving categories as fluid and co-created by changing power dynamics. This shift towards a complex understanding of identity was a positive move toward inclusivity, but there has been a tendency with some intersectional work to reinforce status quo stories. When limiting intersectionality to labeling similarities and differences it retains an oppositional consciousness and these "contemporary uses of identity politics have become too oppositional to effect radical change" (Keating, 2013, p. 21).

Keating (2013) noted that several women scholars of color have generated commonalities by making connections through difference, using radical interconnectedness, and by listening with raw openness. Therefore, it is possible to seek and find commonalities through differences because "differences are not in themselves *divisive*. Rather, it's our limited definitions of difference as deviation, coupled with our refusal to openly acknowledge, examine, and discuss our differences that divide us" (Keating, 2013, p. 44). Finding commonalities can occur by recognizing parallels between the experiences of different people, accepting that there is a gap when attempting to understand another person's experiences, and empathizing with others with the support of one's imagination. In this way, commonalities offer us "another entry into coalition-building and transformation" (Keating, 2013, p. 43).

Neurodiversity and Activist Philosophy

One way to build alliances is through the neurodiversity paradigm, which first seeks commonalities, then celebrates differences within those commonalities. Neurodiversity and activist philosophy, as conceived of by Erin Manning (2013, 2016), make up the next side of the conceptual framework.

Erin Manning (2013, 2016) has, through her study of autistic writers, developed several concepts around neurodiversity, including autistic perception. Autistic perception, the perceiving of environments holistically prior to parsing out individual objects and people, is posited to be an innate tendency to attune to radical interconnectedness for some people (Manning, 2013, 2016, see Figure 8). This way of perceiving the world has a direct effect on "autistic" thinking, which often seems to conflict with normative modes of thinking. For example, a person who senses the world as radically interconnected would be less apt to categorize and use hierarchical structures even though categorizations and hierarchies are usual ways of understanding the world from a neurotypical standpoint. Moreover, the threshold between holistic perception and the parsed world offers a longer, or slower, period of uncertainty and possibility. Manning (2013) has further philosophized about autistic perception while working with autistic and other neurodivergent individuals using activist philosophy.

Figure 8

Autistic Perception: A Radical Interconnectedness Prior to Parsing
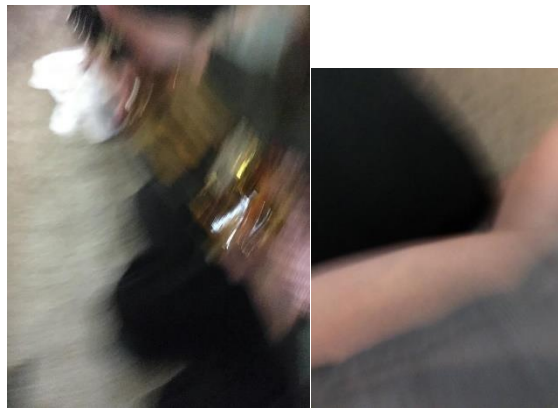
Activist philosophy, as enacted by Manning (2013, 2016), extends on the process

philosophy of Alfred Whitehead (Stengers, 2011; see also Massumi, 2002). Like post-oppositional

consciousness, this philosophy is based on onto-epistemological shifts away from neurotypicality.

Most germane to this neuroplexure are shifts from *being* to *becoming* and from cognitive, rational,

or *brain-based knowledge* to *knowledge (in) formation through experience.*

An ontology of immanence, or of becoming, brings with it a belief that a person is not a

static individual, unchanging, and unaffected by its surroundings, but a complex being-with-others

that shifts and transforms over time, space, and realities (Deleuze & Guattari, 1987). Manning

(2013) further developed this viewpoint by referring to the more-than-human, meaning that

humans are always implicated in assemblages with others, including nonhuman living things and

objects, in shifting socio-cultural settings. Therefore, becoming is an ecological event; it is an

ongoing occurrence within the various ecologies a person inhabits.

Becoming is evidenced in autistic perception and thinking. Knowledge and concepts are

experienced while in formation during the learning event. In this way, knowledge is no longer

perceived as transcendent but immanent and learning is no longer perceived as occurring within

an individual but through relational interactions in the environment (Manning, 2013). Furthermore,

knowledge (in) formation cannot always be consciously articulated. Before a person can verbally

state an idea or explain a concept, knowledge is already being formed. Manning (2013) uses the

term prearticulation to describe this knowing-in-body time. Fellow philosopher, Massumi (2002),

also focuses on the embodiedness of knowledge (in) formation when he discusses sensory

perception and its role in the process. Knowledge (in) formation, then, occurs through embodied

perception, but also through the more-than-human assemblages in the environment during

emergent events (Vasquez et al., 2021).

Activist philosophy further supports these onto-epistemological shifts through its

advocacy for neurodiversity in daily practice (Manning, 2013). Scholars who work from an activist

philosophy are interested most in how an emergent event unfolds to difference rather than in pre-

existing, pre-defined subjects and discourses of normativity (Manning, 2016). Manning (2013)

stated: "Activist philosophy is not a politics yet. It is about the force of the political in its activation" (p. 74). This means that relation in the event comes before any structure, form, definition, or practice. It is the movement in the experience(s) that create shifting formations. Activist philosophy or "a politics in the making depends on generating a movement constellation that activates a singular modality of encounter" and involves "a choreographic practice" (Manning, 2013, p. 75).

Imagine a classroom with all its moving parts. There are students in different parts of the room, a variety of materials on the walls, shelves, desks, floors. A bell rings and everyone shifts in motion toward an event. Maybe it is lunchtime or math time. This movement constellation somewhat converges in an encounter, or event, that has been determined by a choreographic practice. The choreography between the bell schedule, the classroom schedule, the students' and teachers' relationships, and the multiple events prior to this emerging event bring the more-than-human assemblages (e.g., teacher-student-carpet-blocks-bell) to experience something new together. Choreography as this ecological, radical interconnectedness is foundational to an activist philosophy according to Manning (2013), who explained: "Choreography less as that which is generated by the human for the human than a practice that foregrounds how the event itself attunes to a relational milieu that exceeds the human or wherein the human is more ecological than individual" (p. 76).

Furthermore, it is during the event that politics emerge. Politics, here, is "understood as a sustained encounter with the modalities of the in-act," or the movement of the event (Manning, 2013, p. 142). The event itself challenges form (e.g., routine, definition, policy) and there is an attention to possible social injustices as they occur. It is an attunement that encourages more-than-humans to move with the event to "the in-act of worldings yet to come" (Manning, 2013, p. 185). Activist philosophy aligns with Keating's (2013) objective of reimagining possible different realities for social change.

Conceptualization of Micromoments Using a Neurodiversity-inspired Educational

Perspective

Activist philosophy, the neurodiversity paradigm, and post-oppositional consciousness interconnect with creative learning concepts in this neuroplexure to create an educational perspective that reimagines the status-quo stories of humanness, teaching/learning, schooling, and education. This neurodiversity-inspired educational perspective is used to conceptualize micromoments for inclusive education.

Neurodiversity-inspired Educational Perspective

The neurodiversity-inspired educational perspective weaves together the onto-epistemological assumptions of living and learning described in the last sections of this chapter. First, being and knowing are considered multiple and inter-relational. This is exemplified as each person is becoming, with intersectional identities that shift across contexts, and is becoming-with, human and nonhuman others joined in assemblage in each event (See Figure 9). Furthermore, every learning event is emergent in that it does not have a predetermined beginning and end and is comprised of always shifting assemblages (e.g., dog-bowl-food soon becomes dog-bowl-ants). Finally, more-than-humans are entangled in learning experiences through embodied human senses and perceptual interpretations, which guide knowledge (in) formation. This pre-verbal process occurs in and across bodies, beyond the mind. Therefore, the neurodiversity-inspired educational perspective is defined as a perspective for teaching and learning that is based on the concepts of multiplicity, inter-relationality, emergence, and embodiedness. Within each of these concepts are other relevant considerations for education and educational research.

Figure 9

More-than-human Assemblage: Desk-laptop-sketchbook-yarn-Ananí-theory-glue

Multiplicity. Acknowledging a "multiplicity of modes of existence" is essential for inclusive education (Manning & Massumi, 2014, p. 8). Most notably, educators can recognize multiplicity through neurodiversity, asynchrony, intersectionality, and more-than-human assemblages. First, neurodiversity signals a multiplicity of modes for learning, thinking, communicating, and interacting. Within these modes there is also variability. Rose (2016) uses the term jaggedness profile to acknowledge the variability in development across attributes, such as height, weight, intelligence, and emotional aptitude. In education, the term asynchrony is used to describe this multiplicity of human attributes and the uneven development of those attributes (Asynchronous Development, n.d.; Silverman, 2021). Both neurodiversity and asynchrony are normalized within the neurodiversity-inspired educational perspective.

Additionally, multiplicity in modes of existence extends to social spheres. For example, intersectionality is one way to discuss the many, shifting social identities of a person. Intersectionality is especially important when considering how identities are implicated in power dynamics, such as with groups that have been historically oppressed (Sumi et al., 2013). Furthermore, social dynamics also include the more-than-human. People are always entangled in a more-than-human assemblage. Manning (2013) uses the term more-than-human from a

relational standpoint, similar to how Deleuze and Guattari (1987) used assemblage to note that parts of a body are relational and never fixed. From the neurodiversity-inspired educational perspective, intersectionality and more-than-human assemblages are recognized as part of how our world works.

Inter-relationality. For educational purposes, inter-relationality can be further understood through the concepts of interdependence, autistic perception, and co-choreography. Interdependence is integral to the neurodiversity movement and disability studies overall (Goodley et al., 2014; Sins Invalid, 2015). Goodley and colleagues (2014) stated, "One of the most significant contributions of critical disability studies has been the dislodging and deconstruction of the fantasy of ableist human one-ness. Disability demands mutuality, support and interdependence" (p. 353). Interdependence is valued as a collective mutual support in the neurodiversity-inspired educational perspective.

Interdependence can be recognized through autistic perception and the more-than-human. People go through their days with varying recognition of their surroundings and sometimes minimal thought about how they are interacting with other humans and nonhumans. Beginning with a holistic sense of the learning event before zooming in on specific assemblages is key to this perspective.

As people interact with others and assemblages rearrange across time and space, they can become attuned to the environment as various possibilities emerge for new directions, new events, new ideas, new concepts, or new knowledge. Once attuned to the inter-relationality of the learning event, co-choreography is possible. Co-choreography is a term that Manning (2013, 2016) uses for the co-creation process in learning events. Co-choreography is how the assemblages inter-relate and affect each other as the event emerges. For educators, this concept can refer to both the designability of and flexibility in learning events.

Emergence. Emergence is what was already described here as becoming and more-than-human assemblages. Of further importance for understanding emergent learning events, are

the concepts of rhizomatic relationships, transindividuation, and prearticulation. Deleuze & Guattari (1987) described becoming as a process of change within an assemblage that accounts for the ever-changing relationships between parts of the assemblage. A rhizome, as opposed to a root, is used to envision the relationships in a Deleuzoguattarian assemblage because it grows in stops, spurts, short lines, long lines, and in different directions. Rhizomatic relationships do not form hierarchical lines, such as in flow charts or concept maps, but lines, or connections, that are constantly shifting, growing, retracting, connecting, and reconnecting. These relational lines are not solidified identities and facts, but thresholds and potentialities, what might be, what is becoming (Sotirin, 2011).

Manning (2013) referred to this as body-worlding, "a complex feeling-assemblage that is active between different co-constitutive milieus. It is individuation before it is self, a fielding of associated milieus, that fold in, on, and through one another" (p. 2). Milieu denotes an ecology of experience, and more so connotes a sense of 'beginning in the middle,' an understanding that there is no specific point in time or space where experience begins (Manning, 2013). Individuation refers to the emergent process of becoming individual, or a singularity, which is determined by how the event is unfolding (Manning, 2013; 2016). But because of the entanglement of assemblages in an event, the process of becoming individual is always also transindividual, or collective (Manning, 2016). Transindividuation happens in the emergent learning event, which in its tenuous becoming, is always at the threshold between actual and virtual realities; those currently being perceived and those immanent to the moment.

Furthermore, knowledge also forms, or becomes, through these collective processes in non-predetermined events. Manning (2016) explained that there is a "different kind of knowing, a knowing in the event, in nonlinear event-time, a knowing that, while impossible to parse, delights in the force of conceptual invention" (p. 24). This knowing often occurs at the juncture where non-conscious and conscious co-compose. In this space, there is a feeling that "opens the event to the as-yet-unthought" (Manning, 2016, p. 36). Through thinking-feeling, there is a nonconscious recognition, and through this experience a preverbal knowing emerges (Manning, 2016). This

beyond verbal expressibility kind of knowing can be called prearticulation and can be further described as a feeling-sensing-tip-of-the-tongue conceptual becoming (Manning, 2013). Epistemological emergence is as valued in neurodiversity-inspired educational perspectives as typically articulated knowledge (e.g., written and spoken).

Furthermore, within this perspective, there is no presumption that there will be one final, correct answer to a question or view on a topic, or even that a learning experience must begin with a question at all. There is no one way to learn and no definite learning objective accomplished by all at the end of a prescribed period. Rather, through the expectation of emergence, one can anticipate multiple, possibly surprising, and creative directions for a learning event.

Embodiedness. Lastly, the neurodiversity-inspired educational perspective acknowledges embodiedness in teaching/learning. Two further concepts that underly embodiedness for inclusive education are the bodymind and thinking-doing. The bodymind is a term used by the disability community as a way to declare the limits of the mind/body dichotomy, which has been a neurotypical view of human life (Price, 2015). As mentioned, dichotomies, categories, and hierarchies, though prevalent in neurotypicality, are replaced with a holistic worldview in neurodiversity. A bodymind ontology connects human perceptual experiences through learning that is a thinking-doing.

In this way, knowing and thinking are intricately involved in movement and feeling (Manning, 2016; Massumi, 2002). Because there is no discrete separation of mind and body or thought and action, thought usually emerges with/through movement. To thinking-doing, Massumi (2002) brings the concepts of thinking-feeling or sensing. For example, viscerality, or interoception, is the sensing that is immediately registered from the five senses, but not logically processed toward thought, and proprioception is the sensing of the relationship between body parts through the muscles and ligaments. These senses are usually considered inner-body and unimportant to formal learning but are implicated in everyday interactions, including learning.

57

Learners, becoming-with their ecologies, are always sensing, perceiving, thinking, feeling, doing as they learn together.

Neurodiversity-inspired educational perspectives recognize embodiedness as integral for teaching/learning. Manning's (2013) description of autistic perception represents only one mode of embodied knowing. Educators could develop attunement to the innumerable, neurodiverse ways in which learning environment interactions might occur through sensing, perceiving, thinking, feeling, and doing in and between bodies.

Conceptualization of Micromoments in Inclusive Education

A neurodiversity-inspired educational perspective creates a convergence between post-oppositional consciousness, activist philosophy, and the neurodiversity paradigm and is outlined for use in educational spaces. Initiating teaching and researching by focusing on learning events that are perceived as multiple, inter-relational, emergent, and embodied shifts teacher and researcher views in several areas, including identity, ability, and teaching/learning. In this section, the neurodiversity-inspired educational perspective will also expand on current conceptualizations of micromoments for use in inclusive education.

First, micromoments and creative learning can occur anywhere and involve anyone. Yet, current micromoment conceptualizations and inclusive education both often function within neurotypical schooling frameworks. The micromoment, then, tends to be viewed as the result of teacher-student or student-student academic interactions, and when occurring in inclusive settings, can be misconstrued as a compliance issue based on behavior or ability.

Furthermore, although intellectual and artistic creativity in neurotypical settings might be viewed as a collaborative endeavor that is enhanced by multiple perspectives, the resulting collaboration is rarely inclusive. In practice, collaboration in inclusive environments is between like-status professionals (e.g., special educator, general educator, and therapist) and not usually between all people, including students and parents, or between people and the nonhuman environment (Davis, 2013; Jung et al., 2019). Moreover, collaboration from an intersectionality

perspective, can sometimes carry the feeling that 'we' privileged people, whether it be race, status, education level, and/or ablebodiedness, will accept 'you' underprivileged people into 'our' space, implying that 'you' have, therefore, been included (Moore, 2016; Sapon-Shevin, 2014).

Instead, the neurodiversity-inspired educational perspective expands inclusive education to include the more-than-human, the dynamic, the fluid, the emergent. Creativity, then, is no longer viewed as intellectual or artistic ability produced by a person or by a group of people with specific attributes and creative learning is understood to emerge during/in/with learning events. Further, the creative learning event, as a shifting of more-than-human assemblages, occurs while connections are made and unmade during/in a vaguely constrained time-space. During these rhizomatic relationships, difference is produced, or stated differently, and new concepts become. Additionally, during these creative openings, the people involved need to process emotions, likely including surprise and uncertainty.

In an educational setting, the teacher, as learning space designer and experience facilitator, can attune to the creative micromoment. Because the event is not defined to a particular time or space, it has already been shaped by enabling constraints (e.g., locations, activities, directions, classroom routines) as well as various levels of flexibility (e.g., possibilities for how to work within these constraints) as the event is emerging. Here, educators can further design enabling constraints that allow for movement within the ever-shifting context of the event. The possibilities in this shifting event work themselves out through improvisational thinking and doing when given room for experimentation and the flexibility to follow various trains of thought. But because micromoments happen quickly, they can be missed, ignored, dismissed, or noticed (Beghetto, 2013). Noticing, or attunement to, micromoments can lead to the co-choreography, or co-designing of the learning event using a kind of guided improvisation (Manning, 2013; 2016; Sawyer, 2019).

Figure 10 depicts a micromoment using the neurodiversity-inspired educational perspective for inclusive education. There are several assemblages converging and disassembling during a learning event. In this depiction, a surprising event was attuned to by a

couple of more-than-human assemblages. Because the micromoment, whether an off-tangent

idea, a question, or misunderstanding, was engaged with, multiple directions for possible creative

learning were opened (Beghetto, 2016). Although there is still a need to manage uncertainty,

there could be a preliminary sensing of the ideas or concepts that are emerging from the creative

opening as well as a movement from prearticulation to the verbal articulation of what was learned.

It is important to note that Figure 10 is very simplistic because there would be many assemblages

shifting, and possibly, many creative openings occurring within this one snapshot in time and

space.

Figure 10

The Micromoment
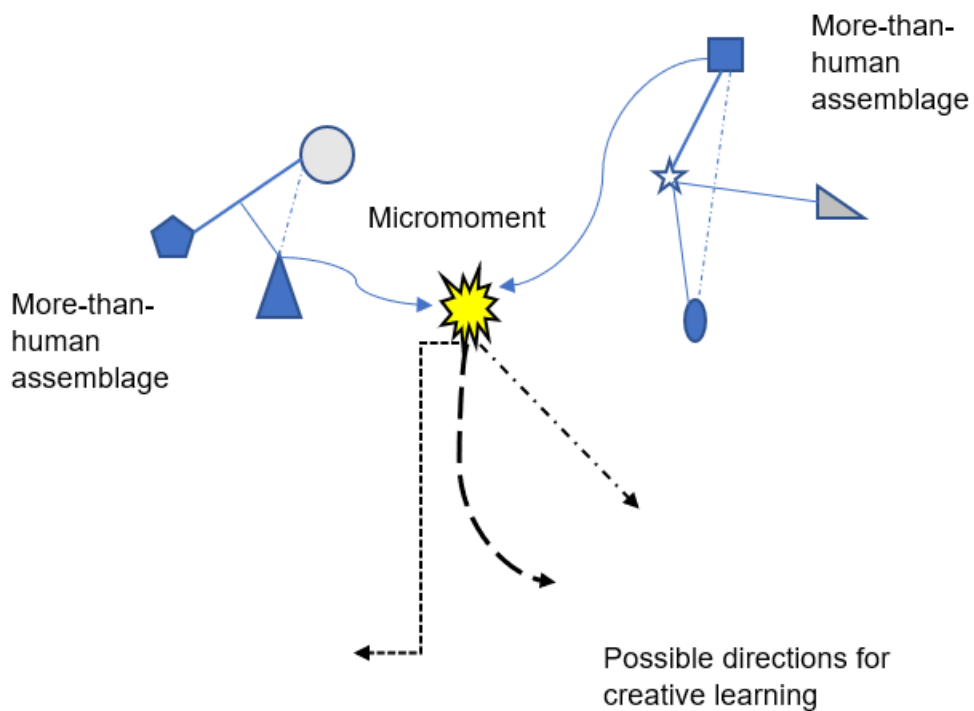
A practical example of a micromoment from a Google search was cited in Vasquez

(2022): "In one example found online, the task is to name six animals that live only in the Arctic. A

student answers, "two polar bears, ~~three~~ four seals." Student-six-Arctic-animals is foregrounded

here" (p. 160). In this example the foregrounded more-than-human assemblage is indicated. The educator was attuned to this assemblage and the surprising answer that was given. From this point, the learning event could move in various directions. The teacher might correct the student, delve deeper into what the student was thinking, or even build from the student's idea in future lessons.

Creative learning from neurodiversity-inspired educational perspectives in inclusive education has several implications. If learning does not occur in human brains, then the categorization of humans by brain-based attributes is not necessary. Teaching using certain methods for the child with autism, other methods for the child with ADHD, and other methods for the child with giftedness also does not work (Armstrong, 2012; Jung et al., 2019). Additionally, it is no longer the educator's job to 'fix' the child or 'treat' the child's mind. The focus then turns to adjusting the learning environment. To make a learning environment more creative, the learning environment designers (usually teachers), might practice attunement to micromoments and co-choreography during emergent learning events.

Implications for Methodology

In alignment with the neurodiversity-inspired educational perspective, this neuroplexure is a study of micromoments in emergent, creative learning events. Because of this focus, research was not done to or with people, but was a collective study of the assemblages during/in/with the event. The onto-epistemological shifts in this neuroplexure's conceptual framework required different conceptions of the research subject and data.

The subject of this neuroplexure is not a person or phenomena, but an emergent event and its related assemblages. The micromoment is the subject of research, the "what" that emerged during/as the event rather than that which instigated the event in the first place (Manning, 2016). "Instead of a pre-composed subject standing over and above the event, overshadowing the movement, we have a vying commotion of co-activity" (Manning & Massumi, 2014, p. 14). In this commotion, there is a foregrounding and a backgrounding of assemblages

and parts of assemblages, a "multiphasing process of individuation," as the event unfolds (Manning, 2013, p. 24). During an event, though, there are points where "All indeterminacy is consummated. *The many have become one…*" (Stengers, 2011).

Returning to the neurodiversity-inspired educational perspective and the discussion on transindividuation, one is reminded "that every event is a node of activity that is intensively relational…these are but passing points of contact, expressive culminations in a wider process of transindividuations; in the complex phasings and dephasings of life-living…" (Manning, 2013, p. 25). Therefore, in this neuroplexure, the subject is event, and the event is transindividual. There is less distinction between researcher and participant that usual, in terms of knowledge creation. Each individual might take on different roles (e.g., facilitator, designer, lure, interviewee) within the assemblage, but knowledge emerges collectively as the neuroplexure unfolds.

Similar to the shift in understanding research subject, data is experienced as experiential and relational across time, space, and reality (Koro-Ljungberg et al., 2018). Data are dynamic as "…matter and discourse are coimplicated in complex and shifting arrangements from which the world emerges" (Koro-Ljungberg et al., 2018, p. 469). Different assemblages using different modes of perception and interaction encounter different knowledge in formation. The more diverse modes, the more diverse forms of knowledge might be explored.

Because data is processual and tenuous, it is difficult to capture, or document. Koro-Ljungberg and colleagues (2018):

> …suggest that data may manifest as an event in which data, theories, writing, thinking, research, researchers, participants, past, future, present, and body-mind-material are entangled and inseparable. Data never stop but they may begin to vanish and disappear once one thinks data have arrived or one has arrived to data. (p. 479)

Above it was noted that subject was event, and here it is suggested that data may also manifest as event. If event is transindividuation, a moment of coalescing of assemblages, then it could be said that data are manifestations of event assemblages as well.

As so, data are elusive and resistant to containment. Yet, they are active and always already entangled in the event, which makes it possible to pluck them out of sequence, or quasi-capture them for 'study' (Koro-Ljungberg et al., 2018). Quasi-captures function much like snapshots that capture only a partial reality of a moment in time and space or a memento that is kept to remember an occasion. It is important to note, though, that once documented, data has already shifted in its process of becoming and has become something new. Additionally, once data is experienced through documentation by someone new, they will again have already shifted. In other words, "… data cannot be anchored "in" linear space and time" (Koro-Ljungberg et al., 2018, p. 469). Therefore, a researcher must first consider at which points, or moments, data could be quasi-captured, and when quasi-captured, which from a wide range of tools, strategies, and forms of documentation should be utilized.

Cues, cuts, and choreography, which denote where and when attention is garnered in event-focused studies, are important for the quasi-capture of data (Manning, 2013). A cue is an event trigger, a sensory signal that serves as an enabling constraint for movement. "Cues transform the movement of the collective into a collective individuation, making felt the relational weave of the dancing surface as it unfolds" (Manning, 2013, p. 105). Cues occur at the intervals between what has past and the event's possible future directions. Manning (2013) said, "Moving through cue is landing decision" (p. 105). Decision is not human intention, but the cut that the experience is singling out. In this way, cuts can be said to be thresholds between events, as they become next events. There is never a full stop or ending, only a shifting. Moving through events, these decisional cuts are encountered where "new ecologies, new fields of relation are crafted" (Manning, 2016, p. 19). It is when attuned to cues, cuts, and collective movement that the researcher can enter the choreography of the event. "The choreography of collective movement is made possible by the interrelation between the intervals the movement creates and the collective capacity to cue and align to them, in the moving" (Manning, 2016, p. 120). Therefore, the quasi-capture of data could occur at the intervals as well as during the choreography.

63

The conceptual framework and its implications for research were considered during the design, or patterning, of the neuroplexure. The second half of this chapter contains an explanation of the methodology of the neuroplexure, including data-weaving, while specifically attending to Manning's (2013, 2016) call for research-creation, a co-composing with event through cues, cuts, and choreography, and Koro-Ljungberg and Knight's (2019) call for methodological-poly-experimentation, experiments that engage multiplicity and plurality.

Neuroplexure

To address the research questions and align with the conceptual framework, this neuroplexure was designed as a research-creation that utilized invitations to methodological-poly-experiments as cues for engagement. The main research questions called for a study of movement in the event of the micromoment when asking, how might micromoments move in/with/through emergent learning events? And, how might attunement to micromoment (more-than-human) assemblages be developed? The secondary research questions asked how the work in this neuroplexure might transform inclusive education PL and qualitative inquiry.

The methodology of research-creation is arts-based and open to embodied and inter-relational knowledge (in) formation. Researchers and practitioners of the arts have more readily acknowledged embodied knowing, while also recognizing the limitations of language (Eisner, 2008). Meaning, at times, can be better or differently formed through the senses, during pre-articulation. For example, Jackson-Perry and colleagues (2020) found that it was through sensorial experiences that meaning was made for the participant-researchers in their study. "Meaning was created from sensory, not rational, language, thereby using nonverbal sensory experiences as a primary route back to wellness and self-acceptance" (Jackson-Perry et al., 2020, p. 134). Even though these scholars later articulated their understandings using collaborative writing, knowledge was first perceived as it was forming through embodied interactions.

Arts-based research often follows embodied and inter-relational epistemologies, but sometimes can be heavily focused on methods and predetermined, predictable, and replicable

outcomes, which negate multiplicity and emergence. Manning's (2016) research-creation follows an activist philosophy and is based on four propositions, which are (1) art is a way, a process and not a product, (2) making is thinking and concept creation occurs in the everyday lived experience, (3) research-creation creates new processes, and (4) new processes often create new modes of knowledge, which cannot be judged according to current qualitative research standards (Manning, 2016, p. 28). Therefore art in research-creation is not a discipline or a product, but a way to learn or form knowledge, a mode of creative learning. It is how one attunes to the event and intuitively co-composes with more-than-human assemblages. In the co-composing, there is a thinking-doing and thinking-feeling that leads to the emergence of conceptualizations, which then leads to new processes that co-produce further conceptualizations. Research-creation rethinks thought itself and, in this way, upholds multiple, inter-relational, emergent, and embodied modes of knowing.

Neuroplexure Professional Learning Community

This neuroplexure was designed to take place within a PLC formed in a hybrid 'third-space'. Due to the COVID-19 pandemic and related limitations for in-person contact, a website was used as the main connecting platform. The website utilized an accessibility add-on with reader options for increased inclusivity and served as the hub for project information, participant consent, and communication. It was intended to serve as a virtual gathering space that would also allow the inclusion of collaborators beyond the researcher's physical locale. In fact, the online options for the study did attract participants from across the U.S. and internationally. Further modes for interacting were available through Zoom, FlipGrid, a shared Google Drive, and email updates, which kept communication open for continued collaboration even as social distancing and other pandemic cautions were still in place.

The main pages of the website were publicly accessible and included the purpose for the neuroplexure, a concept cache with terms defined in words and weblinks to related scholarly work, and the guidelines for participation. (See Appendix A for Website Main Pages.) These guidelines were based on drama improv rules. Ansaldo (personal communication, May 1, 2020) listed five theatre improv rules as core skills: (1) listening, (2) accepting, the "yes," (3) supporting,

the "and," (4) taking risks, and (5) letting go of mistakes. Community interaction guidelines as noted on the website were:

1. Listen- Be present to each other at a deep level. Really think about what others are saying or sharing.

2. Accept- Consider what others say or share as valuable contributions to the group. This includes ideas, thoughts, feelings, and modes of expression that are different from yours or that you don't understand.

3. Support- Build on what others say or share. There will be times that you feel you do not understand someone's contribution. You still can support the person or perspective by adding on to it in some way (i.e., questions, connections, analogies, wonderings, etc.).

4. Take risks. There is no right or wrong answer or way to contribute to the group. Share ideas, thoughts, and feelings in many different ways. Try out new (for you) modes of expression.

5. Let go of mistakes. Everyone makes mistakes. When someone else has made a mistake, we can also be supportive of them as they deal with their feelings and learn something new.

    a. A note about respectful communication. Sometimes miscommunication can be perceived of as making a social mistake or error. Because different people have different communication styles, miscommunication happens. In this space, everyone is asked to communicate respectfully. If there is some disagreement about what constitutes respectful communication in a specific instance, both sides will be asked to give their perspective and take time to learn from each other. There will be opportunities for sensitive topics to arise and each person will need to remember that every other person is in a different place in their learning. In community, we can gently offer multiple

66

perspectives on these topics to broaden each other's understanding. Intentionally hurtful, vulgar, discriminatory, criminal, or otherwise inappropriate interactions will result in removal from the group.

Interactions within the PLC were designed for improvisation within the enabling constraints listed above. This improvisational space supported emergence. For example, when working in synchronous small groups, participants were able to contribute to and shift the directions of open-ended embodied discussions on micromoments, disability, neurodiversity, education, and inclusion. In this space, and through the neurodiversity perspective, difference was valued. van de Water and colleagues (2015) reminded readers that "privilege, bias, and different life experiences are facts of life in a diverse society, and ignoring these issues not only fails to neutralize them, but also prevents you and your group from examining them directly in order to understand and address their effects" (p. 83). This 'third space' for educational PL allowed for interactions that engaged with diversity and equity issues while "creating necessary space for dialogue" (van de Water et al., 2015, p. 77).

The Micromoments in Neuroplexure PLC was formed as participants registered for the study over a period of several months. To review, co-learner is the term used to refer to a registered participant and the term collaborator refers to the registered participants that contributed responses after engaging with the invitational tasks. Because the website was in the public domain, everyone could access the main pages and it, therefore, served as part of the recruitment process. Recruitment emails and social media posts were also sent through various educational organizations and disability and neurodiversity groups. Educational organizations included various levels, preschool to higher education and educational research. While recruitment efforts targeted individuals from these groups, enrollment was not limited to those groups for three reasons. Everyone has a stake in public education, everyone engages in creative learning, which can occur in informal spaces every day, and the more diverse the PLC, the more co-learners might learn from/with each other. (See Appendix B for the Consent Form.)

Study enrollment was open and ongoing between December 2021 and May 2022. There was a total of 50 registered member co-learners. Of the 50 members, 22 registered with university email addresses, three with PK-12 school or district email addresses, 21 with general email addresses (e.g., yahoo, gmail), and 5 with email addresses from outside the United States. This suggests that at least 25, or half, of the co-learners were educators and/or students.

While all co-learners had access to the study's collaborative work in Google Drive, only 12 collaborators, including the researcher, uploaded contributions or engaged in discussions. Of the 11 others, the researcher was completely unacquainted with seven. The researcher had met or knew about two of the collaborators and had worked with three of the collaborators in some capacity prior to this study. Additionally, at least five collaborators were connected to the researcher's university, as evidenced by email addresses. Also of note, five of the collaborators who participated in small Zoom group discussions were from different time zones than the researcher's, with one participating from China.

None of the co-learners were asked to share their demographics beyond the email address needed for registration, but the small group discussion sessions provided spaces for collaborators to share aspects of their identity when they felt comfortable to self-disclose. Figure 11 includes various social identities that were made known during these sessions. The list does not ascribe any certain label or intersectionality in connection with any specific collaborator but gives a sense of the diversity of participants.

Figure 11

Diversity of Collaborators

COLLABORATORS

Mouth reader.   Hyperlexic.   PhD candidate.   Gifted in English.

Have ADHD, recently diagnosed.   Was 3rd grade teacher.   Not athletic.

Sensory seeker.   Special Education teacher.   Neurodivergent adult.   Hispanic.
Is a father.   Was in the gifted program.   Class clown/joker.
Didn't like math.   Taught science.   Recent autism diagnosis.

Had an instructional aide in high school.   Taught in a parochial school.

Uses braille for written communication.   Was a high school theatre student.

Immigrant.   Graduate student in education.   Good at language(s).

English is second language.   Creative.   From Southwestern U.S.

Received autism diagnosis as an adult.   Visual thinker.

Fear of public speaking.   From a poor and violent neighborhood.   Struggled in math.

Was nontraditional college student.   From Southeastern U.S.

Unable to speak when stressed.   Was training schoolteacher (China).

Background in music and improvisation.   Neurodivergent advocate.

Was a general education student.   Is a mother.

Preschool teacher.

In a teacher education program.   Was homeschooled K through 8th grade.

Quiet, smart girl.   Teaches higher education.

Recently defended doctoral dissertation.

These collaborators contributed responses to the methodological-poly-experiment invitations, which moved the neuroplexure in its study of micromoments for inclusive education.

Methodological-poly-experiments[4]

Interactive tasks were offered through invitations, utilizing a post-oppositional consciousness tactic, and were designed as methodological-poly-experiments. Koro-Ljungberg and Knight (2019) explained that "experimental qualitative methods are qualitative inquiry processes that utilize experimentation, creativity, and imagination…multiplicity, poly-dimension,

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[4] Methodological-poly-experiments take the place of methods for data collection in this iteration of the neuroplexure.

and unthought…**methodo**logic**al**-poly-**ex**peri**ments**…" (pg. 2). The methodological-poly-experiments in this neuroplexure invited collaborators to engage with the research questions through multi-modal, artful interactions. Collaborators were also encouraged to think about micromoments as events and through movement or thinking-doing. Additionally, the enabling constraints were set forth in a way that allowed for flexibility and improvisation. In this way, the neuroplexure was continually open to new processes and new modes of knowledge.

The Micromoments in Neuroplexure website included members-only links to the micromoment poly-experiments. To begin with, there were four invitations for online, asynchronous work and one invitation for developing an in-person, virtual, or hybrid small group for synchronous poly-experimentation. The invitations were titled microMemories, microMementos, microMovements, microMoment-ings, and small group poly-experimentation.

A microMemory refers to a memory of a micromoment within a learning event. These surprising or unexpected moments that break from routine could be remembered from various points of view, including the student, teacher, or an object, and told from first, second, or third-person perspectives. Additionally, micromMemories could be communicated using a variety of modes for expression and are not limited to verbal storytelling. The invitation to this task was worded as follows: Think about a moment when you were in school (or another learning environment, however you define this) and did or said something that others found surprising and/or unexpected. Tell/show something about this experience using Flipgrid or upload a video, audio, image, or document.

A microMemento is an object that serves as a souvenir or memento of a micromoment. When remembering a micromoment, there are often objects that are highlighted in the assemblage of the event. One of these objects could be kept in mind to further study the micromoment. In this neuroplexure, several objects were purchased and 'kept' as microMementos. The invitation to contribute microMementos was worded as follows: Think about a moment when you were in a school setting (or another learning environment, however you define this) and someone did or said something that you found surprising and/or unexpected. If

you could take a souvenir or memento from this experience, what would it be? Use Flipgrid or upload a video, audio, image, or document to share your microMemento.

A microMovement is the movement of the micromoment, which can be mapped using various forms of nonrepresentational cartography. microMovement mappings are focused on the event as a socio-material flows and interactions. microMovements could be expressed using a variety of formats and medium, including drama, dance, painting, and weaving. The invitation to contribute to microMovements was worded as follows: Micromoments are always in motion. We might miss them if we are not attuned to our environment. Dedicate some time to attune to your learning environment. "Map" the movement of a micromoment you are experiencing. (The map does not have to be a typical map of the physical space but can be any way you might show micromoment movement.) Use Flipgrid or upload a video, audio, image, or document to share your microMovements.

microMoment-ings are collective (re)creations of micromoments, which enable further exploration of micromoment movement into speculative realms. microMoment-ing as a speculative practice could engage various techniques, including role-play, storying, and fabulation (i.e., exploring ideas through fictional stories). The invitation to participate in microMoment-ings was worded as follows: microMoment-ings are the collaborative creation of micromoments and an exploration of their movements. This is an invitation to join in a role-playing 'game' in which you will collaboratively create a micromoment story. To participate, you can upload a micromoment story, telling only up to the micromoment, or you can add onto someone else's micromoment story. Please do not use names or likenesses of real people or places (other than yourself). The following are the steps for participating in a microMoment-ing.

    A. Choose the micromoment that will begin your story.

    B. Give a short description of the character you will be taking on using text, audio clip, video clip, drawing, or image. Characters can be from those already introduced in the micromoment story starter or a new character. They can be human or nonhuman (i.e., pencil, rug, dog).

C. Add to the story by posting text, audio, video, or images. Speak from your character's point of view.

D. You can finish the story or leave it open for someone else to finish. (You might also join a microMoment-ing that has already begun and add to that story.)

E. This is an asynchronous activity and might take extended time to complete while you wait for others to add to the story.

Invitations to participate in small group micromoment poly-experiments were designed for the synchronous study of micromoments. Collaborators were invited to request in-person, online, or hybrid small groups for poly-experimentation. One in-person groups met at Arizona State University and the researcher's ASU Zoom room was used for several online small groups. These groups followed the interaction guidelines based on improv, same as the website. This small group format allowed for a collaborative exploration of the invitational tasks and for further discussion related to related inclusive education topics. The group had the opportunity to choose to upload individual contributions or use video clips from the small group recordings as contributions to the shared Google folder given that all visible/audible/recognizable individuals were in agreement.

Both the asynchronous and synchronous spaces for interaction were developed as improvisational spaces and were, therefore, more open to experimentation and to the possibility of new experimental propositions arising. In this way, the PLC assemblage could have directed the inquiry as events unfolded.

Data-weaving Overview

Data-weaving is a term coined during this dissertation. It encompasses the process(es) of weaving together or the further entangling and layering of microMementos in new and different ways toward creative learning. Multi-method, process focused, and assemblage-oriented research, such as that which occurs during data-weaving, can "bring qualitative inquiry more closely into a complexity that resembles reality…" and should increase rigor and praxis (Morse,

2018, p. 804). Because reality in this kind of inquiry is multiple and quasi-captures are partial, judgments about truth or interpretations about another's perception of reality cannot be made. Instead, as a non-representational study, data-weaving does not involve description or interpretation, but emphasizes "the power of the precognitive as a performative technology for adaptive living, as an instrument of sensation, play, and imagination, and a life force fueling the excesses and the rituals of everyday living" (Vannini, 2015, p. 4). In this way, data-weaving within this neuroplexure continued to focus on emergent, embodied processes and future possibilities over products or results.

This neuroplexure took to heart Morse's (2018) words, "…for some purposes, fiction and art are more useful than their objective/actual counterparts… they allow for greater depth of expression…" (p. 805). Instead of articulating individual or more-than-human perspectives, the focus was on the unfolding micromoments and their inter-relational aspects. With this focus, multiple modes of knowledge were enacted through memories, writing, photography, drawing, poetry, video, and fiber art.

Therefore, data-weaving is not a conventional analysis but a co-creating and co-choreographing of experiences toward future possibilities. In this neuroplexure, data-weaving followed multiple processes, four of which will be outlined briefly here and detailed more extensively in Part II of this dissertation. First, one form of data-weaving occurred in the virtual realm that included the Micromoments in Neuroplexure website, small groups over Zoom, and Google Drive. The website contained information on micromoments, neurodiversity, research study guidelines, and blog entries on a variety of related topics. The small groups over Zoom as collective and creative learning events enacted a data-weaving, especially with microMemories and microMoment-ing. These events-as-data-weavings were video recorded. All the contributions to the methodological-poly-experiments were uploaded to a shared Google drive either by a collaborator or the researcher. Although, these virtual data-weavings might be considered conventional data collection or data storage, here they are considered data-weavings because they are events quasi-captures are being layered and woven together. For example, a video clip

73

might include microMemories, microMovement ideas, and discussion topics interwoven between two or three people and the Google drive contained several folders with various contributions, some in multiple iterations These spaces were in continual process during the timeframe of the study as collaborators wove in their audio, video, and document quasi-captures.

Second, data-weaving occurred while collaborators responded to the microMoment-ing invitation. During this process, memories of emergent learning events were summarized up to the point of the micromoment, then two or three collaborators wrote or drew multiple, speculative endings by adding on to the summary in a round robin fashion. This resulted in three complete versions that began with one microMemory and partial versions of a second microMemory.

Figure 12

Excerpt from a Collective Speculative Fabulation

After collaborators contributed responses to the methodological-poly-experiments and participated in small group discussions, data-weaving continued between the researcher, microMementos, and the fiber arts. Koro-Ljungberg and colleagues (2017) state:

> Data may be actualized through movement from one set of data to another, through foldings, redoubling and reductions, data pasts projecting ahead to the data future. Fluid, dissolving, and multiple data could be a reprocess- actualized by being differentiated and differentiating themselves. (p. 3)

74

In this way, multiple 'reprocesses' constituted a data-weaving that was open to multiplicity, emergence, inter-relationality, and embodiedness.

After a period of fiber art learning, including a refamiliarizing with some previously learned crafts, the researcher extended data-weaving to fiber art sculpture mappings and interactive, speculative flow charts. (See Appendix C for Fiber Art Learning.) Three fiber art sculptures were microMovements, or maps of micromoment movement. These began with microMemories, contributed accounts of micromoments from collaborator memories. From the microMemories, sketches were designed, theory about micromoment movements developed, fiber art structures built, and further micromoment theory developed.

Figure 13

Fiber Art Sculpture Mapping in Progress

Finally, the flow chart was initiated as a kind of content analysis of the small Zoom group discussions. Audio from microMemory recordings and their resulting discussions were categorized to create an organizational chart and initial flow chart sketch. This sketch was then developed into a hanging fiber art flow map that could be interacted with further. microMementos from each microMemory were used to further interact with this moving content analysis as a speculative endeavor.

Figure 14

Fiber Art Flow Map or Moving Content Analysis

Data-weaving in the forms of microMoment-ing stories, fiber art sculpture maps, and moving content analysis will be detailed and reflected upon further in Part II of this dissertation.

PART II: THE NEUROPLEXURE

Part I included the initial conventional sections of a dissertation and was written using a traditional academic writing style. One reason for choosing the structure of Part I was to introduce readers to possibly unfamiliar theories and methods in preparation for Part II. Part II details the data-weaving in the neuroplexure and is written in a way that reflects its rhizomatic, growing, processual movement. Because of this organic movement, the text will often shift between what might traditionally be thought of as methods, analysis, findings, and discussions. Additionally, in several examples, the discussions tend to lead to the development of new theory or new directions for research.

Furthermore, ARTiculation is used in this part of the dissertation (Vasquez, in press). ARTiculation is a term I have used for the articulation of research using embodied, artistic forms of writing that especially highlight prearticulation. ARTiculation can be used when research processes cannot be easily parsed into separate stages and definitive answers to research questions cannot be verbalized. Yet, Part II will respond to each of the research questions through this data-weaving while shifting between methods, analysis, findings, and discussions. To guide readers through these shifts, I have developed the following icon key.

Designing the pattern (Methods): These sections include the enabling constraints designed for the neuroplexure.
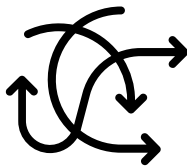
Data-weaving (Analysis): These sections include multi-modal interactions with microMementos (quasi-captures) in various weaving, layering, growing fashions.

Presenting the gift (Findings): These sections include descriptions or summarizations of the data-weaving interactions.
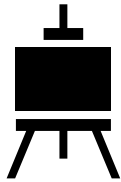
Positioning the loom (Theory and Discussion): These sections include ideas for extending the gifts (findings) and could combine new theory or conceptualizations with practical applications. There might also be connections made to the literature.

Furthermore, Part II has been divided into three chapters, with each chapter attending to one of the research questions.

This neuroplexure first sought to explore the questions: How might micromoments move in/with/through emergent learning events? and, how might attunement to micromoment assemblages be developed? Responses to these questions will follow an overview of collaborator contributions which occurred during the first form of data-weaving.

Collaborator Contributions

Collaborators generated a variety of contributions to Micromoments in Neuroplexure. A total of twenty-one microMemories were generated, 20 during small Zoom group meetings and one individually. Between one and five microMemory uploads were produced during each of the seven Zoom group meetings held in the first session, which focused on microMemories and introduced microMovements. Fifteen microMemories were uploaded as video clips, five as written anecdotes, and one as a drawing. Table 1 outlines the microMemories that were contributed at each small group meeting.

Table 1

Micromoments in Neuroplexure Small Group microMemory Contributions

Group	Date	#Collaborators	Format	microMemory Contribution
1A	02/03/2022	2	Video	Comparing My Self Portrait
			Video	Not Jumping the Puddle
			Video	Grading My Invention
1E	02/10/2022	2	Video	Trying to Collaborate as a New Teacher
			Video	Not Taking the Math Fact Test

1F	02/09/2022	3	Video	Questioning Efficacy of an Educational Policy
			Video	Not Doing the Oral Book Report
			Video	Standing Up for Another
1H	02/23/2022	2	Video	Using a Twizzler to Conduct
1I	02/23/2022	3	Video	Shouting "A Dragon!"
			Video	Solving Math Problem in Unexpected Way
1K	03/15/2022	2	Video	Crying in Kinder
			Video	Doodling During Math
			Video	Not Doing Homework
			Video	Retreating Under the Desk
1L	03/24/2022	2 (+ assistant)	Written	Walking a Student from the Bus
			Written	Getting a C
			Written	Being Removed from Honors Class
			Written	Being Late to School
			Written	Switching from Braille to Computers

Although Zoom group meeting collaborators were given the opportunity to upload microMemories in any form, they all chose to have me, as the researcher-facilitator, take video clips from meeting recordings and upload them to the shared folder. I uploaded each clip to a private Google folder, emailed each collaborator to invite them to review the clip, and moved the clip to a shared co-learner folder after receiving their approval. There were a couple of cases where the email was sent out multiple times, the final notifying the collaborators that the video clips would be shared within a given timeframe unless they responded otherwise. These emails and notifications were intended as reminders to the collaborators that they have input as to what data is shared with other co-learners and used in the study.

The five written anecdotes were produced during a Zoom meeting in which the collaborator did not wish to share video. The titles of these microMemories are designated with an asterisk in Table 2. After multiple readings of the transcripts from this meeting, I wrote five anecdotes that seemed to reflect the micromoments. One example, titled "Switching from Braille to Computers" is highlighted in the upcoming section called "Sketching Micromoment Movement" and in Figure 26. These anectodes were also uploaded to the private folder for review, then later to the shared folder. The singe drawing was uploaded by a collaborator directly to the shared folder and is not included in Table 1.

The first session of small Zoom groups included time for discussion, whether before, during, or after collaborators shared their microMemories. During these seven meetings, about 88 discussion topics were generated, some being very similar topics, but from different contexts or perspectives. Some discussion topic examples are grading and rubrics, anxiety in math and test-taking, reflecting on teacher mistakes, presumption of competence, and misunderstood students. (✍See Appendix D for a complete list of Discussion Topics.) I determined that a new topic was

being discussed each time the conversation changed direction. Then, I recorded 50 quotes from the discussions as evidence of some of these topics. I did not group or categorize the topics any further because I considered these discussions to be contextually based and because I wanted to determine how much discussion was generated from the methodological-poly-experimental prompt.

microMemory quasi-captures further influenced the microMementos and microMoment-ings. After multiple rounds of viewing and listening to the Zoom group videos or rereading transcripts, I chose a microMemento for each microMemory. A few of these were directly chosen because the collaborator mentioned them as a possible microMemento (e.g., colored glass tile) during the small Zoom group. Many microMementos were objects spoken about in the microMemories (e.g., gate, dragon, backpack) and some were objects related to the memories (e.g., sticker with a song title). These 20 items, as listed in Table 2, were purchased for further data-weaving.

Table 2

Micromoments in Neuroplexure microMementos

microMemory	microMemento
Comparing My Self Portrait	colored plastic tiles
Not Jumping the Puddle	toy filled with blue water
Grading My Invention	hamster ball
Trying to Collaborate as a New Teacher	multi-colored ink pen

Not Taking the Math Fact Test	hourglass
Questioning Efficacy of an Educational Policy	question mark sewing patch
Not Doing the Oral Book Report	blank index card
Standing Up for Another	red brick
Using a Twizzler to Conduct	Twizzler (candy)
Shouting "A Dragon!"	toy dragon
Solving Math Problem in Unexpected Way	"Rent" sticker printed with 525,600
Crying in Kinder	doorknob
Doodling During Math	paper with marker doodles
Not Doing Homework	small backpack
Retreating Under the Desk	foot fidget band
*Walking a Student from the Bus	toy gate
*Getting a C	magnetic plastic letter C
*Being Removed from Honors Class	worry rock
*Being Late to School	shoelaces
*Switching from Braille to Computers	alphabet braille tablet

Additionally, short anecdotes were written for each microMemory and copied onto three microMoment-ing templates as story starters for multiple micromoment versions. The story starters included any background details that the collaborator shared in the telling of their microMemory as well as a description of the micromoment. They did not include a description of what occurred after the instant of the micromoment.

Two small Zoom groups and one in-person group were held in a second round of small group meetings in which collaborators worked together on microMoment-ing. (See Table 3.) Of the 21 story starters, only two were chosen to create alternate endings. Of those two, only the microMemory entitled "Not Taking the Math Fact Test" generated multiple versions. Each of these three versions was created by more than two people, including the collaborator who initially shared the microMemory and one or more collaborators who added to the alternate endings. Collaborators mostly used writing or typing for these microMoment-ings, but some also included digital photographs, clipart, and drawings. They also chose both human and nonhuman character perspectives from which to tell the story.

Table 3

Micromoments in Neuroplexure Small Group microMoment-ing Contributions

Group	Date/Location	#Collaborators	Completed?	microMoment-ing Contribution
2B	04/13/2022 In-person/University room	2	Yes	Not Taking the Math Fact Test, Version 1, Part 2
			No	Doodling During Math, Version 1, Part 2
2C	04/14/2022 Zoom meeting	2	No	Not Taking the Math Fact Test, Version 2, Part 2
			No	Not Taking the Math Fact Test, Version 3, Part 2

2D	04/15/2022	2	Yes	Not Taking the Math Fact Test, Ver. 2,
	Zoom meeting			Parts 3, 4
			Yes	Not Taking the Math Fact Test, Version
				3, Part 3

Note. One version of Doodling During Math was begun, but not completed. Three versions of Not Taking the Math Fact Test were completed. Each version had a different number of parts depending on the stories and the authors. Version 1 had two parts, version 2 had four parts, and version 3 had three parts.

Only two microMovements were uploaded to the shared folder, one being a videoclip example that I contributed. The other being a drawing. (See Appendix E for Individual Contributions.)

Table 4 summarizes the various collaborator responses to the poly-experimental invitations. These responses created the first form of data-weaving and were also further engaged with during subsequent data-weaving engagements.

Table 4

Methodological-Poly-Experiment Invitation Response Summary

Type of Response	Number	Formats
microMemory	21	15 videos, 5 written anecdotes, 1 photograph of a

		drawing
microMovement	2	1 video, 1 photograph of a drawing
microMemento	21	21 purchased physical objects
microMoment-ings	21	story starters
	1	completed story with three versions by five collaborators
	1	incomplete story with one version by two collaborators
Discussion topics	88	
Discussion quotes	50	
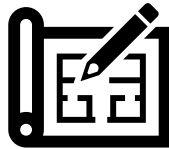
Further Conceptualization of Micromoments

During the Neuroplexure, I attempted to follow the flow of the assemblage. As stated in Part I, it is when we attune to cues, cuts, and collective movement that we enter the choreography of the event. Since the initial enabling constraints had been set forth and collaborators had contributed responses to the invitations for methodological-poly-experiments, I was then able to attune to the movement in the study and design enabling constraints for the next form of data-weaving. Figure 15 demonstrates the movement from invitations to collaborator responses to the multiple forms of data-weaving and beyond to future possibilities for this work. The teal-colored shapes are the methodological-poly-experimental invitations, and the yellow, light green, and blue shapes are the data-weavings. The red arrows show the possibilities that have emerged and are emerging from this research-creation. The interconnectedness of the methods can be seen in the connecting lines.

Figure 15

From Invitations to Data-Weaving to Future Theory and Practice
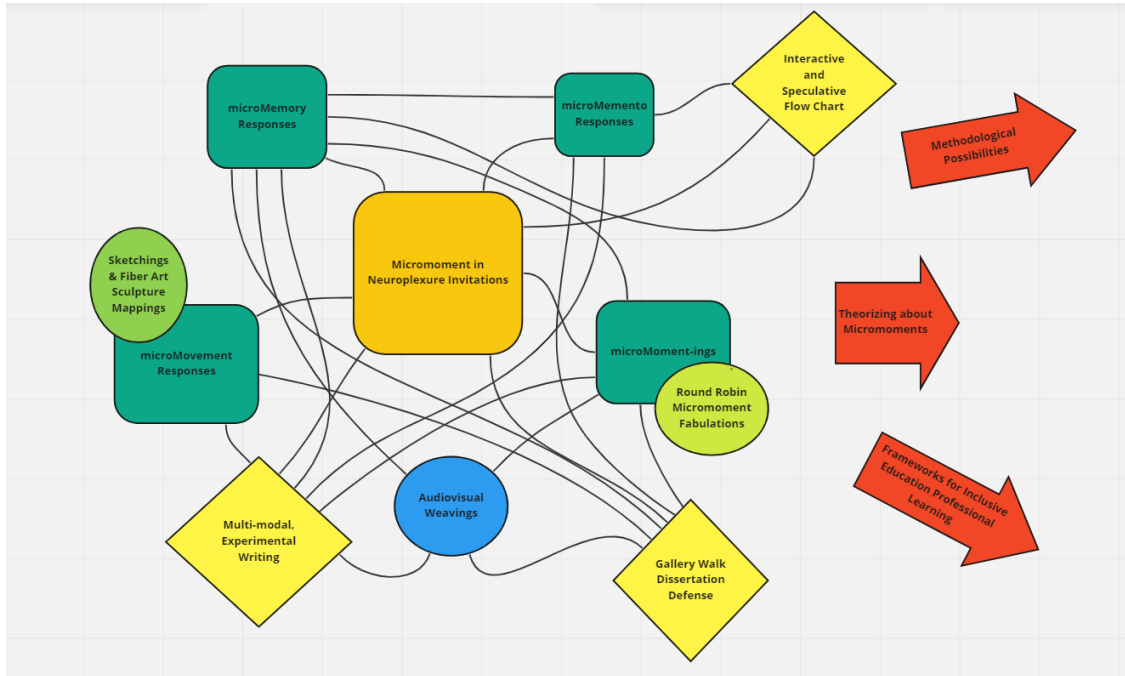
While reviewing collaborator contributions, I found that several aspects of micromoments seemed to be important for following their movement. I conceptualized micromoments further by the dimensions in which they seemed to operate and by the common elements of each dimension.

Micromoment Dimensions

Micromoments are events that seem to operate in dimensions that include time, space, and possibility. In this work, possibility refers to alternate, parallel, intersecting, and diverging possible events. Figure 16 is a conceptualization of the cross section of a micromoment as it

moves through time, space, and possibilities. Multiple past events in multiple past spaces

converge at the point of micromoment and extend into multiple possible future events in multiple

possible future spaces. These 'strands' or 'strings' are not fixed, but constantly shifting as notated

by the multiple black dotted lines surrounding the black dot micromoment. This visual expands on

Tanggaard and Beghetto's (2015) ideational pathways and pedagogies of the possible and

Barad's (2017) quantum physics.

Figure 16

Micromoment Dimensions: Time, Space, Possibilities (Stilled Cross-section)

Micromoment Dimensions: Time, Space, Possibilities (Stilled Cross-section)

Multiple possible future events in multiple future spaces

Multiple past events in multiple past spaces

Micromoment
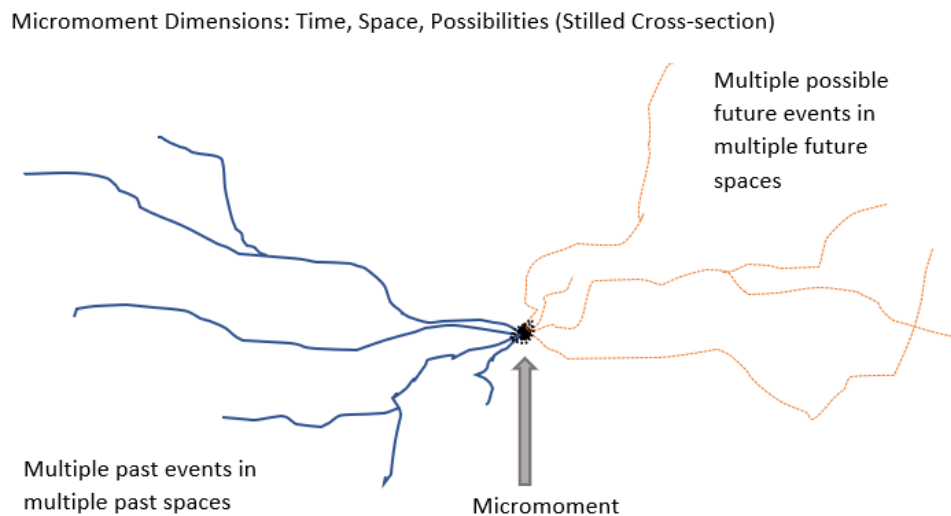
Creativity theorists Tanggaard & Beghetto (2015) proposed Ideational Pathway Diagrams

(IPD) as a method for studying the movement of ideas in learning environments and other

sociocultural spaces. This diagrammatic approach documented dialogues from transcripts to re-

present ideational trajectories using a temporal continuum and horizons of determinacy. The

"horizon of determinacy" was based on the partially indeterminate potentiality of ideas, meaning

that ideas might "develop into creative outcomes. Others may emerge briefly and then come to

rest. Still others may emerge, be put down, and become reanimated in subsequent interactions"

(Tanggaard & Beghetto, 2015, p. 131). Examples given were of teacher (or facilitator) centered analyses, where one person was leading the direction of the dialogue.

Conversely, the approach taken in this neuroplexure was to map the movement of micromoments. The mappings here occurred across time, space, and possibility. Possibility relates to 'determinacy' in IPD as well as the possibility that is inherent in creative learning (Beghetto, 2020) and as possible pasts, possible futures, possible selves, and possible worlds (Glăveanu, 2020). Possibility also relates to post-qualitative inquiry speculative methods (See Ehret et al., 2019; Springgay & Truman, 2019; Willis & Anderson, 2013).

The dimensions of time, space, and possibility can be further described as a "multiplicity of paths and histories," following quantum temporality (Barad, 2017). Time is not perceived conventionally in quantum physics because time is not considered linear and stable in the same way that matter does not move in solely linear or stable paths. Barad (2017) stated:

> Quantum physics not only deconstructs the strict determinism of Newtonian physics, where the future unfolds predictable from the past, but it also blows away the progressivist notion of time… Quantum physics opens up radical spaces for exploring the possibilities for change from inside hegemonic systems of domination. (p. 61)

While Newtonian physics is based on the three dimensions of width, height, and length, quantum theory is based on matter as particles or waves, which extend beyond the three spatial dimensions with which most people are accustomed. From this perspective, there is less focus on one predictable outcome and more focus on multiple possible outcomes. This can be generative for work in social justice because people who are grouped and labeled are less likely to be stereotyped, tracked, and further marginalized by deficit-oriented practices based on a deterministic sense of time and space.

Additionally, quantum theory is applicable in the real world even though this depiction of time and space contains indeterminacy, or uncertainty. Barad (2017) also stated this about her diffractive work:

89

[it] is ultimately about the possibilities of justice-to-come, the tracing of entanglements of

violent histories of colonialism (with its practices of erasure and avoidance) as an integral

part of an embodied practice of re-membering- which is not about going back to what

was, but rather about the material reconfiguring of spacetimemattering in ways that

attempt to do justice to account for the devastation wrought as well as to produce

openings, new possible histories by which time-beings might find ways to endure. (p. 62-

63)

This quote harkens back to discussions on actionable uncertainty in the literature review and

activist philosophy in the theory and methods chapter. It is because of the inability to confidently

predict outcomes of an event that people can humbly open themselves up to possibilities, even

those that seem implausible. Being open to possibilities might break a person's dependence on

the status quo stories. In this neuroplexure, the histories of colonialism are entrenched with

histories of neurotypicality and re-membering is a practice of re-envisioning education as

sustainably inclusive, beginning with the conceptualization of micromoments.

Furthermore, when thinking of these timespacemattering 'paths' as strings, certain

aspects of string theory become generative. It is theorized that these strings shift across various

vibrational states, and that their vibrations move in every possible direction, including those

beyond the three spatial dimensions with which most people are familiar (Gubser, 2010). During

this movement, these strings, or fibers (matter) can split, connect, parallel, and intersect with

others. Moreover, when taking superstring theory into account, the multiple, unknown dimensions

could be entangled with each other, allowing us to see only part of a particle's movement

(Roussel, 2021). These quantum time and string theories offered further openings for thinking

through micromoment movement across time, space, and possibilities.

Micromoment Elements and Qualities

Micromoments not only appear to operate within multiple dimensions, but they also seem

to share certain elements. After multiple viewings, listenings, and readings of contributed

microMemories and small group discussions, I labeled the perceptible elements as presence, structure, diversity, and agency. Later, during my work with fibers, these concepts were more fully developed and the micromoment elements were revised as presence, structure, divergence, and motion.

Figure 17 illustrates micromoment dimensions, elements, and qualities as conceptualized in this dissertation. This figure depicts a larger view of the micromoment as a small black dot in Figure 16. It is a cross section and a still shot. It is important to remember the vibrational movements, the splitting, and reconnecting that occurs with micromoments in emergent learning events and that the micromoment is a convergence of and interactions between more-than-human matter bound by time, space, and possibilities.

In this study, presence in micromoments was described by perceptibility, the quality of being able to be perceived. Perceptibility is portrayed with overlapping spots of varying degrees of opacity in this figure. Structure was described by designability, the quality of being capable of being designed. In the figure, structure is indicated by a stack of sticks or wood. Diversity was described as the quality of being diverse or being composed of differing elements or qualities and is illustrated as multiple streams diverging from a river. Motion was described by activity, the quality of being active or more specifically intra-active (Barad, 2007). Motion, and intra-activity, are visualized as merging and running watercolor spots. Each of these elements were evident in the micromoments shared between collaborators as will be demonstrated further in this chapter.

Figure 17

Micromoment Dimensions, Elements, and Qualities

Micromoment Dimensions, Elements, and Qualities

TIME

DIVERGENCE (Diversity)

PRESENCE (Perceptibility)

MOTION (Intra-activity)

STRUCTURE (Designability)

SPACE

POSSIBILITY
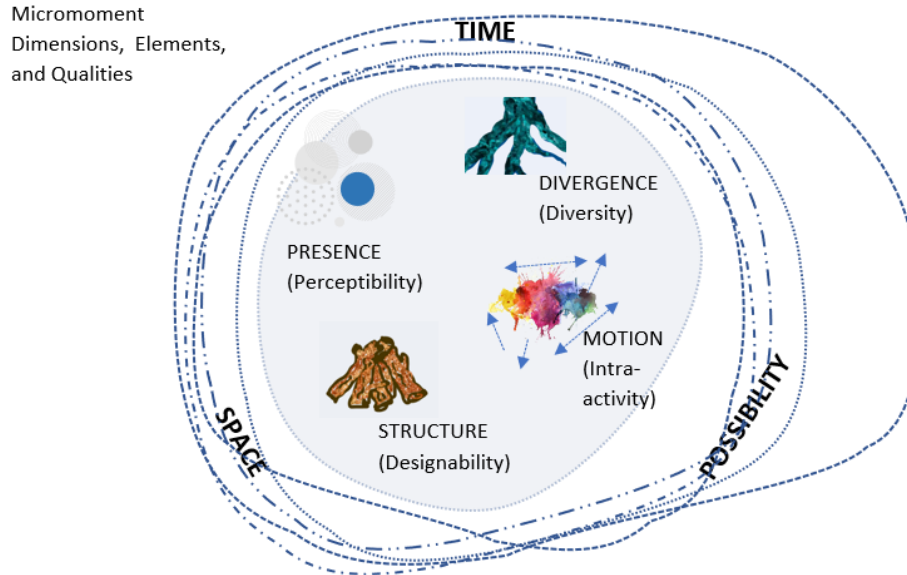
Visual by Ananí M. Vasquez © 2022
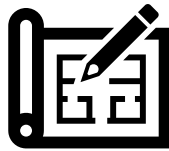
Designing Data-Weaving for Micromoment Movement

I returned to the contributed microMemories. Those with the most detail up to the point of the micromoment and with the instant of the micromoment more easily identifiable were chosen for further study using the updated conceptualization of micromoments. This narrowed the 21 down to nine microMemories. These nine microMemories were contributed by seven of the 12 total collaborators and included two of my own contributions. In this neuroplexure, I, as the researcher, participated as a co-learner and collaborator in creative learning. Because collaborators were not considered research subjects, but the micromoment events were,

researcher contributions to the micromoment methodological-poly-experiments were recognized as valuable for data-weaving.

With the nine microMemories and their related microMementos, I began sketching micromoment movement. The sketching occurred during multiple viewing/listening/readings of the microMemories. I used colored pencils to create visual maps of the movement felt in the telling of the microMemories. For example, I was able to differentiate between continuous and blocked flows and solitary or interwoven interactions within micromoment flows. These sketches served as preliminary movement maps that helped determine techniques for fiber art mapping, which would move the maps from a limiting two dimensions towards the inclusion of time, space, and possibility.
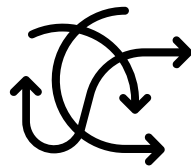
Sketching Micromoment Movement

This section of the chapter is comprised of the data-weaving that used sketching to explore micromoment movement. The structure begins with a presentation of the microMoment-ing story starter as a preview of the micromoment. The story starter is then followed by corresponding sketches, a textbox with brief notes made during the process, and a retelling of the micromoment ending. This structure is repeated for each of the nine microMemories.

Not Jumping the Puddle

One day in fifth grade, our class was walking from specials back to our classroom. The teacher decided to take the shortcut and walk our line through the landscaping rather than taking the sidewalk. It had either rained or there had been irrigation not long before because there were still some muddy spots as well as one big puddle. The class line went directly toward the puddle, each student nimbly jumping over it before reaching the sidewalk in front of our classroom door.

As it got closer and closer to my turn to jump, I got more and more anxious. I was not good at jumping and I knew I was not going to make it over the puddle without falling in, getting muddy and having the class laugh at me. The teacher was dressed in a sophisticated skirt and heels. She walked primly around the puddle to the door.

My turn.

Figure 18

Sketch of Not Jumping the Puddle

Textbox 1

Not Jumping the Puddle Notes

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NOTES
    Expected flow              uncertainty    MICROMOMENT
Adult 'privilege'                                  'age appropriate' obstacle
        THE SAFE PATH - - - - - - - - - - - - - -
                                misunderstood behavior        UNSAFE
                                    Blanking,
                                            Deflating.
```

The students all rolled along, jumping the puddle. The teacher, in her skirt and heels, walked around. I walked around the puddle, knowing I wouldn't make it across. The students laughed, knowing my physical limitations. The teacher reprimanded me, and I froze.

Grading my Invention

In elementary school, I was in the gifted program. I was really good at English, even though it was my second language. Gifted Math and Science were a struggle for me. One day, in 4th grade, we had an assignment where we had to create an invention using the scientific method. My friends were very analytical and were looking for problems in society and figuring out solutions. My invention was very different from everyone else's. I started, in my ADHD head, from, "This would be cool if it existed." (I've recently been diagnosed with ADHD.) I had a pet guinea pig and thought, "What if there was a device that allowed you to exercise your pet guinea pig?" I called it the Guinea Pig Roller and it was like a hamster ball with two handles on each side. The Guinea Pig could walk inside it, in place. People loved it; the teacher and the students loved it. I brought my guinea pig to school to demonstrate. And then it was time to grade the project.

Figure 19

Sketch of Grading My Invention
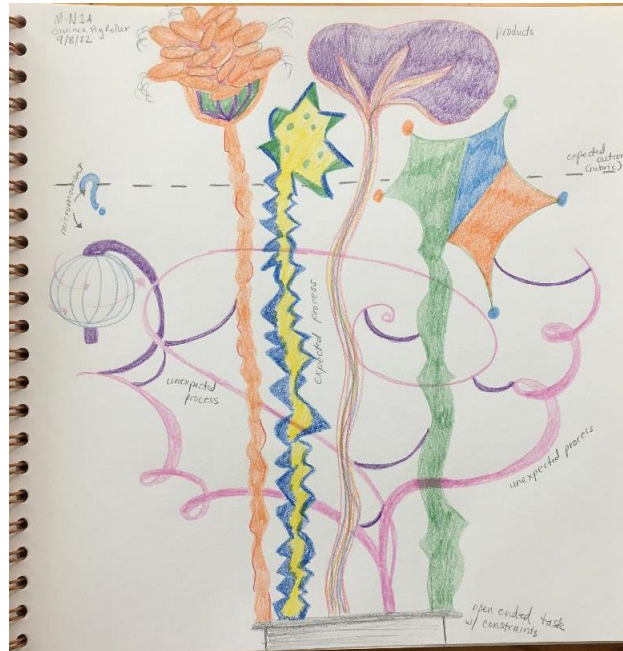
Textbox 2

Grading My Invention Notes

NOTES

Open-ended tasks with enabling constraints

Expected process   *unexpected process*

Expected process

Expected process

Expected outcome (*rubric*)   **MICROMOMENT**

products

Although the teacher and my peers loved my invention, I received a low grade for not

using the conventional process, the scientific method. We all ended up with creative products, but

my way of thinking and processing was different than the others and for that I was evaluated and found lacking.

Trying to Collaborate as a New Teacher

During my first year of teaching, I knew that the third-grade team would be working together and that those who had been teaching a long time would be like mentors. I think we had five teachers on the team. I was brand new, just out of the university. One was in her second or third year of teaching and the others were veteran teachers. So, in one of our first meetings, we were sharing our curriculum plans for the next month and sharing resources. I did my planning using thematic units. I would draw a web with an overall arching theme and add the subject areas and tell how they were all related to the theme. Then I would list the standards that would be taught under each area. It was exciting for me to put the standards together that way and I was looking forward to sharing it. After I shared my plans, the other teachers—

Figure 20

Sketch of Trying to Collaborate as a New Teacher
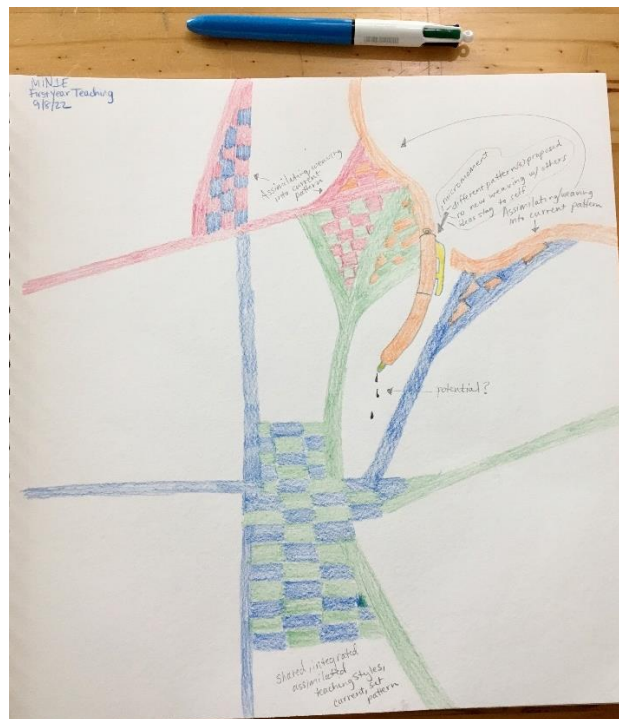
Textbox 3

Trying to Collaborate as a New Teacher Notes

> **NOTES**
>
> Shared, integrated, assimilated teaching styles　　　*current, set pattern*
>
> Assimilating, weaving into current pattern
>
> 　　　　　　　　　　　　　Assimilating, weaving into current pattern
>
> 　　**MICROMOMENT**
>
> Different patterns proposed　　　no new weaving, ideas stay with self
>
> 　　　Lost potential?

The other teachers said it was best to stick with what had been done in the past. They told me that I could try my ideas out, but I was warned that they probably would not work. They also were not interested in using them in their own classrooms. Yet, I was expected to learn from them as more experienced teachers and mentors. I had not expected this in a collaborative, professional setting.

Questioning Efficacy of an Educational Policy

In my Introduction to Education course, we were talking about important legislation in the history of US education. The teacher had us break into groups and each group read an article about a different legislation before presenting it to the class. Among others, we talked about Brown vs. the Board of Education. No one was really asking questions, but I was really curious when we were talking about the history of separate but equal being dismantled, so I asked a question. I said, "So we are talking about how great this act is, which undoubtedly it was, but why are schools still segregated? You can look around and see schools that are 90% White or 90% Black. And the 90% White schools tend to have more funding, more resources. The school that has the high population of Native American, or Black or LatinX, is going to be more impoverished, most likely a Title 1 school." Then—

Figure 21

Sketch of Questioning Efficacy of an Educational Policy
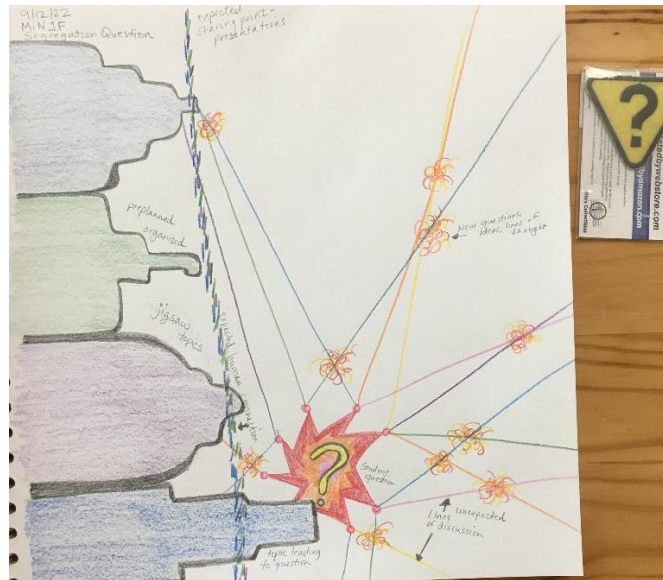
Textbox 4

Questioning Efficacy of an Educational Policy

NOTES		
Preplanned assignment, organized		Jigsaw topics
Expected sharing point, during group presentations		
Expected level of human connection		
		Topic led to curiosity
STUDENT QUESTION	**MICROMOMENT**	
New question	*new* idea	*new* line of thought
New idea	*new* question…	

Then my question started a discussion where most of my peers engaged with even more new questions, new ideas, and new lines of thought. The teacher allowed for this space and the discussion became lively, with students sharing varying points of view.

Not Doing the Oral Book Report

When I was in school, I had a, and still do, have a deep-seated fear of public speaking. When I went to school, the teachers did things one way and there were no ands, ifs, or buts about it. I always dreaded the book report assignments because we had to stand up in front of the class and give our book reports. It was debilitating to the point that I couldn't move. I would rather take an F. I asked my teachers if I could write it, draw it, paint it, do something other than speak it. They—

Figure 22

Sketch of Not Doing the Oral Book Report
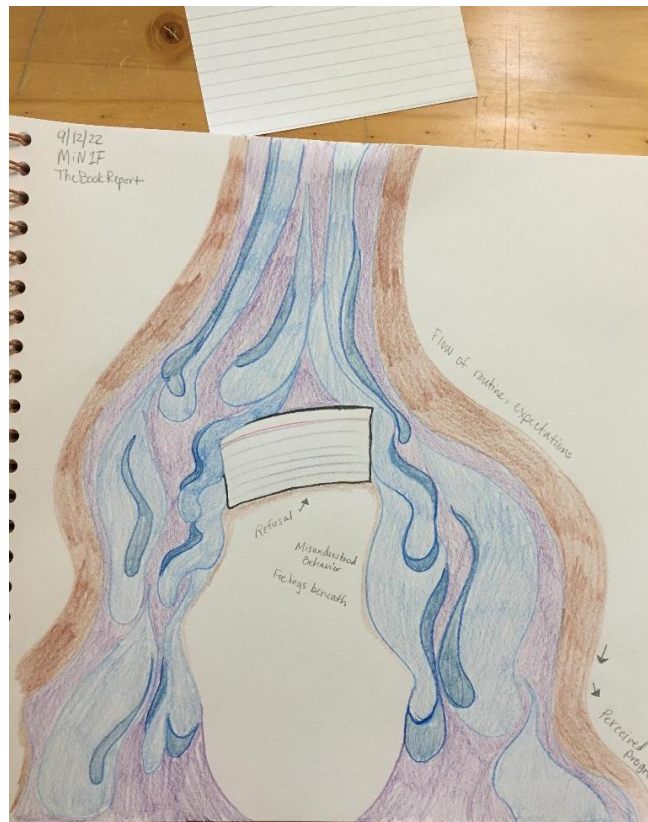
Textbox 5

Not Doing the Oral Book Report Notes

```
NOTES
    Flow of routine, expectations

                              → → → → → perceived progress
                    DOUBLE REFUSAL
        no report           MICROMOMENT           no alternative


    misunderstood behavior              feelings beneath behavior
```
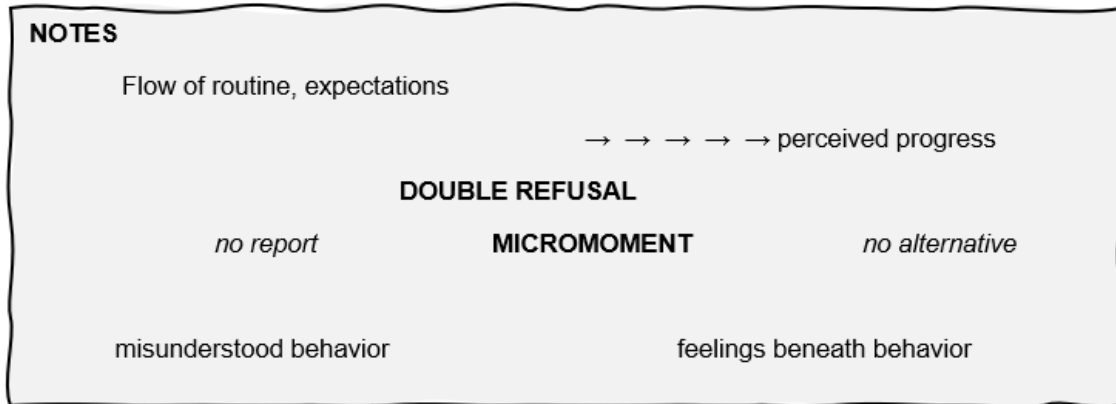
They would say no. I wouldn't do it and I would take the F. Now as a teacher, though, I have my students show their learning in any way that they want.

Using a Twizzler to Conduct

I was a class clown, a joker. I was always getting into trouble for this. So, the unexpected was something that I was always looking for. Looking for a moment to surprise people with humor or a joke. Eventually it was no longer unexpected because that became my role. I also played in orchestra in middle school. It was a blast. We had fun with it. In seventh grade, we had a concert, and it was after hours. I remember the auditorium. They opened up the stage. Everybody was there. The whole orchestra was there. The parents were all there. It was full. And the teacher was nowhere to be seen. People were wondering what was going on. "Where is the teacher?" The principal came up to us and asked if we could do it on our own. We told him we needed a conductor. There was some back and forth before I was eventually elected to do this. But I needed a baton. So, there was all this food. People brought food. For the baton, I went to the food table and got a Twizzler. The Twizzler became the baton as I conducted. Which was totally inadequate because it's flimsy, but it was fun. Later-

Figure 23

Sketch of Using a Twizzler to Conduct
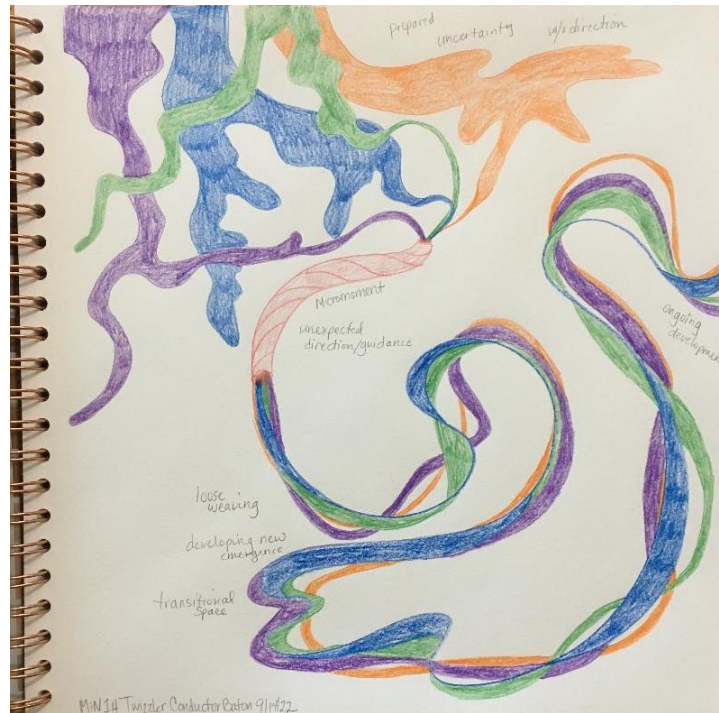
Textbox 6

Using a Twizzler to Conduct Notes
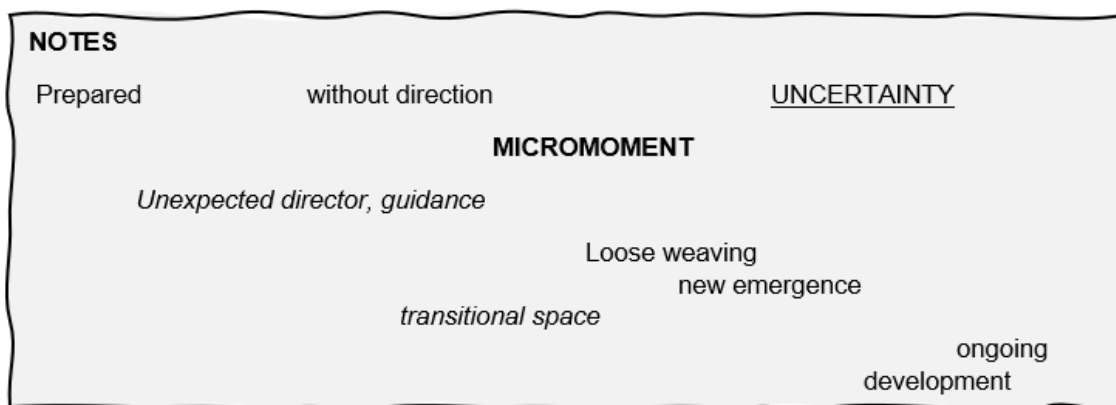
Later, we found out that our teacher was fine. He had just been stressed and had forgotten all about the concert. He liked telling stories, so this became one of them. I ended up going into music and teaching as an adult.

Shouting "A Dragon!"

I teach 3-year-olds in a theater class, 20 minutes once a week. It is pretty improv based. We sing, "Going on a bear hunt, gonna catch a big one." Usually when we get to, "Oh no, there's a…" big patch of grass, some mud, etc., the things that we all know about are set. We have pictures. Those are always the way. But one day, I'm like, "Oh no!" and a kid just jumps up from the back of the room and yells, "a dragon!" And I just looked at them and-

Figure 24

Sketch of Shouting "A Dragon!"

Textbox 7

Shouting "A Dragon!" Notes

```
NOTES
    Contained flow                    points of predetermined potential pivots
        MICROMOMENT
                        unexpected pivot      shift in assemblage dynamics
                            connections to other routines, experiences
                            connections to other routines, experiences
new formations taking shape                   FUTURE POSSIBILITIES
```
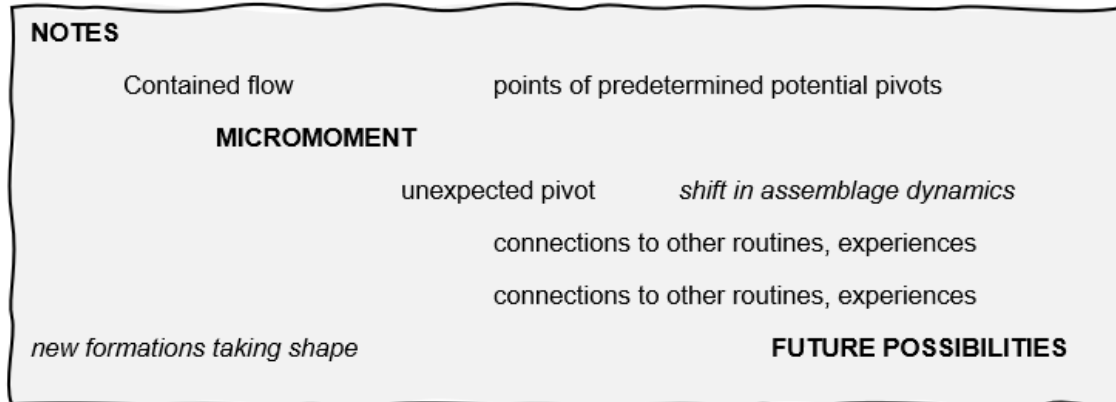
And I just looked at them and said, "What are we gonna do?" So they all ran to another area in the room and huddled together to problem solve. They combined a problem-solving activity we had done before with this activity to create something entirely new.

Not Doing Homework

I'm autistic and I also have ADHD. For the first half of my school career, I was always getting in trouble for not bringing the materials I needed home with me to do my homework. Everyone, including my guardians, thought I was intentionally leaving my things behind because I didn't want to do my homework. I was so exhausted by the time I got home to do homework even if I had my things. But it wasn't intentional. I didn't have the ability to remember all of the things I needed throughout the day by the end of the day when it was time to pack my backpack. I didn't know what to pack anymore. I was in middle school, twelve years old, not doing my homework, when finally-

Figure 25

Sketch of Not Doing Homework
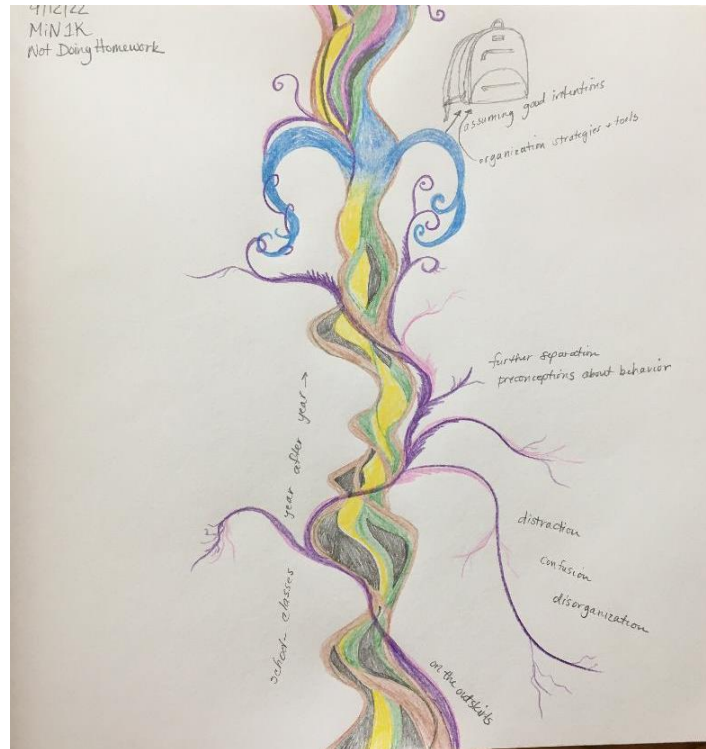
Textbox 8

Not Doing Homework Notes

NOTES

School and classes, the same year after year   *me on the outskirts*

Distraction   Confusion   Disorganization

Further s e p a r a t i o n   preconceptions about behavior

MICROMOMENT

Teacher assumes good intentions   *teaching/learning organizational strategies and tools*

Finally, I had a teacher that assumed good intentions and taught me organizational strategies and how to use organizational tools. I had gone so many years with teachers assuming I was not doing my homework on purpose until finally this one teacher took notice and helped me learn how to plan for all the steps needed in order to complete and turn in homework.

Switching from Braille to Computers

Multiple times things were not prepared in time or were just not available. I will say some of my teachers tried. They would modify the lesson for me, like if they wanted students to draw or something, they would tell me I could write down what I would have drawn or describe what I would have done. But there still were quite a few problems as well. Some of them were not used to working with students with disabilities, but obviously some of it was also just not knowing how to handle it. They weren't used to making modifications. So, a good example that I can think of is in my first two or three years of high school, I get everything in braille. Then they tell me that I will need to switch to computers. I said I would rather stick to braille. I think braille is easier for me. They said-

Figure 26

Sketch of Switching from Braille to Computers
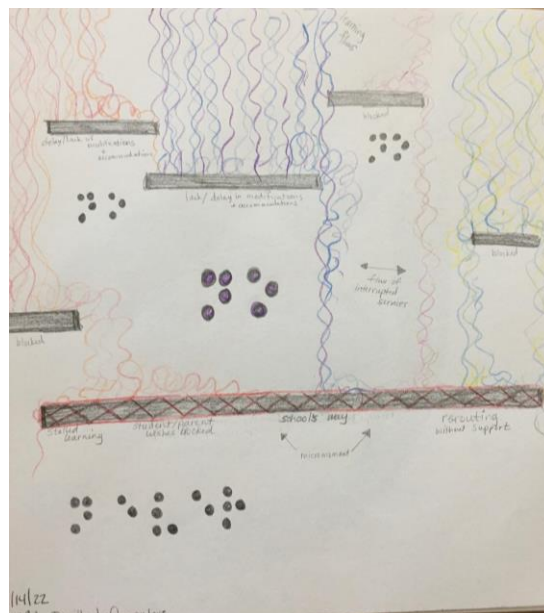
Textbox 9

Switching from Braille to Computers Notes

> **NOTES**
>
> *Learning flows*
>
> Delay/lack of modifications/accommodations   Delay/lack of modifications/accommodations
>
>   Blocked   <u>Blocked</u>   Flow of services interrupted
>
> BLOCKED
>
> Stalled learning   student & parent wishes blocked
>
> **MICROMOMENT**
>
> *School re-routed without support*   school's way the only way

They said that I needed to use computers in college and did not allow me to use braille anymore. The problem was that they were not set up for me to use the computer. I went a long time with the staff trying to get the software to work and without being allowed to use braille, which made me very behind in my work. Even though there had been problems with modifications and accommodations before, I couldn't believe that it was more important for them that I use the computer than to actually do my work and learn something that year.

Micromoment Flows

While exploring micromoment movement in response to the first research question, I encountered a couple types of flows, which I am calling sustained and dam(m/n)ed. Additionally, there were at least three kinds of interrelated flows, including those in which *unidirectional* flows

were foregrounded (transmissive; see Miller & Seller, 1990), those in which flows were *interactive* (transactive; see Miller & Seller, 1990), and those in which flows were intra-active (Barad, 2007).

I have borrowed the terms transmissive and transactive from curriculum studies. They refer to two of three perspectives for teaching and learning (Miller & Seller, 1990; Thomas & Footrakoon,1998). Transmissive describes teaching where the teacher is tasked with transmitting knowledge to student and transactive teaching is where knowledge is viewed as processual and control is shared (see Thomas & Footrakoon, 1998). These teaching/learning flows were evident across some of the microMemories.

Intra-active flows are similar to those in transformational teaching, the third perspective for teaching in curriculum studies where learning is designed as inquiry and facilitated by the teacher (see Thomas & Footrakoon, 1998). Conversely, intra-active flows were experienced beyond the teacher-student interactions as multiple, inter-relational, emergent, and embodied. The term intra-active is aligned with the neurodiversity-inspired educational perspective outlined in this dissertation.

These three teaching/learning flows attended most to the micromoment element of motion, through types of relational movement, as well as the elements of presence and divergence. Sometimes the instant of the micromoment occurred at or near a shift in attention to motion (e.g., transmissive to transactive). For example, in "Using a Twizzler to Conduct," the flow seemed to begin as transactive and shift towards intra-active at the instant of the micromoment. There was a sense of interaction between the teacher, students, and administrator prior to and during the musical event. It was believed that even without a teacher the students could accomplish a collective performance. Once the collaborator (as the student) began to conduct with the Twizzler, the event became intra-active because the mode of conducting left orchestra members with various ways of interpreting the wobbly direction of the limp candy rope and with the need to take cues from each other and the orchestral production as a whole (i.e., the assemblage).

Within the interactive teaching/learning flows were the sustained and dam(m/n)ed micromoment flows, which attended most directly to the dimensions of time, space, and possibilities, and the elements of structure, divergence, and motion. Sustained flows were the easiest to sketch because they felt continuous. There were structured and improvisational movements up until the instant of the micromoment which then shifted in flow but continued steadily albeit differently. Alternately, there were micromoments with flows that seemed blocked or diverted back to the original stream or structure at the point of the micromoment. I call these flows dam(m/n)ed. Dam(m/n)ed has a couple of connotations. First, these flows were dammed because they blocked or diverted movement from creative learning. The flow of the event was stopped, slowed, or redirected in some way. Second, damned has a negative connotation and reflects an aspect of being unwelcome, doomed, defeated, bad, or condemned during the interactions. Some of the dam(m/n)ed micromoment flows were blocked for a short time and in other microMemories the flows were blocked more completely. Table 5 lists the types of flows for each of the nine sketched micromoments.

Table 5

Micromoment Flows for Nine microMemories

microMemory	Type of Movement	Perspective	Setting
Shouting "A Dragon!"	Sustained, intra-active	Teacher	Preschool
Trying to Collaborate as New Teacher	Dam(m/n)ed, transmissive	New teacher	Team meeting
Grading My Invention	Dam(m/n)ed, transactive	Student	Gifted class
Not Doing My Homework	Sustained, transactive	Student	Middle school
Questioning Efficacy of Educational Policy	Sustained, transactive to intra-active	Student	Teacher Ed.
Not Doing the Oral Book Report	Dam(m/n)ed, transmissive	Student	Elementary

Switching from Braille to Computers	Dam(m/n)ed, transmissive	Student	HS/SpecialEd.
Not Jumping the Puddle	Dam(m/n)ed, transmissive	Student	Elem.Walkway
Using a Twizzler to Conduct	Sustained, transactive to intra-active flows	Student	School concert

The micromoment flows engaged with in this study seem to be in alignment with Beghetto's (2013, 2014) discussions of creative openings, soft dismissals, and creative mortification in typical classrooms. Neurotypical patterns of classroom talk follow transmissive teaching flows where the teacher asks or directs, and the students are expected to respond in a certain (right) way. Therefore, the teacher must decide what to do when there is an unexpected response, whether it be an idea or behavior. Of course punitive teacher responses to the unexpected have had negative effects on students and learning, but teacher soft dismissals can also cause negative effects (see Beghetto, 2013). Soft dismissals, such as saying "we'll come back to that," might not be outright rejections of the unexpected, but their effect is the same. Beghetto (2013) stated that "dismissals can, over time, send a message to students that their mini-c ideas are not welcome and thereby curtail students' willingness to share their mini-c ideas, interpretations, and understandings" (p. 78). In this statement, mini-c refers to "novel and personally meaningful" creativity, or creative learning (Beghetto, 2013, p. 11). Soft dismissals work like the diverted dam(m/n)ed micromoment flows.

Additionally, dam(m/n)ed micromoment flows that are completely blocked are similar to creative mortification. With creative mortification, there is a suppression of creative learning due to negative experiences, often including feelings of shame (Beghetto, 2013). In several of the microMemories, the creative learning blockers or dam(m/n)s were due to misunderstanding behavior, which is part of learning when viewed from the neurodiversity-inspired educational perspective. These micromoments evoked shame in not being able. For example, not being able to speak in front of the class, not being able to jump over a puddle, and not being able to remember what homework materials to pack in their backpack.

Beghetto (2013) noted that the suppression of creative learning, also referred to as talent loss, creates a problem larger than the student, teacher, and classroom. "The problem with talent loss is that once potential has been undermined, one never really knows what has been lost" (Beghetto, 2013, p. 89). What might have been created and learned if the one Micromoment in Neuroplexure collaborator was allowed to share his book report using a mode other than speech? What might have been created or learned if the protocol for walking in line was left up for class discussion? (See Not Jumping the Puddle.) What might have happened if a teacher in the early grades had noticed the student's need for developing organizational skills rather than dismissing the lack of completed homework as a behavioral issue? (See Not Doing Homework.)

Fiber Art Mapping

It is interesting to note that while sketching some of the dam(m/n)ed micromoments, it was difficult to find the pattern of flows. Although the event was moving, independent, individual flows were foregrounded more than collective event flows in these examples. This seemed to be case where collaboration felt forced rather than developed. There was a sense of structural blockages that attempted to maintain separateness or individuality within the assemblage. For

111

these microMemories, I tended to sketch patches, weaves, and solid looking structures that appeared to have less movement. On the other hand, the micromoments that felt like integrated events, I tended to draw with twisting, braiding, flowing strands. After noticing these differences, I made second iterations of sketches for a couple microMemories in preparation for the fiber art mapping.

I then narrowed down the study from nine to three micromoments. When choosing, I considered the least number needed to further explore most kinds of micromoment flows. "Shouting A Dragon!" displayed a sustained, intra-active flow. "Not Doing My Homework" displayed a sustained, transactive flow, and "Not Doing the Oral Book Report" displayed dam(m/n)ed, transmissive flows. These three were used for fiber art mapping, during which I continued to explore micromoment movement related to dimensions and elements.

The fiber art sculpture mappings used crafting practices that built on Knight's (2016) inefficient mapping as attunement to entanglements of space and Rousell's (2021) immersive cartography as maps you can walk into. The fiber art sculptures created during this neuroplexure were mappings or entanglements of the micromoment events as they moved. Here there is a more pronounced exploration of the dimensions of time and possibility than space.

Part of the foregrounding of possibility is experienced in the sculptures' openness to further exploration and play, which contributes an element of speculative immersivity. Further, as nonrepresentational cartographic inquiry, it maintains a "force of ethical deliberation" because the work:

> brings with it a belief that we might be productively otherwise and this belief is animated by an ethical commitment to change. Through our post-qualitative work we generate difference and we do so because it is the right thing to do given the vagaries of our shared world. Ethical force propels our practices for difference. (Kuntz, 2021, p. 217)

During each mapping, I used the corresponding sketch, fiber materials, such as yarn, thread, and embroidery floss, and other materials for structural support, such as Styrofoam and

chicken wire, to create the three-dimensional movement of each microMemory. In the case of "Not Doing the Oral Book Report," I created additional sketch iterations to attempt to capture the micromoment's transmissive flows before beginning its fiber art map (See Figure 27). I also replayed the microMemory video clips several times while mapping.

Figure 27

Final Iteration of Sketch for Not Doing the Oral Book Report
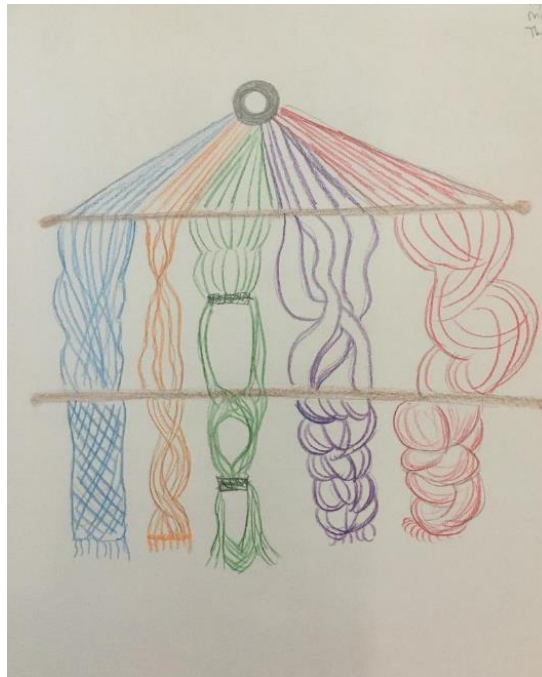
During data-weaving events, I took notes on the micromoment dimensions and elements that became known to me in the making-thinking. The sheets included spaces to make notes on each of the micromoment dimensions and elements. Although creative learning was occurring during the embodied mappings, I was not yet ready to verbalize this new knowledge. Therefore, after completing the fiber art sculptures, the notes became a way to begin to move beyond prearticulation. I used the notes to create poetry first, then short expository writings for each micromoment by dimension and element.

Figure 28

First Page of Micromoment Note Sheet

Figure 29

Second Page of Micromoment Note Sheet

114

Each of the three fiber art sculpture mappings will be highlighted in this section of weaving. First, pictures will demonstrate the thinking-doing processes. Next, poetry about micromoment dimensions and elements will follow. Finally, textboxes with beginning expository text will attempt to articulate what was learned. This format illustrates the ARTiculation process that can occur in creative learning and qualitative inquiry.

Shouting "A Dragon!" Mapping

The Shouting "A Dragon!" micromoment moved in sustained, intra-active flows. The emergent, creative learning event was continuous, with the teacher allowing the students to move in directions that diverged from the routine. The movement was created through the assemblage, the more-than-human collective engaged in this classroom activity.

Figure 30

Preparing the Underlying Structure for Shouting "A Dragon!"

115
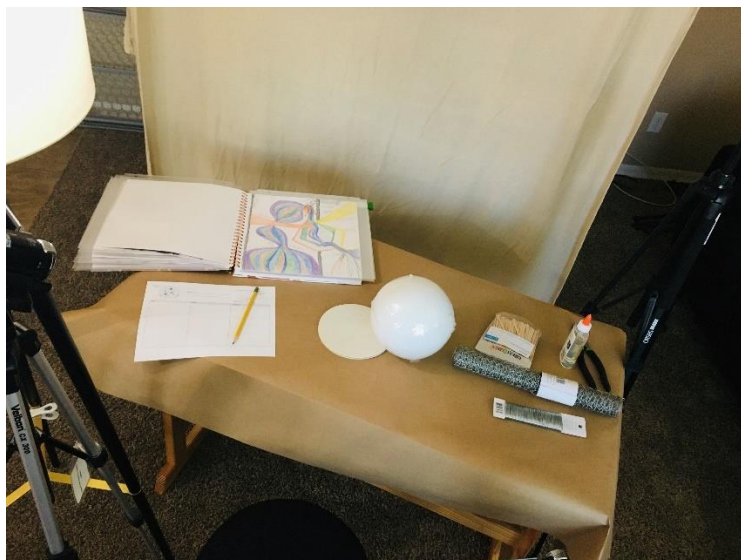
Figure 31

Wrapping the Structure with Fiber Flows

These multiple strands of yarn wrapped around the structure similar to how the collective class moved with/through/around the routine of the Bear Hunt song.

Figure 32

Mapping the Flow of the Bear Hunt Routine

At several points in the Bear Hunt routine, there are openings for students to change the direction of the activity by calling out an object that the bear might encounter. There are pictures of the objects that might be chosen. At the point of choosing, the movement squeezes tighter in anticipation, before spreading out into the next verse of the song.

Figure 33

Creating the Facilitating/Guiding Wrap

The teacher guided the movement of the class, shifting from tighter to looser facilitation and thinner to wider supports depending on the collective movement.

Figure 34

A New Formation Taking Shape

The teacher moved with the collective class assemblage, towards the creation of something new. The students merged routines from different activities and ended up creating a new experience. This section of the mapping was attached to the larger structure after the emergence of the micromoment.

Figure 35

Shouting "A Dragon!" Fiber Art Sculpture Map: Angle 1

Figure 36

Shouting "A Dragon!" Fiber Art Sculpture Map: Angle 2

Figure 37

Shouting "A Dragon!" Fiber Art Sculpture Map: Angle 3

       The "Bear Hunt" structure was completed. From the top emerged entangled strands and exploding yellow yarn, the instant of the micromoment. This then flowed into the new structure that was emerging. From the new structure or routine, extended multiple possibilities for further creation, depicted here with loose fibers.

Shouting "A Dragon!" Dimensions

<u>TIME</u>

Cultivating, minute by minute, day by day

Classroom community, culture

Building trust in routines

Of care

Always returning

Reinforcing

Reassuring

Like tying two points along the same string

Together

Looping time

Strengthening the next-again

Building momentum

Like a scarf in its crocheting

Time moves quickly

On a narrow path

Of predetermined pattern

Feeling productive

Ignorant of missed

Opportunity

Until the micromoment

Is noticed

Time

Shifts

Stops

Starts

Pattern seeking…

Textbox 10

Shouting "A Dragon!"- Time

Time is needed to nurture a classroom community. It takes consistency, structure, reinforcement, all in a caring manner (hopefully). Learning/teaching can then sometimes happen by routine. This routine could feel productive if it's not examined. In adhering to routine, opportunities for deep learning might be missed. In this way, routine might not always be a good use of time. When opportunities (e.g., micromoments) are recognized, the routine begins to shift and restructure along with experiences of time.

SPACE

Back and forth

Up and down

Overlapping, twisting

Laying side-by-side

Dimensions shifting

Around structures

Below structures

Becoming structures

Perspectives changing

The teacher

Spreads and shrinks

Malleable to the movement

In micromoment space

A scarf of many widths

A length of minute intervals

Repeated in difference

Back and forth

Up and down

Overlapping, twisting

Laying side-by-side

Dimensions shifting

121

To fragility

Uncertain, porous space

Multidimensional space

In formation

Textbox 11

Shouting "A Dragon!"- Space

Learning spaces can be the physical spaces of the classroom and school, but in the mapping, it is also movement and the relationship between aspects within the schooling/learning environment. What kinds of spacing does the teacher use in teaching or supporting students? At times, the teacher takes up more space, others less. Sometimes teachers are closer to students and sometimes further (i.e., proximity). What kinds of space do the structures of schooling take up? The curriculum, the curriculum map, the school policies, the classroom routines. They often make up the foundation space, but sometimes also the framing space, and/or the ceiling space. They can be supportive, or they can be stifling. Creative learning can generate new spaces, new structures. This shifting, possibility space is a fragile, uncertain space.

POSSIBILITIES

Too much?

Too little?

Yarns without pins

And tucks

Knots or stitches

Might unravel.

Distractions

Might lead to loss

Strands hidden

Clinging to others

Undistinguishable

Perfection

Preciseness

Preoccupy

Start with a pattern

<div align="right">

Make mistakes

Re-pattern the pattern

Generate new

Possibilities move

At the micromoment

Open to more shapes

More timeframes

Multiple directions

Where the ends

Are not always tied

And

The front might be the back

The up might be the down.

</div>

Textbox 12

Shouting "A Dragon!"- Possibilities

> Time and space continuously shift before, during, and after a perceived micromoment. At the point of a micromoment, possibilities for new experiences of time and new spaces, shapes, and forms are open. Holding tightly to the known (e.g., procedures, practices) can keep the learning and learners from generating something new and creative. Following the shifts in patterns made through mistakes or relationships with other aspects of the learning environment (e.g., students, teachers, materials, spaces) can lead to new or even slightly different patterns for learning. When open to different perspectives, teachers can learn to be distracted by perfection or preciseness less and to be more attuned to micromoments.

Shouting "A Dragon!" Elements

<div align="center">

<u>STRUCTURE</u>

Teacher massaged

Underpinnings

Develop

Classroom rhythms

Tying and tucking

Knotting and weaving

123

</div>

Measure against measure

Yet

Structure with choice

Structure with room to create

Flexible structure.

And like a shawl

On a cool night

The teacher

Wraps and warms.

Like a rope,

Guides through fog

To safety.

How tight one wraps

How tight one grips

The exact tension

Needed to hold on

For a creation ride.

Micromoment

Undefined shape

Messy space

Frustrating pulls and rips

Untamed strands

Unruly threads

Trial and error

Trial and trial

Single becomes multiple

What's finished unravels

What was becomes anew.

Textbox 13

Shouting "A Dragon!"- Structure

The underlying structures in formal education are used to develop classroom practices and routines. Students and learning are measured against those structures. During this weaving/mapping, the structures in place were flexible, allowing room for improvisation. The teacher used guided improvisation, balancing structure and improvisation moment by moment. This allowed the flow of the learning activity to be sustained through the micromoment, past the time of uncertainty toward the development of a new routine.

MOTION

Twisting, wrapping, growing

Together

To learning climax

Rests to restore

To assess

Reflect

Remind

Teacher guides

With soft knitted movements

As the structure wobbles

Wants to topple

With the inertia

Of the event

People, things, ideas

Tangle.

Teacher widens, narrows,

Loosens, tightens,

Moves with event

Cues with event

Micromoment shifts

Direction

Form

Speed

Pattern

Stop

Go

Start

Stop

Change

Combining familiar movements

In new ways

Returning to the known

Weaving a familiar difference.

Textbox 14

Shouting "A Dragon!"- Motion

There is a rhythm to a learning activity that provides structure and flexibility. There is a collaborative-ness, a cohesiveness to the event. There is a movement that ebbs and flows, rests, and regenerates. As improvisation/flexibility builds or increases, the underlying foundations might be threatened. Reflecting on these structures is important while the teacher responds to this movement. The teacher can take cues from the event, reassess the structures in place, reassess familiar practices, and allow difference to lead to creative learning for self and students.

DIVERGENCE

Flexibly contained

To generate

Adaptations

Yet

Not all stay put

In line

Within the limits

Teacher diverges

From the plan

In minute and hidden ways

In grand and rebellious ways

And like strands of yarn

Attracting each other

Getting snagged on wire

Learners shift

The pattern

The speed

The space

Moving in different ways

Diverging from

THE path

Splashing through

An ocean of possibility

In a micromoment.

Textbox 15

Shouting "A Dragon!"- Divergence

Learning environments are designed to contain (i.e., limit) divergence. Not all learners stay within the expected bounds. Also, some teachers might push the boundaries set by school norms. Things happen. Unexpected things happen. And these things can cause the established routines to unravel. It is at the micromoment that divergence is most deeply felt. When divergence occurs, the teacher must adapt to the changes in the classroom setting along with diverse students.

PRESENCE

Perceived

In conformity

Properly woven together

Loose ends tucked out of sight

Loose ends lost, camouflaged

Surface structure

Conceals underpinnings

Changes perceptions,

Perspectives

Stepping forward

Stepping back

Presence felt

Differently

Presence felt

In time past

For possible futures

Point links to point

A-long string

Circles

Multiplies

In nonconformity.

Textbox 16

Shouting "A Dragon!"- Presence

What is perceived of as present in a micromoment varies depending on the weight that is placed on the structures, people, materials, and ideas entangled in the event. Group activities, such as the one in this weaving/mapping, encourage a kind of conformity or unity in movement and presence. In singing a known song with practiced motions, the students and teachers moved in harmony. Any small divergences were probably not noticed much, as the whole class continued together. The teacher's presence became larger or smaller at different points of the activity, allowing students' presence to be foregrounded at expected times. This 'dance' encouraged at least one student to feel comfortable enough to make their presence known in nonconformity, stepping beyond what was expected of the learner. The teacher then became backgrounded as the students huddled together to connect familiar routines in new and unexpected ways.

Not Doing the Oral Book Report Mapping

The micromoment "Not Doing the Oral Report" moves in dam(m/n)ed, transmissive flows. Year after year, the teachers would block the collaborators' (as student) request to do the book

report using an alternative format. There was a sense that students were expected to learn independently, such as with preparing and giving oral book reports. The teacher gave the directions; the students were to follow. Then each student was to pass their 'knowledge' of the book they read to the other students in the class through the oral report. There could have been several micromoment instances in this microMemory. I have chosen to focus on the double refusal as the micromoment(s). The student refused to do the oral report and the teacher refused to allow an alternate format for sharing about the book.

Figure 38

Individual Chains Progress Over Standard Intervals

From school year to school year, the students were expected to show progress by preparing for and presenting an oral book report. These events marked regular intervals as students continued on their own distinct paths through the graded system. Although there was most likely room for divergence in the books read, there was inflexibility in how the report was to be shared.

Figure 39

Preparing to Map the Collaborator's (as Student) Oral Report Trajectory

Figure 40

Repeated Refusals Diverted Creative Learning

The collaborator (as student) repeatedly encountered blockages, or dam(m/n)ing, when refusing to do the oral reports and when the teachers refused to allow alternative forms for sharing the book report.

Figure 41

Mapping Reveals a Progress Mindset

The oral book report seemed to be a kind of mark of progress, yet it was a consistent hurdle for the collaborator.

Figure 42

Final Mapping with Entangled Future Possibilities

Although the collaborator came across this dam(m/n)ing every year through school, this practice did not continue into the collaborator's own teaching practice. As a teacher, the collaborator included flexible assignments for students, moving beyond the status quo toward a more inclusive educational setting.

Not Doing the Oral Book Report Dimensions

TIME

Again,

Again,

Again,

Time cycles

Measured by

The book report.

Repetition,

Over time

Equals

Progress.

Right?

Difficulty,

Increased

With time

Equals achievement.

Right?

Skill development

Takes

Time.

Repeat,

Repeat,

Repeat.

Refusal

Halts "progress"

But only

For the

Micromoment.

Textbox 17

Not Doing the Oral Book Report- Time

In this microMemory, there is a sense of repetition over time, a dreaded march toward the next required book report, the next refusal, the next failure. Time is marked by intervals from oral book report failure to oral book report failure. The sense is that the time spent on this repeated assignment was for progress, achievement, skill development… learning? Yet, there seems to be no deep understanding of why the assignment and the time for the assignment was beneficial. This marching time halts only at the micromoment, the moment that the teacher refuses to allow the student an alternate form for representing his work and the student refuses to give the required oral report. Here the teacher, parents, and peers are surprised that this student would rather take the F and 'fail.' Even with these refusals, time marches on and the next oral book report comes due. Until the student becomes a teacher.

SPACE

Forward

Straight forward

Space between

Learners

Separate spaces for

Learners

Loosely

Woven lines

Guide

At first

But later

Tighten and constrain

Stay in your

Own lane.

A refusal

Dams further

Creates

Space from self

Space between selves

Reader self

Writer self

Speaker self

Knower self

Dam(n)ing self

Dam(n)ing learners

To the lonely

Forward march.

Textbox 18

Not Doing the Oral Book Report- Space

In this microMemory, there seems to be a deliberate separating of learners, separating teacher from learner, and skills from subjects and modes of learning. These learner 'lanes' might seem less stringent in the early grades but probably become more and more hardened as students move up through the grades. In this micromoment, the speaker (of the oral report) was viewed as the learner and knower. The student who was not able, or refused to speak in front of the class, was then considered a failure, not able. But not able to what? The student was able to read the book, write about it, and glean important information to share with the class, but was blocked from doing this due to his anxiety with speaking in public and the teacher's inflexibility. The space was made in the structure of the curriculum for this repeated assignment, but there did not appear to be space for assessing its relevance or for matching the evaluation to the appropriate skills (i.e., grading on reading comprehension rather than public speaking).

POSSIBILITIES

Within the boundaries

Twist or weave

Knot or tie

But stay within

The boundaries

A refusal

Surprises

<div align="right">

To new possibilities

To reunify 'selves'?

Reader-writer-speaker-artist-

To ignore until next time

Fear, failure

To try harder next time

futility

To form new patterns

Of boundaries

Of process

Of product

Of evaluation

Of expression

Of learning

And teaching.

</div>

Textbox 19

Not Doing the Oral Book Report- Possibilities

> In every assignment, there are boundaries and 'wiggle room.' Flexibility allows for students to make learning relevant to their experiences, interests, and abilities. Teachers have the most power to decide the boundaries and the ways in which students can move within the boundaries. They also have the power to respond to refusals and to uphold those expectations. But, once there has been a refusal, there is the opportunity to form new patterns for learning rather than tightening the boundaries that are already not working for at least one learner. The student in this microMemory was met with inflexibility leading to failure, but this student later became a teacher and created flexible assignment boundaries for students while developing an inclusive environment.

Not Doing the Oral Book Report Elements

PRESENCE

Like strands of yarn

Kept in line

To maintain

The pattern

One by one

Side by side

Skill by skill

Parallel

Until the oral report

One-to-many

Facing, listening, judging

Speech

Not the book

Not the author

The student

With the notecards

The closed mouth

The feet that refuse

To move to the front

Of the class.

Singled out

Body

Face

Movements

Voice

Stage presence

Presenced, perceived

The speaker is knowledgeable

The speaker is a reader

The nonspeaker refuses

And is refused

Doubly damming

The learning process

Yet, learning prevails

Spills over

Learners learn

Despite

The dams.

Textbox 20

Not Doing the Oral Book Report- Presence

In this microMemory, learners are foregrounded as separately developing individuals. The teacher/student binary is also foregrounded as there is a distinct separation between the one giving the assignment and the one expected to do the assignment. The assignment itself foregrounded the oral presentation while reading skills, comprehension, discussion of literary themes and writing are all backgrounded. At the instant of the oral report, relationality shifts from parallel learning to one-to-many. The one presenting is singled out and judged by their body, face, movements, voice, stage presence, etc. They are judged by what others see and hear from this presentation in a context where public speaking is probably viewed as correlating with intelligence or being knowledgeable. Refusal is also foregrounded in this micromoment, both the teacher's refusal to alter the assignment and the student's refusal (or inability) to complete the assignment. This double refusal worked to block, patch, or dam the progress of learning for a while, most notably with the grade of F. But the learning kept on for the learner, who later became a teacher. What was the purpose of the assignment then? What could have been foregrounded other than the oral report?

<u>DIVERGENCE</u>

Difference

Contained

Requests to expand

Denied

Quality control

Standardization

Unique learners

Fashioned into

Similitude

Only refusal

Disobedience

Noncompliance

Insubordination

138

Frays the edges

Of the taut

Patterning

Where divergence

Can no longer be

Contained

Textbox 21

Not Doing the Oral Book Report- Divergence

Divergence is well contained in this micromoment. Requests to move beyond the limits are denied. This event reflects the factory model of teaching with its focus on standardization. Diverse students are made to learn and produce as similarly as possible. In this memory, the micromoment as a refusal, leads to divergence that cannot be contained. This divergence can lead to various opportunities, such as receiving an F for a grade, building low self-esteem and self-confidence, or creating new teaching strategies and modes for learning. Eventually, as this student became a teacher, he used his power to facilitate a learning environment where assignments were flexible in terms of process and presentation and where diversity of thought and learning modes were encouraged. It is interesting to note, that there is always more than one way or pattern emerging at any time in the classroom. The direction the learning assemblage goes depends on many things, but teacher attunement can make a difference.

STRUCTURE

Interval by interval

Calibrating

By event

Each report

Benchmarking

Marking

Learners

Like individual strands

Of yarn

Assessed

At each bar

Where the bar has been set

For them

Separate

Yet compared

For comparison's sake

These parallel shapes

Keep in formation

Improving in

Their compliance

In increasingly

tightly woven fabrics

individual yet

strikingly similar

uniformity

familiarity

acceptability.

Until the dam

Is built

Netlike

Holding back

But learning

Spills over and through

Neatly tied

Said and done

Tied twice

Into a stalemate

That leaks

Chaotic drops

Of possibility

Forming patterns

That drip

Drop

Textbox 22

Not Doing the Oral Book Report- Structure

This micromoment is structured by a movement that is marked in intervals. Each interval was indicated by the oral book report, a sort of benchmark or evaluation. It appears that very student was treated as an individual that must pass this mark repeatedly while progressing through their school career. Further, students were compared and judged by their performance. The expectation was standardized, designed for sameness of process and product, even though there might be variability with the books chosen for the report. This microMemory describes a dam or blockage in the flow of learning. The dam structure can be envisioned as netlike in that it holds back the student (and others) from learning because of its focus on containment. In this case, the nets are the teacher's refusal to offer flexible modes for presenting the report and the student's refusal to give the oral report. But, like a net or a woven fabric, there are holes and edges where learning still occurs despite the learners' divergence from expectations. Also, this dam is neatly locked, or tied, to make the statement 'that is that' or this is the way it is done, live with the consequences. Additionally, there is the finality of thought in 'this is not something I can physically do, so I will fail the assignment.' Learning still might happen, but the student's sense of self and the student-teacher relationships might be negatively affected.

<u>MOTION</u>

Marching forward

Building momentum

Faster

Toward

Pause

Restart

Interval to interval

Slight twisting

Some knotting

But moving

Straight

Toward

The goal

Until

Delayed

Dam(n)ed

Interaction climaxes

Teacher/student binaries

Stretch, strain to snap

Detain, constrain

Or cultivate

Flow

Intertwined

Weaving

Braiding

Knotting

Tying

Twisting

Together

Textbox 23

Not Doing the Oral Book Report- Motion

There is an urgency, a need for maintaining momentum until reaching the pausing point of the oral report assignment/evaluation. Movement is mainly linear and forward focused, most likely with some twisting and tangling, which is kept under control. At the point of the micromoment, there is a holding back or detaining and a spilling over/through. Then there is a restart and movement through the next interval towards the next oral report. The pausing at the micromoment occurs with a double refusal. Interactive movement also shifts as the teacher-student interaction becomes pronounced when neither is willing or able to give way. The movement forward seems detained, or slowed, but the movement between individuals has increased. While the relationship between teacher and student is foregrounded, it could possibly be reconfigured. In this microMemory, there remained a kind of stalemate with no adaptation to the assignment and no completed assignment.

Not Doing Homework Mapping

"Not Doing Homework" moves in sustained, transactive flows. Much like "Not Doing the Oral Book Report," the collaborator who contributed this microMemory talked about a repeating, schoolyear-after-schoolyear event. There were expectations from the teachers which most

142

students were meeting. Yet, the collaborator (as a student) was not able to meet the expectations like their peers. This sustained flow continued throughout the years, while the collaborator usually hovered on the outskirts of the class. The instant of the micromoment occurred when a new teacher noticed that the collaborator needed support for learning organizational skills. This teacher did not assume homework was being refused intentionally. After a period of instruction on and guidance with organizational strategies, the collaborator felt that they had been brought into the collective of the classroom and was less on the fringes. A kind of disconnected, or barely connected, hanging-by-a-thread kind of tangential movement in this micromoment also relates to belonging or not quite belonging.

Figure 43

Wrapping the Structure with Classroom Flows

The Styrofoam created the underlying structure of the year-after-year progression the collaborator felt going through school. The multiple strands and clumps felt like the various movements in classroom ebb and flow.

Figure 44

Movement Might Stretch the Structure

       Sometimes things happen in a classroom that stretches the structures in place, but the collective remains intact.

Figure 45

Needs Being Met and Feelings of Belonging

The collaborator, like the purple-pink strands, attempted to stay connected to the classroom, but could not meet expectations. They remained on the outskirts until a new teacher reached back to them and figured out what they needed to succeed. This connection led to more of a sense of belonging.

Figure 46

Tendrils Becoming Frazzled with Disconnection

The collaborator's wanting to learn and to be able to do homework was felt like a reaching in the mapping. They were reaching out for help, but no one was responding. This led to a sense of disconnection and futility.

Figure 47

Tendrils Reach to Future Possibilities

       While the collaborator tendrils were initially 'hanging by a thread,' once their needs were met, the teacher was able to open up multiple possibilities for future learning and teaching.

Figure 48

Not Doing Homework Sculpture from Different Perspectives

There is always so much occurring in a classroom, or other learning environment, that it is necessary to slow down and attune to its movements from different perspectives. What might appear to be disobedience from one perspective, might end up being a need for instruction in a seemingly different area.

Not Doing Homework Dimensions

<u>TIME</u>

Click-clack

Click-clack

Like a train on a track

Marking time

Chugging along

Moving forward

Passengers aboard

Living, interacting

Engaging

Some slow moving

Some quick with busyness

Some lives intertwine

Some linger on the outside

Time stretches

Long

For the outlier

Lonely disconnection

Until integrated

Connected

Reaching hands grasping

Textbox 24

Not Doing Homework- Time

> In this micromoment, there is a sense of measured time that is moving forward. Within this steady movement, there is some interaction and differences in how time is experienced, as with any group. But for one student on the outskirts, time stretches out long. It's a disconnected dragging time. Year after year, the student experiences the same thing. It is not until 6th grade that something changes.

<u>SPACE</u>

Pre-formed structure directs

Teaching-learning movement

Builds forward and upward

Wrapping in strands

Longer, tighter, thin strands

Shorter, bunched up, wider strands

School spaces filled

Neatly, messily, hurriedly, carefully…

Strands expand

Moving away

Yet still intimately connected

Eruptions ultimately are subsumed

Back into the structure

What moves outward

Is pulled back in.

Our class.

Our community.

Yet disconnect occurs

Tangential strands

Of desire

Moving alongside

But outside

Not integrated

148

But hovering at outskirts

Until…

Textbox 25

Not Doing Homework- Space

In this micromoment, space is felt within the pre-formed structure of schooling, which builds forward and upward. The student seems to express a sense of disconnection from the whole of the class community. As the community continues to learn together, the student remains unintegrated, on the outskirts. The community space undulates with limited divergence, yet does not attune to this student, who remains tangential to the community until the micromoment where the student's desire for learning and acceptance is satiated.

POSSIBILITIES

Movement patterns

Set in time

And space

Divergence

Pops

Re-merges

But desire pulls

Toward a reaching

Towards potential connection

Toward actual connection

Textbox 26

Not Doing Homework- Possibilities

In this micromoment, the possibilities are perceived especially when the desire, or reaching, of the student is reciprocated by the new teacher, one who attunes to the student's need, assumes good intentions, and supports learning. From that point, possibilities open for both the student and the teacher.

Not Doing Homework Elements

<u>PRESENCE</u>

Cohesive movement

Choral response

Normed patterns

Acceptable difference

Divergence perceived

Contained and submerged

Multiple perspectives

Foregrounded

Disconnections desire

Outliers reach

Student reaches out

Teacher reaches out

Beyond the cohesive

Choral, normed, acceptable

Toward each other

Knot in support

Anchors instead of pins

Attunement to

The fraying into emptiness

Perceiving desire

Rather than delinquency

Textbox 27

Not Doing Homework- Presence

There is a sense of cohesiveness present in this microMemory; there was a class movement from year to year. But one student was perceived of as too divergent to integrate into the class community and remained outside; physically present as an individual, but not present in collective community. The student wanted to do well but was not able to and the result of not turning in homework was that teachers perceived of the behavior as an intentional refusal of homework. The student's wants and needs were not perceptible to the teachers for some reason. Possibly because assumptions are made when there is a lack of attunement to the movement in a learning environment and in learning event intra-actions. Attunement is necessary to understand the student's underlying needs. At the point of the micromoment, there is an ultimate connection between the new teacher and the student because the need is finally perceived. There is then this instant where the student is taken into the fold and anchored with understanding and executive functioning strategies.

<u>DIVERGENCE</u>

Togetherness

Undulating

Stretching

Retreating

Eruptions subsumed

But deviation

Detached

Desires integration

Lonely

Disconnected

Unsupported

Reaching

Until grasped

Joined

Textbox 28

Not Doing Homework- Divergence

> There is a sense of togetherness, yet one that excludes divergence that is too different. The unexpected is experienced as deviant, so that when one student could not do what most of the other students were doing without explicit instruction, that one student was considered to be behaving badly. This is a false togetherness that is built upon rigid understandings of human development. It was only when divergence was attuned to without assumptions of misbehavior, that the student was 'brought into the fold.'

STRUCTURE

Standard

Similar

Moving

Together

Ages

Grade levels

Learning

The same

Building up

Year

After year

This structure

Supports difference

Only to a limit

Not too much

Not for long

A hook here

A hand there

But not

Enough

Not what's

Really needed

152

Forcing connections

Can burn

Like the hot glue

From the glue gun

Can exhaust

With each

Failed attempt

Attunement

From someone new

Can alter the structure

So that it stretches back

To the reaching outlier

Shifting the whole

Undulating with

Joining with

Detached

Textbox 29

Not Doing Homework- Structure

The structure seemed to move upwards in an almost uniform shape. It appeared to support only minimal divergence. Several (diverse) students were able to work together in a classroom community across many years, but not all felt connected, or felt like they belonged. The structure allowed for this disconnection because there was a lack of attunement and a surplus of assumption-making built into the mindsets, routines, and practices of the school. Not only being disconnected, but being forced to connect in unhelpful ways can also sometimes do harm. When teachers assumed that homework was not being done because the student was refusing to do work, this had many negative outcomes, including keeping that student outside of the classroom community. When an attuned connection is made between teacher and student, it can lead to supports for learning. The student is then anchored to the learning community and begins to integrate as a fellow learner, feeling a sense of belonging to the collective group.

MOTION

Moving up

Through each grade

Wrapping and filling

Every space

A learning community

Weaves

Along

Around

Beside

With.

Undulating,

Making divergence perceptible

Yet keeping

Connected

How does movement connect?

When the outskirts

And the outliers

Attempt

Reaching out

Falling away

Grasping

Yet, not held in return

Left outside

While inside

Inter-relation abounds.

Until a teacher attunes

Reaches back

Connects and supports

A new becoming-with.

Textbox 30

Not Doing Homework- Motion

This micromoment seems to move forward and upward. There also seems to be a sense of filling in or spreading out to fill the space, such as when the students continued through the grade levels, learning together, learning with each other, and with the support of the teachers. But there was also a sense of separateness, a tangential hovering where the one student that was not meeting expectations was relegated. This student was seeking, reaching, attempting to connect, but was not able to until a new teacher entered the learning environment. Then there was an inclusive, collective movement that was lacking before.

Movement and Attunement

Although I appear to be creating and using a classification system to define micromoment movements, it is not static or hierarchical. Here, it is important to remember the onto-epistemological assumptions of the neurodiversity-inspired educational perspective and the dynamics of more-than-human assemblages. Focusing on multiplicity, inter-relationality, emergence, and embodiedness, I attuned to flows that I then called sustained, dam(m/n)ed, transmissive, transactive, and intra-active. These are not all the possible types of micromoment movements, and the terms I use might not be the best labels. Furthermore, there is no better or best kind of micromoment flow or way to teach and learn. Of utmost importance in this study, is the teacher's attunement to the movement in the classroom, especially the movement in/through/with micromoments, and to how movement affects creative learning and inclusivity of divergence.

As stated earlier, these micromoment maps are kinds of inefficient, immersive cartographies that foreground movement and possibility, rather than physical space (See Knight, 2016; Rousell, 2021). Mapping the collective movement of an educational event, in terms of ideas, feelings, and actions is different than mapping, say, the collective movement of the flight of

a gaggle of geese by changes in location. It is rather like mapping this flight in music or painting. Furthermore, the microMemories were memories put to words and shared through voice, gesture, and other nonverbal communication, so mapping required the use of imagination and embodied knowing. Mapping as thinking-feeling and thinking-doing were required prior to articulation of knowledge. It is also possible that much of what was felt or sensed was lost in the translation from prearticulation to expressibility in words.

Attunement can be developed through practice (Manning, 2013). Attunement to micromoments could begin with an openness to explore unexpected moments in learning environments. By openness, I mean beginning without prior assumptions, or to at least set those assumptions aside for a while. There were many assumptions made during the micromoments that were mapped with fiber art sculptures. For example, a student who does not do an assignment does not want a good grade. Or a student who does not turn in work is being difficult. Delving deeper into assumptions, we can also assess the following: Students must complete homework. Students must do oral book reports every year. All students in the same grade level should be able to do the same things at the same level of difficulty.

Attuning to these micromoments with openness can lead to the questioning of assumptions and changes in practice. Educators might instead ask themselves: What if a student does not have the skills to do an assignment? What if grades are not important? What if school expectations are causing student trauma? Are oral book reports necessary? If so, why? Is homework necessary? If so, why? Should we compare all sixth graders to a sixth-grade standard across all areas of development? And so on.

Additionally, attunement can lead to co-choreography, or co-design of the emergent learning event (Manning, 2013). Once people are open to all that is occurring in an event, they can begin to move with the event in ways that both shape the event and lets the event shape them. Educators are charged with shaping the learning environment and the events in that environment. During that shaping there are fluctuations between structure and improvisation (Sawyer, 2019). For example, in "Shouting 'A Dragon!'" the teacher attuned to the shift in

movement, which was a breaking away from the routine, and was open to 'going with the flow' for a while to see what might be created. The teacher could have redirected the student who called out "a dragon" to choose from one of their predetermined objects in the song. The teacher could have also reprimanded the student and assumed that they were purposefully taking the class off-task or that they were attention-seeking. Instead, the teacher moved with the class to not only witness, but further take part in a completely new creation. Students here were not only able meet standardized objectives like following directions, memorizing song lyrics, repeating the names of known objects, but during creative learning, they collaboratively problem solved, synergistically combined known routines in new and unexpected ways, and developed a new class activity. Recall that these were three-year-olds. (Think about the assumptions that go along with this age group.)

Attunement is not easy to develop, especially when a learning environment is large, with many students, many materials, many outside (of the classroom) expectations. But I posit that it is necessary for the development of inclusive educational environments and events. Without attunement, we have students who are conditioned to believe they are failures because they cannot do something in the way that is expected of them. Moreover, without attunement we have students who are disconnected and feel they do not belong, which can affect learning and wellbeing for a lifetime (Jansen-van Vuuren & Aldersey, 2020). These students are 'hanging on by a thread' and are reaching out for understanding and support, but left to dangle, fray, and even detach.

Studying micromoments could be especially generative because they are instances or nodes in timespace in which the teacher (and others) is surprised and is more apt to take notice. Surprise and curiosity are very much related, and curiosity with openness can lead to attunement and change in teaching and learning practices (Engel, 2015). The microMemories and maps shared in this chapter are examples of how micromoments might move and how teachers might attune and respond to them.

microMoment-ing and Speculative Movement

It can be generative to engage in micromoment speculation. Considering what might happen after a micromoment, such as what a teacher or peers might say or do, can help educators plan for the design of future learning events. During the neuroplexure, co-learners were invited to engage with micromoments through microMoment-ing, which shifted the focus from the movement of the microMemory to the micromoment's potential future directions. Recall that microMoment-ing refers to the collaborative (re)creation of micromoments and an exploration of their possible movements. (See Theory and Methods for the microMoment-ing invitation.)

During this neuroplexure, I summarized the 20 microMemories that had been contributed during small Zoom groups, writing only up to the point of the instant of the micromoment. Then I placed each summary in a storying template saved to the shared Google Drive. During Zoom and in-person small group meetings, collaborators wrote or drew speculative endings by adding on to the summary in a round robin fashion. These fictional endings, or fabulations, allowed "concepts to change, evolve and variegate with life and living, which is necessary in being able to respond to the needs of the present whilst attuning to, being able to articulate, and living with/in a rapidly changing milieu" (Rantala & Koro, 2022, p. 50). One story starter was used by five collaborators to create three new versions of the micromoment called Not Taking the Math Fact Test. These collective speculative fabulations comprise the next section of this chapter.
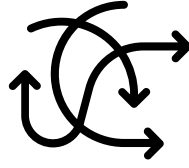
Not Taking the Math Fact Test: Version 1

(Story Starter)

I had always struggled in Math. My old school didn't provide a lot of resources in that subject area to help address that. My motivation to do Math was down significantly because I just didn't understand it.

In 4th grade, I transitioned to a new school. I was the new kid. All the other kids grew up together and really knew each other. On top of dealing with that, my new math teacher noticed I wasn't engaged in class. When it came to the multiplication timetable timed tests I thought, "There's no point. I don't know what I am doing." It created anxiety for me. So, I just wouldn't do them.---

Character: First person/Student (Jojo)

I looked out the window and noticed a bird that looked familiar - I knew that hop, that stop, that sideways look and then the hopping anew.

I wondered what that bird would do in a new situation like this. Do birds make new friends? Do birds have situations when they do not know what to do, but are expected to? Do birds know how to do math? I had heard once that crows can count - could this bird count to? I wish I could talk to this bird and ask it - ooh! There it goes hopping again. Hop, hop, hop. Three hops. Does it always hop three times before it stops?

I asked the teacher - Ms. - what kind of bird is that? I've seen it many times before, but I don't know the name? And do birds do math too? How do they know things like favorite places to find food? If they have three babies, do they know there are three? Do they know how many times they hop or fly from branch to branch?

Ms. Junco smiled and said, Jojo, do you like birds? I do too. That's an interesting question about birds and math…let's see what we can find out.

Character: Bird
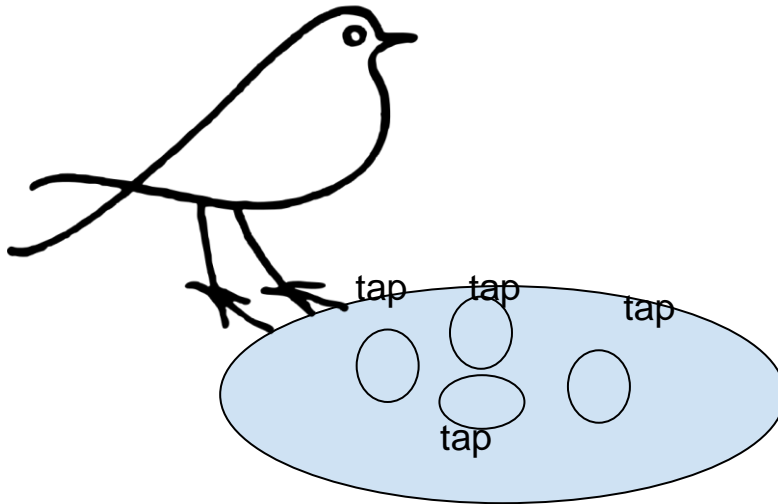
Character: Jojo

"Mom, mom! I had so much fun in math class today!"

My mom wanted to know what had changed, since I usually hate math. I told her that Ms. Junco let me observe a bird and Google if a bird can count. And birds do count! They can touch their eggs or even look at them and know if another bird has snuck in an egg of their own.

After that, I got to make up multiplication problems about bird's nests and eggs. And I didn't have to do the timed test today. But, you know what? I remembered all my X4s after I made up the math story problems. It was a good day.

Not Taking the Math Fact Test: Version 2

(Story Starter)

I had always struggled in Math. My old school didn't provide a lot of resources in that subject area to help address that. My motivation to do Math was down significantly because I just didn't understand it.

In 4ᵗʰ grade, I transitioned to a new school. I was the new kid. All the other kids grew up together and really knew each other. On top of dealing with that, my new math teacher noticed I wasn't engaged in class. When it came to the multiplication timetable timed tests I thought, "There's no point. I don't know what I am doing." It created anxiety for me. So, I just wouldn't do them.---

Character: David

This new school was a Catholic school and it was one of the first times that I had ever had a religion class as part of my day. I mean, I went to Mass on Sundays when I was younger, but we had stopped going recently.

I remember doing those multiplication timed-tests daily. The anxiety would weigh down my arms and hands to the point where I couldn't move them.

And, I remember the day I got over that anxiety. We always started our day with religion, and it just so happened that we were discussing David and Goliath. In all my years of church, I had heard the name David, but had never heard this story of a human defeating a giant. Sr. Wilson, my teacher, asked us to go around and say something that was big- something daunting- that we thought we couldn't do, but something that when we asked God for help, we might be able to. While I didn't share aloud, I thought to myself, if that David could try to defeat a giant, the least I, David, can do is try to defeat my own giant- the multiplication test.

And so, I did. I tried it and got a few. The next day, I imagined that story as I began and did that again and again until, finally, one day, I was able to finish the entire thing. Its nice to know that others who share your name do hard things, too, even if they're scared at first like I was.

Not Taking the Math Fact Test: Version 3
(Story Starter)
I had always struggled in Math. My old school didn't provide a lot of resources in that subject area to help address that. My motivation to do Math was down significantly because I just didn't understand it.

In 4th grade, I transitioned to a new school. I was the new kid. All the other kids grew up together and really knew each other. On top of dealing with that, my new math teacher noticed I wasn't engaged in class. When it came to the multiplication timetable timed tests I thought, "There's no point. I don't know what I am doing." It created anxiety for me. So, I just wouldn't do them.---

Character: Teacher

I had noticed that the new student has been very anxious during math fact timed quizzes. I, myself, don't like giving them, but they are a mandatory part of the curriculum. Today, the student did not even try. So all night I tried to think of ways to make the test easier on all of the students. I decided to bring my guitar to class today and sing a multiplication fact quiz song before the test. I'm really nervous about how the students will respond. And I really don't like playing and singing in public. I figured I'd just start with one of the songs from here:

https://www.youtube.com/watch?v=EgjCLhoI9Mk

Character: Multiplication Timed Test

"Why is it always timed?" moaned 5x3 from their square on one of the twenty-five crisp photocopied multiplication drill tests paperclipped with the others that sat in the file sorter on Mr. Romero's desk.

"I know," said 7x8 from two squares to the left of 5x3. "We are always one of the hardest ones and rarely get solved." 7x8 squinted and tried to subdue their jealousy that 5x3 at least had a better chance of being quickly solved during the timed drill. If only Mr. Romero allowed the students to spend time with us, then we might be able to interact and gain the pleasure of a no.2 lead product next to our = signs, joining multiplier and multiplicand.

162

From the file sorter on Mr. Romero's desk, they could hear Mr. Romero attempting to sing a multiplication song along with his guitar. Laughter from a few students floated from their desks to the paperclipped tests.

5x3 tried to look to see who was laughing, but all they could see was the vast whiteness of the test page stacked neatly on top.

"Times One is Zero. Times Two is Zero" some students sang along with Mr. Romero.

"Well of course Zero is the easiest and always gets a product penciled in during these drills," shouted 7 across the page.

"It's okay 7," said 8. He reached across the x and clasped 7's horizontal line. "We will get solved one day. We just need to be patient and trust that the students will learn and become faster in their memorization."

Just then, the paperclipped tests felt someone grasping them. Then, a wet finger pressed on the top perimeter of the pages and began separating them. Each test page blinked as the white page covering it was passed to a student. The fluorescent light greeted each new page before it found its way to a student's desk.

7X8 held their breath as Mr. Romero set the timer. Maybe today is the day, they silently thought.

Possibility in Fabulation

The microMemory called "Not Taking the Math Fact Test" inspired three different fabulations, or speculative story versions. While microMoment-ing, collaborators had to move beyond the known to imagine the possible. This caused discomfort for some, especially because the activity was open-ended. Some collaborators felt insecure and fearful about not doing it right.

But uncertainty and possibility, especially in emergent practices, are often connected. Those who contributed to the microMoment-ing were able to move in surprising directions, deviating greatly from the original microMemory. The microMoment-ing collaborators speculated about timed tests, math facts, and anxiety beyond the standard and cognitive conceptions. For instance, one person wrote with religion, another with a bird, and another with song. Religious texts, nature, and music are unexpected, but possibly generative, strategies for dealing with timed math fact test refusals and anxiety in the classroom. Furthermore, concepts such as anxiety and multiplication were embodied. One collaborator wrote about anxiety as weighing "down my arms and hands to the point where I couldn't move them" and another collaborator embodied multiplication through a counting bird. Additionally, the personification of multiplication facts expanded perspectives to the more-than-human.

In order to imagine possibilities, one must attune to micromoment assemblages. In this experimentation, the collaborators worked from a very short story starter, had not seen the video clip of the original microMemory, and had not themselves experienced this micromoment. Therefore, it was interesting to discover to what they most attuned as well as what kinds of characters, roles, or points of view they took on during their imagining.

Anxiety was foregrounded in this micromoment. Additionally, each version depicted the imagined student-teacher relationship and illustrated a segment of a more-than-human assemblage in the event. Possible strategies for anxiety, teacher-student connections, and more-than-human perspectives presented during microMoment-ing will be discussed in the following sections.

Student Strategies for Anxiety

Although the story starter only used the word 'anxiety' once, it was designed in a way that provoked a sense of mounting anxiety. From the struggle in math to a lack of resources to low motivation to being the new kid at a new school, those reading the account can feel the pressure building. Most people are able to relate, since everyone experiences anxiety at some point in their

lives. The microMoment-ing collaborators all attuned to this feeling of anxiety differently in their versions of the micromoment. In the first version, Jojo turned to an area of interest for distraction, and in the second version, David connected with a historical figure from a religious text to gain confidence. These versions remind us that there are many strategies for dealing with our feelings and that the behaviors (e.g., distractedness) might not clearly reflect the underlying feelings. Attuning to the undercurrents in the movement of these micromoments could allow teachers to better co-compose the event, moving in possible directions with empathy and care.

Teacher Strategies for Connecting with Students

Each microMoment-ing version attuned to the teacher-student relationship in different ways. In the first version, the teacher related to the student by connecting Jojo's area of interest with math. The teacher moved away from the routine and instead moved with Jojo's area of interest. These movements made a new path towards learning math facts. In the second version, the teacher connected with all students by asking them to share about things they felt were daunting and then by encouraging them to turn to their faith as was done in the Bible story they had studied. This teacher-student relationship was open to feelings and faith, which reassured David enough for him to give the math fact test a try. The micromoment moved away from a cognitivist approach for learning math facts and towards a more relational and spiritual approach. Finally, in the last version, the teacher stepped out of his comfort zone to do something that provoked anxiety for himself (i.e., play and sing in class) in an attempt to relieve anxiety for the student. This was a vulnerable move for the teacher, possibly creating a path for building joint empathy. He also attuned to the environment and explored ways to shift the classroom assemblage in hopes of altering the students' perceptions and feelings about the required math tests.

More-than-human, Multiple Perspectives

All three versions attuned to the more-than-human, alternately foregrounding the bird, biblical texts, historical figures, God, guitar music, song, individual math facts, and the paper that the facts were printed on. Highlighting diverse and perhaps unexpected members of the collective

learning community compelled collaborators to take on multiple perspectives, even when the story starter began from the perspective of the student. There are some interesting take-aways from these three versions both for those of us who collaborated in the microMoment-ing and those who now read the speculative fabulations.

First, educators might hesitate to make assumptions based on behaviors or actions. Because of the story starter, the collaborators knew that the student was experiencing anxiety from past experiences of failure in mathematics. In the microMemory, though, the new math teacher did not know why the student was not doing the work. It would be easy to assume that math fact test avoidance was for various reasons, including inattention, laziness, or defiance. In two of the versions, the teachers began to attune to the learning environment. In the first version, the teacher also co-choreographed learning events that engendered creative learning for the student in low stress encounters. In other instances of 'task avoidance,' the teacher might be open to multiple possible reasons for the behavior. Is the student avoiding the task because of anxiety from past failure or from anxiety about trying something new? Is it because the student has poor eyesight and is struggling to read the paper? Is the student too hungry to concentrate?

Second, instead of taking the routines and practices in place for granted, educators might assess their relevance and effectiveness. In the third version of microMoment-ing, the math facts are talking amongst themselves. Bringing this perspective to the story is like noticing the elephant in the room. There is a student that is not doing the math fact test. Although it could help to investigate what is going on with the student, it could also be beneficial to find out what is going on with the math fact test. Inherent in this practice is teaching by memorization and the use of timing. Visual memorization, fast recall (processing), and good fine motor coordination are only some of the skills necessary for this task. Therefore, teachers might ask themselves what the goal of the activity is, what is most important to know about student learning, and what other ways might learning be expressed.

Third, attuning to the more-than-human, collective experiences shifts onto-epistemological assumptions from individualistic to interdependent. From the individualistic (also

neurotypical) viewpoint, the teacher might think that if most of the students can do something, then it should be the expectation for all students. There is only one way to get to the goal and each person, with appropriate effort, should reach the goal. When looking at the class assemblage from an interdependent viewpoint, the focus moves to learning as being a discovery of what is created from/through collective intra-action. Creative learning is that which emerges from the student, teacher, other people, materials, environment, and practices. There are many ways to get to the goal, and sometimes the goals are multiple as well. From the first viewpoint, those who do not reach the goal or objective in the manner set forth will probably experience a sense of exclusion. From the interdependence viewpoint, creative learning becomes a learning-with where everyone is implicated as teacher and as learner and, in some respect, shaper of the learning event. This kind of learning environment evokes a sense of belonging and inclusion.

Responding to the First Research Questions

The fiber art sculptures were mappings of micromoments shared as microMemories. These re-tellings often included some background for the story, the perceived micromoment, and a description of what happened next. Instead of leaving each microMemory in that reality, it was generative to speculate what else might have happened through microMoment-ing. While imagining multiple realities through collective speculative fabulation, collaborators were able to further attune to intra-active movement in micromoments and utilize these accounts for learning/unlearning.

This chapter attended to the first research questions: How might micromoments move in/with/through emergent learning events? and, how might attunement to micromoment assemblages be developed? In summary, micromoments move in/with/through emergent learning events in many ways. Some of these flows I have termed sustained, dam(m/n)ed, and intra-active, and for others I have utilized the terms transmissive and transactive from curriculum studies. Sustained and dam(m/n)ed describe how continuous a learning event is in which a micromoment has been recognized. Transmissive, transactive, and intra-active describe some of the relationships, or movements between the members of the more-than-human assemblages.

167

Conceptualizing the micromoment from the viewpoint of a neurodiversity-inspired educational perspective was necessary before I was able to study their movements. This conceptualization included the dimensions of time, space, and possibilities, and several elements, including presence, divergence, structure, and motion with their respective qualities of perceptibility, diversity, designability, and intra-activity.

In response to the follow up question, attunement to micromoment assemblages can be developed by noticing that a micromoment event has occurred, by noticing how the assemblage is moving (in as much of its complexity as is perceptible), and finally by co-choreographing micromoments, or moving with the micromoment while allowing it to move the person who is practicing attunement. Furthermore, sharing and discussing microMemories could be a generative practice for learning how to notice when micromoments are occurring in a learning environment. microMovement mapping, whether through fiber arts or any other craft, and microMoment-ing seem to be beneficial for practicing attunement to micromoment movement and imagining possible ways co-design with the event.

It is important to reiterate that the kinds of micromoment movement and practices for developing attunement to micromoments described in this neuroplexure are not all encompassing. They are not the only way to experience or study micromoments. Yet, they offer possibilities for educators interested in assessing and revising their practices for the inclusion of diverse learners.

THE STUDY OF MICROMOMENTS FOR INCLUSIVE EDUCATION PROFESSIONAL
LEARNING

This neuroplexure used the micromoment as a point of commonality across co-learners, which included teachers, students, and neurodivergent adults. Bringing diverse people together to study micromoments established a common ground for considering and reconsidering educational systems, teaching/learning practices, and related ideologies and policies. Through the poly-experimental interactions, this PLC also attended to the second Micromoments in Neuroplexure research question, which stated, how might inclusive education professional learning transform with micromoments in neuroplexure? Although other parts of the neuroplexure respond in some way to this research question, data-weaving with the interactive and speculative flow chart, or moving content analysis, most directly focused on inclusive education PL strategies and topics. Experiences with and speculations from the moving content analysis are the main sources for responses to the second research question and, therefore, will be the focus of this chapter.

Moving Content Analysis: Flowchart to Fiber Art

To respond to question two, I began thinking with a conventional content analysis. Because research that uses the concept of micromoments to initiate professional learning in inclusive education is not currently available, a conventional content analysis is appropriate (Hsieh & Shannon, 2005). Although "qualitative content analysis is defined as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns," content analysis is also a flexible approach that is open to customization based on the needs of the research (Hsieh & Shannon, 2005, p. 1277). In this study, I left the classification process open and instead listed the main threads, or themes, of the microMemories and the multiple fibers, or discussion topics, that emerged during

the discussion. Some interpretation was needed to identify and label the threads and fibers, but further grouping or categorizing beyond the initial labeling was minimal.

Almost all the microMemory contributions began with the invitation to participate in small group Zoom sessions. Each microMemory small group began with a professional learning activity probe in which we reviewed relevant concepts, such as micromoments and inclusive education, and watched examples of people relating stories that could be perceived of as micromoments. Collaborators then shared personal microMemories and proceeded to engage in discussions related to those microMemories. As noted in previous chapters, these microMemories were kept as video clips or summarized transcripts, depending on the wishes of the collaborator.

After listening to and reading the microMemory contributions from seven small groups multiple times, I created a table with the name of each microMemory, their threads, and their fibers. (See Appendix E.) For example, I perceived four threads in the microMemory called "Comparing My Self Portrait," which I called: 1) joy in breaking rules on purpose, 2) taking an intuitive approach to an assignment, 3) same assignment resulting in diverse products, and 4) self-discovery. These threads reflected the collaborator's retelling of the micromoment and used the collaborator's own words when possible.

The microMemory in this example was shared in a small group of three people, who each shared one microMemory. Sometimes discussions began between microMemories, but most often the discussions emerged after all collaborators shared microMemories. The discussion topics, then, often resulted from an entangling of themes and elements in all microMemories, including those from the video examples and those shared between collaborators. For example, the fibers listed on the content analysis table for "Comparing My Self Portrait" were as follows:

1. Grading and rubrics
2. Valuation of teaching/learning in set/sequential order
3. Valuation of logical/analytical
4. Misunderstanding unexpected behavior

5. Late identification and neurodiversity

6. Art class- a place to learn the rules, only to break them

7. The art of teaching

8. Equity in education

To align with the overarching research question, the conceptual framework, and the main tenets of research-creation, I chose to follow these professional learning trajectories using movement, or mapping. Specifically, a mobile fiber 'web' or flow chart was created to show movement between the shared microMemories and discussion topics. This movement indicated how elicited memories connected to professional learning concepts and possible further creative learning opportunities.

The flow chart as a moving content analysis was intended to flow with the small Zoom group professional learning events, including the microMemories and the discussions, and toward the multiple future possibilities for creative professional learning, rather than to contain themes and understandings as static and unchangeable. Therefore, it was necessary to release the microMemories, threads, and fibers from the constraints of the table by using a flowing structure. Figure 49 is the initial sketch made of a possible moving content analysis for further engaging with microMemories and professional learning.

Figure 49

Initial Sketch of a Possible Moving Content Analysis
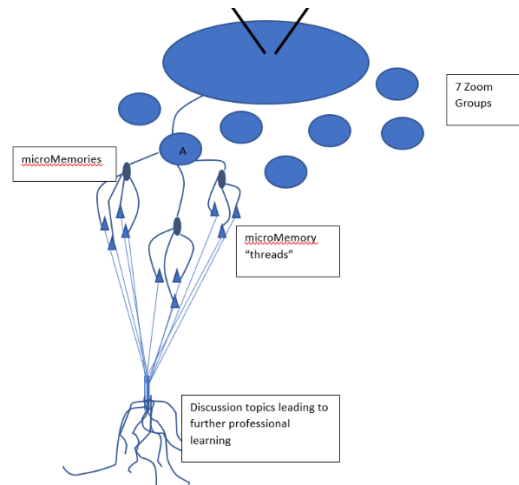
Using this sketch, hoops, yarn, embroidery floss, thread, buttons, and small pieces of cardstock, along with a crochet hook, embroidery needle, and a metal standing hook originally made for hanging potted plants, I created the flow chart so that it would continue to move and allow for further interactive engagement. I began with the largest hoop, thinking of the professional learning probe used in each of the small Zoom groups, and worked my way down to through the microMemories, threads, and fibers.

Figure 50

Top Hoop: Zoom Group Session 1
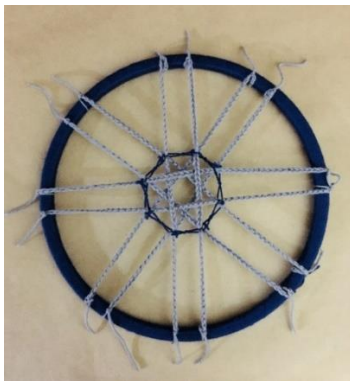
Figure 51

Seven Hoops: Seven Small Zoom Groups

Figure 52

microMemory: Crochet Chain and Button with Embroidery Floss
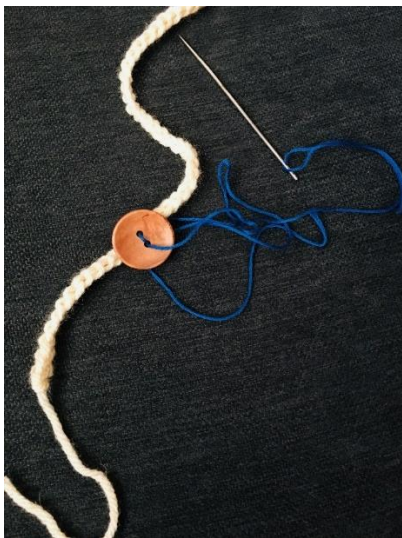
Figure 53

Attached microMemories

Figure 54

Threads (Themes) on Cardstock

Figure 55

Discussion Topics: Fibers of Possibility

Figure 56

Tying the Threads and Fibers

Figure 57

Moving Content Analysis

Figure 58

Moving Content Analysis from Other Angles

Although creating a moving flow chart from the static written table of information was time consuming, it was generative in that it gave me another mode of embodied interaction with the microMemories and discussion topics. As with the microMoment-ing engagements, this data-weaving also created space to explore possibilities for PL, only through discussion topics instead of fabulation.

To move into this improvisational space, I gathered the microMementos and other items, such as string and measuring tape. Then, I replayed about an hour of combined audio segments from the Zoom group sessions as I slowly interacted with each of the chains and strings. Only 20 of the microMemories were used in this data-weaving. Those from the Zoom groups were included, but not the one uploaded picture as there was no group discussion following its upload. After about 30 minutes of data-weaving, I stopped to take notes. After listening and interacting with the second half of the videos, I again took notes. As with the fiber art sculpture maps, this process was also videorecorded and photographed.

Figure 59

microMementos Entangled with the Moving Content Analysis
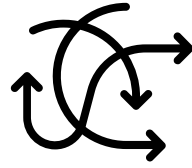
Moving with the Moving Content Analysis

This data-weaving is presented here with several screenshots from the moving content analysis event. In these pictures, the viewer can see me interacting with the flow chart and microMementos. Alongside the screenshots, there will be various quotes from the Zoom group discussions. Finally, there will be a description of several prominent threads and a consideration of the implications for future professional learning planning and implementation.

Figure 60

Moving with the Moving Content Analysis Part 1

"This system of teaching is very particularly suited to a certain subset of students who learn a certain type of way…"

"Whether other people notice or not how much you stand out, you notice it. Ok, I'm really different from other people. And I felt like that for most of my life around family, around friends, around classmates… you know maybe being Hispanic, maybe being an immigrant, or maybe my personality… I never thought, maybe I just think differently. And that's it. I experience… life differently. It's a different framework."

"With my diagnosis, everything has been recontextualized, my entire life and all its aspects. And so, it's kind of great that all of my classes in education are making us think back. What's the purpose of education? Why do you want to teach? And, kind of discovering, reexamining my relationship with education."

Figure 61

Moving with the Moving Content Analysis Part 2

"So, I always attribute her taking that extra time to really help me in, not that it helped me catch up faster in Math, it just, it helped me to know that I could still get it. It would just maybe take me a little extra time because I had fallen behind. And I think without her it wouldn't have opened up opportunities for me then in high school to take honors level math."

"I always would remember what she would tell me. She would just say take your time. I think, too, kind of hearing her voice, always being that positive encouraging person, it helped me to not give up."

"If anything, it has taught us from the last two, two and a half years now, is that nothing can just stay the same, you always have to adapt and try different things and account for different types of learners, too."

Figure 62

Moving with the Moving Content Analysis Part 3
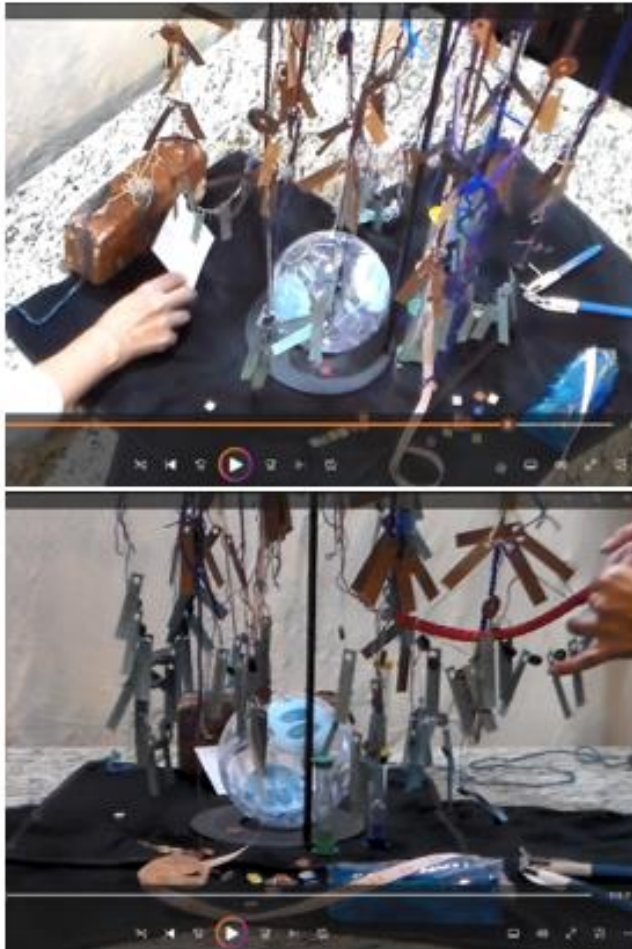
"Thank God for that flexibility now because it's tremendously useful for students now, general education students and especially for students with disabilities. If we'd continue that model from 70s and 80s many kids with different strengths would have to conform to the system."

"And that's the problem I see as a teacher currently. There is always this huge focus on write down the plans and tie it to all these science-based strategies. Tie it to this, tie it to that, there's the standards... Got all those things in place and whist, it's all out the window anyway. Which is ok, you know, we always manage to get it done. We do our lessons. We do our learning. It all happens, but not like it does on paper."

"When you're a teacher, it's open-ended. You know, it's like life. You're gonna make mistakes... You have to follow your intuition... Instill your own values into problems."

"I like this idea of the micromoment, too, because it's not like the drummer's big moment that changes his life forever, which is cool, too... for me it just didn't happen this way. Those sorts of positive changes might have been a constellation of things over an extended period of time, right? That thing you call support, and care. I felt supported and I felt cared for and that's why those teachers had a positive impact on me."

"So, how does one become more sensitive, or make more micromoments happen? It's just like teaching, it's a practice. It's a practice of micromomenting. I do think it is about risk... You do, as the instructor, have to take the dive and kind of have to have faith about that. Also, you have to make a risk assessment about, is this the right time to dive? That seems like something one can get better at, anticipating risk."

Figure 63

Moving with the Moving Content Analysis Part 4

"We might feel a little bit of guilt looking back on some of the choices we've made, but I think it's a good time to think about how we can move forward… then maybe we can think differently about them and make different choices in the future."

"Maybe there are some moments that we need to cherish in our daily life… Maybe we can try to use these kinds of moments to help others, to correct mistakes, like me, or help use these kinds of moments to influence the ideas, the viewpoints of others."

"Be curious, assume good intentions and we've gotta meet people where they are sometimes."

"I went all the way through public education not knowing I was autistic. I spent time in general education, special education, and even gifted and talented and none of it was quite right for me."

"I had recess taken away a lot. And I needed more recess not less recess. I needed more time to sensory seek… to be allowed to get up and walk around the classroom. Because I could still listen if I wasn't sitting still… That was the big struggle. My attention not looking like the attention of other kids. And being in trouble for that constantly. Constantly."

"I think people really need to understand that we all process information differently."

"We've got dyspraxia and dyscalculia and all these different things that are invisible. And right now, I think the school is only looking at autism and ADHD because we are the most disruptive to other people… with the current system, the way it's set up. We don't fit into those systems very well.

Figure 64

Moving with the Moving Content Analysis Part 5
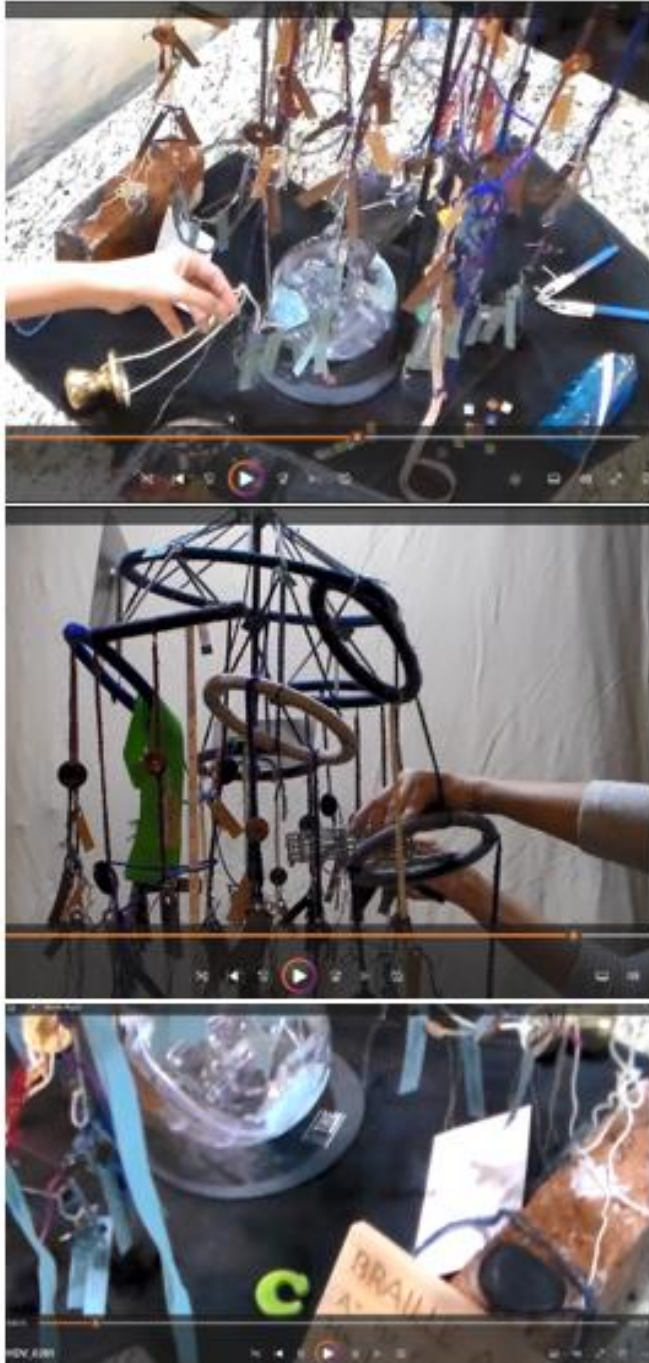
"But a lot of us are so traumatized by the time we go to the workplace. That's something that has to be addressed so we can be our best selves at work and not show up completely traumatized and depleted by the [educational] system that we've just gone through, you know, for 18-20 years."

"Some of them were not used to working with students with disabilities, some just didn't know how to handle it, what to do because they're not use to having to make modifications."

"So, they told me that that's the reason why, essentially, they pulled me out of gifted classes. They told me I was too nervous."

"As an adult, being stubborn, hardheaded and demand avoidant, a bit 'rebellious' as I was called as a kid, has served to my advantage. It's helped me. Whereas they tried really hard to train those things out of me."

"Maybe we need to sometimes not be so serious... Maybe we need to learn how to make jokes with students... maybe we give them too much pressure. And it maybe not good for their growth. So, I think we need to accept the students where they are and help them find their good points and try to help them grow in whatever aspect."

Threads

Throughout this data-weaving, there was a slow sense of unraveling, from larger, more general ideas to the smaller, more contextual fibers. These entanglings with the micromoments through microMemories and microMementos encouraged further prearticulated, embodied thinking that later led to articulated possibilities, which will be detailed in this section.

During the data-weaving with the moving content analysis, several reoccurring threads (themes) and fibers (topics) were perceived. These were not quantified for categorization but were noted and grouped because of their intensities. The threads listed here indicate areas that were relevant to collaborators and that might be further explored for professional learning in inclusive education. First, at a systemic level, there were several references to measurement through the practices of comparison, testing, and rubrics, and expectations, including unmet expectations and low expectations. Then there were discussions about teacher moves, including the tension between structure and improvisation and the integration of accommodations and modifications. Other threads flowed toward issues of self-discovery, receiving disability diagnoses, self-determination, and advocating for self and others. Another thread was woven around emotions and relationships. Teacher-student relationships and student-assignment relationships were often tied to an emotion, such as anxiety. Further discussions linked to (mis)behavior, misunderstood behavior, and refusals. Finally, there was a thread of discussion around in(ter)dependence, or the shifts between needs, expectations, and desires for independence and interdependence.

Measurement

Issues of measurement and comparison came up often in the discussions. Measurement included forms of assessments, such as rubrics and grading. Some of the discussion examples

expressed unfairness in assessment, especially towards divergence in ways of processing and communicating knowledge. For example, in "Grading my Invention," the collaborator explained that positive feedback abounded when presenting the final project to the class. The students and teachers enjoyed the invention of an exercise roller for guinea pigs. Yet, the assignment received a poor grade based on the invention rubric. The collaborator had not used the scientific method, which was the standard process delineated in the rubric. Additionally, in "Not Doing the Oral Book Report," the collaborator had a fear of public speaking, but was subjected to annual oral book reports. This person repeatedly accepted a failing grade because of the inability to overcome this anxiety and because there were no alternative options for assessing the book report. These examples might urge educators to question how assessments could be designed for students who think and communicate neurodivergently.

Figure 65

Measuring Tape Reminds of Rubrics and Testing

Collaborators also discussed how grades were not motivating enough when it came to emotional or traumatic experiences at school. It is a neurotypical assumption that students should be motivated to receive good grades, but there are instances where students cannot fulfill the standard requirements even if they desire a good grade. One person told about assessment anxiety in "Not Taking the Math Fact Test." The repeated timed tests caused mathematics anxiety

to increase to such a level that the collaborator would ultimately refuse to even try the tests. This example was similar to the person who would take a failing grade for oral book reports year after year. Educators might explore the assumption of grades and motivation from a neurodiversity perspective. (More discussion on anxiety and misunderstanding behavior will be found in later threads.)

Figure 66

microMementos Remind of Timed Tests and Grades

There were also other discussions about how assessment, at times, was used to reinforce a perception of a student with disabilities and/or challenges. One collaborator shared about "Getting a C." In this microMemory, the collaborator had been in high school and had missed school due to medical issues. When requesting to make up work and improve the grade, the collaborator was told that it was not necessary since a C was a passing grade. The student and his mother did not agree that the grade was representative of what the student knew and was able to do in that class. Additionally, there had not been accommodations made to keep the student from falling behind and there was no support for making up work after returning to school.

The school representatives were not concerned about the student's potential and felt that a passing grade was fine for this student with a disability.

Further, in "Doodling During Math," another collaborator felt that the teacher would attempt to stump them with math questions as a form of a "gotcha!" formative assessment. This person would doodle during math in order to better pay attention to what was being taught, but the teacher seemed to feel that doodling was an off-task behavior. Calling on this student to answer math questions in front of the class not only served as a check in to see if they were paying attention, but also as a kind of punishment. This teacher knew that the student did not like to be called out in front of the class. These examples might urge educators to question how assessments have been used to reinforce stereotypes about students perceived of as challenging.

One collaborator did not share a microMemory but made several connections during the small Zoom group discussion that related to test preparation. A test preparation teacher, called training school teachers in China, has the goal of getting all students to pass China's college entrance exam, the Gaokao. According to this collaborator, the high levels of anxiety and stress placed on students preparing for this exam had recently been nationally recognized and there had been new policy introduced. This policy intended to reduce the heavy test preparation focus for students. This heavy focus on standardized test preparation was also connected to similar expectations in the United States during the Zoom group discussion. This example might encourage educators to question how standardized test preparation is implicated in issues of student mental health.

Finally, there were discussions about comparison, which tends to be inherent in many forms of assessment. Some of these comparisons will be described in the next section, "Expectations and Asynchrony." Here, I will focus on how collaborators measured themselves by comparing their abilities to their peers. In "Comparing my Self-Portrait," one collaborator told about how surprised he was when everyone in his class had completed their self-portraits. Although he had expected some differences between his classmates' projects, he found that

most of theirs were similar and his was quite divergent. While his peers attempted accurate physical representations, this collaborator had depicted himself somewhat abstractly. Even though these differences surprised him, he enjoyed the assignment and the class because he felt supported in his divergence. This collaborator and a few others in different Zoom groups also recalled comparing themselves to peers in attempts to understand themselves and their divergences better. Some of these other examples will be included under the thread of "Self-discovery, Self-determination, and Advocacy." The neurotypical practice of comparing students to each other leads to people comparing themselves to peers. An evaluation of this practice might motivate educators to question if and how comparisons could be used to cultivate inclusive environments.

Expectations and Asynchrony

Related to issues of measurement and comparisons, a few discussions included concerns about expectations. There were a few examples of mismatched expectations, such as the "Getting a C" microMemory mentioned above in which the student and parent expected the grade to match student ability with accommodations and the school staff expected the student to keep the minimally proficient grade. Additionally, in "Grading my Invention" the student expected his rubric grade to match the in-class feedback, but the former focused on process and the latter on product. In another example, "Trying to Collaborate as a New Teacher," the collaborator expressed a mismatch between expectations of how a grade level team would operate during collaborative planning meetings and her actual experience during her first year of teaching. This person thought that teachers would work together to plan and share resources, but in reality, the more experienced teachers were not open to learning from the newer teachers or in working together to create anything different from what was already being done. These examples might signify a need for further exploration of how mismatched expectations in school communities might create barriers or possibilities for inclusivity.

Figure 67

Empty Backpack Reminds that Homework Completion is a Complex Task

There seemed to be several instances where school expectations were based on

neurotypical viewpoints of human development. There was the expectation that age or grade

level peers should be able to do the same things at the same time. This was evident in "Not

Doing Homework" when teachers assumed that the student's consistent lack of homework was

intentional instead of understanding that the student needed to be taught organizational and time

management skills. It was assumed that since most of the other students were able to take home

the materials they needed, remember the directions, complete the assignment at home, and

return the completed work the next day, that every student should be able to do the same.

Similarly, in "Not Jumping the Puddle," one collaborator shared how she was reprimanded for not

staying in line as each of her classmates crossed the landscaped area, jumping a large puddle

before reaching the sidewalk by the classroom. Since this collaborator, as the student, knew that

she would not be able to cross the distance that her peers could easily leap, she left the line and

walked behind the teacher, who had gone around the puddle. In this example, the collaborator felt

that the students knew of her physical challenges more than the teacher, who assumed that the

collaborator had intentionally mimicked the teacher. An evaluation of the assumption that students of the same age typically develop in the same manner might have educators questioning their understanding of developmental stages and exploring diversity perspectives of human development.

Figure 68

Empty Backpack and a Puddle Remind of Expectations for Human Development

Other discussions touched on asynchrony, the uneven development across developmental domains, and the neurotypical expectation that individuals should progress evenly across domains (See Vasquez, 2023). All people have asynchronous development to some extent. Several collaborators remarked upon having noticeable strengths as well as distinct challenges in different areas. This issue was especially evident during the discussions after sharing the microMemories titled "Comparing my Self-Portrait," "Retreating Under the Desk," and "Being Removed from Honors Class." Two people from the first two microMemories had been in general, special, and gifted educations at various points of their school career, and the third

person, who had physical and sensory disabilities, had been placed in and removed from honors English in high school.

The collaborator who shared "Retreating Under the Desk" explained that the school environment was not a safe space for their sensory needs. Regulating sensory stimuli often took extra energy and made learning difficult. The collaborator in "Being Removed from Honors Class" recalled that he was removed from his honors level English class after becoming anxious, partially due to the lack of accommodations and modifications available for him to fully participate. The school staff's response was to place him in general education English and cite his anxiety as the reason for the removal. In these discussions, there was some reference to feeling as though none of the school placements had been appropriate for their unique, and uneven, constellation of needs.

Furthermore, the first two people described here went through school without a disability diagnosis, only receiving labels of autism or ADHD as adults. They felt that an earlier diagnosis might have helped them to better navigate the school system with their asynchronies. The third individual had diagnoses before school age but felt that his school was not able to meet his needs, especially being that he learned quickly but needed accommodations and modifications for his visual and physical impairments.

Other collaborators also mentioned uneven development and its effects on their schooling experience. For example, the person who contributed "Not Jumping the Puddle" highlighted uneven development between academic ability and physical agility and the person who contributed the microMemory "Not Taking the Math Fact Test" explained that she was good in literacy, but not in math. At a more detailed level, there were discussions about apparent paradoxes, such as being an early reader, but having difficulty translating thoughts to language, or being a good student, but often getting into trouble. An evaluation of the assumption that students typically progress through multiple developmental domains evenly might also motivate educators to question their understanding of developmental stages and explore diversity perspectives of human development.

Teacher Moves

Although many of the collaborators were educators in some aspect of a school system, from preschool through higher education and test preparation, two of the collaborators did not work in school or university settings. These two people each contributed three to five microMemories and had several insights for teaching and learning. Additionally, because of the focus of this neuroplexure, many discussions among all collaborators included the topic of teacher moves. Teacher moves include the balance between structure and improvisation and the related concepts of (in)flexibility, (non)compliance, and (im)permanence. I use parenthesis for these words to denote that they are not binaries. Inflexibility is part of any discussion on flexibility, as is noncompliance of compliance.

During the first Zoom group held, there was reflection on how some teachers tended to value logical, analytical thinking and designed teaching and learning experiences in preset sequences, while others, such as one collaborator's art teacher, created improvisational classroom cultures where students could learn the (art) rules so that they could then break them. This same collaborator shared about the structural and improvisational spaces that were recognizable in one of his teacher education courses. In the microMemory "Questioning Efficacy of an Educational Policy," this collaborator spoke about how the course instructor had organized the class using a jigsaw assignment with readings and presentations. This instructor also was flexible and moved with the class as they proceeded to ask difficult questions inspired by the readings. These examples describe how teachers move through structuring the learning environment, while designing for creative learning.

One aspect of the structure and improvisation balance is the concept of (in)flexibility in teaching. There were several microMemories that brought attention to a teacher's unwillingness to adapt the plans or routines in order to move with the classroom assemblage. For instance, in "Solving Math Problem in Unexpected Way," one collaborator shared how her math teacher would not accept her answer because she had used a song called "525,600 Minutes" to give her answer instead of working out the mathematical conversions. Also, in "Not Doing the Oral Book

192

Report," the collaborator told how he completed a book report every year, but never received credit for it because he could not speak in front of the class. The structures in place in these two examples did not allow for adapting to students' strengths. Similarly, in "Trying to Collaborate as a New Teacher," the collaborator reflected on how the experienced teachers were not open to trying new teaching methods because they felt that it was best to stay with the way things had been done in the past.

Alternately, in both "Using a Twizzler to Conduct" and "Shouting 'A Dragon!'" the discussion groups recognized the principal's and teacher's openness to move with the group. In the first example, the principal provided the possibility that the student orchestra perform in the absence of the band instructor by choosing a student conductor. This, in a sense, embodied the saying "The show must go on!" while encouraging the orchestra to move through the micromoment and create a new experience. Likewise, in the second example, the preschool theatre teacher was open to allowing an unexpected object in the "Going on a Bear Hunt" song and to following the whole group of students as they decided how to solve the problem of having a dragon on a bear hunt.

Figure 69

Dragon microMemento Reminds of (In)flexibility

In some cases, it was hypothesized that (in)flexibility was related to (non)compliance. When structuring the learning event, some teachers expected to control the situation more than others. The assumption being that keeping control of a class included the expectation for compliance from the students. Compliance was expected in the math problem response and oral report micromoments described above. Also, in "Walking a Student from the Bus," compliance was expected from both the student and the bus driver when a teacher forbade the bus driver from accompanying the student with visual impairments from the bus to the school gate. This command was issued even though the student had requested the bus driver's company. The collaborator who shared this microMemory also stated that the bus driver later remarked that they would continue to walk with the student as long as the student wished.

Compliance is an expectation in all classrooms at some level. For example, in "Shouting 'A Dragon!'" the teacher expected that students would call out one of the objects from the song cards that they had used multiple times before. The surprising addition of the dragon created the micromoment, causing the teacher to experience (non)compliance. In this case, the teacher shifted expectations, while in some of the other examples teachers demonstrated limited flexibility with (non)compliance.

Figure 70

Twizzler, Dragon, and 525,600 Sticker Remind of Structure and Improvisation

Related to (in)flexibility and (non)compliance was (im)permanence. Part of balancing structure and improvisation in education is recognizing that some things seem to stay the same while others could change drastically. (Im)permanence was felt when someone thought that they would always be bad at math or would never learn to submit completed homework. It was also felt when new teachers were made to assimilate into the status quo. Additionally, (im)permanence was reflected in each micromoment, when something unexpected happened. Further exploration of structure and improvisation, (in)flexibility, (non)compliance, and (im)permanence, might motivate educators to reflect on how they might design, attune to, and shift directions during learning events.

Other teacher moves pertain to who is foregrounded in lesson design and delivery. These discussions might include considerations of teacher-led and student-led learning experiences as well as how accommodations and modifications are implemented. microMemories about teacher-led learning events had high amounts of structure and expectations for compliance while microMemories about teachers who followed the students' lead had a solid structure, but an openness to adapt. The topic of adapting is connected to questions about who should have access to accommodations and modifications. As noted above, a couple of collaborators did not receive disability diagnoses until adulthood and did not receive accommodations and modifications through special education, even though the learning environment was not appropriate for them. But even in the case of the collaborator who did receive services as a student with a visual impairment, the accommodations and modifications were not provided as needed and his education was affected. These issues urge educators to question the student/teacher binary that is upheld in neurotypical schooling and lesson planning and consider more dynamic, event focused learning environment design strategies. These strategies might encourage less emphasis on disability labels and more emphasis on designing inclusive learning events.

Figure 71

Braille Alphabet microMemento Reminds of Who "Leads" the Learning
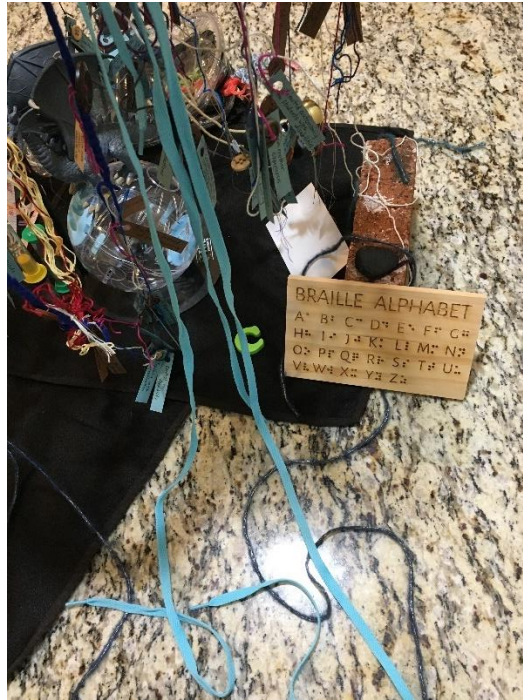
Self-discovery, Self-determination, and Advocacy

microMemory discussions also covered threads of self-discovery, self-determination, and advocacy. Related to self-discovery, some microMemories elicited reflections on who the collaborators were at the time of the micromoment, who others perceived them to be, and how they identified themselves more recently. Although collaborators were not asked to give demographic information, most shared some about their identities. These identities were linked to roles, such as student, teacher, parent, or class clown; abilities, such as being good or bad at a specific academic subject; and social groups, such as ethnicity, language, and gender. As mentioned before, there were also a few discussions about having or being without disability labels and how those labels might or might not have helped students receive an appropriate education in an inclusive setting. The self-discovery thread could be productive for teacher education and for educators during professional learning because it reminds people that identities and belonging shift over time and in different contexts and could expand educator mindsets about

labeling and identity. Although self-discovery is a term more recognizable to educators, it might be beneficial to connect it to the neurodiversity-inspired educational perspective and concepts of individuation and transindividuation.

Figure 72

Self-discovery Involved Reflecting on Who One is Becoming
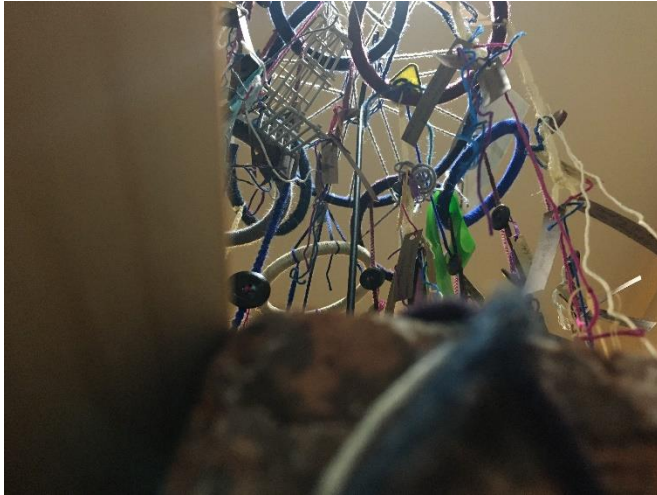
Self-determination was touched upon in several microMemory discussions. In "Not Doing the Oral Book Report," the student asked the teacher for an alternative to giving the book report orally but was denied. In "Walking a Student from the Bus," a student requested a companion to walk with to the school's front gate. The bus driver supported the student's wishes but was reprimanded by a teacher. In "Getting a C," a student wanted an opportunity to increase a grade that was low due to medical absences but was denied. In "Switching from Braille to Computers," a student was told that he would have to stop using braille, his preferred mode of communication, and start using computers to prepare for college. Even though the school was not prepared to support his computer training, he was denied. None of the microMemories noted a time when a student's explicit request was approved. The self-determination thread could assist educators when considering how student self-determination and self and peer advocacy skills might be developed and supported.

Figure 73

Toy Fence and Braille Alphabet microMementos Remind of Self-Determination

Discussions also included examples of advocating for others. In "Standing up for Another," a collaborator told of a time that she stopped a classmate from harassing another classmate. Her actions surprised all involved, including herself. Another collaborator told about a fellow student in advisory class who often came late to school because she was a teen mother, in "Being Late to School." In this microMemory, the student/mother was shamed for having expensive shoes but no money to pay a babysitter. This example might represent the times we are aware of injustices but do not know how to initiate change. The surprising or unexpected instance in this microMemory was the teacher's response to the student. The collaborator (as observer) expected care, concern, or support from the educator, but observed the opposite. This advocacy thread could be productive for educators when considering what kinds of knowledge and understanding might come from student peers as well as how to support students who wish to become allies.

Emotions and Relationships

Throughout the Zoom group discussions, there were expressions of emotions, including feelings of anxiety, hopelessness, frustration, joy, disappointment, guilt, and loneliness, along with the surprise and uncertainty that are inherent to micromoments. Emotions were tied to the learning event, but more directly to the teacher or the assignment that was foregrounded within the assemblage. For example, when discussing "Comparing My Self-Portrait," the collaborator explained that the learning environment designed by the art teacher was joyful. When he discovered that his self-portrait was much different than his peers, he continued to enjoy the activity. The same collaborator shared that he felt curious after sharing "Questioning Efficacy of an Educational Policy." The structure designed by the teacher left space for a generative curiosity which led to questions and creative learning.

Figure 74

microMementos Connect Emotions and Relationships

Alternately, some collaborators expressed uncomfortable feelings. Anxiety was the prominent emotion in several microMemory discussions, including "Not Jumping the Puddle," "Not

Taking the Math Fact Test," "Not Doing the Oral Book Report," and "Being Removed from Honors Class." Collaborators were anxious when confronted with a task that they felt unable to accomplish without support. Furthermore, disappointment, loneliness, guilt, and hopelessness arose in discussions about mismatched expectations, measurement, and advocating for others. For instance, one collaborator was moved to tears while reflecting on past interactions with students. The others in the group assured her that reflecting on teaching 'mistakes' could lead to making different choices in the future. Similarly, in another Zoom group, a collaborator mentioned possible guilty feelings for missing micromoments and considered this generative for developing a sense of responsibility.

Figure 75

Worry Rock microMemento Reminds of Anxiety in Learning Events

During one Zoom group, the discussion turned to the link between emotions and memories. I had noted that several of the microMemories were connected to what are usually deemed negative emotions. The collaborators wondered whether it was natural for painful memories to stay with people longer. The happy memories about school seemed to be those that

were sustained over time, such as the constant care from teachers, or consistent successes in an academic area. Even though the group decided that there must be plenty of happy learning memories, it is possible that those that people return to are the ones that still need to work through. The emotions and relationships thread might encourage educators to question what they want students to remember from their schooling experiences as well as offer the sharing of memories, especially microMemories, as a generative strategy for professional (un)learning.

Figure 76

Twizzler and Dragon microMementos Remind of Joy in Learning
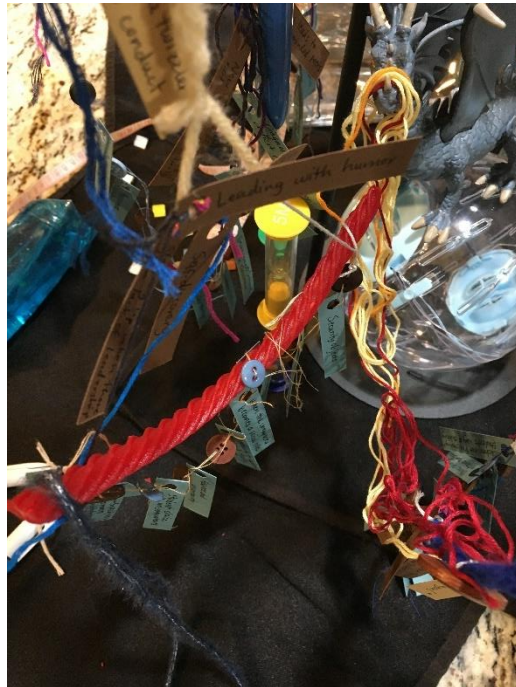
(Mis)behavior and Refusals

Although refusals and denials have come up in other discussion threads, here I specifically attend to refusals resulting from misunderstood behavior. These misunderstandings include times when students refused to do what was asked of them and when teachers refused to support the student. This issue is exemplified in the titles of several of the microMemories, which begin with the word "not." The "not doing" or not following of expectations was often designated

as the micromoment in the learning event. This unexpected behavior usually led to misunderstandings between teacher and student. For example, when one collaborator did not jump over the puddle with her peers, the teacher thought she might be mimicking the teacher's walk around the puddle. When another collaborator did not turn in their homework, their teachers assumed it was intentional rather than a need for developing executive functioning skills. When one collaborator doodled during math, the teacher assumed they were off task or distracted, which was the opposite of what was occurring. Additionally, when a student was often late to school and explained about not having a babysitter, the teacher assumed that her priorities were not in order. When deeming a behavior a misbehavior, the educator often responded with an additional refusal. Sometimes these refusals were very evident, such as when one collaborator was denied an alternative to the oral report. Other times they were less evident and involved a refusal to attune to or compose with the learning event. A study based on this thread might encourage educators to question what they believe about student behavior as well as how they might respond to unexpected behaviors in an inclusive learning environment.

Figure 77

A Blank Index Card microMemento Reminds of Refusals

In(ter)dependence

The last perceived thread involves in(ter)dependence, instances of collaboration or collective learning and times of independence or having to 'go it alone.' Collaborative learning structures were evident in "Questioning Efficacy of an Educational Policy," "Using a Twizzler to Conduct," and "Shouting 'A Dragon!'" In the first microMemory, a jigsaw reading assignment set the stage for presenting information and class discussion. In the second microMemory, the orchestra had to work together not only to perform, but to solve the problem of the missing conductor, and the last microMemory was about a classroom activity where students took turns leading and were able to completely shift the routine of the song to create something new.

In several other discussions, the onus was on the individual student rather than the whole group. This focus on individual students tended to occur in the same discussions that touched upon measurement/comparison and self-discovery, although the feeling was different for each of these. In one context, the individual was portrayed as being lonely and unsupported and in the other context, as gaining confidence and self-awareness. This distinction was observed when several collaborators were expected to 'go it alone,' whether it was to withstand classroom overstimulation, or walk to the school gate, or to go through their first year of teaching without support. Other times, standing up for someone being harassed or leading an orchestra singled out individuals from their group, but in a context where they were ultimately supporting others. Studying the in(ter)dependence thread might encourage educators to question what they believe about independence and interdependence and consider how and when to develop both in the learning environment.

Figure 78

Entangled microMementos Remind of In(ter)dependence
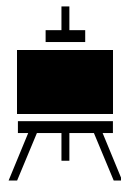
Possible Professional Learning Topics

During the moving content analysis, discussion topics were not grouped into themes using conventional methods because each topic was context specific. Yet, through the entangling of the flow chart structure, microMemories, and microMementos, several discussion threads (themes) became embodied. Although these threads were relevant for the Micromoments in Neuroplexure PLC, they could also be applicable to other PLCs. Most threads offered openings for unlearning, or for reconsidering the way things have always been done, which can lead to shifts in perspectives that might then lead to inclusive practices. Therefore, educators might choose the threads that are most relevant to their contexts.

The threads from microMemory discussions in this neuroplexure unraveled into many different possibilities for professional learning topics and areas of study.

1. Teacher moves: Educators might self-assess for structure and improvisation, (in)flexibility, (non)compliance, and (im)permanence in their teaching. Educators could question how they might design, attune to, and shift directions during dynamic learning events in their specific contexts.

2. Measurement and comparison: Educators might rethink the role of assessments and consider how to design assessments with neurodiversity, equity, and mental health in mind. Educators might also reevaluate the practice of comparing students to peers and seek other forms of assessment that cultivate inclusive environments.

3. Expectations and asynchrony: Educators could discuss mismatched expectations, between teachers, students, and parents, or between what a student is expected to do and can do. Evaluation of the commonly held assumptions that students of the same age typically develop in the same manner and that students typically progress through developmental domains evenly could lead to the exploration of diversity perspectives of human development.

4. Self-discovery, self-determination, advocacy: Educators could begin with self-study on identities, belonging, and explorations of how identities shift over time and in different contexts, which might expand the educator's mindset about labeling and identity. Educators could also consider how student self-determination and self-advocacy skills might be developed and supported in learning environments, including the use of peers and allies.

5. Emotions and relationships: Educators might be encouraged to question what they want students to remember from their schooling experiences. Memories are often tied to emotions about relationships to humans (e.g., teacher) and nonhumans (e.g., assignment, subject area) in the learning environment and the development of these relationships could alter the emotions tied to those events. Educators could use the

sharing of memories as strategies for professional (un)learning. When educators shift

paradigms, they might feel guilty for past practices, but can use those feelings to fuel a

change in future practice.

6. (Mis)behavior, refusals, and in(ter)dependence: Educators might question what they

    believe about student behavior as well as how they might respond to unexpected

    behaviors in an inclusive learning environment. They might also question what they

    believe about independence and interdependence in the learning environment and

    consider how and when to develop each.

Figure 79

Moving Content Analysis after Interaction
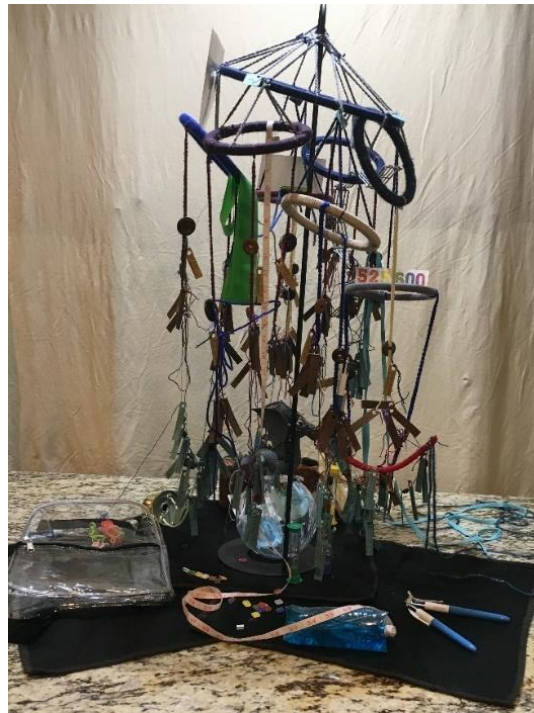
Possible Professional Learning Framework

The moving content analysis and the fiber art sculpture mappings have led to possible

new strategies for creative professional learning for inclusive education. In this section, I will

begin to outline a possible framework for the study of micromoments that could be further

developed for use with PLCs.
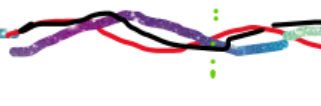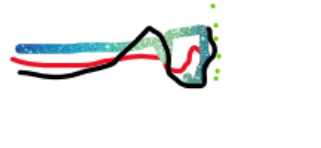
Small groups of educators could study micromoments in the following ways:

- Tell, write, or reenact a micromoment from the learning environment that you facilitate.

- Choose a microMemento (object/souvenir) from the event.

- Sketch the flow of the micromoment.

- Are the flows mostly sustained? Are the flows dam(m/n)ed?

- Build/create/move with the micromoment in all dimensions. Observe the movement you have re-created. How is the chosen microMemento implicated in the movement?

- Describe what you've learned. Consider each micromoment dimension and element.

- What does this tell you about the learning environment that you are facilitating?

- What does this tell you about the learning activities you are designing?

- How inclusive does the movement of the micromoment feel?

- Which elements would you like to work on and in which ways?

- The next time something surprising/unexpected happens, what specifically will you do differently? Why?

- How can the microMemento be used as a visual/tangible reminder?

To support the study of micromoments, the PLC should first be introduced to the neurodiversity-inspired educational perspective, the micromoment dimensions and elements, and the micromoment flows described in this dissertation. Table 6 offers visual models of micromoment flows. Micromoment study worksheets could be available for taking notes and to help support the development of attunement. (See Figures 28 and 29.)

Table 6

Kinds of Micromoment Flows

Most importantly, the PL facilitator will need to cultivate a safe, inclusive environment for educators to learn and unlearn. The facilitator could also consider ways to involve students and diverse adults, including those with disabilities, in the study of micromoments. This further diversifies the experiences shared in microMemories and might engage learners in discussions that would not have occurred otherwise.

Furthermore, the study of micromoments could be practiced within effective professional learning structures, such as PLCs and using action research, coaching, or lesson study (Adams & Townsend, 2014; Constantinou & Ainscow, 2020; Darling-Hammond et al., 2017; Deppeler, 2010; Song, 2010). It is important though that there is time set aside for discussing observed micromoments, considering the threads that might lead to new professional learning, opportunities to follow those threads, and supported practice for attuning to and co-choreographing with future emergent learning events.

Responding to the Second Research Question

This chapter responded to the second research question; how might inclusive education professional learning transform with micromoments in neuroplexure? Micromoments in Neuroplexure included the development of a diverse learning community that was interested in inclusive education and the facilitation of neurodiverse interactions through a website, invitational

methodological-poly-experiments, and small group discussions. I, along with the other collaborators, grappled with various educational issues related to ideologies, policies, and practices. This grappling involved self-assessment and the questioning of educational structures that have been considered status quo. Although collaborators did not have sustained contact with each other and the discussions were not followed by practical applications, several of the discussion threads led to possibilities for further inclusive education professional learning.

Many of the current practices for inclusive education professional learning are effective and would work alongside the shifts in ideology and practice that were embraced during this neuroplexure. First, meaningful PL often begins within safe learning communities that are designed for personalization within collaborative learning structures (Darling-Hammond et al., 2017; Deppeler, 2010; Forlin & Sin, 2017; Song, 2010). Important inclusive education professional learning also focuses on disability diagnoses and characteristics, related teaching strategies, such as UDL and differentiation, and collaboration strategies for special education and general education teachers, such as co-teaching (Ashman, 2010; Jones, 2010; Rapp & Arndt, 2012). Moreover, teacher attitudes about inclusive education show positive shifts after any focused professional learning (Royster et al., 2014). So, how might inclusive education PD transform with the concepts and practices engaged with in this dissertation?

Micromoments in Neuroplexure is a study founded on a neurodiversity-inspired educational perspective, which is comprised of onto-epistemological assumptions that diverge from the neurotypical. With a shift to multiplicity, intra-relationality, emergence, and embodiedness, many prevalent teaching and learning methods will need to be reconsidered. One educational aspect that might be transformed is the reliance on diagnoses and labels as well as the deficit-based thinking maintained by those static and stereotypical representations of identity. When operating from the neurotypical paradigm, there continues to be a focus on bringing 'those' students into the general education classroom and helping 'those' students by offering accommodations and modifications. When shifting to the neurodiversity paradigm the focus

becomes the learning events. Teachers then might ask, what surprises me and why? How can I support all students in creative learning?

Another aspect of professional learning that might be transformed is the focus on cognition as occurring in the mind. Rather than a cognitive or psychological approach to learning, Micromoments in Neuroplexure took a neurodiverse and creative learning approach. This approach highlights embodied learning, using multiple modes for thinking, learning, communicating, and interacting. Further, personally and collaboratively meaningful learning emerges in events that are designed by the educator but are also flexible enough for improvisation by the collective. This way of viewing learning includes all learners, from preschool to higher education students as well as teachers and other professionals.

Professional learning might also be transformed by the inclusion of people who are not professional educators. Typically teachers are gathered into a PLC, and although every PLC will include diverse groups of teachers, most of those teachers will not have had personal experience with disability, neurodivergence, or other social identities different from those with which they identify. Bringing diverse people together to study micromoments in a PLC encourages the reconsideration of unjust systemic ideologies, practices, and policies. Students and adults from social groups that are different from the teachers might participate as co-learners and maybe even as mentors to the teachers. These individuals would need to be compensated for their time, much like other experts who are brought in to conduct training or coaching for teachers. These PLCs could then use strategies such as the Framework for the Study of Micromoments to brainstorm further areas of study related to their specific teaching/learning contexts and to work together to develop a practice of attunement and co-choreography during learning events.

Finally, the Framework for the Study of Micromoments creates an open-ended route for linking ideology, policy, and practice through PLCs intent on cultivating inclusive educational environments. This framework refocuses educators to surprising happenings in learning events, rather than to individual students' abilities and challenges. It foregrounds feelings and memories within those happenings and urges educators to think-feel the event before making changes to

practice and instead of making assumptions about students. The framework is intended to be inclusive, meaning that educators could study any micromoment that arises and should not limit the study to micromoments that foreground predetermined students or groups of students. It is hoped that, through these experiences, educators develop a deep respect for all learners and presume competence of all. Even though this framework could be used in settings other than inclusive education, the goal of this dissertation was on professional learning for inclusive education.

Micromoments in Neuroplexure and the possible directions for inclusive education professional learning described here are in alignment with post-oppositional transformation approaches to social justice (Keating, 2013). These strategies can initially work in parallel with neurotypical structures for education and are not in opposition to special education or the diagnosing of disability for needed services. Yet, they do invite people to rethink, reconsider, self-assess, and (un)learn in ways that could produce transformation at varying levels from classroom practices, to school policy, to shifts in paradigms across society.

This neuroplexure is[5] an extensive exploration of multiple qualitative methods within post-qualitative onto-epistemologies and methodologies. Furthermore, the neuroplexure investigations were intimately tied to practical applications, both in education and in qualitative inquiry. The final research question reads; how might qualitative inquiry transform with micromoments in neuroplexure? First, it is important to recognize that qualitative inquiry is in constant transformation. In this chapter, though, I will present various reflections on the engaged processes and note possible practical approaches for opening, or reopening, lines of thought (thinking-doing) in the field. The following discussions include reflections on research-creation, methodological-poly-experimentation, cartographic approaches, memories and (un)learning, collective speculative fabulation, polydisciplinamory, and dissertation doings.

Research-Creation

This neuroplexure is research-creation. Research-creation is comprised of artistic processes in which making, or doing, is a kind of thinking that leads to new processes and new modes of knowledge (Manning, 2016). It is research through art, or "within a creative process, rather than alongside, around or for it" (Noury & Paquin, 2020, p. 13). Further, research-creation merges art, other practices, and theory, with research form and content using "a wide range of practices and approaches each supported by their own ontological and epistemological frameworks, as well as subjectivities" (Noury & Paquin, 2020, p. 16; see also, Loveless, 2019; Manning, 2016; Springgay & Truman, 2020). In this way, research-creation emphasizes "rigorous transdisciplinarity" or "polydisciplinamory," which includes rigor in research, theoretical work, and art work (Springgay & Truman, 2020, p. 2; Loveless, 2019, p. 60).

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[5] The neuroplexure is referred to in the present tense because it is not bound within the pages of this dissertation and readers (co-learners) are encouraged to further study/weave with it.

Additionally, this form of research exists in nonrepresentational or more-than-representational spheres where time, space, materiality, and affect are inter-related and queered in a continuous multiplication of unfoldings, or new-"ish" becomings (Springgay & Truman, 2020; Vannini, 2015). In this space, several scholar-activists have unsettled dominant paradigms, social, educational, and research related, by engaging with forms of research-creation that opened up new possibilities for different futures (Shannon & Truman, 2020; Springgay & Rotas 2015; Taylor & Benozzo, 2023). Loveless (2019) stated that research-creation "has the capacity to impact our social and material conditions, not by offering more facts, differently figured, but by finding ways, through aesthetic encounters and events, to persuade us to care and to care *differently*" (p. 107). Inspired by Manning's (2016) research-creation based on an activist philosophy directed through neurodiversity, this neuroplexure engaged issues relating to unjust, non-inclusive educational structures with an openness to transformative action (Loveless, 2019; Noury & Paquin, 2020).

Finally, research-creation is often articulated using multiple modalities since knowledge is experiential, situated, and embodied (Noury & Paquin, 2020). Research-creation has been disseminated through art exhibitions, performances, and texts using multiple genres, enabling continuous creative learning to ripple out into academic and public spaces (Loveless, 2019).

Micromoments in Neuroplexure was designed to capture these main elements of research-creation as multiple artistic practices that were open to the development of new processes and knowledge. I engaged in rigorous study of each discipline connected to the project, including the (re)learning of fiber art crafts. During the neuroplexure, there was an ongoing formulation of onto-epistemological assumptions and entanglements with time, space, materiality, and affect in the events of micromoments and data-weaving while activating an activist philosophy for inclusive education. This philosophy of difference was especially focused on how difference altered the unfolding event of the micromoment. Furthermore, the neuroplexure includes multiple modes of ARTiculation and dissemination, which will be discussed at the end of the chapter, in "Dissertation Doings."

Additionally, several other methodological considerations have arisen during this neuroplexure. Because the study was focused on events, I had to formulate new definitions for subject and data. This led to new, or neurodivergent, kinds of engagements with time, space, and materiality. Because of these shifts, I was able to reposition the 'expert' in knowledge making and had to adjust the pacing of research. Shifting with the research-creation also meant further consideration of the balance and tensions between the structures and improvisational spaces throughout the project, both designed and emergent.

Study of the Event

During the neuroplexure, I defined the methodological subject as an emergent event, along with its related assemblages in their becoming-with. The subject was the "what" that emerged during/as the micromoment event and not that which instigated the event in the first place (Manning, 2016). This subject-as-event emerged from the world as an ecological collective in time, place, and reality, as transindividual. Transindividuations highlight the intra-activity of assemblages within/composing the event. Therefore, in this neuroplexure, the subject was the event, and the event is transindividual.

Because of this shift in viewpoints, there was less distinction between researcher and participant in terms of knowledge creation. Even though I, as the researcher, facilitated and designed the enabling constraints, each person took the role of co-learner or collaborator and knowledge emerged collectively, especially during the micromoment invitations and small group discussions. Later, the co-learning continued between fibers, microMemories, microMementos, and researcher.

Data in this neuroplexure, in alignment with the neurodiversity-inspired educational perspective and new materialisms, were experiential and relational across time, space, and reality (Koro-Ljungberg et al., 2018). Different assemblages using multiple modes of perception, interaction, and communication led to diverse emergent knowledge. Because data is processual and tenuous from this viewpoint, the neuroplexure used microMementos as quasi-captures, allowing data to be somewhat accessible for continuous entanglements (Koro-Ljungberg et al.,

2018). microMementos, in the form of objects, photographs, video clips, and other forms of partial documentation, were woven, or "actualized through movement from one set of data to another, through foldings, redoublings and reductions, data pasts projecting ahead to the data future" (Koro-Ljungberg et al., 2017, p. 3). In this way, data also manifested as event, a moment of coalescing of assemblages.

Through data-weaving, the microMemento objects that were connected to each microMemory were returned to often, such as during the sketched and fiber art mappings and the moving content analysis. Furthermore, sketches, photographs, transcripts, and video recordings were attuned to and co-choreographed during the practice of research-creation.

Textbox 31

Possible Transformations 1

Possible Transformations of Qualitative Inquiry:

Further explorations of event as the subject of research could be generative for qualitative inquiry in inclusive education and other social sciences. This kind of research can deliberately shift professionals from deficit-based teaching and learning, towards studies of learning environment and learning event design and transformation.

Additionally, further explorations of how to quasi-capture 'data' in the micro of time, space, and reality of an event as well as what to do with quasi-captures, could be fruitful for qualitative inquiry. How might researchers contain these forms of event documentation loosely enough so that they can go on to re-produce anew?

Positioning the Expert

During this neuroplexure co-learners with diverse backgrounds and learning experiences co-created knowledge. The intent was to shift the role of the 'expert' from the researcher to the collective. This shift was not a complete shift, though, because co-learners were adults who had all been through some form of formal education. Therefore, they had been assimilated into neurotypical learning and researching routines. For example, most of the invitation contributions followed dominant forms of connecting and collaborating, which were through Zoom meetings, writing, and speaking. Additionally, the collaborators who attended small Zoom meetings, looked to me as the facilitator to explain, direct, and reassure. They all preferred that I make video clips from the meetings to upload as their contributions.

Moreover, the open-endedness of the methodological-poly-experiment invitations ran contrary to neurotypical expectations for interviews, focus groups, or even professional learning activities. During the second round of Zoom groups, which focused on microMoment-ing, one collaborator became very anxious. This collaborator continued to be uncomfortable even after the enabling constraints were explained and repeated and expressed concern about not knowing the right or expected way to do microMoment-ing. This event served as a reminder that when shifting the 'expert' role from the perceived authority figure, there will be some level of discomfort and uncertainty. As the facilitator, I needed to cultivate an environment that was safe and scaffolded while also encouraging co-learners to take risks.

Furthermore, this neuroplexure looked not only to academic scholars, but to master-crafts-persons from nonacademic settings as knowledge makers and 'experts.' I learned from several people who handed down their crafts through videos, blogs, and social media. Crafts included crochet, weaving, bracelet making and other fiber arts. Additionally, I learned from

disability activists, who often disseminate lived knowledge through similar venues. These experts are often not included in citations and reference lists in scholarly writing.

Textbox 32

Possible Transformations 2

Possible Transformations of Qualitative Inquiry:

Participatory forms of qualitative inquiry, as pedagogical projects, could inform other contexts for professional learning. Research-creation and other forms of creative learning that include diverse individuals and perspectives can stimulate speculation on possible new practices for any field. Professional learning for service fields, such as education, could extend beyond the practitioner and incorporate meaningful interactions with people who represent a wide range of the customers, clients, or students that the practitioners work with daily. Although introducing a 'client' as mentor to the practitioner might be novel, there could be many benefits for professional learning that would not occur using only feedback from survey data. (See Koro-Ljungberg, 2016, on participant-driven research).

Qualitative researchers can work towards more inclusive citation practices. Researchers have already recognized the value of sharing work through social media, podcasts, blogs, and vlogs. These forms of knowledge dissemination are often used by activists and individuals with lived experience/expertise. Researchers might recognize that the educational system has not been an inclusive, supportive environment for people with divergent modes of thinking, learning, communicating, and interacting. This includes neurodivergent people and people from nondominant cultures and languages. Therefore, many individuals cannot, have not, and often do not want to pursue higher education, yet have personal and practical experience that others can learn from. There is a beginning movement for the citation of indigenous elders and knowledge keepers (MacLeod, 2021). Similar practices can also be considered for other 'experts,' such as disability activists and master-crafts-persons. The more researchers cite non-academic scholars in their work, the more the ideas around academic knowledge ownership might be disrupted.

Structure and Improvisation

In this neuroplexure, the terms structure and improvisation were used because of their connection to creativity theory, and especially to creative teaching and learning. While designing the dissertation, though, I first studied Manning's (2013, 2016) work on technique, technicity, and minor gestures, which are philosophically complex concepts related to structure and improvisation. These theoretical concepts motivated me to move more fluidly with/in/through spaces of improvisation.

Manning (2013) uses the terms technique, which can be simply explained as practices that define and are defined by an event, and technicity, loosely defined as enabling constraints across an improvisational field, to explain how one might co-compose, or co-choreograph the event.

Where technique engages the repetitive practices that form a composing body- be it organic or inorganic- technicity is a set of enabling conditions that exact from technique the potential of the new for co-composition. Think the new not as a denial of the past but as the quality of the more-than of the past tuning toward the future. (Manning, 2013, p. 33)

In this way, technique and technicity, in interplay, describe the bodying, or becoming, of an event.

For example, classroom interactions are usually dynamic and complex. Even within highly structured classrooms and with the use of multiple management techniques, teachers find that implemented lessons diverge from lesson plans. In the same way, researchers traditionally have attempted to control their subjects, data, and analyses with multiple management techniques, while attempting to ignore or explain away the effects of technicity. But technicity is always present, albeit often backgrounded. "Technicity acts through techniques, not parallel to

but co-present with, registering the body's conditions of arrival, its coalescing rhythms, atmospheres, cadences. It registers what is latent within the event of the ecology, the background to the action of the technique" (Vasquez et al., in press). Beyond the perceived control, there is dynamic interaction, and it is in technicity where we might explore what the body, or in the case of this neuroplexure, the micromoment, might become. Manning (2013) stated, "Technicity embeds margins of indetermination across systems of technique, activating the associated milieu of emergence itself" (p. 40). Through this neuroplexure, I took the responsibility to co-compose, to explore the cues, cuts, and choreography, to play with/in the interplay of technique and technicity so to emerge-with the micromoment in its bodying.

Minor gestures emerge within this technique/technicity interplay. According to Manning (2016), the minor gesture is an activating force in a relational field. This force causes dissonance, yet it opens the event to something new. Micromoments are a kind of minor gesture, and from this viewpoint, are not only considered events, but also forces. It is important to note that micromoments always carry an element of surprise or unexpectedness, while other kinds of minor gestures could be subtle and mundane. Yet, both kinds have the inter-relational 'power' to shift perceptions and practices when attuned to (Ulmer, 2018).

Tensions between structure and improvisation are inherent in neurotypical teaching and researching, evidenced by the constant balancing of routines, practices, enabling constraints, and flexibility. Instead, thinking with technique and technicity helped to shift away from a focus on tensions towards an experience of dynamic interweaving. For instance, a couple of times during the neuroplexure, I revised the invitation directions to provide more scaffolding to the co-learners. This was especially important because I was working with groups of people who had never met before and therefore had not had the time and opportunity to cultivate a safe, collaborative learning community. Attunement to the movement in the overall research-creation as well as the movement through small group and fiber art interactions led to frequent adjustments that benefitted the collective.

Textbox 33

Possible Transformations 3

Possible Transformations of Qualitative Inquiry:

There is much to be learned by studying the movement of events. (See Koro-Ljungberg, 2016, fluid methodological space). To clarify, I am not referring to the movements of individuals within a space where an event is occurring, but the movement of the whole, collective event. In order to do this, it could help to unbind the event from its physical location, such as through a practice that uses memories.

It might also help to relate the movement to other movements in nature or daily life, such as the flow of a river or the bumps of a bicycle hopping down a set of stairs. Taking examples from drama and dance improvisation, educators, including instructors for qualitative inquiry courses, might re-envision the event through embodied, affective domains. Furthermore, using a movement analogy for an event might assist the researcher practice attunement to the assemblage, flows, and forces.

This analogy could then be moved-with through mappings, including maps that engage multiple modes of learning and sensorial experiences. Although talking through concepts, such as technique and technicity might give students something to think about, moving collectively might better capture the feel of movement in event. These opportunities to explore event movement might dissolve the binaries that are implied through words like "tensions" or "balance."

Slow Research

Ulmer (2017) has written about Slow Ontology, which "asks not how we can find a slower way of doing scholarship, but how we can find a slower way of scholarly being" (p. 201). Furthermore, "Slow (with a capital "S") refers to a state of being in which scholars choose to live

writing and research through locality, materiality, and artisan craft" (Ulmer, 2017, p. 201). A Slow Ontology disrupts the expectation for fast, efficient research, and initiates a redefining of quality and productivity. This Slow Ontology also offers divergent rhythms for inquiry, and these new rhythms shift our academic-writerly identities so that writing is less about getting published, increasing scholarly metrics, and adding to a Curriculum Vitae and more about writing-with (also, sketching-with, painting-with, weaving-with). Although, when slowing down to be present in the event, attuned to and co-choreographing the event, scholars face uncertainty and possible failure. This is especially concerning for doctoral students and early career researchers. Slow Ontology, though, is the way of research-creation scholars, for whom moving with/in/through the event is essential.

One challenge with research-creation is predicting research timeframes. There is always the possibility of making 'cuts' when needed, but it is still necessary to fully respond to each research question. In this neuroplexure, time was somewhat warped rather than unidirectional and predictable. For example, I did not predetermine the art practices to be used during data-weaving and, therefore, had to take additional time to learn or relearn fiber art crafts. Additionally, while mapping with fiber, I experienced a queering of timespacemattering, similar to the shifts and 'flows' I have felt before when painting or writing poetry or fiction. This feeling recalled Ulmer's (2018) words:

"Visual interventions suspend and awaken.

Ideas linger and

Compositions percolate and

Gradually turn into research-creations.

#SlowWriting is a daily #MinorGesture" (p.1).

Throughout this process, I benefitted from a supportive dissertation committee and especially encouraging co-chairs. Although I could have completed a dissertation in a shorter amount of time using conventional qualitative methods, I instead designed a research-creation

that aligned to my onto-epistemological beliefs. There was still the tension between finishing the dissertation within a specified timeframe and producing quality work. Yet, the neuroplexure as a weaving between multiple co-learners and crafts needed the time to become and I needed the time and support to live through the uncertainty.

Textbox 34

Possible Transformations 4

Possible Transformations of Qualitative Inquiry:

Although I have been made aware of, and participated in, several opportunities for qualitative inquiry mentorship in the last few years, there has not been a group for scholars who do research-creation in the United States. Arts-based research groups might include research-creation but are wider in scope. A collective of research-creation mentors who can support each other and those new to research-creation, such as graduate students, early career researchers, and researchers coming from other traditions would be beneficial for scholars in the United States, especially in regions that cannot easily access support from eastern Canada where research-creation is more highly supported. This group could engage with issues related to Slow Ontology and the acceptance of research-creation across various fields of study, such as the 'educations.'

Methodological-Poly-Experiments

Koro-Ljungberg and Knight (2019) noted that although scholars, along with artists and philosophers, have been using poly-experimentalism for centuries, poly-experimental practices

have been revived by the postqualitative turn, which supports the development of fluid methodological spaces. Fluid methodological spaces make methodological-poly-experiments possible because they are spaces "where multiple things and methods occur simultaneously and where frameworks and methodological foci are diverse and continuously changing" (Koro-Ljungberg, 2016, p. xx).

Because of this multiplicity, polyvocality is foundational to methodological-poly-experiments. Methodological-poly-experiments encourage diverse perspectives while decentering dominant framings of the world (Koro-Ljungberg & Knight, 2019). Polyvocality could be practiced through participant driven research (PDR) and "participant-driven ideologies and theoretical orientations call for research approaches that bring participants' embodied experiences, lived lives, senses, emotions, thoughts, beliefs, and so on to the forefront" (Koro-Ljungberg, 2016, p. 186).

In this neuroplexure, multiple open-ended prompts for engaging with micromoments were offered to participants. These prompts attended to methodological questions and inclusivity issues within the 'educations.' For example, participants were invited to use memories, mementos, mapping, and speculative fabulation as methodological experimentations for micromoment study. Yet, these experimentations were contextualized within neurotypical experiences in the educational systems. The neuroplexure was also designed to encourage multiple ways to engage with the prompt, including speaking, writing, drawing, moving, and creating in ways that could be quasi-captured in audio, video, and photographs.

Through methodological-poly-experimentation, I attuned to methodological issues related to modes of participation, including presence and contributions, and modes of embodiment, including prearticulation, and extralinguistic knowledge and expression.

Presence

Micromoment in Neuroplexure research participants, while engaged with the study at some level, were not required to contribute to the neuroplexure. Therefore, it was often difficult to assess participant involvement. To differentiate, I designated registered website/study members as co-learners and individuals who uploaded a response to an invitation or participated in Zoom

discussions as collaborators. I intentionally included those whose presence were difficult to perceive as co-learners because I wanted to assume that since they registered for the study, they were interested in the topic in some way. I also extend the 'label' of co-learner to anyone who interacted with the public website pages, although I am not able to describe that reach in any definite way in this dissertation.

The issue of presence is often considered in educational environments, although it is most noticeable in conversations and studies about absence. In this neuroplexure, I have conceptualized presence in terms of perceptibility. Presence in research is what is perceptible. Fifty people's presence were perceived when they registered for the study. A much smaller number of people was perceived when uploading contributions to micromoment invitations. Additionally, I sometimes received email communications from potential research participants and registered participants asking questions or responding to email updates. These individuals were made perceptible through email.

Furthermore, I was moved to consider why some registered study members were difficult to perceive once they had registered. One reason might have been that schools were just opening after COVID19 shutdowns and teachers were readjusting, and helping students to readjust, to hybrid and in-person teaching while also dealing with a myriad of health and political issues. Even though the topic of micromoments for inclusive education professional learning might have been important to these individuals, they might have had to prioritize involvement for practical reasons. Also, it was very important to show respect to the participants and the stress they were under while designing the neuroplexure. Therefore, the neuroplexure as an invitational space was re-iterated through the study information, the consent form, and my interactions with co-learners. Although the study was based on collaborative learning, co-learners knew that they could contribute as little or as much as they wanted or were able.

During the neuroplexure, presences other than the co-learners were brought into the assemblage. For example, several people, objects, and events were introduced through

microMemories as well as fictional characters created during microMoment-ing. These presences

could not have been anticipated beforehand but were integral to the work for this neuroplexure.
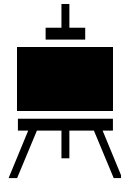
Textbox 35

Possible Transformations 5

Possible Transformations of Qualitative Inquiry:

Qualitative researchers might reconsider engagement by seeking the perceptible in ways beyond the tangible. Some questions to consider:

- What presences are brought to the research by the participants or the event?
- How are participants present even when there is no tangible 'data' or documentation from them?
- How are participants present beyond the tangible 'data' they contribute?

Embodied Knowledge

The micromoment invitations were open to multiple modes of thinking, learning, communicating, and interacting, yet collaborators tended towards the most familiar forms, being Zoom discussions, Zoom recordings, and written text. These are privileged forms of knowledge production and dissemination and were most likely limited embodied thought.

Because expanding research under the neurodiversity paradigm was important for this study, I continued to weave contributions from participants in embodied ways. Through fiber artwork, I was able to further explore extralinguistic knowledge and the (non)verbal shifts in

ARTiculation. Koro-Ljungberg (2016) proposed that "qualitative researchers could allow meaning

to reestablish itself in a flux, in the liminal space, at the limit of words and things, as what is said

of a thing (not its attribute or the thing in itself) and as something that happens (not its process or

its state)" (p. 17). In this open space between collaborator contributions, art practices, and a

written dissertation, sensory perception, bodily movement, and crafting have been co-implicated

in thought processes.
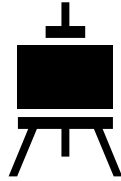
Textbox 36

Possible Transformations 6

Possible Transformations of Qualitative Inquiry:

Qualitative researchers can continue to encourage participants to engage through multiple modes
for thinking by offering many opportunities in emotionally safe groups. This is not just to advance
research-creation and post-qualitative methods, but to cultivate research spaces that are inclusive,
especially of neurodivergent individuals. Research spaces need to be designed for different modes
of thinking, learning, communicating, and interacting, and be open to the possibility of encountering
modes yet unknown.

Cartographic Approaches

The micromoment sketches and fiber art sculpture mappings used crafting practices that

built on Knight's (2016) inefficient mapping as attunement to entanglements of space, including

surfaces, light, time, gesture, and sound, and Rousell's (2021) immersive cartography. Koro-

Ljungberg and Knight (2019) explained that inefficient mapping was inspired by Denis Wood's

(2013) experimental narrative mapping, which was aimed at disrupting dominant, and colonizing, approaches to mapmaking. The experimental narrative maps inspired a practice of attunement to the ecology beyond physical locale and static structures. Later, Knight's (2016, 2019) inefficient mapping of urban playgrounds further attuned to the activity, or movement, of children rather than the architecture. Koro-Ljungberg and Knight (2019) explain:

> Inefficient mapping was a vital methodology for paying attention to parts of a complex cluster of simultaneous happenings and for placing inconsistent observations of partial aspects of those clusters into a schematic that was also inconsistent and partial. Inefficient mappings can note affects, choreographies, temporalities, and movements that posttheories and speculative theories dwell on. The inefficient mappings are an intense collaboration between muscular jolts, grippings, drawing tools, surfaces, impulses, encounters, matters, times, and affects. (para. 14)

The neuroplexure's fiber art mappings also built on Rousell's (2021) immersive cartography, which was recently introduced as "an emerging approach to inquiry that incorporates the environmental arts, philosophy, and social sciences" (p. 580). Further, immersive cartography is co-created and can move in multiple pathways which keep the inquiry process open to "more-than-human ecologies of participation" (Rousell, 2021, p. 580). More simply, immersive cartography can be thought of as research-creation that uses maps you can walk into and further engage with. Rousell's (2021) experimentation with mapping focused on environmental issues and their social entanglements. This work sought to "reconfigure the sensorial and affective conditions through which social encounters take shape" and to rethink "cartography as a function of processual movement, in which new trajectories of experience are made possible through the production of a cartographic work of art" (p. 581).

The fiber art sculptures created during this neuroplexure were mappings of the micromoment event as it moved. These cartographies allowed for the exploration of the micromoment's multiple dimensions and elements as well as its generativity for future possibilities. In these ways, these fiber art mappings could be considered both inefficient

mappings and immersive cartography. The difference here is that the mappings were created from memories contributed by collaborators rather than observations in a physical space. Additionally, the immersive dimension of the mappings will occur during the dissertation defense and has not yet occurred at the time of this writing.

There are two interesting directions for qualitative inquiry that I would like to discuss here, the idea of mapping movement through multi-dimensional space and the use of fiber art. Post-qualitative cartography has remained tied to a physical location. Instead, this neuroplexure's mappings foregrounded movement as collective flows. This shift disrupted the perceived binding of the locations' boundaries, such as classroom walls or a school sidewalk, and refocused the study on the action in the event.

Although I chose the word neuroplexure, with the understanding that plexure referred to weaving, I intended the research-creation weavings to be multi-modal and emergent. After most of the participants were reluctant to try nondominant modes of interaction, I decided to return to the idea of weaving more literally. During my time learning and reacquainting myself with fiber arts and crafts, I realized that work with fiber has many similarities to work in the (human) social realm. Fibers and fiber arts carry the political, the familial, the professional, the cultural, the pedagogical, the socio-spatial, and other social realms (Brinn, 2019; Ingraham, 2010).

Additionally, fibers have been used in post-qualitative inquiry and research-creation (Niccolini et al.., 2018; Reid, 2019). Reid (2019) states:

> I turn to craft, specifically fibre-based practices like quilting and nature-based dyeing, as a way to make sense of the world around me. Craft is what makes me *feel* things. It forces me to see big pictures, look outside of myself, get raw, question my long-held beliefs, be uncomfortable, desire to do better in this world. Craft can be that space where we come together, commune with each other, hold one another, see the beauty and the ugly together, and struggle through the really tough shit. (p. ii)

228

Textbox 37

Possible Transformations 7

Possible Transformations of Qualitative Inquiry:

Qualitative researchers might expand on the use of cartography that is even less bound to situated, three-dimensional space, to explore its generativity for speculative inquiry.

Qualitative researchers might explore fibers and the diverse fiber arts and crafts to engage differently with social issues and participants.

Memories and (Un)learning

Qualitative inquiry has utilized memories in various ways. In post-qualitative inquiry, Barad (2017) explored possibilities for an embodied re-membering that rethinks time as an undoing and works towards accountability, especially for colonial practices and victims of violence. By troubling dominant, neurotypical perceptions of time, one becomes aware of "a multiplicity of paths and histories and the situatedness of time" that are aspects of quantum temporality, and how "quantum physics opens up radical spaces for exploring the possibilities for change from inside hegemonic systems of domination" (p. 61). For Barad (2017), re-membering is a coming "to terms with the infinite depths of our inhumanity, and out of the resulting devastation, to nourish the infinitely rich ground of possibilities of living and dying otherwise" (p. 86).

Similarly, Rhee (2006) used re/membering to confront her "sanctioned ignorance" and states, "my use of re/membering encompasses the double acts of remembering (recalling) and re-membering (becoming a member again).'Remembering' brings the silenced history and the voice of the marginalized back to my mind and 're-membering' continuously affirms my solidarity or belonging to the voice of the displaced" (p. 598). Through re/membering as/with Korean women in U.S. higher education, Rhee (2006) realized that "many of us have never conceived of ourselves *only* as somebody's other," yet that is the position granted in academia, the "minor, victim and irrelevant" (p.597). Re/membering is a re-narrativization of positions people occupy in a community where power remains unequal. Further, Rhee's (2021) work with rememory reproduces history by narrating "mothers, whose wronged experiences, pains, and fights unsaid during their lifetime… haunt us" (p. 1). In these examples memories are not used to tell a story from one person's perspective, they are embodied actions through a queering time where realities cross and intermingle to bring attention to injustices, incite responsibility and accountability, and motivate change for the future.

In educational spaces, the processes of re-membering and re/membering is related to (un)learning. This term has been used for the process of learning new practices and paradigms, while also letting go of those that no longer fit with current conceptions or orientations. Unlearning occurs through reflective practices and has been "linked with social justice projects and the development of inclusive practices within a framework of transformation informed by anti-discriminatory and feminist approaches" (McLeod et al., 2020, p. 2). McLeod and colleagues (2020) further stated, "the deconstruction and disruption to individual or workplace norms associated with unlearning is considered in the literature as transformative in that it enables growth and new approaches to be taken up" (p. 2). In this dissertation, I have used the word (un)learning because it highlights that any learning includes a sifting out of that which does not match the new learning. It is mentioned many times in my work because it is critical for social transformation.

Diverse, collaborative engagements with memories activated pedagogical spaces for (un)learning during this neuroplexure. Additionally, microMementos were used to connect memories, mappings, and future possibilities resulting from (un)learning. In this way, microMementos acted as both nodes in time and as objectiles. Objectiles are familiar forms, yet unpredictable, because they reference objects' actions, movements, or flows rather than their attributes (Manning, 2013; Springgay & Rotas, 2015).

Textbox 38

Possible Transformations 8

Possible Transformations of Qualitative Inquiry:

Qualitative researchers could begin a study of events through the elicitation of memories and their related emotions. They might also be more intentional about creating spaces that attract diversity, of thought, action, experiences, and social identities to increase the possibility for (un)learning to occur.

Qualitative researchers might further explore the use of mementos as objectiles.

Collective Speculative Fabulation

This neuroplexure utilized collective storying, or speculative fabulation, as one of the methodological-poly-experiments. This was one design technique that kept the neuroplexure open to possibility and transformative action. Storying has been described as "a method and a practice that encourages people to make sense of their realities, narrate their specific ways of knowing and being, and name their past and present while (re)imagining their future selves," as

"equity work that is grounded in care, critical listening, and intentional collaborations," and as "creative, engaging, and humanizing" (Kinloch, 2020, p. 67). Storying includes lived experiences and can be open to multiple modes of expression.

Further, storying can move beyond interpretive methods when including "what could have been" or "what might come to be." Collaborative storying as speculative fabulation allows the suspension of disbelief and the imagining of potentialities through affect and the embodiment of characters. Furthermore, it is an unfolding of events that are performed and enacted by those who are engaged in the activity (Riessman, 2008). In this way, storying can involve multiple voices, perspectives, truths, and meanings as well as lead towards social transformation.

Moreover, through fiction, one can experiment, play, or practice, within a constructed world without concern as to whether or how the event would occur in 'real life' (Kraatila, 2019, Paterson et al., 2020). Speculative fiction, therefore, allows ideas to be considered without the limitations placed by plausibility (Kraatila, 2019). Truman (2019) stated:

> Through speculative alter-worlding, materialist feminisms envision new worlds within inherited contexts. Situated feminisms and speculative fabulations (of how the world could be) operate as a kind of differential movement in feminist new materialisms… Since racism, heterosexism, ableism, and assumptions about gender identity are material realities, a situated feminism must attend to and intervene in the processes and assemblages that allow inequalities to emerge, persist, and reproduce. (p. 7)

During this neuroplexure, storying as collective speculative fabulation occurred during the microMoment-ings.

Textbox 39

Possible Transformations 9

Possible Transformations of Qualitative Inquiry:

Qualitative researchers might cultivate research spaces where participants are comfortable enough to take risks and use multiple modes of interaction and communication, such as drama, visual arts, crafts, music, and dance. These modes for storying and speculative fabulation could release new processes for knowledge formation.

As mentioned before, qualitative researchers could be more intentional of creating spaces that attract diversity, of thought, action, experiences, and social identities, especially by seeking out participants from differing viewpoints on the issues and events being studied.

Polydisciplinamory

This neuroplexure, and research-creation overall, work to blur disciplinary boundaries. Loveless (2019) refers to this blurring as polydisciplinamory. Here, I intended to blur the 'educations' by merging concepts from multiple fields, including creativity theory in education, gifted education, special education, general education, inclusive education, and disability studies in education. I wanted to explore ways to link ideologies, policy, and practice for educators.

Furthermore, as research-creation, this work automatically merges philosophy, art, and practice. Even though there was a focus on neurodiversity and disability, I hoped that the inclusive design would yield implications for other marginalized social groups, such as those grouped by race, nationality, and/or language. This kind of blurring moves beyond transdisciplinarity, and although it still requires a good understanding of each field, does not require a researcher to be equally strong in every area. In fact, it can be beneficial to collaborate with others strategically so that each person can learn from the others.

There are dilemmas for polydisciplinamorous researchers, though. They might have either a harder time finding a journal or other outlet that fits their work best or they might have too many options. This is also similar to their dilemma for finding an academic position and joining professional organizations.
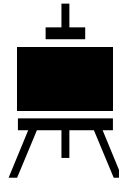
Textbox 40

Possible Transformations 10

Possible Transformations of Qualitative Inquiry:

A group of qualitative researchers could create a database of scholars who use research-creation. This database could list the areas that the scholars merge or would like to merge in their work. This might make it easier for researchers to locate others who are interested in blurring similar fields and to coordinate co-learning across disciplines.

Dissertation Doings

Typically, dissertations in education are written using academic language and defenses begin with lecture style presentations. It was important to me to align the written dissertation and the dissertation defense with the study itself, including the neurodiversity-inspired educational perspective and its underlying onto-epistemological assumptions. Therefore, I used experimental writing in Part II of the written dissertation, weaving academic text, poetic text, images, tables, and textboxes throughout. This section of the dissertation also did not follow the typical analysis, findings, and discussion chapter formats, but followed the rhizomatic strings of the neuroplexure.

Furthermore, a guided and interactive gallery walk was the presentation mode for the dissertation defense. This gallery walk included textual displays as well as the sketches, fiber art sculptures, and the moving content analysis from the neuroplexure. An audiovisual mapping, or video, of three microMemory contributions with clips of related data-weaving was also presented. Additionally, attendees chose one microMemento object, which was tied to a card displaying its related microMemory, They were then encouraged to engage with the microMemento, sculpture mappings, moving content analysis, and the available string. In this way, this dissertation continued to be a pedagogical, immersive, neurodiverse experience from inception to dissemination.

Textbox 41

Possible Transformations 11

Possible Transformations of Qualitative Inquiry:

Dissertation and dissertation defense formats in the social sciences are not often questioned. Qualitative researchers who mentor or serve on dissertation committees might have discussions with their doctoral students about aligning their dissertations with their research theory or approaches. This not only seems methodologically rigorous, but it could open the space for neurodiverse modes of knowing and communicating.

Bordering and Building On

Micromoment in Neuroplexure has left me with as many methodological questions as I began with, only different ones. Beginning with research-creation and methodological-poly-experiments allowed me to generate multiple directions for future work in qualitative inquiry.

Each section of this chapter began by presenting a gift, 🌱 which in some ways was like presenting findings. "Gift-giving" in research reminds me of how my aunt would gift a crocheted baby blanket to each new family arrival. In the same way, the reflections in this chapter have been offered with care and were developed through the crafting of the neuroplexure. Additionally, just as every blanket has a border, which serves both as a boundary that limits the size as well as a space for adding on further, this chapter also explored bordering and building on.

In the above sections, the following were discussed as possible qualitative inquiry borders (or limitations). First, utilizing research-creation requires a rethinking of traditional terms and concepts such as subject, data, expert, and methods. Also, neurotypical academic expectations are the rapid production of research using predetermined ways to gather data, participants who actively and tangibly contribute, and cognitive knowledge disseminated through speaking and writing. Furthermore, academia continues to function in siloed disciplines. These limitations make research-creation challenging for new researchers.

Several possible areas for building on to qualitative inquiry were also introduced. Many of these ideas could be explored by individual or small groups of researchers, but it would probably take communities of research-creation scholars coming together to support each other to substantially pave the way for doctoral students and early career researchers.

Finally, this neuroplexure has implications for the use of research-creation, the study of micromoments, cartographic approaches, and speculative fabulation in creativity studies, disability studies in education, neurodiversity studies, professional learning research, and research in any of the 'educations.'

PART III: YARN TAILS

Part III is comprised of the conclusion chapter, which is written according to conventional academic standards. Before moving into the conclusion, though, I would like to leave readers with one last connection to fibers and weaving as a possible thought experiment.

What are yarn tails? What do you do with them? How does this relate to research, especially research endings… and new beginnings?

> When you're finishing one ball of yarn and need to join a new ball of yarn there are… ways of dealing with the yarn tails [ends]… I've come to a point in my row, where I'm just about out of yarn in one ball… I need to join a new… ball of yarn in the same color. So the way I'm going to do that is by overlapping… I'm going to overlap them in this direction. I'm going to work them together… you're going to have a little bit of the new tail just dangling down… work with both your end tails… I have tension in both yarn tails, so now I knit them together… what I'm doing is, I'm essentially knitting with a strand of yarn that's twice as thick as the original... This affects the new stitches that are being created… Now I've worked five stitches and you can see that each of these stitches… is made up of two strands of yarn. It's important to remember that… those are not two stitches; those are each one stitch. At this point I can just drop the yarn tail of the old ball of yarn and continue working with just the new ball of yarn (Richardson, 2018, 0:00-2:38)

Figure 80

Preparing to Join Yarn Tails

CONCLUSION

This conclusion will begin with a concise summary of the purpose, research questions, and broad outcomes. Then, there will be a general overview of the potential contributions to research and the major limitations of this dissertation. Finally, recommendations for possible future research opportunities will be presented.

This dissertation entangled multiple issues across the 'educations' in various ways to generate possible future directions for inclusive education PL. Because of my personal and professional experiences as a teacher, especially in gifted, special, general, and teacher educations, I sought to design a study for imagining and practicing neurodiverse schooling and research endeavors. Therefore, it was important to design creative co-learning experiences with diverse learners about events in educational environments, with special attention to their related neurotypical deep structures. By creating new practices for inclusive learning and researching events, I hoped to uncover hidden or marginalized modes for learning and knowledge production and develop creative professional learning strategies for inclusive education.

Therefore, the purpose of this research was, first, to study micromoments, as unexpected learning events. Second, the study of micromoments, designed as a form of professional learning, was intended to create space for educators to (un)learn and imagine new teaching/learning practices through reflection and discussion with diverse co-learners. Finally, the purpose of this process was ultimately to develop strategies for use in inclusive education PL experiences.

Merging concepts from creativity theory, disability studies, and philosophy along with professional learning, special and inclusive educations, qualitative inquiry, and fiber arts practices, I and other collaborators responded to post-oppositional invitations crafted to engage the following questions: How might micromoments move in/with/through emergent learning events? And, how might attunement to micromoment (more-than-human) assemblages be developed? How might inclusive education professional learning transform with Micromoments in Neuroplexure? How might qualitative inquiry transform with Micromoments in Neuroplexure?

These open-ended questions allowed the research design to evolve with the collaborator contributions and move in new, unanticipated directions.

<center>**Responses to the Research Questions**</center>

Responses to the research questions were multiple, speculative, and in some cases, primed for further practical experimentation or application. In response to the first research question, micromoment movement could be understood by attuning to micromoment dimensions, elements, and flows. During the neuroplexure, I noticed the dimensions of time, space, and (multiple) possibilities, the elements of presence, divergence, structure, and motion. The element of presence was described by the quality of perceptibility, divergence by diversity, structure by designability, and motion with intra-activity.

A focus on these dimensions and elements activated an attunement to micromoment flows. The flows described in this neuroplexure were named sustained and dam(m/n)ed, referring to their continuity, and transmissive, transactive, and intra-active, referring to the kinds of interactions occurring within the event. Sustained micromoments were those in which the learning assemblage converges at the micromoment and moves together toward creative learning. Dam(m/n)ed flows were those in which the learning assemblage is blocked or diverted in some way. In the micromoments studied, dam(m/n)ed flows often included feelings of shame, frustration, or loneliness due to the perception of inability, usually of the student or the person with less perceived power in the event.

During micromoment exploration, it was discovered that attunement to micromoment movement could be practiced by studying micromoment dimensions, elements, and flows. The study of micromoments could include creative PL activities, such as those initiated by the invitations in this dissertation. The sharing of microMemories proved to be a generative place to start the discussion of micromoments in learning environments. microMoment-ing also served as a collaborative way to move a group towards imagining future possibilities, even for unhappy or otherwise negatively perceived learning events. Although collaborators only slightly touched upon

<center>239</center>

microMementos and microMovement mappings, I continued to explore these methods for attuning to micromoment movement using fiber arts. These practices could be further developed by groups that have had time to cultivate safe spaces for risk taking and should incorporate multiple modes for thinking, learning, communicating, and interaction, including those we typically consider art. Additionally, co-learners could note when micromoments are occurring in their daily lives and use those moments for further microMemory exploration. This could support educators towards being able to study micromoments as they are happening. More attuned educators should be more able to co-design the learning event in inclusive ways.

In response to the second major research question, Micromoments in Neuroplexure offers various areas for possible transformation in the field of education and teacher PL, especially for those intent on its transformation towards inclusivity. First, the neurodiversity-inspired educational perspective developed here is important for shifting from neurotypical to neurodiversity paradigms in education. This, in practice, would refocus the efforts of curriculum and lesson design to the learning events rather than individual students and their abilities or disabilities. Additionally, using a Framework for Studying Micromoments prefaced on neurodiversity and tenets of inclusive education sets the stage for educators to rethink their comfort with control, or structure and improvisation, as the classroom leaders or facilitators. It can also help educators develop a sense of openness to the unexpected and a hesitancy to jump to assumptions when a student, or the class, responds in unexpected ways. This project also models the use of diverse individuals in PL, especially individuals who can contribute from lived experience to the redesign of learning environments. Educators can learn from people who have already been through the school system and have highly divergent ways of thinking. These forms of professional partnerships could benefit the future neurodiverse (all) students of these educators.

In response to the final research question, Micromoments in Neuroplexure extends on work in post-qualitative inquiry and research-creation in education, while also merging creativity studies, disability studies in education, and scholarship in the educations. Along with a continued

240

rethinking of methodological concepts, such as subject, data, expert, and methods, and neurotypical academic expectations, such as rapid production of research using predefined methods and the continuation of siloed disciplines, this project introduced several new ideas. Although the terms microMemory, microMemento, microMoment-ing, and microMovements are connected to the study of micromoments as denoted by the 'micro,' the use of memories, mementos, moment-ing, and movement mappings can be built on further. Memories, storying with speculative fabulation, objects and objectiles, and inefficient and immersive mapping have been used in post-qualitative research, yet not in quite the same way as done in this neuroplexure. Furthermore, the main intent of the chosen methodology was to move research practice beyond neurotypical and exclusive modes for knowledge production beginning with the neurodiversity paradigm, while also aligning with the issues facing the 'educations' as indicated in the literature review. As research-creation, this project connected theory and practice, and as a pedagogical practice, was a constant co-creating of creative PL experiences in the making.

Review of Potential Connections to and Directions for Research

Potential connections to and directions for research were indicated throughout Part II of this dissertation under the presenting the gift (Findings) icon. ✿ This section will include a general overview of potential contributions, especially those issuing forth from neurodiversity-inspired educational perspective, micromoment study for professional learning, and neuroplexure as methodology.

First, the neurodiversity-inspired educational perspective developed in this research has promising implications for educational research and inquiry methods. The perspective's underlying onto-epistemological assumptions shift conceptions of human development, intelligence, ability/disability, and teaching/learning towards the neurodiversity paradigm and away from essentialist and deficit-focused paradigms. Additionally, using this perspective for research in neurodiversity studies might assist the field in moving further away from its autism focus and towards a more inclusive critical advocacy for social transformation.

241

The second major contribution to research was the development of neuroplexure methodology. Neuroplexure as a research-creation intent on social transformation through the neurodiversity paradigm was designed with methodological-poly-experimentation and an emphasis on multiple modes of knowledge production. This work also brings research-creation into the context of the 'educations' and PL for educators. Additionally, through the neuroplexure, fiber arts and the sociality of fibers were recognized as an embodied form of knowledge.

The final major contribution to research is the study of micromoments. The micromoment was a concept in creativity theory that had not been extensively studied. Using process philosophy to study the event of the micromoment, opened up several possibilities. First, studying micromoment dimensions, elements, and flows led to a deeper understanding of these events. Second, reflecting on and discussing micromoments in diverse groups interested in inclusive education led to personal and professional growth. A beginning framework for the study of micromoments for inclusive education PL was also presented in Part II of this dissertation. Furthermore, because micromoments occur in daily life, the study of micromoments has implications beyond formal education systems, into the workplace and other community contexts.

Review of Limitations

There were several limitations to this study, some of which have been alluded to in Part II or presented in the introduction chapter. In this section, the major limitations will be discussed, beginning with participant engagement, time constraints, and the limitations of using research-creation in education, and concluding with the constraints of operating from a neurodiversity paradigm within neurotypically designed educational and research systems.

First, this study was designed during the COVID pandemic, and therefore, relied heavily on virtual participant registration, communication, and interaction. Furthermore, interactions with collaborators began as schools were reopening after the COVID-19 closures. In this context, participants were initially unknown to each other and were limited in time and energy for building professional communities with each other. This impacted comfort levels for taking risks and exploring open-ended tasks. The study was designed as an invitation to tasks and dialogue, and

although participants were encouraged, they were not required to contribute to the group. This resulted in contributions from only about one quarter of the registered participants. Additionally, finding time when participants from multiple time zones could meet synchronously was difficult and resulted in groups being composed of only two or three people, including the researcher. Further research could be developed with small groups who are able to meet synchronously as a part of ongoing professional learning.

There were other time constraints beyond the challenge of scheduling around multiple time zones. The dissertation timeline did not match an educator's annual rhythm. For instance, recruitment began in December when most teachers are ready for a break and not adding new commitments. Zoom group sessions occurred during the spring semester when teachers were gearing up for standardized testing. Future research could instead begin in the summer and move into the fall when teachers are most prepared to reflect on and attempt changes in teaching practices.

Furthermore, the time constraints of the dissertation required cuts that resulted in minimal collective explorations with microMoment-ings and microMovement mappings. These cuts also meant that most of the mappings were done by one person, the researcher.

It is also important to note that there are certain limitations for research-creation in education. Current educational policy around curriculum, teaching methods, and professional development favor evidence-based research, which is defined as research that uses randomized controlled trials or quasi-experimental designs. This emphasis on science, to the exclusion of art, is also reflected in the minimal acceptance of arts-based research for educational transformation. This is especially noticeable in educational fields such as special education. Additionally, research-creation is contextual and pedagogical. Although the creative learning that occurred during this study can be meaningful to the readers of this dissertation, it did not yield results that can be applied to new contexts based on conventional standards of generalizability.

Finally, operating from a neurodiversity paradigm while living, working, and learning in a neurotypical world offers many challenges. Challenges included the expectation for academic writing formats, difficulty translating embodied knowledge into words, and collaborator expectations for conventional research and learning interactions. These produced tensions as we worked towards an openness to neurodiverse modes of interaction while also being pulled back into status quo stories.

Recommendations for Future Research

Several opportunities for future research were indicated in Part II under the Positioning the loom (Theory and Discussion) sections 🎨 . This section will outline three possible major research trajectories, which are aligned with the those listed under the contributions to research section in this chapter. Future research about the neurodiversity-inspired educational perspective, micromoment study for PL, and neuroplexure as methodology could be promising research trajectories.

First, the neurodiversity-inspired educational perspective could be used as a basis for teacher education and for other professionals in education, such as educational psychologists, administrators, and therapists. This perspective could also be used to help merge separate programs in schools, such as general, special, and gifted education, as well as to support schoolwide efforts towards inclusive education. Researchers might use surveys, interviews, or participatory methods to assess transformations in individual and school community paradigms about human development, intelligence, ability/disability, and teaching/learning, as well as changes in practices towards inclusivity.

Next, the neuroplexure is open to multiple iterations. Qualitative researchers could design other research-creation experiences that use post-oppositional methodological-poly-experimentation and involve neurodiverse co-learners. Additionally, the neuroplexure is not limited to educational fields, but can be applied in other social research. Furthermore, data-weaving in neuroplexure is not limited to speculative fabulation, fiber art mapping, and moving

content analysis. The methodology is open to multiple possibilities for data-weaving that could be further explored by qualitative researchers.

Finally, there is much potential in the study of micromoments as a form of professional learning. Within the boundaries of PL for educators of inclusive education, future research could be done with multiple, small PLCs and could be incorporated into existing professional development structures, such as AR, coaching, or lesson study. Although the PL in this dissertation was designed for teachers in the context of inclusive education, the study of micromoments could be extended to various professions and informal contexts. For example, the dimensions, elements, and flows found in micromoment movements could be further explored in various contexts and using different perspectives. They are not intended to be used for evaluating others, though, and would best be used for self-reflection and collaborative learning.

Joining Yarn Tails

Although this conclusion contained brief summaries of the responses to the research questions, contributions to research, limitations, and possibilities for future research, more specific and contextualized information about these can be found in Part II. Yarn tails have been left for the reader throughout Part II and Part III of this dissertation; a string left hanging here or there. This string can be taken and merged with new work, or it can be left dangling.

I began this dissertation with an invitation to the reader to move through the pages with an openness to discomfort, difference, and (neuro)divergence, and an expectation for personal creative learning and unlearning. I hope that some of the uncertainty encountered through these pages has transformed to a sense of possibility. Educational change can begin with one person, one memory, one art form, one reflection, or one discussion, which ultimately might affect one student, one class, multiple classes of students, or even more people or environments. There is further work to be done, including more crafting of creative professional learning events for the cultivation of inclusive learning environments. As I close this dissertation, I leave the reader with an invitation to find a yarn tail, or two, to join with.

245

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254

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APPENDIX A

WEBSITE MAIN PAGE: TEXT AND VIDEO LINKS

Micromoments in Neuroplexure: Engaging with Micromoments through a Neurodiversity-inspired Perspective for Inclusive Education

Micromoments in Neuroplexure membership is free and gives you access to several micromoment invitations. These invitations could be considered tasks, activities, explorations or experiments that might support us in thinking critically and creatively about teaching and learning in diverse groups. Engagement with these tasks can be done individually in your own teaching-learning situations or in online, hybrid or in-person small groups. Most tasks will take approximately 30 minutes, one task might take up to 90 minutes and synchronous groups will take 60 minutes per session for 1 to 3 sessions, depending on the needs of the group. You will also be able to upload your contributions to share with the group as we learn with each other and through our multiple experiences with micromoments. Participation is voluntary.

Although I hope school-teachers and educators of all levels as well as **neurodiverse** adults will become members, any consenting adult is welcome to join as we are all teachers and learners across our various formal and informal life settings. We will call members who are here to learn with others **co-learners**. They may or may not choose to upload contributions for the group to see and use in future learning. Members who upload to the group are called **collaborators**. Co-learners and collaborators are invited to participate in Micromoment Poly-experiments, multiple tasks that focus on the experience of micromoments.

(Membership Link- linked to consent form and website/research registration.)

Thank you for visiting Micromoments in Neuroplexure. This is a project close to my heart. I hope to share in this important work with you, fellow educators, fellow neurodivergent individuals and/or fellow proponents of inclusion. Please consider registering for a free membership and become a Micromoments in Neuroplexure co-learner and collaborator. Participation is voluntary. For questions or concerns, please go to contact information or email my supervising professors, Dr. Ron Beghetto at ronald.beghetto@asu.edu or Dr. Mirka Koro at mirka.koro@asu.edu

There is an additional option for individuals unable to interact through online technology or in-person: In this case, interaction will occur mainly over the phone, including texts, calls and Zoom calls. Individuals with disabilities have the option to choose an assistant for phone usage. Individuals may also send contributions, such as pictures, documents, audio, and video through text or mail. Contact anani.vasquez@asu.edu to request any of these accommodations.

What is Neurodiversity? Introduction to Neurodiversity (video) https://youtu.be/HZjxsg8qUFA

What are Micromoments? Introduction to Micromoments (video) https://youtu.be/tPKFlKnJgoQ

APPENDIX B

CONSENT FORM

I am a graduate student under the direction of Professor Beghetto and Professor Koro at Arizona State University's Mary Lou Fulton Teachers College. I am conducting a research study to explore micromoments for inclusive education.

I am inviting your participation, which will involve co-learning through website asynchronous invitations (tasks) and/or synchronous online, hybrid or in-person workshops. Participation could include exploring on your own, learning from what others share and/or sharing your own work, ideas and thoughts. You may choose how much or how little you wish to participate. Most asynchronous online tasks will take about 30 minutes, with one taking about 90 minutes total. If you choose to work with a small group synchronously, either online, hybrid or in-person (in the Phoenix/Tempe, AZ area) you can expect to spend 60 minutes per session for 1 to 3 workshop sessions, depending on the needs of the group. You can sign up to participate (in any or all of these activities) by going to www.neuroplexure.com and registering as a free member.

Your participation in this study is voluntary. You have the right not to answer any question/respond to any task, and to stop participation at any time. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although there is no specific benefit to you, possible benefits of your participation are collaborative learning that could transfer to your personal and professional lives. There are no foreseeable risks or discomforts to your participation.

Confidentiality will be maintained by the use of data encryption, unique usernames and passwords, and private group settings. Because this is a collaborative project, your posts or uploads will be viewable by all researchers and participants (website members). Your responses will be identifiable only by the username you choose to use, unless you participate in synchronous groups. Those participating in synchronous groups will be asked to keep what is shared in the group confidential. In this case, there is always a risk that a participant will share information with someone outside of the group. Complete confidentiality cannot be guaranteed. If synchronous groups are online or hybrid, participants have the option of keeping their camera off and choosing their screen name.

The results of this study may be used in reports, presentations, or publications but your name will not be used, unless you give specific permission to do so (for example, if you wish to be credited by name for collaborating on a project). De-identified data collected as part of the current study will not be shared with other investigators for future research purposes.

You have the option, but are not required, to upload documents, video, audio and written posts in response to the invitations (tasks). Synchronous groups will decide together which documents, video or audio to include online. You also may remove, or ask to have removed, any of your uploads at any time.

There is an additional option for individuals unable to interact through online technology or in-person:
In this case, interaction will occur mainly over the phone, including texts, calls and Zoom calls. Individuals with disabilities have the option to choose an assistant for phone usage. Individuals may also send contributions, such as pictures, documents, audio, and video through text or mail. Contact anani.vasquez@asu.edu to request any of these accommodations.

If you have any questions concerning the research study, please contact the research team at: anani.vasquez@asu.edu or Ronald.beghetto@asu.edu . If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of

Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

By checking each of the agreements below, you are agreeing to be part of the study.

Please note: "Membership to the website" is the same as "participation in the study" and "end membership" is the same as "withdraw from the study".

- ☐ Be 18 years old or older and able to give consent for yourself.
- ☐ Agree to adhere to the participation guidelines. [insert hyperlink to participation guidelines]
- ☐ Agree to these confidentiality guidelines:
  - ▪ Do not post names, personal information or likenesses of real people or places, other than your username.
  - ▪ If you choose to post your likeness, voice or personal information, you understand that it will be visible to other members. Your likeness or voice (video or audio) could be used as data for a dissertation project, publications and presentations, unless you request it be removed. [hyperlink to contact form]
  - ▪ Synchronous small groups will have the opportunity to choose any work from time together to upload to the website, including video, audio, text and image, given that all visible/audible/recognizable individuals are in agreement.
- ☐ Agree to post only original responses (your own work/creations) or give credit if remixing someone else's work (See creative commons). [Add hyperlink to creative commons]
- ☐ Agree to not intentionally post hurtful, vulgar, discriminatory, criminal or otherwise inappropriate video, audio, images, documents, or text.
- ☐ Agree to include a trigger warning before posting potentially disturbing content (i.e., abuse, violence, etc.)
- ☐ Agree to have your work used, and possibly remixed or adapted, for educational purposes, including journal articles, conference presentations and professional development. The authoring of this work will be cited as "collaborators," unless the website member gives specific permission to use their name or username. [hyperlink to contact form]
- ☐ Understand that you can end membership at any time. [hyperlink to end membership] When ending membership please give your username, email address and tell if you want to leave your uploaded contributions for the group or if you want to have all of your contributions deleted.
- ☐ *Understand that individuals may request the following options as accommodations: (1) have an assistant of their choice to help access the website, read aloud or enable text-to-speech options for consent, and/or register the individual by username and email address on the website, (2) have the researcher read aloud the consent form, take oral consent and register the individual by username and email address on the website, or (3) have the researcher read aloud the consent, take oral consent and record an alternate form for contact, including phone number and/or mailing address. In any of these cases, the individual can request a copy of the consent form by email or a hardcopy by mail.*
- ☐ *Understand that individuals may request the following options as accommodations: (1) interaction over phone, including texts, calls and Zoom calls, (2) individuals with disabilities can choose an assistant for phone usage, (3)*

individuals may sent contributions, such as pictures, documents, audio, and video through text or mail for the researcher to upload to members-only spaces on the internet (website forum, Google doc folders, Flipgrid).

☐ Understand you can contact Ananí through the contact form, her advisors Professor Ron Beghetto at ron.beghetto@asu.edu or Professor Mirka Koro at mirka.koro@asu.edu at any time with questions or concerns.

☐ Understand that you can contact the Chair of the Human Subjects Institutional Review Board, through the Office of Research Integrity and Assurance, at (480) 965-6788 if you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk.

Participation guidelines include:

- <u>Listen</u>- Be present to each other at a deep level. Really think about what others are saying or sharing.

- <u>Accept</u>- Consider what others say or share as valuable contributions to the group. This includes ideas, thoughts, feelings and modes of expression that are different from yours or that you don't understand.

- <u>Support</u>- Build on what others say or share. There will be times that you feel you do not understand someone's contribution. You still can support the person or perspective by adding on to it in some way (i.e., questions, connections, analogies, wonderings, etc).

- <u>Take risks</u>. There is no right or wrong answer or way to contribute to the group. Share ideas, thoughts and feelings in many different ways. Try out new (for you) modes of expression.

- <u>Let go of mistakes.</u> Everyone makes mistakes. When someone else has made a mistake, we can also be supportive of them as they deal with their feelings and learn something new.

<u>A note about respectful communication.</u> Sometimes miscommunication can be perceived of as making a social mistake or error. Because different people have different communication styles, miscommunication happens. In this space, everyone is asked to communicate respectfully. If there is some disagreement about what constitutes respectful communication in a specific instance, both sides will be asked to give their perspective and take time to learn from each other. There will be opportunities for sensitive topics to arise and each person will need to remember that every other person is in a different place in their learning. In community, we can gently offer multiple perspectives on these topics to broaden each other's understanding. That being said, intentionally hurtful, vulgar, discriminatory, criminal or otherwise inappropriate interactions will result in removal from the group. [insert hyperlink to End Membership]

[Once the membership form is filled out with all checked boxes, members should be redirected to the Invitations/Member page]

End Membership
You may end membership by using the contact form. [insert hyperlink to contact form] *If you are participating through phone and/or mail, you may request to end membership by text, phone call or a written request by mail.*

When ending membership please give your member **username**, registered **email address** *(or phone contact information)* and tell if you:

        ☐   want to leave your uploaded contributions for further learning

                    -OR-

        ☐   want to have all of your contributions deleted.

Members who are found to have violated any of the membership agreements or participation guidelines can be removed from the group. They will also have the option to leave their contributions for further learning or to have all contributions deleted.

APPENDIX C

FIBER ART SKETCHBOOK STUDY AND NOTES

The sketchbook study began with an exploration of fibers, keeping the micromoment dimensions and elements in mind. I gathered a variety of thread, yarn, and embroidery floss, and experimented with numbers of threads or strands, textures, and tensions by unraveling, knotting, and painting with the strands. I then returned to my experiences with fiber art learning and added pictures and notes to the sketchbook, further sketching about these experiences using the dimensions and elements of micromoments.

During Fiber Art Learning, I viewed the eight films on www.sheilahicks.com at least two times each and kept notes on fiber art techniques that were relevant to this study. During my study of crochet, I (re)learned to make slip knots, chains, and granny squares, which also include double crochet stitches and slip stitches. I also (re)learned friendship bracelet knotting for the twisted and striped patterns. In weaving, I learned about weft and warp and how to use tabby, sumac and twining weaves, hemstitches, and how to weave in the ends, as well as frame building and shedding (use of sheds).

Learning Activity	Date(s)	Abbreviated Notes
Michael's Online- Tapestry Weaving for Beginners https://www.youtube.com/watch?v=wJUQiHK-Hzs	6/28/22- 8/11/22	Built wooden loom, watched video and attempted different stitches, kept observation notes Completed one small tapestry.
Michael's Online- Granny Squares for Beginners https://www.youtube.com/watch?v=AkpFrCyv0RM&t=135s	6/14/22- 8/3/22	Watched video and attempted various stitches and techniques Completed several chains and two granny squares
Michael's Online- Fingerknit Headband and Woven Bracelets for kids https://www.youtube.com/watch?v=6DoYEt4nCRA&t=161s	8/11/22	Completed one band.

Online tutorial- Twig Weaving https://www.youtube.com/watch?v=N8mCBJsvTXw	8/15/22	Completed one twig weaving.
Online tutorial- Found material weaving https://www.youtube.com/watch?v=oSs7albfboM	8/15/22	Used found materials in the twig weaving above.
Sheila Hicks Website https://sheilahicks.com/films	6/9/22- 8/9/22	Kept notes on techniques, color, texture, shape, scale, inspirations, senses
YouTube Inkle Metis Loom Sashes, Teresa Byrne's "Weaving a Story" https://www.youtube.com/watch?v=aC5_ZKo_d2Y	8/9/22	Took notes on technique and cultural use of story and color
History of Fiber Arts https://www.widewalls.ch/magazine/fiber-art	8/9/22	Took notes on history of fiber art 1950s to present, connection to women's movement/feminism
Beginner Friendship Bracelets https://www.youtube.com/watch?v=Y_FzuLwCZnk	8/10/22	Created a few bracelets using different knotting

Reflections on Fiber Learning and Experimenting:

Threads and yarns differ, not only in material and color, but in the number of constituting smaller threads, their texture, and the tightness in which they are twisted. The threads and yarns that I studied were plied, constituted by two to six strands/threads, with a very large, fluffy yarn (25 mm) having only two, sewing thread having three, yarns sizes (4-6.5mm) having three or four, and embroidery floss having six. Each of the smaller threads/strands were constituted by many even smaller threads. Tensions varied with the large (25 mm) yarn and the embroidery floss having the loosest twists and the sewing thread the tightest twists, although there was one yarn (5 mm, Yarnspirations Caron Crystal Cakes, Glittering Moonlight) that was either tightly twisted, woven, or gnarled as well, and difficult to unravel. It is also possible that this yarn was created as a single-ply. 1 Plied yarn is produced by twisting single yarns to make a thicker yarn. Usually the twisting is in the opposite direction that the single thread/yarn/ply was created.

Two interesting events occurred during multiple experimentations. The first could be described as events of attraction and the second as events of central tendency. These micromoments were unexpected happenings during the relational experience between the fibers, myself, and the environment. As I became attuned to these micromoments, I followed the concepts of attraction and central tendency to further experiment.

When more than one yarn/thread are near, there is an attraction, a stickiness, clinginess, that seems to pull different strands towards each other, whether in parallel or patterned under, over, around. (Agency?) They become loosely entangled; connected, but not fused in three-dimensional space. They continue to move, attach, detach, reattach, as changes occur in the environment. With closer inspection, it is possible that the tiny fibers that spring out from even the tightest yarns act as hooks that attach to others easily, much like the intentional hooks of Velcro. (Not sure if static electricity is involved in this attraction.)

Spinning comes before weaving. Fibers are spun, threads are twisted, then threads/yarn is used to weave fabric.

When taking a piece of sewing thread or embroidery floss with one end in each hand, then looping and stretching out to create a simple knot, the knots tended to settle towards the center of the string. When creating multiple knots, the string tended to knot near or over/around other knots, eventually creating large knotted areas near the center of the string. Sometimes the knots in place, caught the string as new knots were being created and guided the new knot to attach to the old one(s). These knotting experiments reminded me of a bell curve or measures of central tendency.

When painting with the thread and yarn, those with the smoothest texture, usually tightest spun, picked up the paint more thoroughly on the surface and painted more clearly defined lines and dots. Those that appeared fluffier, more textured or loosely twisted, did not pick up the paint well and left less defined strokes and spots on the paper. This might be because the surface area of the many loose threads needed to soak up the paint rather than the tighter spun yarns/threads with less surface space to soak.

During the time spent knotting for friendship bracelets, structure and presence were foregrounded. Patterns in structure occurred by color, length of floss, and knotting sequence. The twist pattern was made by wrapping one strand around all the other strands, then knotting. Then alternating the wrapping string. The alternating was necessary because you might use up all of

the first string before finishing the bracelet. The diagonal bracelet pattern used a one strand-to-one strand knotting from left to right, each strand wrapping around and knotting with the strand to the right. For this pattern, anchoring the bracelet close to where the work was being done was helpful so that the whole thing would not flip over and tangle the strands of floss. Spreading out the floss as much as possible made it easier to determine which strand was needed next. Tension was important for both patterns because if knotting was too loose, there would be spaces that allowed the other color floss to show through (be more easily perceived). Working with the embroidery thread that was found in my old childhood embroidery box, turned back time, or merged times for me, especially with the smell of the floss, the same smell of my childhood home along with the scent from being stored for many years. Making the bracelets also reminded me of the times that my friends and I made bracelets for each other back in upper elementary and middle school. Most likely, some of those bracelets had been made from some of this same stored floss.

While braiding, I began with yarn that already had been spun into three thick strands. I unwove the strands and braided them instead. In braiding there is a taking, wrapping, and giving pattern . When braiding with strands that are not already distinct, there is the question of which fibers end up in which strands/groups. Nearness/location and the desired size of each group play a role. And in this case, the braider must keep a tight hold on the loosely defined strands.

With finger knitting, the hand became the frame or structure for the 'building' of the finger knitted headband. The pattern used was over-under (each finger in both directions), then a bottom over top (for each finger). This knitting created a fabric "headband" that looked somewhat like a cord, was loosely woven (space between strings), and stretchy. This method was relatively quick for producing the fabric (headband, belt, etc).

While reflecting on twig/branch weaving, structure, diversity, and presence were foregrounded. The two branches from a fork in the main branch formed the basic structure for the weaving. This frame was in a v shape and was flexible/pliable. The warp served as a scaffolding to weave on, orienting the weft. The tension in the warp changed the shape of the v, making the space between the branches thinner as the warping continued. Therefore, the more tension, the less area/space to work in/with. I used a basic over under weaving pattern for this piece. This weaving was diverse, especially in material, including wood/tree branch, embroidery floss/thread, cloth ribbon, paper ribbon, yarn, pipe stem cleaner, and lace. There was also a diversity in color, texture, width, and form of material. The diversity was in part patterned by sensing and following lures. After weaving one material, I sensed the attractive direction to go with the next material, often taking in its multiple attributes as well as sensing the whole. This attunement to agency, or activity, or influences and attractions, was in part due to the element of presence, or perceivability. In this piece, there was seen and unseen while weaving, as well as with the tails, or loose ends. The loose ends were wrapped, knotted, tucked, and/or woven into the back of the weaving. Some of them are visible in the back and some were made decorative and are visible from the front. Some of the materials overlap others in the weaving and therefore the overlapping materials are both seen and unseen, or partially seen.

During crocheting chains, structure was again highlighted. Two hands created the main frame for the work, creating tension and stability for different parts of the yarn strand. The crochet hook also plays a part in the framing of the yarn as well as the activity of the yarn. The basic pattern for crocheting a chain is loop on hook, then wrap the hook with more yarn, and pull yarn through the loop while keeping the right amount of tension. The amount of tension will determine if the chain is looser (with spaces between chains) or tighter (less space). The tension on the loop around the hook is also important. If it is too tight, it is difficult or impossible to pull more yarn through the loop. If it is too loose, the loop is unstable and will fall off the hook, therefore, making

it difficult to build upon. The chain begins with the slipknot, which itself is a secure but adjustable/adaptable structure.

When reflecting on the three chains made, I was able to note diversity in feel, nap, thickness, width and hook size, color, fiber, producer, and series names. There was not a predetermined normal yarn or crochet chain. Each had a host of attributes. One yarn being light 3, 4 mm, G6 hook, Cozy Wool Merino, made from 55% Superwash Merino and 45% Anti-Pilling Acrylic in the color gray, with infrequent, light napping that produced a chain ¼ inch thick. Another was bulky 5, 6 mm, J10 hook, Yarnspirations Bernat Bounce Back, made from 96% acrylic and 4% polyester in the color ochre, with frequent, thick napping that produced a chain 3/8- ½ inch thick. And the third being medium 4, 5 mm, H8 hook, Yarnspirations Caron Crystal Cakes, made from 64% acrylic, 24% polyester, 7% nylon, and 5 % metallic in the color Glittering Moonlight, with frequent, thick, long napping that produced a chain ¼-3/8 inch thick.

Structure and presence were foregrounded while crocheting granny squares. The basic pattern used 3 chain and 3 double stitches. The chains made an enclosed space possible and the double stitches build on the space. This pattern generates possibility for continuous growth in rounds going counter-clockwise. This pattern could go on forever, growing larger and larger. The spaces are very noticeable in this pattern, making the negative space present, or perceivable as much as the solid yarn sections. The intentionally made spaces with the 3 chains are easily perceivable, and some smaller spaces in the chains or double crochets are perceivable depending on the tension used. One of the most interesting things in this experience being that the spaces are generative for the growth of the overall structure. Corners and edges are other sites for growth since they border the spaces and are wrapped when building on with double crochets. Another interesting learning was that while completing a round, the beginnings and endings of the round are woven together so that it is undiscernible as to where it began and where it ended. This seems like a possible tie to inclusivity.

The granny square experience also foregrounded diversity. The granny square rounds were layered, side-by-side, and interwoven lightly. Their differences were made and contained deliberately, by choice of yarn and adherence to the pattern. Difference could be increased by stitching various squares together. After learning some basic crochet stitches, one could combine different stitches together in different patterns, using different yarns or cords in many different ways, leading to more and more divergent and creative outcomes.

To further expand on agency and action during granny square crocheting experiences, were the many actions of twisting, looping, wrapping, stretching, repeating, stitching, winding, knotting, holding, pulling. These actions were influenced by the presence, or perceptibility, of attributes of the yarns, which were perceived as wrap-able, pull-able, hold-able, loop-able, twistable, stretchable, windable, knot-able, stitch-able. It seems that practice with perceiving as much as possible beyond what is thought possible would lead to more diverse outcomes. We move with that which is perceived. What if we perceive more than what we have preconceived?

When reflecting on loom weaving, structure was highly foregrounded, especially in the loom itself, which I had to make with wood, screws, and nails. The loom as the frame provided constraints for the development of the weaving/tapestry/fabric. I made the loom a rectangle shape, taller than wider, with 18 nails along the top and 18 along the bottom. The loom could have taken other shapes or sizes and could have used differing numbers of nails or connectors. Even so, there was still some flexibility in frame usage in that the weaver could choose the number of nails to use and how much space between the top and bottom to fill. The warp added further constraints and could be perceived as a scaffold for building the weaving/tapestry/fabric. In a way, the warp is almost an extension of the frame as well as the beginning of the woven piece. At times, the structure of the frame inhibited the growth of the weaving/tapestry/fabric. This

occurred when the yarn would snag on the nails while I was trying to weave. This might have happened less if the nails protruded less from the wood than they did.

Agency, or activity, was foregrounded when studying the tools for weaving on the loom. These tools supported, guided, facilitated the activity of weaving. When considering the word facilitate, facil is 'easy' in Spanish or from facile in English. The tools were used to make the weaving process easier. They supported the weaver whoever they might be. In a sense, the tools acted as accommodations, at least in the way we might use them in education. Although not all accommodations are offered or allowed for every learner. The shed stick created space, held the pattern (every other string), and made movement (weaving) through the piece easier. The spacer created a tension while holding a space that marked the 'beginning' of the weaving. This spacer made the beginning perceptible. The beater also contributed to tension, tightening the wefts as they lay next to each other. Looser weaving allows the warp to show through (or be perceptible to the viewer) and tighter weaving doesn't.

Together the structure and the agency, in activity, worked with divergence and presence toward creativity, creation and/or creative learning. In one tapestry, I was able to learn and use tabby weave, sumac weave, and twining weave, varying tensions so that the warp could be seen in some and not in other sections. I used angles, shapes, stitching, and added embellishments. I used knots and unraveling at the ends, top/bottom edges. I varied the types of yarn. I also left spaces where warp could be seen without any weft. In creating a structure that allowed for divergence in weaves and other techniques, I was able to create something that I had not imagined beforehand. Also, it was interesting that once I removed the tapestry from the loom, I decided to flip it 'upside-down' for the final piece. What had begun as the bottom of the tapestry became the top. Some of the ends were left knotted and perceptible to the viewer and other ends were woven in with a needle.

APPENDIX D

DISCUSSION TOPICS

Micromoments in Neuroplexure Discussion Topics

Group	Topics
1A	Grading and rubrics
	Valuation of teaching/learning in set/sequential order
	Valuation of logical/analytical
	Misunderstanding unexpected behavior
	Late identification and neurodiversity
	Art class- a place to learn the rules only to break them
	The art of teaching
	Equity in education
1E	Diagnoses and deficit-perspectives
	Questioning and creativity
	Engagement (interest) in the classroom
	Anxiety in math and test-taking
	Assessments
	Curriculum planning in grade level teams
	Pandemic teaching
	Teacher shortages
1F	Schools represent society
	Structure and improvisation balance
	Teacher education and teacher self-reflection
	Art of education
	Different views of the world
1H	Sensitivity to aberration (patience and openness)
	Memories (painful stick longer, happy ones are more sustained/backgrounded)
	Micromomenting as a practice
	Guilt for possibly missing micromoments (response-ability)

When unexpected behaviors become a (person's) role

Absence and uncertainty

Security objects

Student choice with micromoments

Teacher community to support them in teaching differently

Teacher education and practice (connections/disconnections)

1I   Reflecting on teaching mistakes

Micromoments thougt of as organizational

Being too serious as a teacher

Focus on grades, ignoring whole child

Reduction Policy, training school, China

China's college entrance exam (Gaokao)

Presumption of competence

Teaching with improvisation

Control vs. Flexibility

1K   The 'educations'

Sensory issues and learning environments

Inappropriate teacher responses

Misunderstood students

Behavior from unmet needs

Neurodiversity

Teachers who make a difference

Intentionality (behavior) vs. ability

Executive function skills need to be taught

Labels

Auditory processing, eye contact, mouth reading

Mementos

Autism organizations help, but not neurodiversity mindset

Autism/ADHD overlap

Alternative technology

Negative traits as a child become beneficial to adult

College not seen as possibility

Compliance

Translating thought to language

Unmasking by crossing modes

1L   Teen mother experiences

Limited autonomy for students with disabilities

School and students- differing ideas of independence

School/teachers focus on one symptom/label instead of holistic picture

Lack of resources

Inflexible expectations

Twice-exceptionality

"Regular" schooling

APPENDIX E

INDIVIDUAL CONTRIBUTIONS TO INVITATIONS

Micromoment in Neuroplexure Individual Contributions

Date	Format	Contribution
2/10/22	Screenshot with words (.png)	*microMemento:* multicolored pen with comment. Connects to microMemory "Trying to Collaborte as a New Teacher" (researcher example)
2/23/22	1:39 minute video (.mp4)	*microMovement:* weaving colored thread around four sticks stuck into a cardboard base. Connects to "Trying to Collaborate as a New Teacher" (researcher example)
5/3/22	photograph (.HEIC)	*microMovement:* Drawing of hand near bottle labeled Thiamine B1. Little person on middle finger is laying down, saying "ahhhh." There is sand and water/waves between fingers and the bottle. Three green squiggly lines move from near tips of fingers outward. Red wavy lines go from fingers toward wrist. Title-Micromovement experiencing thiamine.
5/3/22	photograph (.HEIC)	*microMemory:* Drawing with the words '5th grade' at the bottom. Two classroom scenes (top and bottom of paper). On top, there is a chalkboard with a teacher facing the board and pointing with a pointer. Three students sit at desks. One has hand raised and is facing teacher/board. The other students are

facing teacher/board. In the bottom scene, two students are facing teacher/board. One is facing the student with hand up and gesturing. One student is drawn in pencil only and has a frown. A word bubble says 'burp!' Three students and the teacher are facing the first student with their mouths open and hands near their mouths. Title- "fifth grade unexpected burp."

_____

APPENDIX F

INSTITUTIONAL REVIEW BOARD APPROVALS

EXEMPTION GRANTED
Ronald Beghetto
Division of Teacher Preparation - Tempe
-
Ronald.Beghetto@asu.edu
Dear Ronald Beghetto:

On 10/21/2021 the ASU IRB reviewed the following protocol:
Type of Review: Initial Study
Title: Creative Professional Learning for Inclusive
Education: Engaging with Micromoments Through a
Neurodiversity Inspired Perspective
Investigator: Ronald Beghetto
IRB ID: STUDY00014726
Funding: None
Grant Title: None
Grant ID: None

Documents Reviewed: • Consent Form2.pdf, Category: Consent Form;
• Data Collection Instrument2.pdf, Category:
Measures (Survey questions/Interview questions
/interview guides/focus group questions);
• IRB.MicromomentsInNeuroplexure2.docx,
Category: IRB Protocol;
• Recruitment email post2.pdf, Category: Recruitment
Materials;
• Recruitment Webpage2.pdf, Category: Recruitment
Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal
Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 10/21/2021.
In conducting this protocol you are required to follow the requirements listed in the
INVESTIGATOR MANUAL (HRP-103).

If any changes are made to the study, the IRB must be notified at
research.integrity@asu.edu to determine if additional reviews/approvals are required.
Changes may include but not limited to revisions to data collection, survey and/or
interview questions, and vulnerable populations, etc.

*REMINDER - All in-person interactions with human subjects require the completion of the
ASU Daily Health Check by the ASU members prior to the interaction and the use of face
coverings by researchers, research teams and research participants during the interaction.*

These requirements will minimize risk, protect health and support a safe research environment. These requirements apply both on- and off-campus.
The above change is effective as of July 29th 2021 until further notice and replaces all previously published guidance. Thank you for your continued commitment to ensuring a healthy and productive ASU community.

Sincerely,
IRB Administrator
cc: Anani Vasquez
Ronald Beghetto
Mirka Koro
Anani Vasquez

EXEMPTION GRANTED
Ronald Beghetto
Division of Teacher Preparation - Tempe
Ronald.Beghetto@asu.edu
Dear Ronald Beghetto:
On 2/14/2022 the ASU IRB reviewed the following protocol:
Type of Review: Modification / Update
Title: Creative Professional Learning for Inclusive
Education: Engaging with Micromoments
Through a Neurodiversity Inspired Perspective
Investigator: Ronald Beghetto
IRB ID: STUDY00014726
Funding: None
Grant Title: None
Grant ID: None

Documents Reviewed: • Data Collection Instrument Invitations for
Google Folder, Category: Measures (Survey
questions/Interview questions /interview
guides/focus group questions);
• IRB.MicromomentsInNeuroplexure4.docx,
Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal
Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on
2/14/2022.

In conducting this protocol you are required to follow the requirements listed in
the INVESTIGATOR MANUAL (HRP-103).
If any changes are made to the study, the IRB must be notified at
research.integrity@asu.edu to determine if additional reviews/approvals are
required. Changes may include but not limited to revisions to data collection,
survey and/or interview questions, and vulnerable populations, etc.

REMINDER - - Effective January 12, 2022, in-person interactions with human
subjects require adherence to all current policies for ASU faculty, staff, students
and visitors. Up-to-date information regarding ASU's COVID-19 Management
Strategy can be found here. IRB approval is related to the research activity
involving human subjects, all other protocols related to COVID-19 management
including face coverings, health checks, facility access, etc. are governed by
current ASU policy.

Sincerely,
IRB Administrator

APPROVAL: MODIFICATION
Ronald Beghetto
Division of Teacher Preparation - Tempe
Ronald.Beghetto@asu.edu
Dear Ronald Beghetto:

On 3/21/2022 the ASU IRB reviewed the following protocol:
Type of Review: Modification / Update
Title: Creative Professional Learning for Inclusive
Education: Engaging with Micromoments Through a
Neurodiversity Inspired Perspective
Investigator: Ronald Beghetto
IRB ID: STUDY00014726
Funding: Name: (Unspecified)
Grant Title: None
Grant ID: None

Documents Reviewed: • Consent Form3.pdf, Category: Consent Form;
• Grant Proposal, Category: Sponsor Attachment;
• IRB.MicromomentsInNeuroplexure5.docx,
Category: IRB Protocol;
• Phone Accommodations.pdf, Category: Measures
(Survey questions/Interview questions /interview
guides/focus group questions);
• ProposalBudget.docx, Category: Sponsor Attachment;
• Recruitment email post3.pdf, Category: Recruitment Materials;
• Recruitment Webpage3.pdf, Category: Recruitment Materials;

The IRB approved the modification.
When consent is appropriate, you must use final, watermarked versions available under
the "Documents" tab in ERA-IRB.
In conducting this protocol you are required to follow the requirements listed in the
INVESTIGATOR MANUAL (HRP-103).

*REMINDER - Effective January 12, 2022, in-person interactions with human subjects
require adherence to all current policies for ASU faculty, staff, students and visitors. Up-
to-date information regarding ASU's COVID-19 Management Strategy can be
found here. IRB approval is related to the research activity involving human subjects, all
other protocols related to COVID-19 management including face coverings, health
checks, facility access, etc. are governed by current ASU policy.*

Sincerely,
IRB Administrator
cc: Anani Vasquez
Ronald Beghetto, Mirka Koro, Anani Vasquez