Exploring New Teacher Beliefs: Identity, Home-life, and Culture in the Classroom

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Exploring New Teacher Beliefs: Identity, Home-life, and Culture in the Classroom

by

Frederick B. Bradley III

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Curriculum and Instruction with a concentration in Science Education Department of Teaching and Learning College of Education University of South Florida

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Keywords: action research, science education, Noyce, STEM

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DEDICATION

I dedicate this dissertation to my mother, Denise. Damn Ma, we have come so far, in so many ways. Whether I was falling, getting up, or crushing it, you have been my greatest supporter, confidant, and friend. True to form, you welcomed each of these roles as I worked to complete this dissertation. To say I could not have done this without you is an understatement. I owe to you any past, present, and future successes, as well as the best parts of me.
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ABSTRACT

A persistent shortage of science, technology, engineering, and math (STEM) students, teachers, and professionals is seen by many as a threat to the nation’s global economic standing. Deficits in these areas are often attributed to a lack of quality K-12 STEM education, which is due in large part to a high rate of teacher turnover. Moreover, such teacher attrition has been shown to occur far more often in high-need schools and districts; thus, serving to further marginalize disadvantaged members of society.

This study occurs within the context of The Robert Noyce Scholarship Program at our research-intensive university in the southeastern US. The program seeks to improve the recruitment, preparation, and retention of STEM teachers in high-need middle and secondary classrooms, and is likewise partnered with a large, local, title I school district. Central to this program’s approach is, the offering of financial, cohort and mentor support to highly qualified STEM degree holders and majors, who wish to supplement their undergraduate degree, with a Master of Arts in Teaching (MAT). As Noyce scholars work towards their
degrees, they also, intern, work, and learn alongside peers, university faculty, district teachers and staff, as well as other science education professionals, in what amounts to a professional support network. It is hoped such a multi-tiered support will allow Noyce graduates to persist beyond their inductive teaching years and develop into highly qualified education practitioners.

This research was designed to explore the beliefs expressed, explored, and developed by Noyce scholars as they participated in a collaborative action research (CAR) based instructional intervention. The Noyce CoP as it was known, centered on a journal club, which was embedded within a master’s level science education field practicum course. Students engaged with literature and gained understanding relevant to the influence of belief systems on how we construct our identity, perceive the conditions in which it happens, and view ourselves and others as we go through the collective process. Access to these new teachers’ beliefs was gained via an online literature discussion board, reflective writings, surveys, and face-to-face collaboration during four “CoP meetings”. The latter proved to be invaluable in promoting opportunities for these new teachers to recognize, critique, and challenge their beliefs, and those of others as well. Accordingly, the CoP served as a research-focused arena for collaborative autobiographical self-
reflection, which I contend is ideal for studying new teacher beliefs.

This research follows the path of other science education researchers who recognize the potential of studying new teachers’ beliefs’, to help overcome a perceived cultural disconnect, which has been credited with inhibiting K-12 science teaching and learning. To do so, I position the Noyce CoP as quintain, whose story is told using three themes I constructed: 1) new teacher beliefs about identity and science teaching and learning; 2) new teacher beliefs about home-life and science teaching and learning; and 3) new teacher beliefs about sociocultural-interactions and science teaching and learning. Throughout I incorporate elements of portraiture to not only give you a better idea of who the CoP members are, but also to allow you a view into our CoP meetings, and how we collaborated to construct new knowledge. Qualitative analysis revealed that during the CoP, the scholars and I were able to generate considerable understanding regarding the cultural divide that can exist when teaching science in high-need schools. Moreover, there is also evidence that the CoP served to help these new teachers develop personal and professional ties they can incorporate into their larger support network, and perhaps help them persist through their inductive years of teaching.
CHAPTER 1: INTRODUCTION

This dissertation explores new science teachers’ beliefs and insights regarding how aspects of our identity, home-lives and sociocultural experiences converge to impact teaching practice in science technology engineering and math (STEM) classrooms. It does so by examining new teachers’ beliefs and perceptions as they participated in a community of practice (CoP) (Wenger, 1998), which was centered on a journal club, embedded within a master’s level practicum course (Golde, 2007; Tallman & Feldman, 2012; 2016). While the CoP was intended to help prepare these new teachers, for the diverse classrooms they are likely to be placed, it also provided an arena for attempting to make sense of how they see identity, home-life, and sociocultural-interactions converging in the science classroom.

Before proceeding with this introduction, I must mention several things to keep in mind while reading. As you may have noticed in my opening paragraph, at times I will vacillate between my use of the terms “STEM”, and “science”, when referring to careers, students, teachers, and education in
general. This is because the literature I consulted to develop my conceptual framework includes considerable overlap between the two, and any conditions affecting “science”, are by nature “STEM” concerns. Just know my field is science education, and each of the scholars in this study are either working towards or have completed a MAT in science education. This brings me to my second point. I will also use the term “new teachers”, fairly often. At times, this is meant to include the other members of our CoP, who were either at various stages of pre-service teaching, or in their first semester of fulltime teaching. Others, I am referencing any inexperienced teacher, pre-service or otherwise, who as we will discuss, is likely to encounter challenges working alongside students from diverse backgrounds. Finally, there are instances in this proposal where my narrative will lean towards a conversational tone, a tendency I feel is appropriate for two reasons. First, as you will see, conversations are a vital component of my research design, and offer benefits absent from other forms of exchanging information. Additionally, my use of portraiture (Lawrence-Lightfoot, 1997), demands I allow aspects of myself to be revealed throughout my research design. I feel presenting examples, stories, and explanations using my own words will allow me to address this requirement by providing the reader more insight into my thought processes, beliefs, and
Finally, I use the collective term “Noyce CoP” when referring to the intervention, which is the object of this proposed study (Thomas & Meyers, 2015). This umbrella term covers, CoP members, our meetings within the context of the practicum course, and our participation in the journal club.

To inform this undertaking I have reviewed literature exploring, and/or attempting to explain, our nation’s inability to supply an ever-growing STEM workforce, shortages of qualified STEM teachers in our public schools, and the disparate impact of STEM teacher attrition on certain schools, and subsets of America’s population. Additionally, I followed the path of researchers pursuing a greater understanding of the links amongst STEM teacher recruitment, preparation, and retention, and these foreboding economic, academic, and sociocultural conditions. All the while, keeping a keen eye on the role of cultural dynamics in these processes.

This study occurs within the context of a National Science Foundation (NSF) funded, Robert Noyce Scholarship Program, at a large research focused university in the Southeastern United States. Our Noyce program aims to recruit, prepare, and support, highly qualified STEM majors, as they complete their Master of Arts in Teaching (MAT), and move on to teach in “high-need” schools and districts. The 2018 Noyce CoP was established,
during my time as the instructor for our scholars’ middle and secondary science field practicum course.

The main goal of the CoP was to provide a venue for reflection on our teaching practice, provide support for growth in our practice, and become better prepared to teach students in our respective classrooms. However, it was also designed to facilitate the utilization of several types, and sources of data in order to facilitate triangulation, and contribute to its overall validity. My primary data sources were, the recordings of conversations within the CoP; however, in an effort to support my interpretations of our individual, and collective experiences in the Noyce CoP, each co-participant (myself excluded) was asked to complete pre- and post-instruments targeting aspects of diversity awareness, and socially constructed identity. Additionally, I made continued use of my research notebook, which contained observations, “debriefings”, and other notes pertinent to this study. These measures were taken with the intent of buttressing my conclusions, promoting transparency, and facilitating the triangulation of my data.

The data collection efforts described above helped me in addressing an area of need in the field of STEM teacher recruitment, preparation, and retention. Particularly, identifying ways to assist new teachers in overcoming a
potential lack of cultural congruency (Ladson-Billings, 1995) in their classrooms; by challenging them to critically reflect on their own beliefs, alongside other education professionals. Moreover, my findings are relevant to education stakeholders calling for innovations in STEM teacher preparation, aimed at better preparing new teachers for the racially, culturally, and linguistically diverse classrooms they will likely serve.

Background of the Study

An increasing shortage of professionals, educators, and students in STEM fields in the United States has garnered more and more attention in recent years (Kuenzi, 2008; Byars-Winston, 2013; Stets, Brenner, Burke, and Serpe, 2017). This has led to concerns about our ability to maintain a competitive STEM workforce (Hagedorn & Purnamasari, 2012), and ensure a sufficient supply of quality STEM teachers in our nation’s classrooms (Raju and Clayson, 2010).

Hagedorn and Purnamasari (2012) caution against assuming the impact of these shortages is equally distributed across communities, and like El-Haj and Rubin (2009), blame a shortage of qualified STEM teachers for the disparate STEM achievement amongst underrepresented members of society. In addition, others have credited a lack of quality K-12 STEM instruction in our high-need schools with inhibiting the ability of marginalized
individuals to participate STEM related academia (Maltese and Tai, 2011), and careers (Brown et al., 2016). Curtis (2012) points to the disproportionately high-teacher turnover (attrition) in high-poverty schools and districts, as being a likely contributor to the overall problem.

How Do We Address America’s STEM Problem?

In order to stop the revolving door, which continues to shuffle novice STEM teachers in and out of our ‘hard to staff’ schools, Morgan and Kristonis (2008) call for proactive approaches to teacher recruitment, and preparation. The Robert Noyce Scholarship Program for STEM Majors, at our university answers the call of Morgan & Kristonis (2008), by pursuing teacher preparation initiatives, which incorporate mentoring, professional development, and peer support (Wilson, 2011). In addition, its staff, scholarship recipients, and interns have all participated in in research aimed at recognizing, and bridging cultural divides, which get in the way of STEM teaching, and learning, and contribute to new teachers leaving the field (Gay, 2002). Much of our program’s initiatives, and research (this study included), place an emphasis on examining interns’, and scholars’ beliefs, perspectives, and experiences, pertaining to the notions of institutionalized racism, deficit perspectives, and stereotyping. While the primary focus of our
past efforts and this study are aimed at best preparing our scholars for any potential cultural disconnects in their future classrooms, we also see opportunities to work alongside others education researchers concerned with advancing STEM teacher recruitment, preparation, and retention as a field.

This research centers on my interpretation of the individual and collective experiences of Noyce CoP participants as we engaged in critical reflection about how aspects of our identity, home-lives, and sociocultural-interactions influence science teaching and learning. This methodology is reliable, creative, and harkens to those seeking innovative approaches to STEM teacher, recruitment, preparation, and retention. Moreover, our CoP conversations, my reliance on a critical friend, and the instruments I have chosen for this study, allowed me to access novice teachers’ perceptions, and explore ways to better prepare them for the classroom. Additionally, I am confident additional understanding was generated, relevant to the improvement of STEM teaching and learning in high-need schools, new teacher persistence, and the field of STEM teacher recruitment, preparation, and retention.

**Problem Statement**

An inability to supply sufficient numbers of qualified workers to America’s STEM fields is drawing ever-increasing
attention. Research from the field of education examining this problem, places much of the blame on inadequate STEM teacher preparation. Moreover, the lack of quality STEM instruction in high-poverty K-12 schools, and districts, has been associated with lagging STEM achievement amongst students from non-traditional backgrounds. If taken at face value, such a stance might help explain the underrepresentation of these individuals in STEM academia, and careers. More and more, the ability of STEM teacher preparation programs to ready new teachers for the racially, ethnically, culturally, and economically diverse classrooms is being questioned. Despite the realizations that accompany such query, the body of research concerned with the preparation of new teachers for the nation’s increasingly heterogeneous classrooms remains limited. In order to promote equity in both STEM, and society, science education researchers must be proactive in considering the confluence of students’ and teachers’ identities, home-lives, and sociocultural ways of being, as we seek to further the field of STEM teacher recruitment, preparation, and retention.

**Purpose Statement**

The purpose of this study was to explore the beliefs of new teachers as they participated in the 2018 Noyce CoP. Pairing my conversation transcripts with surveys, utilizing a critical
friend, and keeping a detailed research notebook, afforded me a more complete understanding of these new teachers’ perspectives, and experiences regarding the roles identity, home-life, and sociocultural-interactions play in their lives and classrooms. Critical reflection in these areas led to understanding, and knowledge, which might help them persist beyond their inductive years of teaching, and grow into highly effective science educators.

**Rational for Study**

Although considerable time, resources, and research has been allocated towards improving STEM teaching in America’s classrooms over the last 70 years, there is little evidence pointing to success in this area (Goldhaber et al., 2014). Despite this lack of progress, we as education researchers are duty bound to continue working towards the betterment of STEM teacher recruitment, preparation, and retention. Not only out of a sense of professional obligation, but also because of its implications for the promotion of equity in our society. Our increasingly diverse classrooms are home to the very individuals, who are most often associated with underachievement in STEM K-12 curriculum, academia, and professions. Therefore, it stands to reason, improvements in STEM teacher education
should include preparing new teachers for the dynamic classroom environments they will likely encounter.

If we are to promote social justice in our classrooms, we must put new teachers in position to “interrupt the complicity” and “to awaken dialog within science education that exposes and makes explicit those longstanding, implicit assumptions, attitudes, beliefs, and practices...” (Bryan and Atwater, 2002, p. 823) that undermine fair, and equitable STEM education. The Noyce program at our university answers this call by working to improve STEM teacher recruitment, preparation, and retention through the promotion of a supportive network of scholarly peers, a research focus aimed at preparing teachers for diverse classrooms, and ultimately placement of these new teachers in high-need schools, and districts. I developed the CoP to serve as an arena for me to work alongside novice teachers, interpret their experiences, and engage them in systematic discussions surrounding education literature concerned with multi-cultural issues. I am pleased to learn our interactions allowed us to awaken dialog, and challenge “longstanding, implicit assumptions, attitudes, beliefs, and practices” (Bryan and Atwater, 2002, p. 823). Additionally, as we delved into aspects of our identity, life experiences and sociocultural perspectives, critiqued relevant literature, and participated in reflective cycles of action, we created opportunities to further
our practice as educators. A process that likely included us developing tools, and gaining new understanding, which might help us all better navigate diverse learning environments. Moreover, I feel our collaboration throughout this study led to understanding valuable to the field of STEM teacher recruitment, preparation, and retention.

To best make sense of what exactly occurred during the 2018 Noyce CoP, I use a methodology, which relies on the use of portraiture (Lawrence-Lightfoot, 1997). In addition, by supplementing my interpretations of CoP conversations with: instruments focused on identity, and diversity, input from my critical friend, and a detailed research notebook, I was able to support my interpretations, and understandings. Therefore, providing opportunities for triangulation, more comprehensive findings, and increased validity (Creswell, 2009).

**Significance of Study**

The high turnover that has come to characterize novice STEM teachers’ inductive years, indicates more must be done to prepare them for the classroom. Given this situation is especially true for high-need schools, and districts, it is suggestable that novice teachers’ professional practice must be modified in ways that allow them to be successful in challenging environments. This may help make quality STEM instructors
available to the districts, schools, and most importantly, students, who need them most. Moreover, relying on the premise that the availability of quality instruction, will lead to increased student interest in STEM careers; improvement in this area has the potential to have a positive impact on the individual, and familial situations of marginalized subsets of our nation’s population.

Research Question

The intent of this study is to better understand how pre-service teachers consider theirs and their students’ belief systems as a factor in science teaching and learning. To guide this effort I use the following research question:

In what ways will the participation in the Noyce CoP allow pre-service teachers to express, explore, and develop their beliefs about the influence of identity, home-life, and sociocultural-interactions in science teaching and learning?

Researcher

My interest in improving STEM education for marginalized students is rooted in personal history. My attending and later teaching in schools serving marginalized student populations, has been a catalyst for personal reflection, and professional interest. Much of my focus has been drawn towards factors that
have had an impact on mine and my students’ education, as well as ways to improve science teaching and learning in schools like those which I attended, and worked. In the remainder of this section I weave anecdote and narrative to: provide some personal background and context for my K-12 school experience, discuss my interest in science and its importance in my life, describe the journey that led me to science education and my current research interests, and explain why I feel exploration in this area is important.

The communities I grew up in were centered on the public housing, and poor working-class neighborhoods, that were home to virtually all my nearest relatives, and me. Moreover, for the sake of perspective, and transparency, I will also take the opportunity to let you know I identify as bi-racial (white mother/black father), and am from a single parent home. The public schools, which served my neighborhoods, were the setting for my K-12 education. Although I do not ever recall hearing the term, I suspect by today’s standards they would be considered “high-need.” Proof is evident in a recent conversation I had with my mother, where we laughingly recalled how proud she, my sisters, and I were the year she finally made enough money for us to be able to receive “reduced priced” lunch. Prior to my sophomore year in high school, we would have to present a “free lunch” card at school each day. As an adolescent this was quite
embarrassing at times, especially as my peers and I began to understand concept of social hierarchy, and our families’ place within it.

Outside of school, my surroundings were by any measure “urban”. We flew our kites from rooftops to avoid cloths and power lines, played football in the streets between passing cars, and any nearby trees were of the utmost canine interest. However, in an ironic twist of fate I ultimately ended up earning both a bachelor’s, and master’s degree in environmental science. What was constant throughout all my schooling was an interest, and apparent aptitude for the sciences. This love for anything “science”, carried over into my professional career, where at various times I: designed and installed equipment in wastewater treatment facilities, used various forms of chromatography to isolate proteins for immune suppressant drugs, and employed spatial technologies to model contaminant transport in coastal watersheds. While I found these experiences, and others rewarding, educational, and challenging, I came to realize what I most wanted to do, was teach.

My first real experience teaching came as I worked in a geo-spatial analytics lab before, during, and after I completed my master’s degree. During this time, I taught geographic information systems (GIS) workshops to professionals, and was
also the teaching assistant, or instructor for virtually every spatial technology course taught at our university. Additionally, I would guest teach in friends’ classrooms at nearby Title I elementary, middle, and high schools. I found I very much enjoyed the challenges and rewards teaching offered. Moreover, I grew to greatly value the personal growth I experienced as a result of working with students. This was particularly true of my time spent with learners from backgrounds similar to my own. This ignited a passion, which eventually led to me teaching secondary science in a Title I school, where 100% of the student body received free breakfast, and lunch. Teacher turnover at this school was very high, and it was not long before I was department chair. I saw many teachers come through whom despite our efforts, struggled to develop positive relationships with the student body. Some would not come back the following year, leave over winter break, or simply not return after a weekend. Regardless of how they vacated their position, the pressures associated with lurking standardized exams, often found these students added to my already crowded classrooms. It was far from easy, and most days I was exhausted but, I could do it. This ability I now realize was due in no small part to my personal familiarity, with my students’ reality.
Today, I am no longer in my science classroom, but it is never far from my mind. I am a doctoral candidate in the Science Education Program at the University of South Florida (USF), where my research interests focus on the preparation of new teachers for increasingly diverse STEM classrooms. The path I have chosen is a culmination of my life experience, time in the classroom, and work with the Noyce program at our university. The latter of these has positioned me as a mentor, instructor, and researcher at various times, this research being no exception. In particular, I situated myself as a privileged co-participant within the 2018 Noyce CoP, as I sought to gain understanding of ways to better prepare pre-service teachers for diverse STEM classrooms. My privilege in this regard, is permanently tied to me having designed the CoP and this study. However, the more personal, and relevant “privilege” I feel am afforded in this study, is born of my experiences as both a student, and teacher in high-need classrooms, and schools. This not only includes being able to recognize the ways STEM education has furthered my professional, academic, and life prospects; but also, the special debt of gratitude I owe my high school biology, and geometry teachers. They were both fantastic in so many ways, none more than their ability to first, show me I could be successful, and then teaching me how to be successful. Their efforts were instrumental in helping me become
the first of my known relatives to earn a four-year degree, the only one to complete a master’s program, and the lone family member to date, pursuing a Ph.D. These two exceptional educators helped change my life, and sent me on course I had little knowledge of. Moreover, I have come to realize the impact this entire process has had on other members of my family.

I am a proud uncle to four nieces, and a nephew. Three of my nieces are currently college students, and we discuss their education quite often. It has made me realize, that while there are many great people who have given me guidance, provided direction, and shared valuable experiences throughout my academic career, none of them were family. I now have the opportunity to share my academic experiences, and help guide three young ladies I love dearly. This I believe benefits me, them, and our entire family. This to me where the importance of, and my commitment to, this research lies. Like me, students in today’s diverse STEM classrooms deserve life changing instruction, and any attempts to better understand how to make this a reality is worthwhile. Not to be discounted in any such efforts, is the role of teacher education programs (TEP), in developing new teachers that are able to provide life changing instruction to students who need it most. I view this study as a small, but important step towards this goal.
Limitations

Limitations associated with this study are the rooted in both my sampling method, and personal experiences. My use of convenience sampling means any findings may not necessarily be representative of the population, or even a sub set of the population (Salkind, 2007). My research approach also seeks to probe aspects of our lives, identities, and sociocultural-interactions, all of which I contend are particularly intimate. Moreover, the literature I chose to drive our conversations in these areas was done so, because of the strong impact it had on my own thinking, and understanding. This coupled with my role as instructor, facilitator, and mentor, makes it likely subjectivity will permeate the entirety of this study.

Delimitations

The primary intent of this study is to investigate how the examination of new teachers’ beliefs regarding the roles identity, home-life, and sociocultural-interactions play in their lives and classrooms might lead to understandings useful for STEM teacher educators, seeking to better prepare their students for America’s increasingly heterogeneous K-12 classrooms. This research is limited to the members of the Noyce Cop. A particular focus will be given to the conversations, which occurred in this setting, as well as the instrumentation
used to support any understandings gained along the way. Thus, a
delimitation of my study is the restriction of this research to
novice science teachers, and how they express, explore, and
develop beliefs relative to the teaching and learning of STEM
curriculum.

**Definition of Terms**

I am aware there are several terms I have already used,
which depending on the context can have different meanings and
significance. Accordingly, the following provides operational
definitions of such terms, particularly as it pertains to their
meaning and use in this study:

Feldman (1998) summarizes **collaborative action research**
(CAR) as a methodology where practitioners take action within a
given setting to improve, and increase understanding of that
practice. The practitioners acting in this study included pre-
service and first-year science teachers, and myself. Our action
consisted of engaging in a journal club as a way to better
understand factors affecting teaching and learning in our
respective settings. For my co-participants this setting was
their middle and secondary science classrooms, as well as the
practicum course, while I was confined solely to the latter.

Wenger (1998) describes a **community of practice (CoP)** as
“the basic building blocks of social learning” (p. 229), where
competence (what it takes to be recognized as a competent member of a group) is defined by its members' collective development, and accountability, interactions that occur during this process, and the production of a “shared repertoire of communal resources” (p. 229). Competencies in the Noyce CoP revolved around us being able to relate the concepts, principles, perspectives, and theories presented in the journal club, to our individual and collective teaching practices. The interactions driving this process were encapsulated by the conversations, which occurred during our CoP meetings. Meanwhile, the communal resources we collectively produced came in the form of greater understanding of our individual, and collective teaching practices.

Feldman (1996) developed the method of enhanced normal practice (ENP) according to three mechanisms: anecdote telling; the trying out of ideas; and systematic inquiry. “Anecdotes” in this study were present in two forms: 1) the “critical anecdotes” members of the CoP shared as we discussed issues, revelations, and understandings, which may have occurred since our last meeting; and 2) the meaningful exchanges, which came about as we collaborated to examine our individual and collective practices. The “trying out of ideas” included our progress as we presented issues, garnered feedback, and modified our practice accordingly.
Due to our interest in classroom actions, and beliefs, references to the latter in this study, follow the reasoning of Bryan and Atwater (2002). They come to the consensus beliefs are “part of a group of constructs that describe the structure and content of a person’s thinking that are presumed to drive his/her action.” (p. 823).

Given this study examines the dynamics of classroom culture through the lens of experience, culture is this study can be defined as “learned patterns of thought and behavior that are passed from one generation to another and are experienced as distinct to a particular group” (Carter, 2000, p. 865).

In a study exploring the teacher self-efficacy beliefs, and career persistence, Moran and Hoy (2012) define a novice teacher as somebody with three years teaching experience or less. For this study I have expanded this criteria to include pre-service teachers (i.e., the current Noyce scholars), and collectively refer to them as new teachers. This is due to the fact that most were interning (and thus teaching), and one participant was teaching fulltime in the classroom.
CHAPTER 2: LITERATURE REVIEW

Before I proceed with my literature review, I would like to provide you with some background regarding its organization and purpose. The issues in science teaching and learning this study addresses are complex, and include an array of contributing factors. Likewise, this literature review is multifaceted, and incorporates ideas and perspectives from researchers both within and outside of science education, and education in general. Therefore, in the interest of ensuring my reasoning, and perspectives are communicated in as clear a manner as possible, please allow me a moment to shed light on how I have structured this review.

The five main sections of this chapter are intended to help the reader understand: 1) why there is a practical need for research of this type in the field of science education; 2) some of the challenges in science classrooms contributing to this need; 3) teacher education programs’ (TEP) role in alleviating these conditions; 4) how my research addresses the needs and challenges posed to TEPs; and 5) why studying new teacher beliefs can help me meet this goal. Below I introduce each of
the five sections, which will address these points of understanding throughout the remainder of this chapter.

In *America’s STEM Problem*, I address the need for research of this type by discussing how decreased interest and performance is having a deleterious effect on our nation’s global standing in STEM fields. Research investigating the disproportionate consequences of this decline for marginalized segments of our population is presented, alongside studies placing the blame on the state of STEM education. The problems associated with the latter, have been attributed to cultural conflict and teacher attrition in high-need schools, and is expanded on in *Culture in the Classroom*. In this section I provide my understanding of “culture”, and discuss some challenges it can pose to science teaching and learning. Moreover, I make the case that cultural discord is in some ways a social and institutional force, that serves to further marginalize underrepresented members of society. Next, I present possibilities for TEPs to help confront these forces (*The Role of Teacher Education Programs*) by producing culturally responsive teachers (CRT), who enact culturally responsive pedagogy (CRP) in their classrooms. Then I describe how my proposed research is positioned to at least begin helping the Noyce program work towards graduating highly qualified STEM teachers, capable of enacting CRP in their respective classrooms.
(Answering the Call for Innovative Approaches to STEM Teacher Education) and discuss the centrality of beliefs in this endeavor (Conceptualizing Beliefs). I conclude by revisiting each of the points of understanding described above, and relating them in a manner that substantiates my argument for conducting this study.

**America’s STEM Problem**

A shortage of STEM professionals, educators, and students in the United States has garnered considerable attention in recent years, and while the statistics and trends associated with this problem are outside the scope of this literature review; I do refer those seeking such information to Kuenzi (2008), Maltese and Tai (2011), Hagedorn and Purnamasari (2012), National Research Council (2011), Byars-Winston (2013) Daily and Eugene (2013), and Stets, Brenner, Burke and Serpe (2017). Additionally, Pea (2014) provides a summary of NSF funded research concerned with the role of beliefs in STEM and science education, and determines rigorous studies, commissioned reports, policy changes, and international test results show we are not developing a proficient STEM work force, or base of expertise at a rate that will allow the US to remain globally competitive. Stets et al. (2017) describe the need to increase interest and persistence in STEM careers as a “national concern”
(p. 1), whose consequences are closely tied to our ability to compete in an increasingly global STEM economy. Moreover, the prospects of improving the situation becomes less optimistic, considering it is being played out against the backdrop of decreased interest and achievement in STEM education (Raju & Clayson 2010). In fact, according to Goonewardene, Offutt, Whitling & Woodhouse, (2012), roughly only a third of all bachelor’s degrees awarded by our college and universities, are in the science and engineering fields. This has in turn, led to fears the nation is losing our position as the global innovation and technology leader, and becoming increasingly unable to maintain a competitive STEM workforce (Hagedorn & Purnamasari, 2012). While these conditions seem to be having an effect across the board, they appear to more pronounced amongst marginalized segments of our society. Moreover, this is happening as the demographics of our country are undergoing constant and drastic change.

The Demographics They are a Changing

Johnson (2011) asserts we are in an “era of declining performance” (p. 171), as it pertains to STEM education, and calls the US education system’s need to meet the needs of its diverse student population a “striking challenge” (p. 171). To do so will require an ability to “hit a moving target”, so to
speak. This is because America’s student body is, and will continue to undergo a drastic transformation in the coming decades. For example, in 2009 the proportion of Hispanic students surpassed African Americans for the first time (U.S. Census Bureau, 2009), becoming the largest minority group in our schools. Also consider that by 2045, Whites will be a statistical minority in this country (Brookings Institute, 2018). In the meantime, science teacher education programs, classroom teachers, and policy makers are faced with the compounded problem of declining STEM interest amongst traditional and marginalized students alike, as well as, the underrepresentation of the latter amongst those who do pursue careers in these fields (Green, 2014).

**Disproportionality and STEM Career Opportunities**

Noting this disproportionate relationship, Byars-Winston (2013) asserts, now more than ever it is important to increase scientific literacy and the representation of marginalized individuals in STEM career paths. Perry, Link, Boelter, and Leukefeld (2012) attribute the importance of addressing such demographic disparities to the existence of gaps associated with gender, race, ethnicity, and income and occupational prestige. They suggest increased representation of marginalized groups in STEM careers can serve to alleviate some of the inequities
marginalized communities face, resulting from a lack of social mobility.

Despite the global proliferation of STEM careers, the number of people of color who pursue these careers remains small (Perry et al., 2012), with minority representation in STEM careers requiring a college degree hovering around 10% (Nation Resource Council, 2011). This has social justice implications given the potential of these careers to not only provide access to high-paying jobs (and socioeconomic mobility), but also open doors to a knowledge base that will aide individuals in making health, environmental, and business decisions (Barton, 2002). Fortunately, there appears to be opportunities for improvement in these areas, but the need is urgent (Byars-Winston, 2013). It has been estimated that STEM job growth outpaced all others, almost twofold (17% vs. 10%) for the decade spanning 2008-2018, amounting to roughly 2 million jobs (Carnevale et al., 2011; Langdon et al., 2011). Moreover, in our nation’s major metropolitan areas around 30% of job openings are in STEM (Brookings Institution, 2012; Byars-Winston, 2014). However, if we fail to address the inequitable representation in our STEM workforce, marginalized segments of our population will remain deprived of opportunities. What is more, we will fail to take advantage of talented individuals who might help us halt the US’s declining STEM performance (Johnson, 2011).
Pointing a Finger at STEM Education

Much of the blame for our inability to meet the needs of our STEM workforce has fallen on the shoulders of the nation’s education system (El-Haj & Rubin, 2009; Atkinson & Mayo, 2010; Malteese & Tai, 2011; Gooneward, Offutt, Whitling & Woodhouse, 2012; Harackiewicz et al., 2015; Brown et al., 2016). To increase the number of college and university STEM graduates at post-secondary institutions; we must make changes at the primary, secondary, and post-secondary levels (Gooneward et al., 2012). For K-12 education, this involves improving students’ introduction, and sustained interest in science. At the higher-ed level, this involves supplementing efforts to recruit STEM majors, which largely revolve around financial incentives. While these incentive-based programs (Worsham et al., 2013) are a nice step towards addressing the problem, they are hardly a solution (Gooneward et al., 2012).

In order to encourage interest in obtaining STEM degrees, what is required is a better understanding of how students learn, and instructors teach (Gooneward et al., 2012). This statement relies on the premise that improved understanding of science teaching and learning at the postsecondary level, will lead to better STEM teaching candidates, who are able to help K-12 learners experience success and develop a lifelong interest
in science and STEM (Pea, 2014). The problem is this road to STEM improvement fails to account for the fact that our nation’s sociocultural landscape is hardly level. This makes the success of any “one size fits all” approach unlikely. What is needed is for educators (at all levels) to create STEM learning environments that welcome and nurture student interest, especially those from non-traditional backgrounds (Norman, 2014).

**Teacher Attrition**

Making this already complex problem even more multifarious, is the fact that addressing our STEM teacher shortage extends beyond merely increasing the number of STEM education graduates at our nation’s colleges and universities. Raju and Clayson, (2010) insist recruits to the teaching profession must also be of sufficient quality to meet the demands of today’s diverse classrooms. Ingersoll and Perda (2009) examine this notion of a “supply-side deficit” and determined colleges and universities are producing enough mathematics and science teachers to overcome annual losses due to retirement. However, they also find, when pre-retirement teacher turnover is taken into account, the gap between the supply and demand for STEM educators narrows considerably. This ultimately leads them to conclude teacher turnover due to factors associated with job
dissatisfaction (i.e., salary, administrative support, student behavior, and decision-making power) now outpace traditional retirement (Ingersoll & Perda, 2009). Such ‘teacher attrition’ (Ingersoll, 2003, p. 9), is not hard to envision when one considers nearly half of all teachers leave the profession within 5 years (Ingersoll, 2003; Liu, 2007).

Hagedorn and Purnamasari (2012) caution against viewing the impact of teacher attrition as being equal across educational settings, and blame a shortage of qualified STEM teachers for the disparate achievement of underrepresented members of society. Additionally, they argue these shortages can be isolated to certain geographic areas. High-poverty school districts are such an area, and its classrooms are hit hardest by teacher attrition (Curtis, 2012). Loeb, Darling-Hammond and Luczak (2005) quantify this relationship and estimate the rate of teacher attrition to be twice as high in high-poverty schools. Ingersoll (2007) establishes a positive relationship between free and reduced priced lunch enrollment and teacher attrition, and finds turnover is particularly high in STEM disciplines, whose pool of potential applicants is much smaller than that of the humanities. All of this results in a situation where oftentimes, non-white, poor, and low performing students are being taught by the least qualified teachers (Ingle, 2007).
This has implications for the long-term outcomes of these students, because poor K-12 STEM instruction will make them less likely to work towards post-secondary degrees in these fields. Moreover, those that do, will find they are not adequately prepared to meet the demand of these majors (Pea, 2014). I am not only referring to content however, as oftentimes the departmental culture of STEM disciplines is characterized by white, heterosexual, male norms, highly competitive “weed-out” courses, and instructors who serve more as gatekeepers, rather than mentors (Seymour & Hewitt, 1997). This has led many culturally diverse students to receive “hidden messages” from the curriculum, which cause them to question their ability to pursue STEM careers (Green, 2014). Additionally, such impediments to STEM involvement are not acute, and Russell and Russell (2014) describe the promotion and improvement of participation amongst in these fields amongst traditionally underrepresented populations as “one of the most predominant issues in STEM education” (p. 2).

Regardless of the forces responsible for the shortages, and underrepresentation of certain groups in STEM described above, it is teachers and students who must negotiate them as they attempt to foster, and participate in successful teaching and learning environments. Given teachers are tasked with guiding both students and themselves through this process, their
recognition, understanding, and handling of it, is the cornerstone of success for both them and their students. Additionally, the burden of tempering the negative impacts societal and institutional forces have on nontraditional students, falls largely on the shoulders of teachers. The problem is, our predominately-white teaching force appears to lack understanding of the existence and magnitude of institutionalized racism within our education system, and how this perpetuates inequalities throughout (Sleeter, 2008). However, it appears this shortcoming is more than merely a lack of knowledge on the part of decision makers, TEPs and teachers. And it has been suggested the underlying problem is a cultural divide among these educational power brokers, and the increasingly disenfranchised student populations they are intended to serve (Irvine, 1990; Delpit, 1995; Gee, 2000; Irvine, 2003; Prime & Miranda, 2006; Sobel & Taylor, 2011; Sleeter, 2008; Johnson & Atwater, 2014; Russell & Russell, 2014; Solorazo & Yosso, 2016)

I address this “cultural divide” at length in the next section (Culture in the Classroom). I begin by providing you with my understanding of what “culture” is, and move on to explain how interactions surrounding this social construct are of consideration to teaching and learning. I also discuss how cultural disconnects serve to act as institutional forces, that
further marginalize individuals, both in and outside the classroom. I conclude with some implications of these phenomena for science teaching and learning.

**Culture in the Classroom**

As I mentioned above, we are producing enough new teachers to staff our classrooms, but their failure to persist in the classroom (especially those characterized by high-poverty), is leaving us in need. Some think this is because even though the number of new teachers is keeping pace with the number of minority students, these recruits continue to be predominately-white, middleclass, monolingual, culturally isolated, and female (U. S. Department of Education, 2009). Not to say the teaching profession does not include educators from a range of cultural backgrounds, but overall our nation’s pool of teachers continues to remain “highly homogenous” (Taylor, 2011, p. 5). This can lead to cultural mismatches in the classroom, where the teachers’ culture, way of speaking, and attitudes are at odds with their students (Frankenburg, 2006). Oftentimes, the situation arises where teachers’ beliefs surrounding “diverse” or “culturally different” students, are synonymous with “at-risk”, because their ways of being might differ from the white, middle class values they are familiar with, and are promoted in our schools (Ladson-Billings, 1999). Norman (2014) describes how
such a “relational” (p. 176) dynamic can lead to problems in “urban” classrooms, and is present in the form of a cultural disconnect between mostly white teachers, and their increasingly diverse student body.

What is Culture?

Before I delve deeper into how cultural conflict has an impact on teaching and learning, I think it is worth taking a minute to frame my conception of “culture”. Culture has been described as early acquired “mental programming” (Hofstede, Hofstede, & Minkov, 2010); a system of meaning with ingrained social structures, and practices (Lenski, Crumpler, Stallworth & Crawford, 2005); a bound group’s shared knowledge and practices (Carlone & Johnson, 2007); the meanings and behaviors we carry across and create as we interact with others in various settings (Johnson & Atwater, 2014); and the beliefs, practices, norms, and ways of being we act upon in response to our environment (Trumbull, Rothstein-Fisch & Greenfield, 2000). What has become clear to me after exploring literature surrounding this topic is, our culture is shaped early in life, we do not construct it on our own, and it can change in response to various settings. Each of these points has relevance to the science classroom, and contributes to the unique “micro-culture” (Evans, 2014, p. 36) of every classroom. This conceptualization of classroom culture
makes sense to me, because I know I used practices, and had ways
of being in my classroom that differed from other science
teachers in my department, and vice versa. In this way, culture
can vary from classroom-to-classroom, and if we broaden our
scope, school-to-school, region-to-region, and country-to-
country (Evans, 2014).

Student/Teacher Cultural Interactions

Having conceptualized culture, I now turn your attention
back to potential disconnects, that can occur when the lives of
students, teachers, and school culture converge in the
classroom. Much of this divide is rooted in a power struggle,
resulting from traditional values being forced upon students
from non-traditional backgrounds.

Solorzano and Yosso (2016) suggest TEP’s tendency to rely
on “majoritarian stories” (p. 133) paints the views of minority
students in a deficit light; and take issue with viewing
assimilation as the primary solution for addressing the failure
of marginalized students (Solorzano & Yosso, 2016). The problem
being, assimilatory practices serve to subordinate minorities
who seek to develop a sense of identity that opposes white
Americans’ (Fordam & Ogbu, 1986). This fact has not been lost on
students, and the persistence of discriminatory experiences
(such as devaluing one’s culture), have not only made them aware
of their presence, but also their implications for educational and social inequalities (Vega, Moore & Miranda, 2015). One frequently occurring instance of this is when students are made aware of their differences (e.g., non-white, non-middle class), as they are subject to school tracking that essentially sorts them by race, ethnicity, and/or SES (El-Haj & Rubin, 2009). My own students were certainly aware, and I was asked on more than one occasion in my “traditional” earth space science, and biology classes why I “don’t teach white kids”, or why “Ms. K.” upstairs has all the “good kids” (i.e., white kids) in her “honors” classes. My students not describing themselves as “good kids”, points to what El-Haj and Rubin (2009) describe as a tendency for students in lower tracks (who are usually poor and of color) to become demoralized, demotivated, and subject to an inferior quality of education. Unfortunately, I have seen each these assertions play out in my own class, and if I were being transparent, I would have to admit conditions in my classroom sometimes prevented me from providing the absolute best learning experience for all my students.

I was not alone in facing such challenges, and in science classrooms across the nation students of color face identity challenges associated with the judgments, stereotypes, opportunities, and restrictions present in these learning environments (Brown et al., 2016). This has had grave
consequences with respect to minority navigation of the science curriculum in both primary and secondary schools (Brown et al., 2016). Additionally, Maltese and Tai, (2011) discuss the negative impact of these early deficits on completion of post-secondary STEM degrees, and how this has contributed to the severe underrepresentation of marginalized individuals in STEM careers discussed earlier in this chapter (Bryan et al., 2016). El-Haj and Rubin (2009) suggest the root of this problem lies in disconnects surrounding not only the dissemination of science curriculum, but also the social interactions taking place in America’s classrooms.

**Not on the Same Cultural Page**

Difficulties associated with interactions in the classroom have been attributed to the merging of student, teacher and school cultures. This situation has been identified in education research as “cultural disconnect” (Norman, 2014), “cultural incongruency” (Sobel & Taylor, 2011), “cultural dissonance” (Prima & Miranda, 2006), “cultural disjunction” (Russell & Russell, 2014), and a lack of “cultural synchronization” (Irvine, 1990; 2003). Irvine (2003) also uses the term “cultural discontinuity”, when referring to instances where a lack of cultural understanding on the teacher’s part, results in
negative interactions, and the dismissal of students’ culture in the classroom.

A Social and Institutional Force

Whatever the name, Delpit (1995) asserts these types of classroom conflicts arise when students from non-traditional backgrounds are forced to submit to a “culture of power” (p. 24). She goes on to identify the following five aspects of culture relevant to the classroom: 1) Issues of power play out in many facets of classroom life because some stakeholders (i.e., teachers, textbook publishers, and curriculum developers) have a greater hand in shaping teaching and learning; 2) students are expected to participate using particular ways of speaking, looking, and behaving; 3) success in institutions is determined by those in power using a merit system based on white-middle class values; 4) those outside of a particular culture will “catch on quicker” if they are explicitly told the rules; and 5) those with power are far less likely to be aware of it, versus those who do not have it (p. 26-27).

Each of the five aspects listed above is relevant to our conversation thus far, and I could not agree with Delpit more regarding the influence of power in the classroom. For one thing, not only is there potential for at least three levels of disconnect (i.e., teacher, text, and curriculum); based on
teacher demographics, there is a good chance the most powerful person in the room (the teacher), subscribes to cultural values in line with traditional schooling. Moreover, it is these same values that will be most influential in determining student success. This is problematic because if those in power are unaware of their position, they will likely fall back on their own experiences, and assume they are maintaining objectivity. When in fact, there is a high probability they will hold biases against students whose ways of being are unfamiliar to them. Additionally, as I will discuss later, K-12 students are keen to recognize any presence or lack of favoritism, and can begin to question their own ability, and identity when they feel their way of being is not valued in the classroom (Cohen, 2014; Wallace, 2014).

As we can see, social and institutional forces shape the classroom experience, and some argue our schools continue to reinforce ideals associated with racial, economic, and academic oppression (Ogbu, 1992; Tobin, Seiler & Walls, 1999; Spillane, Diamond, Walker, Halverson & Jita, 2001; Duncan, 2005; Ladson-Billings, 2006; McLaughlin, 2015; Perkins & Sampson, 2015). Additionally, these forces contribute to the inequities throughout field of education, and have had a negative impact on the availability of resources, teaching quality, and achievement of non-traditional students (Milner, 2012). Fordam and Ogbu
(1986) suggest this serves to subordinate minorities’, and causes them to exercise power by opposing the assimilatory forces of white middle-class America, both in and outside the classroom.

**The Institution of Culture**

Blanchett, Klingler, and Harry (2009) describes the goals of education prior to the civil rights movement of the 1960’s as being less concerned with social mobility and more with suiting the goals of a society dominated by white Americans. While they acknowledge some disenfranchised individuals have achieved social mobility, the main structures, content, and methodologies of disseminating knowledge today, are still aligned with the experiences, language, and customs of the dominant members of society.

With so many long-standing institutionalized obstacles in place, it may come as no surprise that the performance of non-mainstream students in the science classroom continues to trail that of their more mainstream peers. Brown (2006) attributes this discrepancy to linguistic dissimilarities, struggles rooted in gender and ethnic identities, and an overall incongruity of curriculum. In fact, Delpit (1995) describes how a decade prior, Michaels and Cazden (1986) addressed this point and determined young white children told “topic-centered” narratives (i.e.,
stories focusing on a single event), while black youth had a tendency to speak in the form of episodic narratives with shifting scenes. Although these differences in style are certainly worthy of note, perhaps more important were teachers’ assessments of these children’s stories, and abilities. White teachers described a black child’s story as “terrible” and “incoherent”. Conversely, black teachers found the same child’s story to be “well formed”, “easy to understand”, and containing “lots of detail and description” (Delpit, 1995, p. 55). Moreover, the white teachers expressed concern regarding the future educational prospects of this child, while black teachers found her to be “exceptionally bright”, and “successful in school” (Delpit, 1995, p. 55). Although this is only a single example, it demonstrates how a teachers’ cultural experience can influence their evaluation of student performance, perceived value of their ways of being, and even expectations regarding their long-term outcomes. This is important because anyone who has ever been in a classroom knows students have an uncanny ability to recognize what we “really think”, and deficit notions surrounding their abilities, and personal lives are unlikely to go unnoticed.

Lee (2001) calls for approaches that acknowledge students’ cultural and linguistic experiences in order to better equip them for functioning in not only what she calls “institutions of
power”, but also in their home and communities. In other words, students need instructional and assessment methods that help diverse learners connect their cultural norms with that of mainstream expectations (Lee, 2001). Lee (2001) notes the difficulty teachers face when the cultural norms of their students’ classroom participation stray from what are considered mainstream expectations. This struggle is rooted in a persistent failure to recognize, tendency to ignore, and perhaps even dismiss diverse students’ knowledge and experiences; instead of allowing them to make valuable contributions to the learning process (Lee, 2001).

Gee (2000) views this divide along the line of two types of discourses that are at play in the science classroom. The first “Big D” (Discourse) involves the language and social practices that have come to characterize groups of people. Meanwhile, “Little d” (discourse) is related to the written and spoken language associated with a given context. The unique discourse patterns of science (both “Big D” and “Little d”) that include amongst other things, measuring, graphing, the use of instruments, and scientific language are often at odds with student’s everyday lives in their homes and communities (Gee, 2000). A prime example of this is how the means, manners, and skills students need to be successful in the science classroom are steeped in science’s positivist, white, Western-European
roots; which are often at odds with many students’ conception of the world.

At the root of this problem is the presence of a cultural discontinuity that exists among marginalized members of society and those whose phenotypes, ideals, and cultural norms are more aligned with the dominant societal discourse. Tyler et al. (2008) conceptualize cultural discontinuity in terms of school-based behavioral processes that inhibit members of non-mainstream cultures from enacting preferences and practices learned in the home while at school. Moreover, awareness alone will not address this problem and we must search for ways to promote unceasing cultural consciousness in our classrooms if we are to truly challenge the social and academic inequities marginalized students face (Hollins & Guzman, 2005). I argue the space occupied by pre-service and in-service teachers is where changes in perspective must occur. Additionally, although such shifts require considerable time, support, and reflection, I believe TEPs are capable of meeting this challenge, and fostering necessary change.

The Culture of Science

Carlone and Johnson (2012) recognize the importance of culture in science teaching and learning, and suggest they are by nature cultural endeavors. Palmer (1997) considers science
teaching a “human activity” that “emerges from one’s inwardness, for better or worse” (p. 15). I agree but feel this carries over to student learning as well. This is because science “teachers and students are operating within micro-cultures” (Evans, 2014, p. 36), where the strengths and weaknesses of each can come together to create a dynamic, which varies from class to class, school to school, region to region, and of course country to country (Evans, 2014). Rahm (2002) positions science teaching and learning as not only an acquisition of facts, but a way of acting, talking, and experiencing situations leading to membership in the scientific community. Furthermore, Pitts (2011) conceptualizes science education as a cultural production that takes place both within and between cultures, and describes them as interstitial spaces. For many non-mainstream students, this is oftentimes the “location” where teaching and learning occurs. These intra- and inter-cultural exchanges are often complicated, which is perhaps not surprising, considering the culture of science is often characterized by and present in spaces where white, masculine behavioral values and norms are contained within a meritocratic system (Carlone & Johnson, 2007). However, Taylor (2011) warns, given the unchanging demographics of our nations’ teachers, and the increasingly diverse cultural, racial, ethnic, and linguistic background of our K-12 students, it may be time to consider a “new norm” (p.
8). If this new norm in our schools is to truly promote equitable learning opportunities for all students, it would need to counter long-standing notions that students who do not behave, learn, and communicate in a manner consistent with white, middle class values are somehow “culturally deprived” or “culturally disadvantaged” (Ladson-Billings, 1999, p. 216).

Lee, Deaktor, Enders, and Lambert (2008) address this polarity within the context of science teaching and learning, and assert that the home cultures acquired by non-traditional students (i.e., minorities, English language learners, and low socio-economic status) are often discontinuous with science’s positivist, white, Western-European roots. Shademon (2011) agrees and describes how these ideals can be a source of dissonance, which if overcome can unlock unrealized potential amongst these students in the science classroom.

Prime & Miranda (2006) describe the impact of cultural dissonance in the classroom, and suggest science teaching and learning takes place in “cultural interface zones” (p. 508). More specifically, they state that if power struggles are not successfully negotiated in science (the intellectual discipline), the teacher’s culture, and the culture of students converge; learning (and consequently achievement) will be compromised. When noting specifically the comparative
underachievement of African-Americans, Prime & Miranda (2006) assert this phenomenon can be attributed at least in part to the failure of the science curricula to bridge the gap between students’ experiences and the world of science. While this may in fact be true for African-Americans, I suspect this reasoning can also be applied to others as well.

The enactment of curricula is the product of an interaction amongst four commonplaces (i.e., the teacher, the subject matter, students, and the social environment in which they all coexist). Additionally, any alteration or conflict amongst any of the four commonplaces can have an adverse impact on curricular delivery, and might help explain why enactment of the curriculum can vary even within the same school (Prime & Miranda, 2006). Issues of race and culture cannot be excluded from this dynamic, and an understanding of each must be considered when investigating teaching and learning in America’s classrooms today. This statement carries substantial weight when one considers most teachers are white, educated, and consider English their first language; while slightly less than three fourths of African-Americans, and greater than three fourths of Latino youth attend schools where the majority of students are of color (Orfield, Frankenberg & Lee, 2003). In light of these realities, Blanchett et al. (2009) declare the segregation of our nation’s schools is hardly a thing of the past, but rather a
likelihood, which is steadily increasing. Moreover, the idea of re-segregation as a pressing societal concern gains traction when faced with the fact that most students at these schools receive free or reduced priced lunch; and the overall quality of education provided to students in these high-poverty schools lags behind those catering to the white middle class (Blanchett et al., 2009). The latter of these two assertions has grave consequences with respect to the future outcomes of these children and their entrapment in the cycle of poverty (Blanchett et al., 2009).

The question then becomes, if by all indications the types of new teachers entering the workforce continue to remain the same, and the students they are intended to serve, continue to change; then how do we overcome the cultural divides in our classrooms? As I will discuss in the next section, many believe TEPs have the potential to play a key role in answering this, and other related questions.

The Role of Teacher Education Programs

Because many pre-service teachers are typically unaware of the oppressive forces in education that serve to marginalize so many students, opportunities are needed for them to examine their beliefs, assumptions, and attitudes, and learn to recognize injustices in and out of the classroom (Villegas,
Through increased understanding of themselves, these new teachers will have a foundation for learning how to acknowledge diverse cultural practices and perspectives in their future classrooms; as well as, ways to involve their students in conceptual learning processes (Sleeter & Owuor, 2011). Norman (2014) agrees with this line of reasoning and calls on TEPs to make equipping new teachers with the skills and attitudes necessary to meet the challenges of diverse student populations a priority. Lenski, Crumpler, Stallworth, and Crawford (2005) assert, if we are to prepare new teachers for work in high-need schools, we must instill in them teaching practices that recognize, understand, and value diverse cultures. In addition, the development of effective measures for addressing cultural differences must be a goal pursued at the pre-service, in-service, and university levels (Lenski et al., 2005). The aim being to transform classrooms from places where non-mainstream culture is stigmatized, to communities of learning where all are motivated to succeed (Norman, 2014). Any hopes of accomplishing this task are predicated on the ability of TEPs to ensure new teachers are capable of critiquing assumptions and practices detrimental to the success of diverse students (Tobin, 2012). This includes teaching candidates being able and willing to confront any negative attitudes they may have about students from non-traditional backgrounds, and critique the sociocultural
lens they bring to the classroom (Villegas & Lucas. 2002; Taylor, 2011). These teachers must also come to understand that their ways of communicating, teaching, and learning are directly linked to their primary culture, which often differs from their students (Taylor, 2011). What is needed, are teachers who understand the influence of their own, as well as their students’ home and community cultures, on teaching and learning processes (Taylor, 2011). They must not only understand this influence, but come to use students’ cultural knowledge, life experiences, and ways of being to make learning more relevant and effective (Gay, 2010). This requires TEPs develop teaching candidates who are not only sound in their pedagogical content knowledge (PCK) (Shulman, 1987) but also able to enact culturally relevant pedagogy (CRP) (Ladson-Billings, 1995).

**Culturally Relevant Pedagogy**

You may have noticed I chose to use the term “culturally relevant pedagogy” as opposed to “culturally responsive pedagogy”, or even “culturally compatible teaching”, which are often used in its stead (Taylor, 2011). This was not a random choice, and I will share my reasons in a moment. Name aside CRP is a “theoretical model that not only addresses student achievement, but also helps students to accept and affirm their culturally identity while developing critical perspectives that
challenge inequities perpetuated by schools and other institutions (Ladson-Billings, 1995). Nearly, 15 years later Ladson-Billings (2009) provides in my opinion, a more user friendly, and perhaps, culturally responsive definition; “a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes” (p. 20). Johnson and Atwater (2014) summarize both using “three dimensions of CRP: emphasis on learning and performance, cultural competence, and engendering a sense of sociocultural-political critique” (p. 82). I view CRP as an approach to education that promotes, facilitates, and supports: the success of all learners, in a student-centered environment, regardless of background; positive views of diverse cultures, and uses their unique strengths to help construct new knowledge; and social justice, by providing an arena for students, teachers, parents, and others to critique and challenge aspects of themselves, others, society, and knowledge itself. In this way, all involved are positioned as agents of positive change, and have the potential of becoming empowered by their experiences. By all I mean just that. In principle, CRP benefits students and teachers of all shades, yes even white (Irvine, 2010). If nothing else, increasing knowledge of other cultures can only serve to broaden our horizons. However, it is far more than that, and later in this proposal I
discuss the value of autobiographical exploration, which is so vital to CRP.

**Culturally responsive teaching.** The responsibility for enacting CRP in the classroom falls on the shoulders of culturally responsive teachers (CRT). I chose to use “responsive” to describe this type of teacher, as opposed to relevant like above. This is a distinction I have failed to make in the past, and have admittedly used relevant and responsive interchangeably when discussing culturally conscious teachers. However, after considering this explanation of each provided by Johnson and Atwater (2014), I am convinced “relevant” is appropriate for pedagogical concerns, and “responsive” is more suited to teaching: “Relevancy means that cultural ideas and actions must be connected with the matter at hand in teaching science or pertinent to the science teaching, while responsiveness means making the adjustments suddenly to the science teaching” (p. 87). CRP requires teachers to foster safe, effective, and empowering learning environments, where science knowledge and skills (e.g., the curriculum) is made more accessible to students by making connections to their school, home, community, and social lives (Johnson & Atwater, 2014). No small task in a science classroom where a common refrain for unmotivated, uninterested, or otherwise distracted students is to question when they will “ever will use this in real life?”
CRP seeks to remove this question from the teaching equation by making scientific concepts so “relevant” to students’ “real life” that they are able to see science’s usefulness beyond something that will allow them to remain eligible for school activities, get accepted to college, or please their parents.

However, even teachers who are well prepared, and committed to enact CRP in their classrooms cannot account for or anticipate every question or event in the classroom (Johnson & Atwater, 2014). Therefore, they must also be equipped to “respond” to situations as they arise during the implementation of curriculum.

Early on in high school biology, students are taught one characteristic distinguishing an organism from an inanimate object, is our ability to respond to environmental stimuli (Miller & Levine, 2006). Being “living things”, science teachers must also remain “responsive” to the various stimuli they are exposed to in the classroom environment, and oftentimes, must do so immediately. Additionally, while I concede like CRP, CRTs utilize students’ cultural background and experiences as avenues for the co-construction of content knowledge, and the development of academic skills (thus making content relevant); their immediate concerns lie outside the overall goals of social justice. To me this is where the distinction between the use of
“relevant” and “responsive” lies. Culturally responsive teaching is more about the “nuts and bolts” or “day-to-day” actions of teaching science in diverse classrooms. Or as Gay (2010) puts it, “using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them. It teaches to and through the strengths of these students” (p. 31). In other words, how do teachers respond to cultural interactions with their students as they try to enact CRP?

This is not to say simply attempting to use CRP in the classroom automatically makes one a CRT, nor does it mean any response to culture can be considered implementing CRP. Moreover, one can respond to cultural challenges in a way that produces a positive result, yet still not intentionally be a CRT. I will use an example from my own experience to highlight this later point.

**My not quite culturally responsive teaching moment.** My initial foray into the teaching profession was as a substitute teacher in 7th grade history class at a Title I middle school. I vividly recall entering the classroom and noticing a young lady standing by the doorway consuming a soda (soft drink). Of course, it being my first day, I was determined to follow the rules and keep my class under control. I had heard about
substitutes being overrun by students in the classroom at this school, and was conscious of not being the subject of any such future tales. I instructed her to either finish her beverage quickly or discard it in the waste receptacle as class was underway. She responded, “It’s for my baby”, and sure enough this 13-year-old girl was in my estimation, about as pregnant as one could be. I responded, “Soda’s bad for babies”, and just kept walking as if such interactions happened in middle school classrooms all the time. She and the other students got quite a laugh out of my comment, and I would later become her “favorite teacher” when she began attending the high school where I would go on to teach fulltime. “Neicy” was one of a group of students who ate lunch in my room every day, and we joked about the incident from time to time. However, we also talked about pictures of her young son, and I watched him grow through pictures over the years. What conversations with her and other young mothers in my classroom revealed was, they appreciated that I did not try to be overly nice to them, spend my time lecturing them, or make them feel uncomfortable by not treating them like other students. The point is, although I may have responded to cultural situation in a manner that strengthened my relationships with students, I can assure you at the time, I had not the slightest idea what a CRT, or CRP was, and would not for years.
My personal experience seems to fall in line with the notion that becoming a CRT takes time, exposure to diverse classroom experiences, and professional development (Darling-Hammond, 2006; Johnson and Atwater, 2014). Given one’s development as a CRT, and ability to enact CRP appear to be closely associated with their teaching experience; it stands to reason the implementation of measures for addressing cultural differences in the classroom is a goal that needs to be pursued at the pre-service, in-service, and university levels (Lenski et al., 2005).

**Producing Culturally Responsive Teachers**

If TEPs are to produce CRTs, their graduates must possess: “(a) a knowledge base about cultural diversity and ethnic and cultural diversity content in the curriculum, (b) abilities to establish caring and learning environments in classrooms, (c) abilities to communicate with students from ethnically diverse backgrounds, and (d) abilities to respond to students from ethnically diverse backgrounds” (Johnson & Atwater, 2014, p. 83). Part of this process needs to include enriching field experiences and courses that allow teaching candidates to explore their culture, and beliefs (Russell & Russell, 2014). In this way TEPs must themselves embrace CRP if they wish to graduate CRTs who will in turn, enact it in their own
classrooms. The two are so closely tied that Villegas and Lucas (2002) propose the use of CRT’s “salient characteristics” (p. 23) as a framework for infusing CRP into TEPs. According to them, CRTs: “(a) are socioculturally conscious, (b) have affirming views of students from diverse backgrounds, (c) see themselves as responsible for and capable of bringing about change to make schools more equitable, (d) understand how learners construct knowledge and are capable of promoting knowledge construction, (e) know about the lives of their students, and (f) design instruction that builds on what their students already know while stretching them beyond the familiar” (Villegas & Lucas, 2002, p. 23). The thought being, if TEP graduates carry these abilities into the classroom they will develop into CRTs as they gain experience with diverse students, learn to utilize CRP in their teaching, and position themselves and their students as agents of change.

My intent in the first three sections of this literature review has been to illuminate the inequities surrounding access to high quality STEM teaching for marginalized students; as well as, the aims teachers, teacher educators, and TEPs should pursue if we intend to bridge this divide. As I have discussed, much of the blame for the former falls on our inability to keep new teachers from leaving “hard-to-staff schools” (Morgan & Kritsonis, 2008, p. 2), while the latter focuses on the mindset
and skills TEPs must develop in pre-service teachers, in order to allow graduates to persist in diverse classrooms. The remainder of this review, and dissertation is dedicated to discussing the rationale behind, as well as the manner in which, my study contributes to the body of research concerned with addressing issues surrounding science education I have discussed thus far.

**Answering the Call for Innovative Approaches to STEM Teacher Education**

My intent thus far has been to present the case that the state of science education in the US is in decline, the consequences of this reality are proving particularly harmful to marginalized segments of our population, many of the issues associated with these conditions are rooted in cultural discord, and TEPs have a role in addressing these problems (Johnson, 2011). To reverse this trajectory, and meet the needs of an increasingly diverse student body, Morgan and Kritsonis (2008) recommend proactive approaches for recruiting teachers, that incorporate university and school district partnerships; field placement in hard-to-staff schools; and the engagement of potential teachers on college campuses as students choose career paths. Ingersoll (2007) contends any such efforts must focus on not only the recruitment, but also the retention of new
teachers. Wilson (2011) agrees and argues achieving the second of these two goals relies on effective teacher preparation initiatives, which incorporate mentoring, professional development, and peer support. The Noyce CoP is in line with this notion of effective teacher preparation initiatives in several respects. First, my teaching experience coupled with my development and facilitation of the CoP positioned me as a mentor to these new teachers. In addition, our engagement in CAR and the self-reflective practice that accompanied it, amounted to professional development. Finally, the CoP was fashioned in a manner that created a space for open and constructive communications, aimed at promoting a sense of teamwork and support for all members throughout the semester. I provide a more complete discussion of each in the (The Noyce Community of Practice) section of chapter three. However, in order to further demonstrate how the Noyce CoP addresses calls for innovative approaches to STEM education, I offer some context below.

Context of this Study

The 2018 Noyce CoP occurred within the context of the NSF funded Robert Noyce Scholarship Program at our university (DUE-1439776). It partners with the nearby Sunshine Public School District (SPSD) and subscribes to Ingersol (2007), Morgan and
Kritsonis (2008), and Wilson (2011)’s call for proactive approaches to STEM recruitment and retention. SPSD is the 8th largest in the US, considered high-need by virtue of its Title I status, and like many others is struggling to recruit and retain qualified teachers in STEM disciplines. The Noyce program aims to encourage and recruit STEM majors to help fill the need for their expertise in high-need middle and high school classrooms. The program’s Master of Arts in Teaching (MAT), and Science Teachers Accelerated Master’s Program (STAMP) scholarships provide financial, cohort, and mentor support to highly qualified students wishing to complement their undergraduate STEM degree with a graduate degree in teaching. During this process they intern, work, and learn alongside peers, university faculty, district teachers and staff, as well as other science education professionals as part of a greater professional learning community. It is hoped such multi-tiered support will allow Noyce graduates to persist beyond their inductive years, and grow to become highly qualified STEM education practitioners.

The Noyce program hangs its hat on the premise that assisting our MAT and STAMP scholars in becoming reflective and effective, research minded, education practitioners, will result in graduates who are ready to meet the demands of high-need
schools and students. The Noyce CoP is one of several measures we have invoked to achieve this goal.

The Noyce CoP was an instructional intervention, which sought to provide an arena for us to engage in collaborative action research (CAR), as members of community of practice (CoP), dedicated to improving our practice as facilitators, collaborators, teachers, and learners. A journal club (Tallman and Feldman, 2016) served as the impetus for personal and group reflection. The literature read and discussed by the journal club covered the following topics: the role of beliefs in shaping our biases (Cohen, 2012), the history of urban education in America (McLaughlin, 2015), the consequences of deficit perspectives in the classroom (Dudley-Marling, 2009), and the value of utilizing students’ culture in the science classroom (Chigeza, 2011; Shademan, 2011). It utilizes the conversations transcripts, survey results, writings, and field notes generated during the 2018 Noyce CoP to tell the story of how these new teachers view the importance of beliefs about theirs and their students’ identities, home-lives, and sociocultural-interactions to science teaching and learning.

The remainder of this chapter is dedicated to providing a comprehensive argument for the relevance of studying beliefs. The significance of which, I am basing on the work of Diekhoff
Conceptualizing Beliefs

The development of a theoretical, absolute, or operational definition of beliefs lies beyond both my current capabilities, and the scope of this research. What I do wish to do however, is offer a working conceptualization of my use of the term “belief(s)” in this study. To do so I draw from the work of more
knowledgeable individuals in the fields of education and psychology.

Beliefs like knowledge, are mental constructs, which characterize a person’s thinking and actions (Bryan & Atwater, 2002; Villegas & Lucas, 2002; Vaino, Holbrook & Rannikmae, 2013; Wallace, 2014, Gray, 2016). Wallace (2014) contends they can be thought of as the views, opinions, and principles we subscribe to each day, but are not necessarily bound to truth. This separation from truth is a fine line Villegas and Lucas (2002) use to separate beliefs from knowledge. Beliefs are neither fact, nor “reality”, yet are still “everything you know” (Gray, 2016, p. 7), because they act as a “filter” for new information, and determine whether it becomes part of one’s knowledge base (van Driel, Beijard, & Verloop, 2001). In this sense, beliefs come to define a person’s reality and what they recognize as truth. This is usually an unconscious process (Gray, 2016), and it is our most salient beliefs that underlie our attitudes, perceptions of social norms, and determinations of “appropriate” behavior (Haney, Czerniak, & Lumpe, 1996).

Being social constructs, beliefs are not created in a vacuum, and are thus subject to “outside” influences. As a matter of fact, beliefs are not even independent from one another, and are part of “an “internal architecture of systems
that are psychologically, but not necessarily logically organized” (Bryan, 2012, p. 478). This lack of logic can be of considerable consequence because we view our beliefs as perfect representations of the world (Gray, 2016). However, other interconnected beliefs, our experiences, and subjectivities, relegate them to the role of “imperfect models for navigating a complex, multidimensional, unknowable reality (Gray, 2016, p. 145). “Reality” is unknowable because we as humans are only capable of grasping “pieces” of it at any given time (Gray, 2016). Moreover, the pieces we are able to “grab” are subject to our individual experiences, knowledge base, desires, and beliefs. And while most of us will agree there is an “objective reality”, we must keep in mind the words of Albert Einstein, “Reality is merely and illusion, albeit a persistent one” (Einstein, 2006). The general acceptance of objective realities is not uniform; this is because we hold beliefs along a “continuum of centrality” (Bryan, 2012, p. 479) where some (we need water to survive) are more central or core, and thus more resistant to change, than more periphery beliefs (one should never put pineapple on a pizza). This suggests we construct beliefs in a hierarchal fashion, using theories and judgments based on selected facts, our subjectivities, and experiences (Gray, 2016). Accordingly, we do not assign equal importance to all beliefs, and prioritize them in relation to other beliefs,
and other cognitive structures (Bryan, 2012). The interweaving of beliefs, cognition, and our perceived realities, is attributed to the difficulties associated with changing our closely held beliefs. This is because when beliefs are changed it has repercussions for this entire system (Bryan, 2012), having an impact beyond just the level of the individual.

As Gray (2016) puts it “Beliefs are the psychological material we use to co-create a shared world, so we can live, work, and do things together. Changing a shared world requires changing its underlying beliefs” (Gray, 2016, p. 145). As we have seen throughout history, changing underlying societal beliefs often occur at glacial pace and can have dire consequences. For example, despite a consensus amongst most biologists, geneticists, and anthropologists discounting racial groups as being discrete, measurable, or scientifically meaningful, many in American society still view African Americans as being intellectually inferior to those of European, and Asian ancestry (Smedley, & Smedley, 2005). Moreover, I am sure if I took the time, I could find other examples associated with race, and more still surrounding ethnicity, gender, and socioeconomic status (SES).

Part of this has to do with the tendency for us to defend beliefs (both consciously and unconsciously) in a “bubble of
self-sealing logic” (Gray, 2016, p. 145), which we hold on to in order to shelter our identity, and self-worth. The problem is, we might do this, even when these beliefs are invalid. Using my example above, no matter the amount of evidence you present, I think you would be hard pressed to find former slave owners quick to admit that it was they, not their captives, who were in fact ignorant. Moreover, I contend even if you were able to convince them, I doubt they would be willing to do so publicly, thus relegating underlying societal beliefs to a static state. So, while beliefs can be considered in many ways, tools for thinking and developing rules for actions, they are also quite subject to artificial constraints that obscure valid possibilities and alternative realities (Gray, 2016). In other words, our beliefs create “blind spots” (Gray, 2016, p. 145) that limit us as we navigate the world. This is important because blind spots inhibit our ability to consider the beliefs of others, and limit possibilities for them and ourselves.

What all the ways of describing beliefs presented above have in common, is that they do so in relationship to knowledge, or “epistemologically” (Hunter & Markman, 2016, p. 680). Hunter and Markman (2016) take issue with defining beliefs in this way. Their contention being, the defining of beliefs relative to other constructs (e.g., knowledge, dispositions, or attitudes), adds to the complexity of an already difficult undertaking. For
example, they wonder, what happens when information previously considered knowledge (say for instance Pluto’s status as a planet) is discounted - does it merely become an incorrect belief? The opposite can be asked about a belief that is somehow “confirmed”- is it promoted to the status of knowledge? Hunter and Markman (2016) assert that epistemological approaches to defining beliefs fail to account for the cognitive processes, which negotiate various representations (including beliefs) in our brains. With that in mind, they recommend defining beliefs in a cognitive sense.

When cognitively defining beliefs Markman and Dietrich (2000) do so according to three classes of “mediating representations” that help shape our thinking. The first, environmental representations, are associated with our immediate contextual conditions. While goal representations have to do with information related to future desires, actions, and outcomes. The third type, mediating representations, help determine what information we take from our environment, its relationship to goal and other mediating representations, and how such input helps shape our resulting thoughts and behaviors (Markman & Dietrich, 2000). According to Hunter and Markman (2016), beliefs about students, classrooms, schools, and pedagogy are mediating representations - thus linking all three classes to actions in the classroom.
This is all meant to make explicit the importance of beliefs in science teachers’ cognition, and the need for researchers to consider them when attempting to infer teacher beliefs via classroom observation. Accordingly, they define a belief as “a mental representation that influences the practice of a teacher if and only if the belief is active in cognition.” (Hunter and Markman, 2016, p. 675). This definition they argue, moves beyond the question of whether a belief is “true” (and can thus be considered knowledge) and allows for the consideration of their place in our psychological system. In other words, they see beliefs as more than just something to be differentiated from knowledge depending on a given circumstance. Rather, beliefs are elements of our psyche that directly influence our actions (Hunter & Markman, 2016).

**My Conceptualization of Beliefs**

My conceptualization of beliefs has come to incorporate elements of both the epistemological and cognitive forms discussed above. The former is valuable because it acknowledges the importance of beliefs in creating “the world as we know it”, while the latter recognizes the subconscious foundation at the root of any attempts to make sense of reality. We can consciously attach ourselves (i.e., our identities) to beliefs we feel validate our existence in relation to others (e.g.,
beliefs about race, ethnicity, gender, education, the environment, war, etc.). However, behind each of these are subconscious cognitive processes, which have been shaped by past experiences, and beliefs that arose from their predecessors. In this way, beliefs are established in relation to our prior knowledge. For example, we might feel hungry, but it is not as though this is something, which came about consciously. I cannot recall ever saying or even thinking, “It is time for me to be hungry”, and then immediately beginning to experience the physical responses associated with hunger. I can, however, recall countless times where I felt the sensation, I believe to be hunger, and immediately began to think about and search for food. “Hunger” arose in my subconscious, and my past experiences led me to pursue food, thus confirming my belief that food will abate hunger.

In my view, it is important to consider each of these conceptions of beliefs (i.e., epistemological, and cognitive), when attempting to explain the role of beliefs in the science classroom. For example, beliefs rooted in a deficit-based thinking, might cause teachers to underestimate the abilities of their students, and keep them from reaching their full potential. Wallace (2014) situates the ideas of Hunter and Markman (2016), and Markman and Dietrich (2000) in the classroom, claiming teachers’ beliefs often serve as their
cognitive filters as they implement instructional strategies, consider new ideas, and construct new knowledge. I will add to this list, by offering subconscious beliefs can also prevent teachers from establishing relationships with their students. I will use an excerpt from Delpit (1995) to illustrate this point:

A twelve-year-old friend tells me that there are three kinds of teachers in his middle school: the black teachers, none of whom are afraid of black kids; the white teachers, a few of whom are not afraid of black kids; and the largest group of white teachers, who are all afraid of black kids. It is this last group that according to my young informant, consistently has the most difficulty with teaching and whose students have the most difficulty learning. (p. 167-168)

I have seen this play out in schools where I have worked. In my experience teachers falling into the third group generally expressed how much they cared about their students, and wanted to help them, but it was often obvious they did not feel comfortable around their students or in their own classrooms for that matter. I do believe there was subconscious fear underlying their discomfort, and it usually did not take long for students to recognize this. While I do not think the students (at least initially) consciously sought to capitalize on their teachers’
fear, I do think elements of these teachers’ subconscious, allowed such situations to occur. In addition, just like those above, these teachers also had considerable problems teaching, which severely hampered student learning.

It appears beliefs are a tough concept to pin down, and their conceptualization, defining, and understanding are ironically, subject to beliefs. Bryan (2012) seems to agree and notes that despite two decades worth of increasing attention on beliefs in the field of science education, there is not a consensus regarding their definition, and offers the following: “beliefs are part of a group of psychological constructs that describe the structure and content of human thought that is presumed to drive a person’s actions.” (p. 478)

What is clear is, regardless of conception, or definition, beliefs are worthy of consideration when identifying conduits to improved teaching practice. In fact, Diekhoff (1983) suggests students’ knowledge often reflects their teachers’ beliefs. While, Nespor (1987) adds beliefs influence teaching and learning more than subject knowledge, content knowledge, or PCK, and are also stronger predictors of classroom actions (Wallace, 2014). With this in mind, I now turn our focus to the role of beliefs in classroom actions.
Beliefs and Classroom Actions

Johnson & Atwater (2014) describe teacher actions in terms of the ways the processes associated with teaching and learning are facilitated in classroom settings. They encompass everything a teacher must do on a day-to-day basis to ensure their students’ success, and include: lesson planning, parent communication, engaging in student/teacher interactions, selecting classroom activities, assigning classroom roles, and so on (Johnson & Atwater, 2014). I wish to make it clear to the reader that although I use the terms “action”, “practice”, and “behavior” interchangeably, what I am likely referring to are the “teacher actions” described above. Within this context the synonymous use of each is warranted because, an action is “a thing done” (Merriam-Webster.com), a practice means “to do or perform often, customarily, or habitually (Merriam-Webster.com), and a behavior is “anything that an organism does involving action and response to stimulation” (Merriam-Webster.com). Therefore, each is bound in a transitive relationship where, an action remains so, a practice is an action viewed temporally, and a behavior is a specified action in response to a particular source of stimulation.

Semantics aside there is a growing body of science education literature utilizing teachers’ beliefs as a means for
understanding teaching practices (Bryan, 2012; Pea, 2014). Likely contributing to such proliferation is the fact teacher beliefs are one of the most widely researched aspects of teachers’ thinking (Prima & Miranda, 2006). Moreover, beliefs have been credited with being capable indicators of decisions individuals will make throughout their lives, and are thus a way to predict future behavior (Bandura, 1993; Pea, 2014). Haney, Czerniak, and Lumpe (1996) also acknowledge the future implications of current teacher beliefs and describe them as “significant contributors to behavioral intention” (p. 985). As did Vaino et al. (2013), who offer that our attitudes, subjective norms, and feeling we are in control, are all factors of beliefs, which set our intentions in motion. In the science classroom, beliefs about students, and how science should be taught can have a direct impact on classroom practice (Johnson & Bolshakova, 2015). Bryan and Atwater (2002) place the utmost importance on the examination of teachers’ beliefs given they play a critical role in making and following through with decisions. Vaino, Holbrook, and Rannikmae, (2013) concur and see promise in using beliefs as a lens for understanding teachers’ practice, directing instructional decisions, and influencing classroom management.
Beliefs and Culture in the Classroom

Being “beliefs”, teacher beliefs, and the actions they lead to, are influenced by the beliefs and actions of others. Specifically, they are subject not only to the societal norms enacted in their particular school; but also, how they believe certain actions will be perceived by students, colleagues, administrators, parents, and the community (Johnson & Atwater, 2014). Hudson, McDonough, Edwards and Bach (2018) describe this as a natural human (actually primate) tendency, and assert that we never really see actions as they are; rather they are distorted by our expectations.

This is because whatever ideals or beliefs we use to evaluate an action, are based on our prior knowledge, ideals, and conceptions of efficiency (Hudson et al., 2018). This situation has the potential to create a stressful cycle where: a teacher’s beliefs lead to an action; this action is interpreted and judged by the other stakeholders involved; this shapes their beliefs regarding the action, which intern guides their actions; that the teacher will then develop beliefs about; and so on. This place teacher beliefs in a prominent position in the classroom, and their influence may be even more pronounced amongst diverse student who might have experienced limited
academic success, and are at a greater risk of school failure (Johnson & Atwater, 2014).

Teacher beliefs and practices rooted in hegemony can inhibit the enactment of CRP in high-need science classrooms. Johnson and Atwater (2014) suggest common myths (which are beliefs) are often accepted uncritically, used to rationalize actions, and the source of barriers to the understanding and implementation of CRP. For example, teachers who believe students of color are naturally less intelligent, will rely on a value system rooted in low expectations, fall back on less challenging content, and promote cultural deficit models (Johnson & Atwater, 2014). Irvine (2010) discusses other harmful beliefs (i.e., myths) surrounding the implementation of CRP. First of which, is the notion that only people of color can practice and engage in CRP. The root of this myth lies in the reasoning that white teachers will somehow relinquish control of their classrooms should they cast themselves as caring teachers of diverse learners. This to me harkens back to the fear of students of color that Delpit (1995) discussed. The second myth put forth by Irvine (2010) is, white students will gain no benefit from the enactment of CRP in their classes. Not only does such a view deprive these students of the chance to learn to value all cultures (theirs included), it also reinforces the normalization of white middle-class values as an unnamed
standard to which all others are compared. When in fact, all cultures are distinguishable via certain characteristics and beliefs (Bryan, 2012). Revealing tacit aspects of teacher (and I contend student) beliefs like those above are vital to any effort aimed at examining the relationship amongst culture, beliefs, and classroom practices (Bryan, 2012).

**Why Study Beliefs?**

What the previous discussion about beliefs and actions points to, is just how critical they may be to the understanding of educational outcomes (Prime & Miranda, 2006). This is a sentiment that seems to be shared by many in the field given the amount of research devoted to their investigation. Having reviewed over two decades of NSF research about beliefs in the STEM, and science education fields, Pea (2014) concludes they are the best indicators of the judgments, and attitudes, which influence what takes place in the classroom and beyond. Beliefs can serve as a means for looking at the attributes of students and teachers that go beyond achievement scores, and can provide valuable insight into teaching and learning (Evans, 2014).

For pre-and in-service teachers, as well as teacher educators, questioning, and coming to terms with their beliefs can be a transformative experience that can shape how they come to perceive, and interact with their students, especially in
culturally diverse classrooms (Johnson & Atwater, 2014). By recognizing that their beliefs and expectations are closely tied to student performance, teachers can undergo a shift in each, and tap into newfound potential capable of improving learning (Pajares, 1992; Bryan & Atwater, 2002; Irvine, 2003; Johnson & Atwater, 2014; Russell & Russell, 2014). Barnes (2006) for instance claims that pre-service teachers who understand their own beliefs and attitudes gain cultural competency, which at least in part translates to their classroom practice. This is possible because their conceptions of themselves and others, frame their instructional goals, expectations, and orientations (Johnson, 2011). Lee and Luykx (2007) contend teachers who come to believe: all students are capable of success; pedagogy is an ever-evolving process; they are part of a community and teaching is a way to give back to it; and science instruction is more about the mining of knowledge as opposed to presenting facts to be stored in students’ heads, will be well on their way to enacting CRP in their classrooms. Additionally, they will be well situated to meet the needs of diverse science learners. However, this is no easy task considering until recently, science instructional materials have reinforced the idea that science is an undertaking for white males, thus silencing non-traditional contributions to the field (Johnson & Bolshakova, 2015). As a result, many teachers have yet to learn how to
integrate their students’ backgrounds into the content they teach, thus inhibiting its accessibility, engagement, and relevancy. This relegates these teachers to the role of content specialists, who use strategies that do not account for their students’ backgrounds, experiences, and interests (Johnson & Bolshakova, 2015). Moreover, even when teachers are willing to adopt new approaches to instruction, they often find it hard to integrate them in to their teaching practices. This is because the culture of accountability present in most schools proves to be a substantial barrier to overcoming traditional practices (Wallace, 2014). However, long before science teachers are able to challenge school culture, and curriculum, they must take on the difficult task of addressing and changing their own beliefs. This is especially true as it pertains to the role of culture (both theirs and their students) inside and outside the classroom (Johnson & Bolshakova, 2015). All of which becomes increasingly important given the job of these teachers is to build bridges between what they and their students know, negotiate students and their own beliefs about content, and the experiences of all involved (Villegas & Lucas, 2002).

**Challenging Teacher Beliefs**

The question then becomes, how can teacher educators help pre-service teachers confront their existing beliefs in order to
better prepare them for the diverse classrooms of today, and
tomorrow? Feldman (2000) suggests the answer lies in creating
better models for understanding the interrelatedness of teacher
beliefs, reasoning, and knowledge. The presumption being,
improving models will allow us to develop programs that make
teacher change more likely, and permit us to take advantage of
benefits associated with science teaching and learning (Feldman,
2000). Bryan & Atwater (2002), Vaino et al. (2013), and Johnson
and Atwater (2014) seem to agree with this line of reasoning,
and identify increased teacher educator understanding of pre-
service teacher characteristics, and beliefs as an imperative.

Bryan (2012) also subscribes to these ideals and asserts
the goal of science TEPs should be to develop an inclination
towards inquiry in its new teachers that promotes reflection
upon their beliefs, practices and meaning making processes. In
addition, such work should not be confined to new teachers.
Rather, throughout their careers, teachers should continue to
refine the ways they challenge ideas surrounding teaching,
utilize experiences, observe and analyze their practice,
approach problems in their practice, and take time to develop
skills aimed at improving their teaching (Bryan, 2012). This
will empower them as they take a lead in their own learning, and
prevent them from feeling confronted by alternative conceptions
and prescriptions (Bryan, 2012). It is important to note that
this process does not call for teachers to abandon their own beliefs, but to gradually replace them with new, relevant, beliefs developed in supportive environments (Nespor, 1987). To accomplish this, science education programs need to provide safe opportunities for teachers to critique their current beliefs, acknowledge these teachers may hold beliefs at odds with reform initiatives, accept they may not possess the knowledge to enact alternative beliefs systems, and consider they may even lack appropriate science content knowledge (Bryan, 2012).

**Teacher Beliefs in Multicultural Classrooms**

Considering our nation’s increasingly multi-racial, ethnic, and lingual classrooms, and the impact teachers’ beliefs have on the success and achievement of their students; it is vital teachers develop their understanding of the roles diversity, culture, and language play in science teaching and learning (Russell & Russell, 2014). This is required if they wish to access the untapped talent and potential underrepresented students bring to the science classroom (Russell, 2014).

This is no small task because many pre-service teachers come to their undergraduate preparation programs with few if any intercultural experiences. In addition, they also carry with them beliefs and assumptions detrimental to the equitable education of students from culturally diverse backgrounds (Bryan
Accordingly, Bryan and Atwater (2002) call for the examination of teacher beliefs about their future students’ characteristics, external factors influencing learning, and appropriate responses to diversity, but caution teacher ideologies and beliefs are often very resistant to change. In fact, Bryan (2012) attributes the sluggish pace of science education reform to the stable, unchanging nature of teacher beliefs. Additionally, this holds true for short professional development interventions (e.g., a course over the summer), and intensive, sustained efforts alike, where attempts to revise, change, or replace teacher beliefs, and practices are always complex, but not necessarily successful.

This is because our core (Wallace, 2014; Cohen, 2012) or governing (Gray, 2016) beliefs are deeply tied to our identity, feelings and self-worth, and serve as the foundation for all of our other beliefs. Therefore, teachers engaging in professional development may adopt new ideas, yet hold them peripherally, and not incorporate them into their core belief sets (Wallace, 2014). This is especially true for experienced teachers, many of whom have had years to develop and groom their foundational beliefs.
Beliefs and Bias

Delpit (1995) sheds light on why our beliefs can be so persistent and asserts, “We do not really see through our eyes or hear through our ears, but through our beliefs. To put our beliefs on hold is to cease to exist as ourselves for a moment—and that is not easy.” (p. 46). Perhaps this why people are determined to persist in long-held beliefs even in the face of mounds of evidence invalidating them (Cohen, 2014). There is a tendency for us to accept information, validating our prior beliefs, and discount that, which contradicts them. Ironically, this can cause us to become even more entrenched in our misplaced beliefs as we “fight” to cling to our identity (Cohen, 2014). As I mentioned at the beginning of this discussion, we have a pervasive and robust tendency to evaluate new information, and the world around us through a prism of our own beliefs. This is known as assimilation bias, and it is often much easier to identify in others, than it is in ourselves (Cohen, 2014). Cohen (2014) presents several studies surrounding the death penalty, public assistance, and gender perceptions in the work place, and found when the core beliefs of the participants differed from the fictional victims of social problems, they were less empathetic to their situation. I contend similar dynamics are at play in our classrooms and schools in the form of meritocracy, and I will use this as an
example to demonstrate how easy it is for us (myself included) to allow assimilation bias to cloud our beliefs.

For most of my life I have believed like most, that schools objectively provide opportunities for everybody as long as they worked hard. However, having now learned how curriculum, pedagogy, and evaluation processes were designed by, and favor, affluent, white, males, I now know schools are far from the objective institutions of learning we are led to believe they (Villegas & Lucas, 2002). I also see the bias against students whose core beliefs, identities, and ways of being are not congruent with school culture. This has led to a situation where, instead of valuing what these students bring to the classroom, they are oftentimes classified as intellectually disabled, insubordinate, or just plain lazy. If I am being entirely honest, I have attached these labels to some of my students in the past. In doing so I essentially classified them according to subjective categories, and limited my expectations of their ability. I am not sure if I should feel comfort or severe dis-comfort, in, knowing I was far from alone in this practice. In fact, I would be willing to bet it happens all the time, at all levels of schooling. Sadly, I am ashamed to admit, I contributed to system where those not meeting some predetermined criteria are cast aside, and deemed undeserving of the benefits education has to offer. Under such a system
academic success and failure boils down to biased presumptions of “character”, and leaves no blame for the institutionalized discrimination present in our schools (Villegas & Lucas, 2002).

While this is problematic on so many fronts, the point of the story is, merit is a constructed criterion, subject to bias, and can be changed to advantage positively stereotyped groups (Cohen, 2014). This allows discrimination to continue under the guise of “fairness and objectivity”, while under the surface unconscious bias contributes to social problems such as inequality, and intergroup conflict (Cohen, 2014). As it pertains to classroom life, the long-held beliefs of teachers and students alike, can coalesce and produce their own forms of intergroup conflict (e.g., students vs. teacher, oppressor vs. oppressed, or empowered vs. dis-empowered). This places teachers and students in the position of “other”, create divides, and adversely affects teaching and learning. It is the job of the teacher to recognize the sources of such conflicts in their classrooms, and work alongside their students to overcome them.

Exploring Teacher Beliefs

Successful work in this area requires teachers to have a working knowledge of how beliefs, identity, and culture come together to create learning environments. However, Villegas and Lucas (2002) suggest that in order for teachers to understand
their future students, they must learn to examine their own sociocultural identities. While they note there are exceptions, they argue most pre-service teachers entering preparatory programs need to gain a sense of who they are socially and culturally. To accomplish this, they recommend prospective teachers engage in “autobiographical exploration, reflection, and critical self-analysis” (Villegas & Lucas, 2002, p. 22), where they can explore their own social and cultural groups, and identifiers such as race, ethnicity, SES, and gender. Moreover, not only must they come to understand them, but also how the extent of their attachment to these groups has shaped the history of their families and themselves (Villegas & Lucas, 2002).

**Framework for Exploring Teacher Beliefs**

Bryan and Atwater (2002) recommend science education researchers and educators focus on three “categories of beliefs” (p.827) if we wish to prepare new teachers for ever-diverse classrooms. They are “beliefs about (a) student characteristics; (b) external influences on learning; and (c) appropriate teacher responses to diversity.” (p. 827). The student characteristics category accounts for teachers’ beliefs about the race, ethnicity, language, and class of culturally diverse students, and any deficit-based perspectives that might results from them.
External influences on learning is related to beliefs about parental involvement, family stability, and students’ community and their relation student performance. The last, teacher beliefs about appropriate teacher responses to diversity, is concerned with the physical classroom, and how teachers negotiate various social and behavioral situations. Bryan and Atwater (2002) chose these three categories because not only do they “broadly define the dilemmas in multicultural science education” (p. 827); they are also a factor in any changes to science curriculum, and issues regarding equity in science education (Bryan & Atwater, 2002).

I have taught in “diverse” classrooms, but one could argue they were far from it, given nearly all my students were African American, and all the students in the school were eligible for free breakfast and lunch. Regardless, I agree with Bryan and Atwater (2002) and find their categories do well in covering many of the factors that I saw influence teaching and learning in my classroom. Moreover, I also find them to be a useful framework for examining teacher beliefs, so much so in fact, that I borrow heavily from them to develop the framework for exploring beliefs in this study.

The three categories of beliefs I investigate are (a) identity; (b) home-lives; and (c) sociocultural-interactions. I
contend they too meet the selection criteria set forth by Bryan and Atwater (2002), but with slight alterations to meet the specific needs of my research. I briefly present the reasoning behind their use below, and expand upon their relationship to beliefs, later in this dissertation.

My identity category is appropriate because I will be using the lens of “positional identity” (Moore, 2008; 2012; 2016) to interpret the interactions of our CoP, and will be seeking to understand how our various “social variables” (e.g., race, ethnicity, gender, SES, etc.) converge to shape our beliefs (Moore, 2016). This is possible because our CoP was an opportunity for us to engage in critical, reflective, self-examination, and come to understand our own sociocultural identities (Villegas & Lucas, 2002). This moved beyond merely examining beliefs about “student characteristics”, which can vary considerably according to context, and will allowed us to use the more stable “self” as a baseline for examining beliefs and culture (Evans, 2014). Moore (2008) asserts pre-service teacher discussions are vital to investigation of beliefs about identity. Perhaps this is because we tell who we are as we talk about our points of view, thoughts, and ideas (Kane, 2012). This occurs even as we talk to ourselves, internalize what is said about us, and develop our narrative of who we are and who we would like to be (Kane, 2012). As we can see, conversations,
anecdotes, talking, dialog, etc., are quite relevant to the conception of identity, and the same can be said about my remaining two categories of beliefs.

The CoP conversations at the center of this research, were often friendly, revealing, and intimate. Their amicable, semi-structured nature was less likely to include anecdotes about “external influences on learning”, and more likely to include direct references to peoples “home lives”. In this sense, my home-lives category deals with experiences that occur outside of school, where all the other learning happens. This learning to me, is more than just an “external influence”, and represents aspects of the self, that students and teachers carry into the classroom.

Finally, while my sociocultural-interactions category certainly seeks to understand these new teachers’ “responses to diversity”, I would like to gain insight into more than just how teachers negotiate social and behavioral situations. Any “negotiation” of this sort in the classroom, will likely involve considerable dialog, exchange of social and cultural capital, and in some cases sheer emotion. This indicates to me, these new teachers will not only be responding to diversity, but also contributing to it. Moreover, these exchanges will vary from
student to student, teacher to teacher, and classroom to classroom, thus highlighting their dynamic nature.

Having explained my rationale for using these three categories to frame my exploration of these new teachers’ beliefs, I will now expand upon the thought processes behind the inclusion of each, and discuss the implication of the beliefs surrounding them for science teaching and learning.

Beliefs About Identity

Stets, Brenner, Burke, and Serpe (2017) describe identity as a set of meanings that define us as we assume roles (role identities), claim membership in a group or category (social identities), and exist as unique individuals (personal identities). Moreover, the meanings, which come to define each, are enacted in behaviors and actions stemming from the identity itself (Stets et al., 2017). Postmes, Haslam, and Swaab, (2005) follow a similar line of reasoning, and suggest individuals’ thoughts and actions are shaped by the internalization of social conditions, norms, and stereotypes. They add the nature and extent of this social influence is subject to the content of their identity. In addition, this content depends on socio-structural factors, which include specific norms, conventions, ideologies, and culture of their group (Postmes et al., 2005). Thus, these aspects of identity are personal in nature, making
each individual identity formation process unique (Sandhu & Tung, 2006). Accordingly, Postmes et al., (2005) describe social identity as “a channel through which society inhabits individuals” (p. 53). Therefore, as people navigate social settings, they bring with them societal structures and conditions, relevant to the shaping of their own personal identity. In this way, identities are enduring because we carry them across contexts. However, they are also dynamic because they change with our day-to-day stories, and contribute to our cumulative histories (Kane, 2012).

Cohen (2012) provides this general definition of identity, “who people are, their values, and the way they want the world to be” (p. 390). But more than that, identity is closely tied to long-held beliefs, group allegiances, and is thus, a prized asset, which is not easily relinquished (Cohen, 2012; Abelson & Prentice, 1989). In fact, so closely held are our identities, that Belmi, Barragan, Neale & Cohen (2015), suggest any threats to them will lead to resistance, and even “social deviance” (p. 467). These threats consist of the devaluation of a person based on group membership (e.g., race, ethnicity, social class), and can cause them to act impulsively, anti-socially, or even aggressively (Steele, Spencer & Aronson, 2002; Gino, Schweitzer, Mead & Ariely, 2011; DeBono & Muraven, 2014). Negative stereotyping is a specific example of a threat of this type,
with members of marginalized groups being more subject to these “social identity threats” (Belmi et al., 2015, p. 467). This condition Fordam and Ogbu (1986) argue has led to situations where marginalized groups can develop a collective identity aimed at opposing the exclusionary, and assimilatory practices of white Americans. Considering our discussion regarding the demographic profile of our nation’s teaching force, it becomes easy to see how social identity threats can cause problems in our increasingly diverse classrooms.

Perhaps then, it is not surprising that more and more, education researchers from a variety of fields are employing identity as a valuable analytical tool, capable of increasing our understanding of schools, and people (Gee, 2000). Its efficacy lying in its ability to provide a more “contextually specific” (Gee, 2000 p. 99) perspective of the ways people acknowledge, and enact their identities, when compared to inert categories (i.e., race, SES, gender, etc.). Kane (2012) agrees and lauds identity as a viable construct for not only understanding how people come to view themselves, but also how they are understood by those around them. The development of this process includes using resources present in their ordinary lives; talking about themselves and their lived experiences; participating or abstaining from certain activities; and the positioning of one’s self in relation to social groups or
communities. Barton, Tan, and O’Neill (2013) also note the utility of identity, but encourage readers to view a person’s identity construction in terms of their actions and development of relationships, as opposed to focusing on the construct itself. Whereby, actions, and relationships at any given moment and are subject to legitimized historical, cultural, and social norms (Barton et al., 2013). They add that, there is a constant tension that exists amongst the way one enacts their identity, and how others perceive it over space and time. This suggests a person’s identity is constantly being created and expanded as they encounter new experiences and relate them to past, present, and future conceptualizations of themselves (Kane, 2012). I agree with this point of view, and offer the identity a person most relates to, is in many ways subject to their environment.

So Many “Identities”

The popularity of the identity construct in education research has caused it to take on multitude of meanings throughout the field. Perhaps this is why Moore (2012) describes the use of identity in education research as simultaneously, fascinating, complex, and challenging. To illustrate the multifarious way it has been defined in education literature, Moore (2012) offers several examples such as racial and ethnic identity (Chavez & Guido-DiBrito, 1999), teacher identity
(Franzak, 2002), teaching identity (Agee, 2004), and discursive identity (Brown, 2004) to name a few. I would like to add science identity (Lee & Fradd, 1998), to this list not only because of its relevance to my field of study, but also, in order shed further light on the complexity of identity as a construct.

Carlone and Johnson (2007) distinguish three stages of development with respect to science identity: 1) being able to do science (performance); 2) understanding scientific content and practices (competence); and 3) being recognized by others for scientific abilities (recognition). In their research examining the tenacity of minority students in science academia and careers, Stets et al., (2017) provide their own take on science identity and suggest it is comprised of several interrelated dimensions. These include, “seeing oneself as having a science identity, holding the science identity as important to oneself (identity prominence), and experiencing verification (or the lack thereof) of the science identity during the school years.” (p. 2) In both of these cases it seems, in order for a minority student to develop a “science identity” enabling them to enact “appropriate” behaviors within a science classroom or occupation (Stets et al., 2017), they must not only navigate a culture often at odds with their own (Carlone & Johnson, 2007); but also, be confident in their
This to me signifies there are countless aspects to one’s science identity, which is just one of many “types” of identity associated with education research. Moreover, it appears the complexity surrounding the construct of identity is unavoidable due to its very nature, and I for one, would hate to add to it by not being clear as to, which “version” of identity I intend to use in this study.

**Positional Identity**

Any interpretations I might make regarding COP members’ beliefs about identity will be viewed through the lens of “positional identity” (Moore, 2008; 2012; 2016). Moore defines positional identity “in terms of multiple social markers (i.e., race, ethnicity, economic status, gender, religion, and age), and is fundamental to understanding how particular social variables intersect with the development of a science teacher identity.” (Moore, 2016, pp. 49-50). I feel this approach is ideal for my study because, during conversations with pre-service teachers about their positional identity, Moore (2008) found it influenced their decision to pursue science teaching, how they enacted pedagogy in the classroom, their relationships with students, and how their students viewed them in the classroom. More specifically, these pre-service teachers talked about their
science identities, science teaching, and their relationships with students in the science classroom in relation to social markers they felt most contributed to their positional identities (Moore, 2008; 2012). Likewise, I examined our CoP’s conversations looking for similar dynamics surrounding the construct of identity, and explored ways their deconstruction can better pre-prepare new teachers for diverse science classrooms.

Regardless of whether one considers identity in terms of developmental stages, dimensions, or positional identity, what becomes clear is it is a relational concept (Moore, 2016), and will likely change as individuals take action when encountering new experiences. Reicher, Spears, and Haslam (2010) agree and describe how our identities are based on comparisons with others, and a result of our collective history and present reality. This is similar to Reicher et al., (2010) who contend our past and present experiences are a product of not only our personal characteristics, but also the settings in which they exist. While Kane (2012) seems to place an emphasis on setting, and defines identity as “a person’s understandings of self in relationship to the world, including people, places, events, material objects, and semiotic systems.” (p. 458). Of course, as we have discussed, any “understandings” we come to, will be filtered through our beliefs, thus bonding new found knowledge
to our identity. Accordingly, like others before me, I propose the examination of beliefs as a means for gaining insight into how new teachers view their role in teaching and learning.

**Beliefs About Home-lives**

When students come into our classrooms the experiences, actions, and beliefs developed outside those four walls, do not magically dissipate once they cross the threshold. Likewise, nor do those born in the classroom remain behind when the bell rings. Accordingly, any beliefs, knowledge, and behaviors nurtured class, should be aimed at helping students succeed in their lives outside of schools as well. Or as Delpit (1995) puts it:

The purpose of education is to learn to die satiated with life. That I believe, is what we need to bring to our schools: experiences that are so full of the wonder of life, so full of connectedness, so embedded in the context of our communities, so brilliant in the insights that we develop and the analyses that we devise, that all of us, teachers and students alike, can learn to live the lives that leave us truly satisfied. (p. 104)

In order to help students succeed in the classroom and beyond, teachers need to have and understanding, and appreciation for
their lives outside the classroom, or their “home-lives”. To truly build relationships with their students, teachers must seek ways to connect to their families and communities (Delpit, 1995). Vital to this is process is the exploration of their own beliefs, attitudes, and unexamined prejudices towards people from races, ethnicities, and classes, different than their own (Delpit, 1995). In many instances, teachers, and teacher educators, attribute problems with student learning to their home-lives, instead of considering their own beliefs, and actions (Bryan & Atwater, 2002). The former often present in views asserting some students come to school with so many problems, it is impossible for them to learn, and parents at high poverty schools are less supportive of their child’s education (Bryan & Atwater, 2002). To successfully counter deficit-based beliefs about students’ home-lives, teachers must have knowledge of content, diversity, and ways to provide rich learning experiences for their students, which acknowledge their home language and culture (Johnson, 2011). This requires them to leverage their understanding of students’ home-lives when developing approaches to behavior management, addressing learning concerns, and tapping into their hobbies and interests, as a means of engagement. There is a temporal component to this as well, as teachers need to be aware of how past learning
experiences have molded their students’ views of school (Villegas & Lucas, 2002).

None of this is to suggest the problems many students face outside of school should be in anyway discounted or minimalized. For example, Perkins and Sampson (2015) discuss several studies linking family poverty to with depression, delinquency, drug use, and stalled intellectual development; and suggest it influences the way parents raise their children, construct the home environment, and stimulate cognitive development (Perkins & Sampson, 2015). Moreover, the effect of these conditions appears to be long lasting, as correlations have been established amongst childhood poverty and: employment, earning potential, school achievement and behavior, health, graduation rates, and the pursuit of post-secondary degrees (Duncan & Brooks-Gunn, 1997; Duncan, Brooks-Gunn & Smith, 1998; Duncan, Ziol-Guest & Kalil, 2010).

I am not challenging the impact poverty can have on children, however, like Dudley-Marling and Lucas (2009), I am opposed to pathologizing low SES students’ language, culture, and by association, their identity. In addition, because teachers are so influential in children’s lives (and in the development of a child’s identity), teachers, and teacher educators, must work to dismantle ethnocentric biases that reify
the language, and culture of middle- and high-SES families (Dudley-Marling & Lucas, 2009). At the same time, they must also counter the tendency for educators and policy-makers to attribute the academic struggles of low SES to their language and culture (Dudley-Marling & Lucas, 2009). Michaels (2005) urges us to move past the outdated notions suggesting our intelligence is not socially constructed, and our situations determine our identity and intellect. To do so, we as educators must learn to not only recognize, but also utilize students’ embodied ways of argumentation, and explanation, as we help them develop language tools (Michaels, 2005). To do so, would be to value their identities, cultures, home-lives and yes, beliefs. This would be a big step towards eliminating the deficit-based thinking, which transforms the marginalized students’ ways of being into “deficiencies” (Dudley-Marling & Lucas, 2009). Finally, the acknowledgement, and critique of deficit-based beliefs that took place within the context of our COP had the potential to promote a level of self-reflection, and understanding, that will allow these new teachers to see diverse home-lives as avenues for engagement, rather than deficiencies to be overcome.
Beliefs About Sociocultural-Interactions

If you have ever taught in a K-12 classroom, then you are aware of students’ ability to pick up on all our habits, tendencies, and even talents. I recall laughing alongside my students, whenever they came up with a new impersonation, or nickname for me. However, I was far from a defenseless victim, and was more than willing to engage in some good-natured back and forth. One thing I have come to realize is, as we laughed and joked, we were also engaging in critical self-reflection. Even as they chided me for my speech, and looks; or offered creative impersonations of “mad me” (always favorite), “nice me”, and “stubborn me”, they also allowed me to see aspects of myself, that I was previously unaware. There are countless times in the classroom where I have thought to myself “Oh my God... I do that”, or had my denials rebuked by 25 students, in unison, loudly. The point is to summarize, infer, and mimic our actions, requires students have insight into our attitudes, biases, and thus beliefs. Pea (2014) discusses students’ ability to pick up on “situational environmental cues” (p. 127), associated with uncertainty, lowered expectations, and deficit-based attitudes. These exchanges occur within a “learning ecosystem” (Pea, 2014, p.127), and can have an adverse impact on student self-efficacy, motivation, and learning (Pea, 2014).
If you recall, Villegas, and Lucas (2002), urged teachers to engage in self-examination of their sociocultural identities if they wished to understand their students. The purpose of which is to foster a “sociocultural consciousness” (p. 21) they see necessary for culturally responsive teaching. Such an orientation includes an understanding that social positions are far from neutral, and some are afforded preferential status, and thus access to power (Villegas & Lucas, 2002). Additionally, these power differentials have a profound effect on how individuals experience the world, and like other beliefs; their consequence carries over to the classroom. A typical example of contradictory school experience is that of the “jock” and the “bullied kid”. However, more and more, we must consider the divergent school experiences of homosexual white females and heterosexual black males; ELLs and Asian Americans, whose primary home language is Standard English; black and Latina females; and countless others. To truly affirm the backgrounds their students, bring to the classroom, and promote equity in schools, teachers must position themselves as agents of change (Villegas & Lucas, 2002).

**Self-affirmation**

Cohen (2014) suggests overcoming power imbalances and developing a socioculturally conscious perspective of science
teaching and learning, requires teachers to invoke the process of “self-affirmation” (Cohen, 2014, p. 392). Self-affirmation entails focusing on sources of self-worth, unrelated to the current topic or negotiation, in order to make coming to a compromise, less psychologically painful for all involved (Cohen, 2014).

A frequently occurring example from my own life revolves around what is apparently my strong “Boston accent”. Technically, my manner of speech hails from an area of Greater Boston known as “The North Shore”, which is makes it distinct in its own right. Regardless, I estimate my accent has been pointed out to me on a daily basis, since moving to Florida 14 years ago. The “Sunshine State” is not alone in noticing however, as I have discussed it with strangers from other states, and countries as well. Sometimes these exchanges lead to unprovoked declarations of hatred for the “Boston Red Sox”, or “New England Patriots”. While others, they result in people telling me about their trip to Boston, or family members who grew up in the area. The former usually lead to some good nature ribbing, handshakes, and even hugs; while the latter often entail friendly conversations about weather, landmarks, or old haunts. These exchanges do not only occur on the street, they have happened in job interviews, classrooms, and yes, even buying a car.
We might casually refer to this acknowledgement of common experiences as “breaking the ice”, and Cohen (2014) suggests this process allows participants to soften their approach, and step outside their desire to be right or get their way. This “negotiation tactic” has relevance to the classroom because as Cohen (2014) puts it “Education is, in many ways, like persuasion.” (p. 396). Moreover, nontraditional students may see their race, ethnicity, SES, etc., as a factor in their treatment in schools, because of past experiences with negative stereotyping and discrimination. This can result in them viewing schools as threats, which is why these students need affirmation more than their white, middle-class counterparts (Cohen, 2014).

Teachers’ understanding of beliefs about themselves and their students might better prepare them to not only challenge their own beliefs in their classroom, but also encourage their students to challenge their beliefs about science, schooling, and themselves. It may also lead them to becoming better at using self-affirmation processes in the classroom. Perhaps if both can learn to challenge their beliefs in these ways, we can shift the orientation of science teaching and learning from one of conflict and oppression, where each “side” can often have differing immediate goals; towards a more ecological situation, where perspectives, skills, and niches of all involved are valued.
I realize my discussion of beliefs is quite lengthy and incorporates a multitude of ideas, and perspectives. Accordingly, before I set about concluding this literature review, I would like to take a moment to summarize my thoughts on beliefs, and why examining them is worthwhile undertaking for science education researchers.

Our beliefs determine how we make sense of the world around us, and are a prominent, influential, and complex force driving our actions. In the science classroom, student and teacher beliefs are of considerable consequence to teaching and learning. Moreover, this is particularly true in diverse classrooms, where longstanding beliefs, myths, and stereotypes can serve to promote lowered expectations and distrust, and create barriers to STEM participation (Pea, 2014). If you consider all that goes into every classroom interaction, it might border on overwhelming, and I am sure it is at times. In any science classroom, at any given time, you will find teachers, students, constantly changing beliefs, shifting identities, and the influence of home-lives and cultures, converging in an intimate space. Add to this the fact that teachers and students often possess beliefs that place them in opposition, it becomes easy to see how personal and cultural conflicts can arise. In addition, considering many obstacles to successful science teaching and learning have been attributed to
such disconnects, and the role of beliefs in their creation, it stands to reason that improved understanding of this construct may serve to alleviate some of this conflict and improve the prospects for all involved.

Conclusion

In the interest of clarity, before moving on to my methodology, I conclude this chapter by providing bullets summarizing the main points presented in my first two chapters, and which informed this study:

- There is a well-recognized need to reverse the downward trajectory of STEM performance in the US.
- This decline has been associated with a lack of interest and achievement in STEM classrooms, which has led to concerns about our country’s ability to staff a globally competitive stem workforce.
- Although, STEM interest and participation is down for our nation as a whole, the representation of marginalized sectors of our society is disparately low.
- There is a school of thought suggesting the underrepresentation of nontraditional individuals in STEM K-12 achievement, academia, and careers, is the result of inadequate stem instruction at the K-12 level.
• TEPs have not escaped criticism, and considerable attention has been given to their inability to produce sufficient numbers of high-quality teachers, who are equipped to meet the increasingly diverse needs of America’s K-12 STEM classrooms.

• This stance is supported by the disproportionately high teacher attrition in high-need schools.

• Many see it as a product of cultural discord in the classroom.

Agreeing with this last bullet, I can recall many instances where teachers quit “because of the kids” during my time as a science teacher at a title I high school.

There has been a great deal of research suggesting this “clash of culture” is due in good part to the fact that our teaching force remains at least demographically, the same as it has always been, while our student body changes, seemingly by the day. This leads to students from nontraditional backgrounds being further marginalized, as they are judged, evaluated, and even valued, according to normalized traditional standards. This is a system many argue, rooted in beliefs, which have considerable influence, both in and outside the classroom. Not just beliefs about teaching and learning, but about these children, their families, their communities, and their culture.
Some have asserted more research exploring the role of such beliefs needs to happen. I agree, and feel the Noyce scholars and I learned a great deal about these types of beliefs in this study. Additionally, my research design allowed me to make contributions to the growing body of work concerned with ensuring science TEPs are producing new teachers who are prepared to work with students from an array of racial, ethnic, and socioeconomic backgrounds. To help me come to such understandings, I used the following research question to guide me:

In what ways will the participation in the Noyce CoP allow pre-service teachers to express, explore, and develop their beliefs about the influence of identity, home-life, and sociocultural-interactions in science teaching and learning?

The interactions of our CoP served me well in addressing this question, and afforded me insight into how these new teachers characterize sociocultural-interactions in the science classroom.
CHAPTER 3: METHODOLOGY

This chapter is intended to provide a full account of the methodology I used in this study. To do so, I begin by describing how I situated themes to tell the story of what occurred during the 2018 Noyce Community of Practice (Noyce CoP), using “portraits” (Lawrence-Lightfoot, 1997) of my subjects. I then move on to provide a detailed description of what exactly occurred during the Noyce CoP, as well as the means by which I analyzed what took place. Finally, I address validity and reliability concerns, and present some anticipated advantages and disadvantages of my research design.

**Purpose Statement**

The purpose of this study is to gain understanding of new teachers’ beliefs and perceptions regarding the roles identity, home-life, and sociocultural-interactions play in their lives in and outside of the science classroom.

**Research Question**

In what ways will the participation in the Noyce CoP allow pre-service teachers to express, explore, and develop their beliefs about the influence of identity, home-life, and
sociocultural-interactions in science teaching and learning?

Research Design

This research design relies on the use of a qualitative intended to be flexible, effective, and processing a practical focus, which aligns nicely with our CoP’s engagement in collaborative action research (CAR).

I found this to be possible after reading studies addressing a number of topics including: equitable health interventions (Wallerstein & Duran, 2010); alcohol use and incarceration rates (Lundholm et al., 2013); fan-athlete interactions and social media (Kassing & Sanderson, 2010; Pegorana, 2010); and education (Flinders, 1989; Lawrence-Lightfoot, 1997; Lawrence-Lightfoot, 2008; Moore, 2008; van Driell, Meirink, van Veen, & Zwart, 2012; Tallman & Feldman, 2016). This literature search impressed upon me the need to remain flexible when dealing with a variety of “real world” contexts. Not to be excluded is the examination of conditions, relationships, and practices at all levels of education. In line with this point, a seminal case study from the field of education (Flinders, 1989), not only discusses the value of looking at individual practice and trying to “do better”, but also, how such work should be used to inform policy, research,
and decisions. Whether this current study is suited to meet these latter aspirations remains to be seen. However, I am convinced using the case study as a scaffolding for the themes I reveal in this study (Thomas & Meyers, 2015), gave me the best chance to address my research question and inform others in the field of science education.

**Defining My Themes**

Thomas and Meyers’ (2015) provide a multitude of ways the case study has been defined by in books and research literature, and include their own definition centered on the distinction of the “subject” and “object”:

Case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems, which are studied holistically by one or more methods. The case that is the subject of the inquiry will be the instance of a class of phenomena that provides an analytical frame – an object – within which the study is conducted and which the case illuminates and explicates (Thomas & Meyers, 2015, p. 7)

I find this definition useful for explaining how I structured my themes during this research. This is because I simultaneously analyzed my subjects: 1) new teacher beliefs about identity and science teaching and learning; 2) new teacher
beliefs about home-life and science teaching and learning; and
3) new teacher beliefs about sociocultural-interactions and
science teaching and learning; and used them to shed light on my
object (the Noyce CoP). This of course relied heavily on my
ability convey the experiences of the CoP members as we
collaborate to create new understanding.

When thinking of my three themes, I consider them “a noun,
a thing, an entity…” (Stake, 2013, p. 1); and in this case, this
is referring to the new teachers’ beliefs about identity, home-
life and sociocultural-interactions, and science teaching
learning. Meanwhile, the object of this study is the Noyce CoP,
and I interpreted the experiences of its members to determine
what occurred within it. This allowed me to explore what
happened during the CoP through several “lenses”, thus affording
varying perspectives of our CoP and providing a multitude of
understandings (Baxter & Jack, 2005). This positions each of my
themes as a “unit of analysis” (Baxter & Jack, 2005, p. 545),
within the object, which serves as the analytical framework for
exploring my research question (Thomas & Meyers, 2015).

Stake (2013) describes the situating of multiple cases in
this manner, but rather than viewing the object as a frame work,
he sees it as a “quintain” (p. 6). A quintain serves as both an
umbrella for each of the cases studied, as well as, a
“conceptual infrastructure” for the study as a whole (Stake, 2013). Figure 1 shows the data sources I used to construct my three themes of new teacher beliefs using elements of portraiture (Lawrence-Lightfoot, 1997). These themes were in turn used to tell the story of what occurred in the 2018 Noyce CoP (e.g., the quintain).

Figure 1: Concept diagram depicting the data sources, and themes used to interpret understandings gained during the 2018 Noyce CoP.
The important distinction being that although greater understanding of the quintain is the main objective, it is achieved through a comprehensive understanding of each theme, rather than focusing immediate attention on the quintain itself (Stake, 2013). Using this approach alongside portraiture (discussed below) afforded me the type of in depth, understanding of my themes required to address my research question.

Portraiture

My job as the researcher for this study required, I develop a portrait of each of my themes (and by extension my quintain) that others can see (Stake, 2013). It was by coming to know these portrayals personally, that I was able to present our experience in the CoP (Silverman, 2000). In order to “paint a picture” of each of my individual themes and the quintain as a whole, I invoked the method of portraiture (Lawrence-Lightfoot, 1997; Lawrence-Lightfoot, 2005; Lawrence-Lightfoot & Davis, 1997), to bring readers as “close” as possible to our CoP, given the confines of research. As a methodology, portraiture seeks to blend art (literature, music, visual arts) and scientific rigor, to illustrate or make transparent, the complexities and details, relevant to a distinct experience or place (Lawrence-Lightfoot, 2005). Moreover, portraiture demands any “pictures” of an
individual, group, or event, reveal as much about the researcher (portraitist), as it does about the subject (Chapman, 2007). This has relevance to my research design because I was a member of the CoP, occupying the role of privileged participant.

My influence and subjectivity can be found throughout this study. From the experiences and questions that inspired it, its design, my facilitation of the practicum course, and now, making sense of what took place, I have been intimately involved in the Noyce CoP. During this process I have seen the CoP transform from a space where I listened to stories, to one where I must now listen for stories (Lawrence-Lightfoot, 2005, p. 10). The latter of which I used to “create life drawings” (p. 5) that are available to people from a variety of disciplines (Lawrence-Lightfoot, 2005). I find this open availability useful as I myself have drawn from fields outside science education when developing my research design. Additionally, given my “privileged status” and influence, I must be sure my “life in the CoP” is part of any portrait I paint of this situation. However, I needed to remain conscious of not painting a “self-portrait” (Dixson, 2005); and instead, relied on my experiences and beliefs to interpret “what I see” (Lawrence-Lightfoot & Davis, 1997). Dixson (2005) employs portraiture, using a Jazz metaphor; and describes a desire to “paint” pictures of stories that allow the portraitist’s “soul” to be present throughout.
This is a goal I aspired to in this study because I cannot think of anything more personal than one’s soul. To clarify, by “soul” I mean our essence, what “defines” us, gives us life. Moreover, I would be remiss if the portraits I painted of our CoP experience, failed to convey how meaningful and personal the interactions within in it, were to me. Yet, viewing the CoP through a less sentimental lens, I am forced to admit how “personal” and “meaningful” the stories we shared were, was in many ways a matter of degree. In my Data Analysis section, I explain how I combed through our stories to find instances where our small community created conversations, and found shared meanings (Lawrence-Lightfoot, 2005). However, before doing so I would like to provide a detailed discussion regarding the design and facilitation of the 2018 Noyce CoP.

The Noyce Community of Practice

The Noyce CoP was an instructional intervention aimed at bringing Noyce scholarship recipients together to build professional networking relationships and collaboratively improve their teaching practices. It involved us engaging in a form of CAR, which revolved around participation in a journal club whose members made use of enhanced normal practice (ENP) (Feldman, 1998). The readings, conversations, and writings derived from our time together focused on the influence of
beliefs, identity, deficit perspectives, social constructs, and other factors on the teaching and learning of science. The goal being to allow opportunities for CoP members to grow as practitioners, teachers, and collaborators. In the remainder of this section I intend to make clear exactly what CAR, ENP, and the journal club looked like within the context of the CoP.

**Collaborative Action Research**

To address my research question, I relied heavily on the use of CAR as a methodological foundation. Feldman (1998) summarizes CAR as a methodology where practitioners act within a given setting to improve and increase understanding of that practice. It is a “self-reflexive process” (p. 28) concerned with the improvement of practice and not necessarily knowledge generation (Feldman, 1996). Mills (2006) describes it as an exercise in critical reflection where understanding takes precedence over “concrete” knowledge. CAR is collaborative in the sense you have two or more groups or individuals working with outsiders, who are acting within complex systems, and making public the results of systematic inquiry (i.e., engaging in authentic research) (Feldman, 1996).

I think to best explain how I visualize CAR in this study, it might be helpful to consider each word of the expanded term (Collaborative-Action-Research) individually. As I see it,
“Collaboration” for our CoP occurred along several lines and varied based on our roles and teaching experience. Collaboration common to all members of our CoP took place as we shared stories, engaged in the week’s literature, made contributions to online discussion forums, and brought issues to light, which were revealed via our experiences in and outside of our respective classrooms. It is with respect to the latter, that the collaborative endeavors of the CoP members likely varied. For the (n=7) scholars who were interning as a requirement of the practicum course, this meant interacting students, their collaborating teachers, and administrative staff for the first time. Meanwhile, for the lone (n=1) CoP member who was in her first-year of teaching this involved working with students, administration, and other educational staff at their schools, but these interactions were now accompanied by all the accoutrements that come with being a full-time “teacher”. Finally, collaboration for me was different in that it was confined to the “university side” of things, where I was focused solely on my work with the CoP and sought council from my critical friend and my advisor when negotiating this process.

The varying nature of the collaboration that occurred within and outside of our CoP contributed to a diversity of questions, ideas, and perspectives surrounding the teaching “actions” each of us came to reflect upon. Some examples of the
types of actions scrutinized include: my facilitation of and teaching within the journal club; our collective development as a CoP; and the ways CoP members discussed, approached, and assessed their teaching practices in light of our engagement in the CoP. However, the first two actions described here are outside the scope of this current work and will be explored in a future “self-study” (Laboskey, 2004). I only mention them to provide the reader with additional insight regarding my role in this study, as well as, to make clear I did not exclude myself from critiquing, exploring, and working to advance my teaching practice. Explanations aside, the explicit focus of this study was to relate the conversations, perspectives, and ideas shared in our CoP to our beliefs surrounding the teaching and learning of science.

I will now take a moment to reveal exactly who participated in the Noyce CoP. Members of our CoP included: the principal investigator of the Noyce program, a respected member of faculty and pioneer in educational action research; (n=8) Noyce scholarship recipients; and me, a doctoral student and graduate assistant for the Noyce program at our university. Growth within and amongst CoP members (i.e., learning) occurred as we negotiated our competencies (what it takes to be recognized as a competent member of our group), with our experiences in and outside the CoP (Wenger, 2000).
Crucial to our CAR efforts, were three CoP meetings, which took place over the course of the semester. Of specific importance were, the conversations that occurred, and the anecdotes, which were shared during these meetings. Each of which, promoted knowledge generation and understanding via logical discussion, and the exchange of ideas and opinions (Feldman, 1998). Moreover, this knowledge was acquired and filtered through social constructs including our language, consciousness, and shared meanings (Rowlands, 2005). During these dialogues we as co-participants moved between conversational situations, immediate understandings, and globalized conceptualizations of events, thus engaging in processes analogous to the hermeneutic circle and textual interpretations (Feldman, 1998). This is where Feldman (1996)’s method of ENP comes into play.

Enhanced Normal Practice

The mechanisms of ENP are: 1) anecdote telling; 2) the trying out of ideas; and systematic inquiry (Feldman, 1996). “Anecdotes” in this study are present in two forms: 1) the ‘critical anecdotes’ members of the CoP shared each meeting as we discussed that week’s readings, and any issues, revelations, and/or understandings that may have occurred since our last meeting; and 2) meaningful exchanges which occurred as we
collaborated to examine our individual and collective practices. The “trying out of ideas” was encompassed in our meeting-to-meeting progress as we presented issues, garnered feedback, and modified our practice accordingly. In this way, our CoP was constantly engaging in reflective cycles of action whose nature, structure, and theoretical backing amounts to systematic inquiry. This current research is the result of these efforts, thus completing the journey of these conversations to the status of “research”.

**Journal Club**

The time has come for me to provide an explanation of why I thought a “journal club’ would be a good venue for examining new teachers’ beliefs, and exactly how this looked within the context of this study. I began tinkering with the idea of journal club (although I did not think to call it that at the time), after developing, and facilitating a summer CAR internship for the Noyce program. Because the program is tasked with supplying new teachers for high-need schools, I felt our scholars would benefit from learning how social constructs such as beliefs, identity, racism, and meritocracy influence life in and outside of the classroom. However, issues during the internship experience convinced me that any such effort would have to be tied to some sort of accountability measure to
promote sustained engagement amongst all participants. After discussing this with my advisor, he suggested a practicum course for middle and secondary science education majors might be a possible venue for such work. Additionally, he made me aware of some journal club-based research he had conducted with one of his former graduate students. I briefly discuss that work here, before moving on to the particulars of the journal club used in this study.

Tallman and Feldman (2016) explore the success of a journal club in engaging pre- and in-service science teachers in education literature pertinent to their practice, and helping to bridge the “theory-practice gap”. Additionally, they conduct their research as part on a practicum course for pre-and in-service science teachers, and draw parallels amongst journal clubs and aspects of Wenger (1998; 2000)’s CoPs. Furthermore, Tallman and Feldman (2016) tout the importance for pre- and in-service teachers to critically and collaboratively explore the literature in their field if they are to become “critical consumers of science education research” (p. 326). This is an ability they consider valuable in deepening pre- and in-service teachers’ knowledge and understanding of science teaching.

Like Tallman and Feldman (2016), I also wanted to help my practicum students “bridge the theory-practice gap”. However, I
was more interested in helping these new teachers build bridges between the knowledge found in educational research focused on identity, student characteristics and classroom interactions; and their actions as teachers and individuals. I am optimistic purposeful, collaborative, engagement in literature addressing aspects of action research, culture, intersectionality, etc. helped these new teachers better understand phenomena they have witnessed or experienced in their professional and personal lives. The supposition being, increased understanding about such things will help them on their way to becoming reflective teacher practitioners, capable of identifying and addressing factors influencing teaching and learning in their classrooms.

Much like our nation’s student body and educational climate, impacts on science teaching and learning are in constant flux. Tallman and Feldman (2016) describe how their journal club motivated members to remain current with research, incorporate it into their practice, and become critical and reflective thinkers. Additionally, they present several studies (Barak & Dori, 2009; Brill, Falk & Yarden, 2003; Price & Felix, 2008; van Driel & Berry, 2012), which make the case for journal clubs as a means for developing pedagogical content knowledge (PCK) (Shulman, 1986). While we also wanted to ensure our Noyce scholars will go on to become research-based STEM educators, who continually improve their practice through critical thinking and
reflection; my dissertation research differs from Tallman and Feldman (2016) and the others in one important respect. I was not explicitly concerned with developing scholars’ PCK. Instead we focused on how: our personal beliefs shape our identities and actions; the development of our beliefs influences the ways we view others; and each come in to play as engage in sociocultural-exchanges with others. Given the Noyce program seeks to improve the recruitment, preparation, and retention of STEM teachers to high-need schools and districts by building supportive professional learning networks; collaborative exploration of these areas is vital to the preparation and support of pre- and in-service teachers who will likely serve racially, culturally, and linguistically diverse student populations.

Having established my rationale for choosing to make a journal club part of our CoP; I would now like to describe how our journal club functioned as a platform for generating practice focused conversations. The purpose of which, was to allow us to share new ideas, generate new knowledge and understanding, and improve our collective teaching practices. In other words, it was a way for us to come together to utilize ENP, engage in CAR, and work to become better collaborators, teachers, practitioners, and learners.
The Noyce CoP Journal Club

I will now explain how the journal club used in the 2018 Noyce CoP came together, and how it was structured and facilitated throughout our semester together. I was assigned as an instructor for a separate section of our college’s middle and secondary science education practicum course, which contained only Noyce scholarship recipients (n=8). I tied the course requirements to objectives I hoped to achieve by establishing a CoP with these students.

The procedure for the four journal club assignments generally followed the same procedure: I would post an article(s) to the course discussion board; students would read the article and search for an additional article of their own relevant to my original post; they would then submit a 400-600 word summary to the class discussion board explaining the relevance of their chosen article to the week’s reading(s); I would then use these summaries to derive talking points, and make instructional decisions for our next meeting. However, we did more than just “talk” in our CoP meetings, as I made sure to have some sort of collaborative exercise in place to facilitate the sharing and extending of ideas and perspectives. Each of our three face to face CoP meetings, and their included activities are covered in detail in chapter four. Additionally, while the
journal club was certainly at the center of the practicum course, there were other opportunities for CoP members to learn from others, analyze their practice and communicate their thoughts. These included: “The Noyce Scholar Panel”, where three former Noyce scholars (and current teachers) were invited to speak and field questions over pizza and soft drinks; having CoP members keep “reflective logs” as they interned in somebody else’s, or led their own classroom; and a final “reflection paper”, that required scholars to combine thoughts from their reflective logs, weekly summaries, and course readings to encapsulate the entirety of their experience in the CoP.

The literature read and discussed by the journal club covered the following topics: the role of beliefs in shaping our biases (Cohen, 2012), the history of urban education in America (McLaughlin, 2015), the consequences of deficit perspectives in the classroom (Dudley-Marling, 2009), and the value of utilizing students’ culture in the science classroom (Chigeza, 2011; Shademan, 2011). Throughout our meetings I recorded all of our conversations and developed the primary source of data I collected, analyzed, and interpreted in this study. The data and understanding generated through our employment of Feldman (1996)’s ENP in this setting was vital to me addressing my research question.
Research Setting

This study was situated within a graduate practicum course for middle and secondary science education majors at a large research-intensive university in the southeastern United States. Excluding myself, participants taught or interned in science classrooms for one of the nation’s largest school districts. This district employs more than 15,000 teachers, who serve over 200,000 students annually, and like many other Title I districts, is struggling to recruit and retain qualified teachers in STEM disciplines.

Population and Sample

This study occurred within the context of an NSF funded, Robert Noyce Scholarship Program, at a large research focused university in the Southeastern United States. This program aims to recruit, prepare, and support, highly qualified STEM majors, as they complete their Master of Arts in Teaching (MAT), and move on to teach in “high-need” schools and districts.

Participant Selection

Participants in this study were chosen based on them being Noyce scholarship recipients, who were registered for the middle, and secondary science field practicum course in our university’s college of education during the Fall 2018 semester.
Table 1 provides a generalized description of each scholar along with the pseudonyms I assigned them for this study.

Table 1: Generalized description of scholars participating in the 2018 Noyce CoP.

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Scholar Backgrounds</th>
</tr>
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<tbody>
<tr>
<td>James</td>
<td>44 year-old husband/father, white, American, heterosexual male from a lower middle class background on the suburban West coast, as well as a father/husband and a contrarian. Retired military who considers his age and upbringing as most core to his identity. (BS Physics/MS IT)</td>
</tr>
<tr>
<td>Paula</td>
<td>21-year-old straight, white, female, of German-European ancestry from Southeast Texas, as well as a Republican, Roman Catholic from an upper-class background. She considers her Texas upbringing and SES as most core to her identity. (STAMP program BS Marine Science)</td>
</tr>
<tr>
<td>Jack</td>
<td>21-year-old white, middle class, homosexual, cis male (he, him, his) from a suburban background. Considers his sexual orientation and political affiliation (Democrat) as most core to his identity. (STAMP program BS in Chemistry &amp; BA World Language and Cultures-Spanish)</td>
</tr>
<tr>
<td>Marie</td>
<td>27-year-old white, middle class, European American, heterosexual female. Considers her middle class suburban upbringing as most influential to her core identity. Began teaching Earth/space and Environmental Science at end of CoP. (BA English Literature &amp; BS Geology)</td>
</tr>
<tr>
<td>Steve</td>
<td>23-year-old straight, male, from a middle-lower class, suburban background. He credits his age and upbringing as most influencing his identity. He is very outgoing, interested in athletics, and intends to teach physics at the secondary level. (BS Physics)</td>
</tr>
</tbody>
</table>
Maya

25-year-old black, pansexual, female, of African-American, Irish, and German descent. She credits her international upbringing to her Air force Father, and was the only member of the CoP to consider race as most influential to her core identity. (BS Environmental Science)

50-year-old husband/father, white, Irish, hetero, male. A former marine who grew up in a middle class southern, suburban, upbringing. Considers his age and upbringing as most influencing his identity. Former physical therapist assistant who will teach HS physics. (BA Physics)

Jennifer

A single mother who is currently teaching middle school science in a high-need school. She was spread thin and chewed gum to stay awake while driving to her evening classes. Did not complete the questionnaire or surveys.

When viewed collectively, I argue participants in the 2018 Noyce CoP can be considered diverse according to several measures. For example, although Maya was the only person to amongst the scholars to claim representation in a minority group, the CoP was home to an assortment of personal and professional experiences. At the personal level, CoP members: represented multiple genders, and sexual orientations; ranged in age from early adult, to middle age; grew up in multiple “versions” of the suburban context, along with one who described her formative years as occurring in an international setting; ranged in educational attainment from pursuing their first undergraduate degree to working towards a second masters; and
lived the lives of the “typical” undergraduates, slightly older students looking to supplement bachelors with a masters degree, and still older students who juggled academic responsibilities while raising children and heading households. Additionally, as you will see when I paint my portraits in chapter 4, the CoP included a continuum of personalities encompassing the reserved, the outspoken, and everything in between. Professionally, the scholars incorporated their prior experiences in the medical field, educational settings, and military service with them into the CoP. This was evident in not only the anecdotes they shared from their time in each of these areas, but also in aspects of their identity they revealed throughout the semester. Moreover, their academic interests not only included the life, physical, chemical, and environmental sciences, but also English literature, and Information technologies (IT).

The diversity of the 2018 Noyce CoP contributed to array of personalities, perspectives, and understandings that bore out in our interactions. This is in line with the intent of this study, which seeks to better prepare these new teachers to navigate each of these factors as they teach science in high-need middle and secondary classrooms. Moreover, in chapter 4 I use elements of portraiture to shed light on the personalities and perspectives that shaped the understanding we achieved during
the CoP, and also provide more of a sense of “who” each of these individual scholars “are”.

**Ethical Considerations**

To ensure this research was conducted in an ethical manner, that considered the rights of all participants, I took several measures. First, I completed the Collaborative Institutional Training Initiative Training (CITI) at my university, and am certified to conduct Human Subjects Research (HSR) until 06/20/2019. You can find my completion record in Appendix A. I also explained, read, and fielded questions regarding the informed consent forms I distributed to, and were signed, by CoP members (Appendix B). Participants were allowed to opt out if they chose, but fortunately none did. Finally, in order to respect the rights, and privacy of all involved (Fink, 2003), I employed several anonymity measures.

I made use of pseudonyms for all participants, and, the university where this research took place, likewise remains anonymous. Additionally, participants’ names were removed from any documents when necessary, and these documents have been stored in a confidential location. Similarly, the cloud in which all surveys, IRB related documents, audio recordings, and any other identifying data, is secure and void of any identifying information.
Data Collection

Qualitative data collected during the practicum consisted of transcripts of our discussions; my planning notes, field notes and debriefings, entered in my journal before, during and after our CoP meetings; as well as a questionnaire focusing on aspects of social identity, which was completed by all the participants prior to our first meeting (Appendix C). I also sought the council of a critical friend, distributed three pre- and post-instruments to provide additional insight regarding participants’ beliefs about aspects of their identities, and diversity. To be specific, I used adaptations of an identity card sort (Moore, 2012; 2016), the Identify a Scientist (IAS) tool (Walls, 2012), as well as, the Miami University Diversity Awareness Scale (MUDAS) (Mosley-Howard, Witte, and Wang, 2011). I expand on each in the next section (Instruments).

Instruments

Before I discuss the origins, focus, and reasons for using my “Identity Indicators” questionnaire, identity card sort, IAS tool, and MUDAS, I want to note how all were adapted for use in this study. In particular, to make their distribution, completion, and analysis more convenient for all involved, I created digital versions of each that could be completed via
computer or mobile devices using the Qualtrics Survey Platform (https://www.qualtrics.com).

**Identity card sort.** When exploring the positional identities of preservice teachers of color (PTOC), Moore (2012; 2016) has PTOCs take part in a card sort activity where they, rank the importance of various “social markers” (i.e., race, ethnicity, SES, gender, etc.) (Moore, 2016, p. 49) to the construction of their positional identity. Essentially, participants place cards in a line on a table in front of them, with the social marker they consider most proximal to their identity (for example gender) closest to them. Then they make decisions regarding the others, all the way to their least proximal marker sitting at the back of the line. Thinking back to my discussion of beliefs, you may recall those surrounding our identities are among the closest held, and staunchly defended. I like Moore’s approach, because it not only provided an opportunity to view these new teachers’ beliefs in a formative sense (pre/post), but also served as an exercise in self-reflection for everybody involved.

In a broader sense, the former of these two benefits has relevance for the development of innovative approaches to assessing instructional innovations in science teacher preparation. Meanwhile, the latter requires the type self-
reflection, and sharing that was so central to participation in the CoP. I view the “card sort” as an opportunity to gain understanding as to whether the CoP had an impact on these new teachers’ beliefs, while simultaneously serving as our initial examination of beliefs within the context of the CoP. I realize this instrument is not without its limitations, as some its results are likely to be predictable. For example, it is not likely that individuals from dominant backgrounds would consider race as being most proximal to their identity. However, I argue the merits of this exercise lie comparing how the identity construction of these individuals compares to those from non-dominant backgrounds. This is true of not only the scholars, but of my own identity construction as well.

Placing the term card sort in quotations above was intentional. This is because creating a digital version of this activity took cards, tables, markers, etc., out of the equation. Instead, I used an imaginary card sorting scenario (Appendix, D) where CoP members were asked to rank 12 social markers from 1 (most influential) to 12 (least influential), in explaining “who they are”. Ultimately, I was not able to determine any pre/post changes in the scholars pre and post card sorts. However, they proved quite useful in helping paint a picture of the scholars involved the CoP.
**Identify a scientist activity.** The visual and verbal “images” of what a “scientist” is and looks like, have changed over the course of history. A few centuries ago, the caricaturists, artists, writers, and story tellers of the seventeen and eighteen hundreds, typed scientists as many things (e.g., madmen, professors, eccentrics, dilettantes, and even magicians), who were often at odds with authoritarian structures (Chambers, 1983). As industrial revolutions around the globe afforded science increased status, and social authority, its organizational structure was transformed. Along with this, came the cultivation of the singular sterile image of a science and its professionals, which endures to this day (Chambers, 1983). This was true of my experience in the secondary classroom; where my mostly black student population, often made associations amongst lab coats, old people, white people, smart people, explosions, and the like, with science and scientists. At least this was the case at the beginning of the year, before I had the chance to challenge them on such beliefs. I have also seen the prevalence of these stereotypical views during my time in our university’s TEP program. For example, recently I attended a National Science Teachers Association (NSTA) club meeting. We were planning for an upcoming event, and one of the officers suggested we dress up in “crazy wigs and lab coats” as we engaged with children at an event. I have also seen this
phenomenon playout during my time as an instructor for elementary science methods courses, where students completed the Draw-A-Scientist test (DAST) (Chambers, 1983). In most cases these undergraduate education majors produced images that seemed to reinforce the perception of my high school students (i.e., the pictures contained a lot of lab coats, voluminous hair, explosions, glass wear, glasses, men, etc.). To me this shows just how pervasive such ideas have become in our society. A stance supported when you consider the students I taught in secondary schools (minority, low SES, low achievement, etc.), could not be more different than many students in my methods courses (white, middle class, post-secondary education, etc.), yet their views of science and scientists are so similar.

Walls (2012) modified the DAST for research examining the nature of science (NOS) views of African American third graders. However, instead of drawing pictures, these youngsters were tasked with selecting “scientists”, from a series of photo line ups on a computer screen. The people in the photos were from a variety of genders, races, ages, etc., and the activity was presented as a game. Walls (2012) uses the results of what he calls the Identify-A-Scientist (IAS) activity alongside interviews to gain insights into how these children view science, scientists, and themselves. While similar in many respects, my use of the IAS in this study differs from Walls
(2012) on two fronts. First, I will be using my IAS results to gain further insights into conversations with adults (as opposed to interviews with children). Additionally, I used an adaptation of the IAS (Appendix E) used by Chapman and Feldman (2017).

Beyond simply choosing a picture from an array, this adaptation of the IAS required participants also answer the following three questions: (1) On a scale of 1 to 5, how confident are you of your selection, (2) why did you choose that particular individual, and (3) what do you believe is the ethnicity of the individual you chose? (Chapman & Feldman, 2017, p. 18). I thought these additions to the IAS will benefit this current study in two ways: 1) much like the card sort in the previous section, it required CoP members to challenge their reasoning, and beliefs as they complete the activity, and 2) like both Walls (2012) and Chapman and Feldman (2017), I felt I could use pre and post IAS results to help inform my interpretations of the CoP experience. However, analysis of IAS results revealed the interns did not find it very engaging, or useful, and led to many cases halfhearted responses that I ultimately determined were of little value to understanding these new teachers’ beliefs, or what occurred during the Noyce CoP.
Miami university diversity awareness scale. The pilot study that informed this research, taught me many lessons. Perhaps, none more important than I need to improve as a survey writer. I came to this realization during my first stint conducting CAR research with summer interns. I developed a survey which I tied to each of my four research questions. In essence, I used my four research questions to categorize my 36 items, and made sure the language and intent of my survey were closely aligned with them. I hoped my survey might tell me something about how interns perceived the influence of various “social markers” on STEM teaching and learning, and serve as an opportunity to collect data for the Noyce program. Alas, as they say, the road to hell is paved with good intentions. A more appropriate aphorism might be, details create the big picture. This is because in my attempt to understand how my interns’ viewed aspects of identity in relation to teaching and learning, I created and used a survey that failed to include gender or age in its long list of items.

This was an important learning moment for me, because it showed me that despite my best efforts, I too can fail to recognize my privilege. In this case, my male privilege led me to overlook the importance of gender, and the realities that age bring to STEM teaching and learning. Further cementing this lesson was the fact that, each became prominent emergent themes
in our CoP conversations that summer. For this study I left such things to more qualified people, which is what led to me selecting the MUDAS survey (Appendix F). My adaptation of the MUDAS like the original, was 35 items long, and intended to “measure diversity-related views of college students” (Mosley-Howard et al., 2011, p. 65). However, I utilized a four-point Likert-scale answering format, which excluded the “neutral” option present in the original. This is because I wanted to encourage CoP members to make tough decisions, regarding general cultural knowledge, intercultural interactions, and social justice issues (Mosley-Howard et al., 2011). To give you a better idea of what the MUDAS assesses, consider their definition of the “diversity awareness” this scale is meant to measure, “a person’s acknowledgment of culture and social context variables like class, race, ethnicity, gender, sexual orientation, physical ability, and religion…” (Mosley-Howard et al., 2011, p. 66). As I have discussed at length in this dissertation, “socially constructed variables” (p. 66) are important considerations is the classroom. Therefore, insight into CoP members’ familiarity with these factors, or how participation in the CoP had an impact on their recognition of them, was worth pursuing. Additionally, because the MUDAS has been reviewed and validated by “an independent expert review panel and given a “good-to-excellent rating” (Mosley-Howard,
2011, p. 69) using this survey prevented any survey writing errors from having an impact on the validity of this proposed study’s findings.

Validity and Reliability

Coming to a consensus definition of “validity” in qualitative research is not likely to happen anytime soon (Onwuegbuzie, 2003; Creswell & Miller, 2000). This is because the flexibility of qualitative inquiry allows for innumerable permutations of researchers, participants, roles, identities, beliefs, stories, methods, philosophies, relationships. And as is often the case with other aspects of research involving people and their social concerns, a “one size fits all” approach for establishing the validity of boundless research scenarios would appear to be an exercise in futility (Onwuegbuzie & Leech, 2006).

I have provided several practical examples of how I approached my study’s validity at several different points in this paper. Now I will take a little time to discuss my overall conceptualization and approach to addressing it throughout this research. I find the following general definition of validity useful in helping explain how I accounted for it in this study: “the quality of being well-grounded, sound, or correct” (merriam-webster.com). The idea of being “correct” did not
really apply to my research design or intent. This is because my research question was concerned with understanding our experience, not proving, or disproving a theoretical position. However, I put great effort into ensuring my research design was well-grounded (practically and theoretically), which translated into a study that is systematic, replicable (in some respects), and useful (i.e., sound). To better explain how I guarded against threats to this study’s validity, I rely on a model of validity proposed by Onwuegbuzie (2003).

This model is founded on the assumptions that there are internal and external threats to validity, and they threaten the research process at three stages: 1) research design and data collection; 2) data analysis; and 3) data interpretation (Onwuegbuzie, 2003). Onwuegbuzie’s model is useful for explaining how I ensured my study maintained its internal and external credibility (Onwuegbuzie & Leech, 2007) amongst such threats.

**Internal and External Replication**

Onwuegbuzie (2000) describes an analogous relationship between threats to internal and external validity, and threats to internal replication and external replication (p. 13). Where internal replication pertains to the “extent to which the results of a study would re-occur if the study was replicated
using exactly the same sample, setting, context, and time” (Onwuegbuzie, 2000, p. 13); and external replication is concerned with “the degree that the findings of a study would replicate across different populations of persons, settings, contexts, and times” (Onwuegbuzie, 2000, p. 17). However, given the non-linear nature of qualitative research it is usually not possible to entirely duplicate or recreate the internal and external conditions surrounding a given study. In addition, while it is a concern for qualitative research in general, I would argue perhaps more so in CAR; where the three stages of vulnerability (e.g., data collection/design, data analysis, and data interpretation) are often subject to change. I make this assertion regarding CAR based on two things, its roots in the improvement of practice, and my past research experience.

This research is concerned with the improvement of our professional practice, which inherently involves change. An example would be my arrival at this current work; which is in many ways the implementation of potential improvements identified during the pilot study. In particular, I have altered my approach to data collection, analysis, and interpretation based on what learned from that experience. Despite any changes I have, and might make to my data collection, analysis, and interpretation, there is certainly a lot of carry-over from my pilot study. This cross-study application of methods and
learning experiences seems to subscribe to the notion of external replication (Onwuegbuzie, 2000). This is not to say I expect the findings of my previous work (Bradley & Feldman, 2017) to be duplicated here. However, what I do believe can be replicated, is, the deep understanding that I gained by implementing these methods in a practical setting.

Internal replication was in many ways a moot point in this study. I base this on its reliance on recreating exact “settings, contexts, and time” (Onwuegbuzie, 2000, p. 13). I will never be able to return to, or recreate any of my past, present or future CoP experiences. Moreover, even if I were able to reconvene the CoP at a later date to replicate my methods, I would not be able to separate us from our past experiences (altering both setting and context). However, for the sake of internal validity in this study, what I worked to replicate was an honest, and open approach to collecting, analyzing, and interpreting my data that makes my decisions, intent, and purpose known. By being mindful and open about the challenges to validity in a study, I worked towards it as I engaged with my data. Perhaps then validity in this study should be viewed in terms of degree, rather than as an absolute goal or achievement (Gronlund, 1981). I like this approach, and I think “validity” in this study is best described as an attempt to “minimize
invalidity and maximize validity” (Cohen, Manion & Morrison, 2007, p. 133).

The same can be said of how I addressed reliability in this research, which occurred alongside an inability to compare identical situations. Reliability has been described in terms of the dependability, consistency, and replicability of research results (Brown & Coombe, 2015). Golafshani (2003) equates reliability to stability, and suggests like validity and triangulation, it is a concept that needs to be reconfigured when conducting qualitative research. I established all three in this study by remaining diligent, ethical, and transparent.

Data Analysis

Given their prominence in my research design, the analysis of our conversations and their resulting transcripts was of the utmost importance to this study. An imperative of this task was becoming intimately reacquainted with our conversations in a manner, that allowed me to identify themes, paint a portrait of my participants, and relate their experiences to their development within the CoP. To accomplish this, I fell back on my hobby of consuming information in audio format. On most days you will find me listening to some sort of audio programing (e.g., books, research papers, podcasts, news, etc.) as I complete mundane everyday tasks (e.g., driving, walking dogs,
workouts, gardening, etc.). For me listening to a captivating interview, is far more compelling and informative than reading a transcript, or summary. To borrow from Dixson (2005), I think it allows for the participants “souls” to come across to the listener. Thus, providing a glimpse into what the person who is sharing is like. I will even argue it is superior to visual media in some respects as well. This is because truly listening, requires an attention, which is often absent as we passively consume visual media. This conversation in relevant to this research because as part of my analysis I listened to our CoP conversations repeatedly, over a period of weeks as I went about my everyday life. Moreover, salient portions of these conversations became cemented in my thoughts, like favorite parts of a book or podcast. Therefore, making them readily available as I interpreted what took place in the Noyce CoP.

Much of the experience I refer to above, has come during my time facilitating CAR with undergraduate STEM majors, as part of a summer education research internship (Bradley & Feldman, 2016; 2017). Much like in this current study, ENP and our conversations were at the center of my efforts to interpret our collective experiences in the internship program. Following the first summer, as I was preparing to submit our research for a conference proposal, the thought occurred to me to listen to our conversations as if they were just another in a long line of my
audio consumption. With that, I listened to the internship’s first meeting during my commute to campus. I listened to it several more times that day, and found I had come to memorize and really interrogate, certain interactions captured in the recordings. Additionally, in my own mind I began to dissect the exchanges that took place as the interns and I collaborated to improve our teaching practice. What ended up happening was, the recordings of our conversations unfolded like the pages of a long audio book, complete with “favorite parts”, and “lessons” learned. As revelations, ideas, and themes began to emerge, and I considered them alongside survey responses. This allowed me to engage in this data in a way that found, accessible, productive, and enjoyable. Accordingly, I used a similar approach in this study as I made sense of our conversations, student writings, as well as surveys and questionnaires. Accordingly, this is the approach I used to construct my interpretations of our individual and collective experiences within the 2018 Noyce CoP.

My analysis included the use of qualitative research techniques, concerned with questions of meaning and understanding (Starks & Trinidad, 2007) and how they were answered as the CoP collaborated throughout the semester. Denzin and Lincoln (2008) describe qualitative research as “a set of interpretive, material practices that make the world visible” (p. 4), and explain this process depends on converting our
surroundings (i.e., the natural world) into “a series of representations including field notes, interviews, conversations, photographs, recordings, and memos to the self” (p. 4). Information they suggest allows qualitative researchers to study things, events, and interactions in the setting where they occur, and attempt to interpret phenomena according to the meanings people apply to them (Denzin & Lincoln, 2008).

Likewise, meaning in this encompassed the knowledge, concepts, and actions generated as a result of the COP’s individual, interpersonal, and collective growth.

Beyond merely addressing my research question, this study contributed to the understanding of the origins, and nature of our socially constructed knowledge; how it was contextualized within our individual, and collective research experiences; while remaining process-based, in its use of CAR. Vital to this process was the continuous comparison of data, emphasizing emerging categories, through the use of an incremental approach (Rowlands, 2005). This included the use of various “codes” and subcodes to identify emerging themes, patterns, or explanations (Starks & Trinidad, 2007).

True to the intent of research design, the coding scheme I use to analyze my data was both systematic and creative (Stake, 2013). To comply with the former, I employed an a priori set of
codes seeking to address my first research question focusing the three areas of beliefs I have discussed throughout this proposal, and another concerned with the science teacher preparation. The three codes I used to account for my research question, were identity, home-lifes, and sociocultural-interactions, along with a fourth, science teacher preparation. My coding scheme was also creative and made allowances for additional open, thematic, and selective sub-codes that helped develop explanatory concepts, establish relationships, and explain what took place during CoP (Chamaz, 2006).

My past CoP work (Bradley and Feldman, 2016; 2017) has shown me that certain aspects of CoP members’ social identities can dominate perspectives, and even become emergent themes. Mason (2002) discusses how remaining flexible and contextual when using interpretive qualitative research methods, can provide understanding of complex social interactions. I agree and can say this has been my experience with CoP work thus far. For example, during my initial foray into this type of research, themes I once thought would be central to my understanding, faded to the background as my co-participants opened my eyes to perspectives I had previously misunderstood, missed, and some cases dis-missed. I quickly learned the benefits of remaining flexible. What is more, I also came to see how practical and productive CoP collaborations can be, when the context in which
they occur is considered when telling the story. I used this experience to guide me as I made sense of what occurred during our CoP, and developed my understanding of what took place. Below, I explain how this was done in this study.

Starks & Trinidad (2007) suggest the repetitive, comparative processes associate with qualitative research requires researchers to constantly negotiate data, concepts, and conceptualizations. With this in mind, I made an effort to remain open to new ideas and directions, as I sifted through my data, connected with my themes, and developed “my version” of what took place in the CoP. This process allowed me to establish new meaning, and come to understand emergent knowledge once obscured during our initial interactions (Starks & Trinidad, 2007). To begin the analytical process, I started off by listening our conversations with my a priori codes in mind. Soon, I found a number of sub-codes that were at times far more interesting than my a priori. It not only opened my eyes to alternate points of view, but also impressed upon me the ability of purposeful conversation to construct new narratives, and knowledge.

Considering the uniqueness of my methodology, and the amount of information I have had to present above to justify its use, I close this section by plainly describing how I analyzed
my data in this study. As discussed, I listened to our conversations extensively, transcribed them, and coded them according to my three a priori codes (e.g., identity, home-life, sociocultural-interactions). At the same time, I was mindful and open to additional themes, that seemed to be a consistent or powerful presence in our interactions, and classified these instances as sub-codes, beneath each of my three a priori codes. I then considered their value in helping me answer my research question, and paint a picture of the 2018 Noyce CoP. Those I considered valuable were applied an additional code of “meaningful exchanges”, which served as the foundation on which I built my themes. I used this information along with the student identity questionnaires, collaboration with a critical friend, student writings and surveys, to make sense of what occurred in the 2018 Noyce CoP.

Subjectivity

Throughout this dissertation I have made use of anecdotes, life experiences, and personal metaphors, to explain aspects of this research. This is because, these are the tools we often rely on during discussions as we engage with others, construct narratives, and “make points”. Regardless of setting, these behaviors reveal aspects of ourselves, that help us construct meaning with others. I think allowing this sort of access to my
personality, interests, and subjectivity, provides insight into the tone and tenor of our CoP conversations. Moreover, my use of portraiture requires elements of myself come through as I develop and present my themes. Therefore, rather than hiding my subjectivity, and striving for unattainable “objectivity”; I instead make my subjectivity available to the reader as they interpret my interpretations. This approach to subjectivity is in line with that of Peshkin (1998) who recommends qualitative researchers “systematically seek out their subjectivity” (p. 17) throughout the research process. Forty years ago, Gronlund (1981) urged education researchers to be more subjective. I think this still holds true, because as nice as it is to know the truth, sometimes it is more important to understand how we arrived there. And how can we truly gain understanding, if we know nothing about the actors involved? Finally, because CAR relies so heavily on self-reflection and improvement, I am tied to a methodology that necessitates participants make subjective judgments about themselves and their practice. Being a privileged participant, I was not excluded from these processes, and was mindful of being transparent and acknowledging my subjectivity as I worked to complete this study.
CHAPTER 4: RESULTS

This study reports on conversations, writings, and surveys created during the 2018 Noyce Community of Practice. Its research design was implemented to answer the following research question:

In what ways will the participation in the Noyce CoP allow pre-service teachers to express, explore, and develop their beliefs about the influence of identity, home-life, and sociocultural-interactions in science teaching and learning?

Throughout it sought to examine the beliefs (n=7) preservice, and (n=1) first year, science teachers expressed, explored, and developed about the influence of identity, home-life, and sociocultural-interactions in science teaching and learning. This was done as they completed their secondary science field practicum course, and otherwise collaborated within the CoP. Below, I use observations, field notes, demographic questionnaires (Appendix C), the Identity Card Sort (Appendix D), MUDAS surveys (Appendix F), conversation transcripts, and end of course reflection papers, to familiarize the reader with these new teachers' backgrounds, personalities, ways of
constructing knowledge, and perceptions of their practicum experience. I combined this information with that derived from face-to-face meetings and online discussions to present themes painting a picture of the beliefs these new teachers expressed, explored, and developed regarding the importance of identity, home-life, socio-cultural interactions to science teaching and learning. Later in chapter 5 I employ these themes to construct my interpretations of what occurred during the 2018 Noyce CoP.

The source of my conversation transcripts were three face-to-face class sessions I led while teaching the practicum course, and facilitating the CoP. These sessions followed a similar pattern where prior to our meeting: 1) I would post an article on our course’s online discussion board, 2) Students would read the article, and find one of their choosing they thought was relevant to the week’s literature; 3) They would in turn post a reply to the discussion board explaining the relevance of their article; and 4) I would review their responses to identify some possible talking points, and strategies for our upcoming class. Once in the classroom, after some usual administrative questions and “catching up”, I used the same general structure for each of our CoP meetings: 1) I would briefly highlight the main points of the article, clarify any misconceptions, and gauge student receptiveness to it; 2) Students would engage in group work where they further probe
ideas present in the articles (both theirs and mine); and 3) students would relate their understandings, and realizations to the rest of the group. Throughout I continuously recorded individual and group conversations, which I have come to learn were fruitful ground for these new teachers and me to generate valuable understanding.

I am convinced the allowance for conversational freedom, and the concurrent nature in which they often occurred, promoted a relaxed atmosphere, where everyone felt welcomed, valued, and safe to speak their mind. A stance that was supported as these qualities revealed themselves in the conversations I share later in this chapter. These recorded exchanges were conversational in every sense of the word. That is to say they were: informal, likely to wander “off topic”, prone to interruption, and often spaces where multiple factions simultaneously agreed with each other, and opposed the views of the other group. As the person tasked with transcribing all this, there were many times where it seemed every member of the CoP was arguing their point with someone else! In addition, to the difficulty of trying to determine “who said what, and to whom”, I also had to decide who I would choose for my “themes”. This posed two main problems, first, each member of the CoP was dedicated, made valuable contributions, and deserved to have their voice heard by other new teachers, instructors, and decision makers at both the K-12
and university levels. The second issue was a result of the unstructured, group nature of our conversations. Because so many of the conversations involved several, if not all the CoP members, excluding stories for the sake of reaching a manageable number of themes would not only do them a disservice, but also limit my use of a good amount of conversational data. Therefore, I chose to position the 2018 Noyce CoP as a quintain, whose story will be told using three themes.

One big lesson I have learned during the dissertation process that identifying the object, subject, defining the boundaries, and ultimately presenting themes can be confusing at times. To clarify the three themes I used to explain what occurred during the 2018 Noyce CoP are: 1) new teacher beliefs about identity and science teaching and learning; 2) new teacher beliefs about home-life and science teaching and learning; and 3) new teacher beliefs about socio-cultural interactions and science teaching and learning. In addition, while there is certainly some overlap and carryover, much of the information needed to construct my three themes for the most part, coincided with knowledge created during each of our face-to-face meetings, and their associated discussion boards. To clarify further, CoP meeting one tended to revolve around identity, CoP meeting 2 and 3 (an online module) focused on factors outside of the classroom influencing science teaching and learning (i.e., home-life), and
our final CoP meeting (4) was focused on sociocultural-interactions both within and outside the classroom. Meanwhile, evidence for “what occurred during the CoP”, naturally emerged throughout the semester. To be honest, I entirely overlooked the potential of purposefully aligning our class sessions with my a priori codes, and will be sure to do so if I conduct any studies like this in the future. Instead, this pattern became apparent during preliminary data analysis, along with the “New Teacher Support” code. Subsequent analysis and reflection revealed several sub codes for each of my four main codes. Those seeking a full account of my coding scheme are referred to my code book (Appendix G).

Issues of organization, and analysis aside, the remainder of this chapter explains how we interacted and constructed new knowledge in each of our CoP meetings, using our words, and writings. Logistically, I feel it would take hundreds of pages to relay the entirety of thoughts, writings, and realizations contributed during the CoP. Therefore, I will construct my narrative of what occurred in the CoP using conversations, and writing excerpts coded as “meaningful exchanges”. Each member of the CoP at one time or another was part of these meaningful exchanges, thus ensuring everybody’s story is told throughout my narrative.
Having brought you “inside” our CoP, later in chapter five, I tie it all together by: summarizing the themes of these new teacher beliefs about identity, home-life, sociocultural-interactions; explain what occurred during the 2018 Noyce CoP; discuss the implications for this work at curriculum, instructional, and individual levels; and conclude with a metaphor for how I see science teaching and learning in the classroom. But first, allow me to introduce you to the scholars who made up the 2018 Noyce CoP.

Scholar Backgrounds

James’ Background

James is a 44-year-old husband and father, who described himself as a white, American, heterosexual, male. He characterized his upbringing as “lower middle class, and having taken place in the “suburban West Coast”. James claimed no religious, or political affiliation and found the Noyce program when he returned to school following a career in the United States Airforce. He holds a Bachelor of Science (B.S.) in Physics, which is the content area he is now teaching at the secondary level, and has also earned master’s degrees in management information systems, and IT Management.

James is amicable, insightful, and has no trouble falling back on self-deprecating humor to keep those around him
laughing, or to help defend positions that often differed with those of the other CoP members. The fact that his views are sometimes atypical is not lost on him, as was evident by him sharing “Oh yeah, I’ll admit it, I’m a contrarian.” His thoughts and writings were usually wrapped in a package of biting, contemplative, critiques and opinions regarding educational reform, education research, and teaching practices. However, what struck me about James in contrast to other “contrarians” I have encountered is, he was not simply providing “alternative facts” for the sake of a good argument itself, rather, he came prepared to defend his points and would do so vehemently, even when every single one of us disagreed with him. It is also worth noting that even though James, myself, and other CoP members would decisively disagree on issues, all our interactions remained positive, productive, and friendly. This is evident in the following exchange where Steve (Introduced below) interrupted James mid-sentence: “I love listening to James, because I disagree with like everything he says!” (Laughter). James defending himself replied, “I’m giving you another perspective!”, to which Steve counters, “I get that but every time you talk, I’m like, what the hell is this guy talking about!” (Laughter). He continued, “Even though I usually feel the complete opposite…” (speaking slowly and deliberately he concedes), you have… ‘points’.” (Laughter).
A brief conversation I had with James during group work in our class really, opened my eyes to why he tends to view the world through a lens of critique, or perhaps even skepticism. We were chatting and joking about how he “eviscerated” yet another author, and research article I selected for the journal club.

Me: So as much as I bust your chops I love your takes though.

James: Oh, I, I, learned because I was in the military a long time, Right? If you don't have the knockdown drag out, people fucking die.

Me: Okay

James: Right. So that's how I look at it.

Me: (Rephrasing to make sense) So, if you don't have the knock down drag out people die. So, like hit all the angles and hit them hard?

James: (Agreeing) Because if you, if you believe something and then you and you don't do something about it and then are you going to go explain to why you didn't know Johnny's mom, why he died? Because you didn't say something.

Me: Okay. All right. Wow, I never considered that.
James: Yeah. So, so, uh, that, that was my life for so damn long. I can't, I can't not, be that person.

I found this exchange valuable for two reasons, first it truly served as a personal point of self-reflection regarding my own tendency to dismiss strongly worded critiques, and seemingly contrarian positions as fodder for the ego, or a natural inclination towards conflict. Second, it revealed the penetrating way James’ professional military experience has become a foundational aspect of his identity, and other ways he makes sense of the world around him.

The results of the Identity Card Sort and MUDAS surveys also revealed information regarding factors other than James’ military background that help him shape his identity, as well as a window into his beliefs regarding culture and ethnicity. During the card sort exercise James identified age, and growing up on the West Coast of the United States as belief systems most core to his identity. This information coupled with his military views described above, provide insight into how James positions himself in the world. Results of MUDAS survey indicate James feels he is well-aware of his culture, and ethnicity, and is quite comfortable talking about either. Although he does not see promoting diversity as an essential part of his role as a student, he does strongly support training to assist (K-12)
teachers in working with diverse students. Moreover, James does not believe he has been afforded any privilege, relative to his race, class, gender, sexual orientation, etc. He would welcome the chance to study abroad, and/or work in an urban community, but would not feel comfortable working with individuals with diverse learning needs. This preference for homogeneity carries over to other areas of James’ beliefs as he feels American public schools should concentrate more on a common “American Identity” as opposed to specific ethnicities. Likewise, he does not think a wide variety of religious diversity is good for our country either.

In his reflection paper James described the practicum as “helpful in learning, with much more certainty, which of my training was useful, and which was worthless.” Based on his experience in his placement schools, he found his English for Speakers of Other Languages (ESOL) course most useful. He lamented the lack of support for these students, and related it back to his preparation experience in the following, “For me, this means that with regard to working with students living in poverty, my formal training at USF was probably inadequate to prepare me.” While I am not in the position to challenge such a personal assertion, I do wonder how much of his discomfort is merely unavoidable due to inexperience. A possibility present when James shared the following: “The classrooms in Hillsborough
County are nothing like what I had expected them to be. I would have never guessed that students who can’t speak English would be placed in a classroom with a teacher who didn’t speak their native language.” I recall being struck by the fact that he was unaware such arrangements are common in today’s classrooms, and this has prompted me to be more reflective regarding my assumptions about preservice teachers’ prior classroom knowledge. James concluded by stating the practicum course “armed” him with understanding, that he expects will better prepare him for the teaching profession.

I surmised from my interactions with the CoP that James was often a willing contributor to our conversations. What engagement with my data has taught me is, James’ views, and opinions were the catalyst for conversations that were amongst the most valuable to come out of the entire 2018 Noyce CoP. This along with a willingness to alter his views, consider new perspectives and rely on reasoning made James a vital member of our group. He was in many ways, the straw that stirred the drink.

Paula’s Background

Paula is a 21-year-old native of “Southeast, Texas”, who considers herself a straight, white female of “German, European” descent, who described the SES characterizing her formative
years as “upper”. She is a Roman Catholic, and claims affiliation with the Republican political party. She is currently progressing through the Noyce MAT program, completing her B.S. in Marine Biology, and will be teaching biology at the secondary level.

Paula’s initial shyness gives way to a smile and demeanor that are kind, welcoming, and make her easy to like. In fact, her personality often made her a willing and capable “peace keeper” in the group. She had no problem jumping into a conversation and lending an air of rationality and compromise, both of which got lost in the shuffle sometimes in our CoP, especially with some of the “boys being boys.” I recall an innocuous, funny, “argument” (a common occurrence amongst all the CoP members. Steve (I promise I will get to him) and I were going back and forth about nothing important. What happened was, I figured I would give away a Dunkin Donuts gift card as a prize for a “poster contest” we were having that evening in class. Steve started giving me a bit of a hard time because “The problem is, I don’t like coffee.” As silly as this may sound, for a moment, I genuinely felt bad because the incentive I offered would not serve to motivate this student as much as the others. On top of that, Steve would earn points against me in this silly game of banter we all played during our time together. It only lasted a second though because out of nowhere
Paula saved me by (not quite) yelling across the table “They have tea! And Pastries!” Steve admitted he liked chai tea; problem solved. Points to Paula.

During more focused discussions she pushed others to further explain their articles, or jumped in to finish a make a point in order to extend conversations. Much like this example here where she added to a point I was making regarding how our core beliefs can make us resistant to growth and change:

You have to challenge (new teachers’ core belief systems), like you have to confront them with their beliefs. Otherwise, like they’re just not going to realize they have the belief. You have to like, kind of hit them with it. Even still, it may not change, but the first step is (recognition).

Paula seems to be engaging in this practice when it comes to herself and this comes through in her card sort and diversity survey results. For example, she believes her formative setting, and SES are the belief systems she considers most proximal to the development of her identity. In addition, she feels she has a strong recognition of the privileges her upbringing has afforded her. Interestingly, Paula indicates she does not have a complete awareness of her own culture and ethnicity, but is eager to learn about, and interact with people from diverse
backgrounds. In the classroom, Paula feels teachers should be trained to work with students that have diverse needs, and very much welcomes the opportunity to work with such students. She appreciates people contributing cultural diversity to relationships and situations. Finally, Paula feels strongly that a commitment to social justice, requires one to change themselves.

When reflecting on time in the practicum course Paula described her experience this way:

I am so grateful for the past semester and the various field experiences I got to participate in while at my middle and high school placements. My two teachers served as mentors for me and gave me inspiration for both what I want to do and what I want to avoid in my future. The group discussions made me aware of current issues in the science classroom and how it is our job as future teachers to combat these problems and truly make our students the focus of our classroom. I look forward to bringing different ideas and techniques I learned through my practicum experience into my own classroom one day.

She seems to engage with her classroom experiences on a personal level, and describes one of her mentors as “a great example and role model for who I want to be as a teacher.” She appreciated
the respect, freedom, and opportunities to learn from her mistakes “before I have a classroom of my own.” Paula’s favorite experiences were when she got to “lead the class by myself and teach the lesson of the day.” At the same time, she was mindful of the what was occurring when she was otherwise involved in lessons. She raised solid questions as to whether a lesson was a “student-driven and inquiry-based lab”, as it was presented to her, and described how a lack of organization and time management, impeded it success before it began.

Paula felt her time spent with the Noyce CoP was “very useful” and opened her eyes to “not only my own beliefs but how as teachers we bring our beliefs into our classrooms.” Moreover, she expressed that “Listening to the wide range of opinions in just our small cohort helped me realize the diversity that will be present in my classroom every day.”; and offered the realization that she “must focus on truly putting my students first and responding to what they bring to the table.” Paula’s biggest take-aways were viewing students’ prior knowledge and experiences as assets in her classroom “even if they are different from my own”, and “The idea that differences are not deficits really resonated with me and is something I will take long into my future.” It is this type of self-reflection, along with all her other talents, that made Paula such a willing and valuable member of the Noyce CoP.
Jack’s Background

Jack is a 21-year-old white, middle class, “cis male”, whose preferred pronouns are he, him, his, and described his formative context as suburban. He identified as a homosexual, and is a “Democrat”. This last bit of information carrying more weight when you consider he ranked “Political Affiliation”, second only to “Sexual Orientation”, as the belief system most proximal to his core identity, when completing his card sort. I cannot say I am surprised Jack is interested in being politically active. He has a confidence, wisdom, and sense of activism that exceeds his years. However, I was surprised to learn that in addition, to completing our accelerated MAT program, he was also completing a B.S. in Chemistry, and a B.A. in World Language and Cultures (Spanish Concentration). Jack also possesses a sharp social awareness, and has shown the willingness to teach others both within the CoP and beyond. As it pertains to the former, I can’t share with you the entirety of the conversation in this format. Not that it was offensive, but perhaps a bit distasteful if you are not familiar with the jargon, and context. Just know it ended with Jack telling Jon, and Steve “Listen… Not all women have vaginas.” I thought, gee, he’s right. But I also realized that even though I think I am generally “dutiful” about making assumptions regarding people’s gender, or sexual orientation, I have nowhere the investment, or
understanding of Jack. He shared this level of insight and understanding throughout the CoP.

Now consider the fact Jack can be such a well-rounded young academic, and educator, despite confessing “I hate writing”, and “can’t read.” This later admittance coming when he interrupted my conversation with somebody else to give me a piece of his mind about the length of the article I had assigned for the week, “Speaking of page numbers, if you ever give us a 40 page article again…” Defending myself, “Whoa, whoa you didn’t do the minus!” I was leery of them coming after me with digital pitch forks, with Jack leading the way, had I demanded they read a literature review of that length. Which Is why I sent out an email explaining that if they excluded a larges series of tables, and references, “minus” these items the article was 16 pages. So, when Jack and Jon (now siding with Jack) contended they were still responsible for 30 pages, I was eager to refute their claim “What!? That thing was like 16 pages! I counted them!” I continue, “I told you in the email. So, all you had to do was read half a page, and save yourself the stress!” (Laughter) Finally Jack relented:

No, no, no. I read the email, I read the email, I skipped the tables. Of course. Yeah. I don't know who would read them, but still it was so long and like I know that you're
used to that. But like I said in the beginning of this class, I can't read. So it's just...

To which I responded, “Well work that muscle Jack! I’m making you better baby!”

Despite jokingly presenting a veneer of reluctance, Jack was usually the first to complete his assignments, and contributed considerable cultural understanding to our group. His MUDAS results suggested he does not feel aware of his own culture, which having interacted with him, I do not agree. He does, however, recognize his privilege, like to interact with people from different cultures, and believes very strongly in learning a second language. In addition, Jack strongly supports the inclusion of a wide variety of cultures and religions in our country. He welcomes the opportunity to work in urban communities, teach students of varying abilities, and believes (K-12) teachers should be trained in ways to introduce issues of diversity in the classroom, and work with students with diverse needs. Finally, like Paula before him, Jack expresses support for the idea that committing to social justice requires self-change.

In his reflection paper Jack focused on four areas of classroom practices he encountered during his field placement, “the use of interactive notebooks, the implementation of
instruction that is geared towards teaching material relevant to standardized exams, the use of inquiry in laboratory activities, and lab safety.” His discussion of each included reasons why he does not like interactive notebooks, comparison of pedagogical practices he observed in the classroom, and even a harsh critique of one instructor’s lab safety procedures, that in Jack’s view created “a culture of unsafety for the students, who are more likely to get injured in lab than they would be if they had a role model that stressed lab safety.”

Interacting with Jack required me to be open to questioning, clear in my reasoning, accountable, and ready to laugh at any moment. He was supportive of other CoP members, raised interesting points, and had a knack for moving conversations forward when they got “stuck”. I am all but certain his peers valued his input as much as I did.

Marie’s Background

Marie is a 27-year-old white, middle class, European American, female, who describes her formative context as suburban. She identifies is heterosexual, and a political Independent. Marie holds a B.S. in Geology, as a well as a B.A. in English literature, and soon after our CoP concluded began teaching Earth Space, and Environmental Science at a local Title I high school. She certainly has the makings of a science
teacher, she is friendly, observant, informed, meticulous, and able to relay concepts and ideas to others with ease. She likes geology puns, and expresses pride when describing her collection of tee shirts adorned with them, and her streak of wearing a different one each time she visited her placement classroom.

When completing the card sort activity, Marie credits formative setting (suburban) and her SES (middle class) with most influencing the development of her identity. This was in many ways Marie’s second time participating in a CoP I was developing. Back in 2017 she voluntarily participated in a few sessions for my first attempt at facilitating a CoP. My initial experience facilitating the Noyce CoP was not nearly as successful as this current attempt. Marie shares my opinion and to give you an idea of her dedication to improving as an educator, even though she was there in her own accord, she was more prepared than several of the people registered for the course. This time around Marie was registered for the practicum course and was every bit as prepared and dedicated as she had shown herself to be in our previous interactions. We all appreciated the professionalism, experience, and diverse knowledge base she brought to the group.

Not only does Marie recognize the influence of her middle class, suburban upbringing, she is also well-aware of the
privileges it has afforded her. She feels very strongly that classrooms should welcome all forms of diversity, and teachers should be well versed in introducing associated issues, and supporting students from a variety of backgrounds. Part of this process including the development of conflict management skills aimed at solving cultural clashes.

At the time of the practicum Marie, had already gone through the county’s Advanced Placement (AP) teacher training, and was grateful when she got to work with an AP Environmental Science teacher as part of her filed experience:

I was very grateful for the opportunity because I was able to ask my practicum teacher many questions regarding AP, such as when she did reviews for the AP exam, how she structured her class, etc. It was very helpful to receive advice from this teacher as well as watch other AP teachers conduct their classrooms.

She applied the same detailed orientated approach to learning about the day-to-day tasks teachers must complete to keep their classrooms running. She shares:

Often I would take different types of assignments home from practicum and would learn how to grade papers, class assignments, and homework according to the teachers’ rubrics. Because as a future teacher I will be grading
papers, it was nice to learn firsthand how to grade quickly and efficiently as well as have the opportunity to practice this skill. At first, I graded assignments slowly, but I eventually learned how to grade quickly and still retain accuracy. My main practicum teacher also taught me how to enter grades into the computer along with the school’s grading policy.

Marie also discusses how she:

learned how to take attendance, where resources are gathered in terms of PowerPoints, lesson plans, worksheets, and projects, and how to email parents. During my time at the high school, I watched individual teachers interact with students and took care to ask how they managed late homework, absent students, observations from administration.

Marie also provides great examples where she compares pedagogical and classroom management styles, and networks with teachers in the school. I chose the examples above to allow you to see pragmatic, yet thoughtful approach that in my opinion characterizes Marie’s experience within, and contributions to, the Noyce CoP. An approach I am confident has followed her into the classroom.
Steve’s background

Steve is a 23-year-old white, “straight”, male, who describes his formative context as suburban, and upbringing as “Middle-Lower” class. He claims “Agnostic” as his religion, and has no political affiliation. Steve considers the setting of his formative years, and his age as the belief systems most shaping his identity. Steve is very outgoing, funny, and as you might have noticed in some of the previous scholar backgrounds, constantly involved in one or more conversations throughout the CoP. While many are the light-hearted banter presented above, there are plenty of instances where Steve thoughtfully shares and challenges his beliefs with both the group and individuals. Perhaps this is due to his love of philosophy, which was his “favorite subject in college”. He ultimately applied this love of thinking towards the completion of a B.S. in Physics, and this is the content area he wishes to teach at the secondary level.

Steve is active, has an interest in athletics, and belches very loudly, all qualities that I think will endear him to students. I sometimes referred to him as “Sporty McKenzie” (Sporty for short), and enjoyed the conversations we had regarding sports, fitness routines, nutrition, and even “good deals” on protein supplements. Steve is very cognizant of his
age when he thinks about how he will interact with his future students. This is apparent when he reflects on his tendency to refer to people as “My Dude”:

I'm just like, man, it's going to be hard for when I'm a teacher because I'm just gonna like, I'm gonna have to realize that like students are students and I'm a teacher and I had to be more professional because even teaching like at the practicum, like someone will raise a question, I'll just be like, yeah, my dude! And I’m like oh I can't do that.

I assured him he’d be ok, and I think he and all the “dudes” will get along just fine. I am convinced of this because Steve has also shown himself to be caring and appreciative. I know this personally, as on two different occasions he expressed appreciation to my teaching style, and methods. Like this instance where I was addressing the group:

Steve: Fred you’re a good teacher.

Me: (Turning around): What’s that?

Steve: When you were up there, I was like actually paying attention to you. So, props...(respect)

Me: Awww ... Thanks dude! (Group laughter)

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Or another time when some group members lamented the meeting time of the course (Friday evenings 5:30 – 7:45 pm), but once again expressed appreciation when recalling a conversation from a previous class meeting:

Jack: That was a really nice discussion. Yeah. I didn't think that even though like the timing of this class is the worst thing in the world,

Me: It's pretty bad.

Jack: I really like enjoy our discussions.

Me: Thank you. I'm glad you like it. That's what I'm saying. I'm like, I got to make it like so you guys enjoy it because otherwise you’ll just hate life.

Steve: Well you got us engaged, which I super appreciate. I’m not like dying, falling asleep in the damn seat. (Slouching) You just see me falling asleep next to you.

Jon: I don't know if I should nudge you or just let you go...

Steve: Just let me go.

Me: Let him own it.

Jon: I used to have this physics class and this guy that kept falling asleep, his name was Marco.
Maya: (Beating everybody to the punch) Would you just scream polo (Laughter) to wake him up when he was falling asleep?

Jon: Thinking he might want me to nudge him and wake him up and this guy was big. He was like six, two, six, three [Laughing] probably like about 250 (pounds). I was like, I don’t know, and he got mad!

Me: He was probably like, 'Do you know how hard it is to drag this body around all day (Laughter), and you waking me up?

Steve: (Laughing) Absolutely!

I chose the exchanges above to show Steve’s willingness to interact with, and support others in the CoP. However, do not let their humorous tenor lead you to assume Steve was not part of deeply meaningful exchanges, during the CoP. One that comes to mind is when Jennifer and he, had a pointed exchange that caused Steve to reframe some gender assumptions he held about teachers. I will expand on their conversation later in this chapter, but I think it, and those shared above will show Steve brought a level of humor, perspective, refection, and willingness that made him a big part of the CoP, and will translate well to the secondary classroom.
Steve feels he is very aware of his culture, welcomes the challenges and opportunities diversity affords, and has no problem discussing either with others. He considers cultural issues in his day-to-day life, has close friends from diverse backgrounds, will speak up when witnessing social injustice, and feels committing to social justice requires him to change. He hopes to work in an “urban” setting, and believes teachers in these schools should be trained to deal with issues related to the introduction of diversity in the classroom, working with high-need students, and overcoming cultural conflicts.

In his reflection paper Steve wrote about how when “observing a variety of classrooms in the secondary educational system” involved a lot of what he was expecting, “some kids who really didn’t care, the ones who did, the teachers who liked their job and the ones who hated it.” However, Steve found observing these classrooms through the lens of pedagogy “mind blowing”. More specifically he describes what he saw in his field placement this way:

To visually and tangibly see the differences in teaching styles and the correlation between the people who enjoyed their job and who, for lack of a better description, would rather be anywhere but there was interesting.
One instance he pointed out while discussing the “role of the teacher in supporting students in their work and encouraging them to keep going even when met with a difficulty.” He relayed the story of a teacher whose demeanor and actions he felt did not support students:

The teacher I mainly observed belittled and called out their students in the middle of class. They would openly discuss their poor grades in front of everyone and yell at them, and also make very rude gestures and looks to other classmates when the student asked a “dumb question”. No one wanted to speak. No one wanted to do poorly. No one wanted to care. The whole soul of the class felt like it had been sucked out and was unable to come back. I thought the class was, honestly, hopeless… Until I got a chance to teach a lab on flames. I simply made an offhand comment to one of the students, after they struggled to successfully determine if their chemical was putting a color into the flame or not, that it could be difficult and not to worry. It was such a simple sentence. That student personally came up to me after the class and thanked me for showing them compassion. It made that much of an impact and seemed to lift their spirit if only for a moment. I didn’t realize how much these little comments effected a classroom as much as they did until that moment.
I feel this story, and the others included shed light on the values, perspectives, and energy Steve brought to the Noyce CoP. Each were certainly appreciated by all of us, and I am confident his future students will come to feel the same.

Maya’s Background

Maya is a 25-year-old Black, lower-middle class, pansexual, female. She described her ethnicity as “African-American, Irish, German”, and attributes her “International” formative context to her “Air Force Father”. This contrasted with all the other scholars whom listed “suburban” as their formative context; and likely contributed to the insightful world view she brought to the CoP. Maya also identified as agnostic, and expressed her support of the Democratic party. Additionally, Maya was the only person in the CoP to choose race as the belief system most proximal to her identity, followed by gender, and ethnicity, respectively. I am not surprised because throughout the CoP, Maya proved to be extremely knowledgeable, and informative in these areas, and others. This along with her sometimes quiet, friendly, confident way, certainly garnered respect in the CoP. However, do not be mistaken, Maya is also witty, fun, and just as responsible as the rest of us for some of the ridiculous conversations that occurred during group work. Such as is the
case below when James took a subtle shot at the pens I provided for the class:

James: These are nice pens. These are nice pens. It didn't look like it at first. But they are.

Group: (Laughter!!!) Wow!!

Jack: Wait are you calling these pens cheap?!

James: Yeah! (Laughter)

Me: My feelings are not even hurt... At all... Because like everything in there is dollar tree. I had to buy all that!

Maya: (Complementing my pens) For the Holla Tree these are great.

Jack: (Laughing) Holla Tree...

Maya: Hollahhhhh!!!! (Group laughter)

“Once on a geology exam”, Maya explained “the energy of like this scene”, by drawing a “little whale”, and emphasizes that her “TA loved it!” and she “was like thank you!” Sadly, I am not sure how many whales Maya will be drawing for her secondary science students. That is because, although she holds a B.S. in Environmental Science, she has since been certified in, and will teach high school chemistry.
Maya is well versed in issues of diversity, and equitable power distributions in society, and throughout the CoP displayed an ability to relay her thoughts on these matters to her peers in a way that left them appreciative, and better informed. Just ask Jack, who after listening to Maya make a point offered “I just love listening to you talk. You’re so smart. I wanna cry!” Not literally of course, but I agree with Jack’s assertion. Whether it was applying tenets of critical race theory to our weekly article, raising all our awareness regarding “disciplinary identity”, or willingness as the lone minority among them to answer tough questions from her peers.

Moreover, she also had access to her peers that I, as their biracial, male, instructor, did not. Take for instance when she explained to the group how oppression shapes, and can itself become a culture:

through time, especially with, um, oppressed groups that some of their culture is actually formulated by their oppression, if that kind of makes sense. So, like black women for instance, like they might've been instilled by their parents to, to have to be presented in such a way, you know, to try and oppose stereotypes. Unfortunately, it's bad. It exists.
I personally had never thought of oppression through this lens, and this and other revelations offered by Maya, were vital to our CoP’s success.

Given her depth of understanding on such matters, as you might imagine, Maya expressed very strong views regarding valuing cultural diversity when completing the MUDAS survey. She has a strong sense of her culture, feels comfortable talking about it, and seeks to interact, learn, and make friends with people from different cultures. Maya has a firm understanding of her privilege, considers cultural issues in her daily life, and has no problem speaking up against instances of social justice. She feels it is important to learn a second language and would welcome the chance to study abroad or teach in an “urban” community. Maya is open to teaching students of all abilities, and feels strongly that (K-12) teachers should be trained to address cultural issues, work with diverse students, and appreciate the range of cultural experiences people bring to the table.

As far as what Maya thought of the CoP, in her reflection paper she writes:

I have attended all five of the practicum cohort meetings this semester and I can truly say that I have enjoyed them. I liked that our group had so many different approaches to the
literature we were given; I felt each meeting was unique and necessary to growing as a pre-service teacher and hearing voices from the field (whether from our instructor, guest speakers/former MAT students, or current cohort first-year teachers).

She feels fortunate to have been given her placement assignments, and as a substitute in the district, even made some connections for future guest teaching assignments. She feels this is important because:

This allowed me to continue to connect with the students I had met through my practicum observations and to practice instruction as the teachers would leave work for the students based on the fact I had prior knowledge to help students through their studies.

I feel this is invaluable experience that will have her well prepared for her own classroom. Additionally, during her practicum placement, she was able to teach multiple lessons in chemistry, and environmental science to multiple sections of middle and secondary science students. She also got to be part of some memorable moments in her placements that included K-9 officers, the “Maker Mania” middle school invention contest, and a teacher who to her students’ delight, tallied on the front board, the frequency with which she “shrieked”. She saw the
practicum course as an experience that, “acted to glean some idea what to anticipate as a future instructor, start to formulate what pedagogical techniques I like and dislike, and get my feet wet teaching lessons and interacting thoughtfully/meaningfully with real students.” She also describes the how the entire experience “proved itself to be useful in the way of networking; I have wonderful instructors that continue to contact me about events and opportunities, and I hope to develop these professional relationships as I continue my education as a pre-service teacher.” I am glad to hear Maya had such an enriching and informative practicum; she deserves credit for helping to make the Noyce CoP the same type of experience.

**Jon’s Background**

Jon is a “White, Irish, Middle-class, ‘hetero’, Male”, and a former Marine who appears at least a decade younger than his 50 years. He described his formative context as “Southern suburban” and his religion as “Deist”. When completing his card sort, Jon credited his age, and southern suburban upbringing with most influencing his identity. Jon is a former Physical Therapist Assistant, holds a B.A. in Physics, and will teach physics at the secondary level.
Jon is also, a stay at home, husband and father, who likes apples, and turkey, ham and cheese sandwiches. He is good natured, thoughtful, curious, and keeps “dad jokes” at the ready. Jon welcomes being the target of light-hearted teasing, and adds the right amount of self-deprecating humor to keep it coming his way. A lot of the grief he caught during the CoP involved him missing emails, course announcements, and assignments. The latter occurring at our first CoP meeting, where he was not aware of the syllabus, or the week’s assignment. Let’s just say this was not the last communication breakdown Jon experienced, and for some reason we all just thought it was the funniest thing. Sometime later in the course I sent out a schedule as part of a jigsaw activity we would be doing in class. Whether by operator error or “auto correct”, I accidentally had him listed as “Ron”, in the table I used. Having noticed this at some point, he loudly and triumphantly said to me, “So here’s the issue!” I ask, “What’s up?” He continued, “Because I’m looking at the schedule here, and you’ve been sending shit to Ron!” (Group Laughs). Realizing he is essentially accusing me of not knowing his name, despite working with him for two months, I defended myself, “No! It’s Jon!” Showing him my planning notes as proof, “I even have you in my notebook as Big Jon!” I further dashed his hopes by reminding him that I did everything through the course page, which would
not include “Ron the scapegoat” in its student email list. Sensing his defeat, Maya piles on, “Excuses, excuses, excuses.” Later in that meeting as everybody was busy, moving about, and participating in group work, I jokingly welcomed him with an “Aye! Ron-aye!” By the end of the night everybody was on board, with Jack at one point stopping James mid-sentence to insist, “Ron! His name, is Ron!”

I am happy to report that Jon’s peers in his cohort, still call him Ron, Ronny, Ronald, from time to time. I think it shows how much everybody likes Jon, and points to how readily he accepts himself and others. Jon’s MUDAS survey results indicated he feels he has a strong sense of his own culture, and values learning from cultures other than his own. He believes cultural expectations should be taught in schools, and teachers should develop skills to deal with cultural clashes. Jon considers himself aware of his privilege, willing to speak out against social injustice, a person willing to change for social justice, someone who values learning a second language, and appreciates a range of cultural experiences.

Reflecting on his practicum experience, Jon expressed concern for the resources available to students:

I was also surprised to find out that after weeks into classes the school still had not received physics text
books or any lab supplies and students were learning from an online program and what they were taught in class, at the completion of my practicum (week 12) students still had not received text books.

Jon also described a classroom experience where he felt empowered as he assisted a “chemistry teacher” in a physics class:

On a few occasions I could see he wasn’t comfortable with some of the material… he did ask me to clarify some of the concepts during class. In his defense physics is a complicated subject and he is a chemistry teacher. The first time it happened I was a little nervous, I didn’t want to overstep my boundaries, I clarified some ideas about Newton’s Second Law and the magnitude of gravity and the second I was done he seemed appreciative and, for the first time since beginning the MAT program, I thought “Oh yeah, I can do this!”

He went on to give his take on his observations of “other” teacher duties. For example, after gaining some experience with grading student work, he decided “This is one aspect of teaching I am not looking forward to.” Additionally, while he found their necessity to be a “sad, and unfortunate consequence of school shootings”, he was glad to be part, and provides a detailed
account of, his participation in an Active Threat Plan (ATP) drill, at his placement high school. Jon also attended four Tuesday Professional Learning Committee (PLC) meetings, where he got to observe experienced teachers making decisions about content, assessment, and course pacing. He concluded by expressing his satisfaction with his practicum experience, feeling it provided him with “a sense of confidence that I have chosen the right career, and look forward to internships and working as a teacher in the future.”

Jennifer’s Background

Jennifer “Jen” is the final scholar to be part of the Noyce CoP. She is different from the others in that at the time of the practicum course, she had just begun teaching science fulltime in a high-need middle school. If that were not enough, Jen is also a single mother, was forced to abruptly move her entire family while juggling work and school, and fights an hour or so of traffic to make it to campus on nights she has class. Jen was spread thin it seems, and described how she relies on chewing gum on her way to class, “It’s like how I stay awake, because by the time I get here I am so (tired)... The chewing, I don’t know why, but it keeps me awake. Whatever works.” Jen shows a true willingness to meet her many demands, even if it means bringing her child to campus with her so she can make it to class on
time. With so much going on in her life, the questionnaire, and survey I distributed during the course likely got lost in the shuffle. I can’t say I blame her. Regardless, I cannot provide you with any information regarding Jennifer’s demographic information, core belief systems, or views on diversity. Instead I will rely on my experience with her, her own words, that of her peers, and her reflection writing to paint a picture of this CoP member.

Jen is resilient, direct, empathetic, likes to laugh, and is not afraid to speak her mind. This last assessment was evident one time when she felt the need to stop Steve dead in his tracks when he used generalizations to describe female teachers, “You’re painting women like a certain way right now, and I’m like, ummmmm… Not happy!” She cares deeply about her students and shows distain for teachers who “throw the book” at students for “each and every little infraction”:

Jen: There are doctors that should be doctors, lawyers that shouldn’t be lawyers and teachers that shouldn’t be teachers. There’s a teacher at my school, she’s a sub. She calls her students cockroaches.”

Group: (Surprised) “Jesus… interesting… wow.”

Jack: (Sarcastically) Does she like her job?
Me: (Trying to rationalize) Does she say it jokingly, like ‘you little cockroaches...Ha-Ha’?

Jen: (Laughing) No. You know how students will come into your class and bitch about other teachers? Well they come in my class all the time and they bitch about this lady and she’s mean. She’ mean as hell. And.. I hate that. Just the way she calls them cockroaches it’s not even...

Me: Like you can feel the distain behind it?

Jen: "Yeah, yeah... and there are a lot of things I can handle but what I don’t do well with is, hearing and seeing the children be abused, because that’s what it is. It’s there and it’s more prevalent than you ever could imagine. That gets me and when children are ugly to each other. Just so blatantly hurtful and say messed up things to each other. That’s really hard. And seeing teachers belittle students as well."

I think this exchange shows the care that Jen puts into her relationships with her students. Moreover, the other CoP members truly valued the insight she brought to our group, or as Jack puts it:

Jack: I gotta say. I really like when you bring stuff in, like your day-to-day experience. I love hearing what
you have to say about what it is like in the classroom.”

Jen: “Thank you. But I always feel like I bring something negative though.”

Group: (Disagreeing) “No! No!”

Jennifer’s reflection paper chronicled “The Highs and Lows of a First Year Teacher”. She began by discussing that despite seemingly hundreds of jobs, she encountered great difficulty as far as “scoring an interview”. However, once she began “to call immediately to follow up” her job prospects improved. Like pretty every much every new teacher I have encountered (myself included) Jen was frustrated that so much of her first week was spent in faculty meetings, instead of her classroom. Particularly, training she describes as “utterly useless”, and thought time would be better spent collaborating with, and getting to know other members of the science team. She relayed her disappointment in finding out the Friday before school began that not only would she now be teaching to grade levels (6th and 7th), but she would also have to leave the room she spent that past week organizing.

Jen ended her reflection paper by discussing how the setbacks she faced the first few weeks of the school year were in many ways’ distant memories. She thought back to the
apprehension she felt at the beginning of the year regarding how she would control “the classroom due to unruly kids, which the school has a reputation for.” Jen declared she “could not have been more wrong, which is one of the biggest lessons learned.” Speaking about her students:

I embrace all of their qualities, good and bad, which none are really, truly bad, which is the point. I embrace them, exactly as they are, without judgement. I did not realize how quickly I would get attached to them; I enjoy working with them, I enjoy going to school every day, and I love teaching them science!

I do not doubt Jen has established meaningful relationships, and is well-liked by her students. I know this was the case as it relates to her and the rest of the CoP. I think of her as a hardworking, curious, and insightful, person, who cares about and appreciates others. The latter evident in the closing sentences of her reflection paper:

Thank you, Fred! You did an excellent job at teaching this course and it was the only Friday class in my career at USF that I actually enjoyed coming to. I will miss the stimulating, engaging, and at times hilarious conversations. I wish you the best and good luck!

No. Thank you Jen.
Noyce CoP Meetings

In this section I relay our experiences in each of our CoP meetings, and do so while attempting to adhere to a similar chronology. That is, I describe the weeks’ assigned reading using scholars’ words where possible, familiarize the reader with the group activity we engaged in that week, and use our interactions (both spoken and from discussion board posts) to shed light on the knowledge we constructed during our time together.

It is worth noting that the “initial” CoP meeting was not the first time we had gotten together. The Noyce scholars were registered for a larger secondary practicum course for both undergraduate, and graduate science education majors. As was the case with the previous CoP in 2017, I was not the instructor of record, but fully designed and facilitated a section of the course that met separately, and followed a curriculum designed with our CoP in mind. Anyway, the instructor of record and I thought for the very first class meeting it would be nice to address both groups, and then break off into our respective sections. I had planned to cover all the administrative details during this time including the syllabus, expectations, how the journal club would operate, as well as to distribute questionnaires and surveys. A solid first class I thought. So,
you can imagine my surprise when the instructor of record dismissed the class after 45 minutes! Not one to disagree with a Professor who was doing me a favor, I was forced to rush through the syllabus, and explain the course assignments, discussion board, and journal club, with a promise to catch everybody up by email. I feel this led to confusion on the part of some of the CoP members (Jen, and Jon seeming the most affected), and contributed to them not completing the first assignment, demographic questionnaire, or surveys. Although in his defense, Jon has recently completed the latter two items to assist me in writing this dissertation.

**CoP Meeting 1**

If my intent during my time with the CoP was to get these new teachers to explore their beliefs, I thought my first step should be to familiarize them with “beliefs” as constructs, and raise their awareness as to how our actions, worldviews, and even identities are filtered the lens of beliefs. To help accomplish this the first article I assigned as part of our “journal club” was a chapter by Geoffrey L. Cohen, entitled “Identity, Belief, and Bias”, published in the book “Ideology, psychology, in 2012. In short, this chapter summarizes three main areas of research: 1) how ideologies about race shape punitive reactions to minority victims, while examining this
issue along a continuum ranging from “color-blind” to “multicultural” ideologies; 2) how people’s identities are strongly tied to self-worth and recognition, and can make them extremely reluctant to abandon beliefs, even in light of substantial evidence, or when to do so would benefit them materially; and 3) how psychological biases contribute to discrimination as people construct “criteria of merit” (Cohen, 2012, p. 386) that excludes the values, and cultures of others, despite a desire to remain partial. In each of these cases, Cohen highlights the seeming ease with which we can recognize the beliefs others use to view their world, but struggle to reconcile our own.

The circle exercise. In light of this, I wanted to engage the CoP in an exercise that would allow them to probe their own beliefs, and see how the beliefs of others differed, even when observing the “same” object. To do this I separated the scholars evenly (Group 1: Jen, Jack, May and James, and Group 2: Marie, Paula Steve, and Jon). I hid behind a dropdown screen and drew as perfect a big blue circle as I could on the white board, and did my best to shade it using the dry erase marker and swirling motions. Wanting each group to rely on their own members beliefs I gave some preliminary instructions to prevent people from yelling out answers or offering up their beliefs (To no avail):
Me: Alright! When I do this (Raise the screen) don’t say anything! No matter what I do, I don’t want you guys to talk about it or anything!

Jen: Ok.

Jon: Does anyone have a piece of paper?

Me: (Joking) Geesh Jon, first you don’t have your homework, now you don’t have paper? Do you need a pen too? (Laughter)

Deciding I had given Jon enough of a hard time, I turned back to my instructions,

Me: Imagine this is nicely shaded (Laughter). I did my best! This is what I need from you two groups, and this is what you will have on your paper when you’re done. One, as a group you are going to decide what this drawing is. What is it? Give it a name, ok? What do you call it?

Jon: Giving it a name not as what we envision it to be?

Jen: So, it will be like Bob the dot?

Me: (Wanting her to think with her group): No! That’s what I don’t want you to say.

Jen: (Thinking outload) No...
Me: (Trying to explain without swaying either group): Just what is it? If I gave you this object, what is it?

Jen: Like a nucleus!?

Me: Alright, so I’m going to say this again... Don’t say anything! (Group laughs)

Jen: I’m sorry, I’m sorry.

Me: (Laughing and assuring her) You’re good. You’re good. Just, what you are doing now, do it with your group is what I’m saying. What you’re doing is fantastic, but I want you to do it with your group...

Jen: Ok. With your group...

With that resolved I attempt to continue with my instructions:

Me: Alright, One, (Pointing to my drawing) tell me what this is...

Steve: (Shouts) A Nucleus!!! (We all laugh hysterically)

Me: AND, number two... what you guys are going to come up with... you’re going to give me 10 beliefs amongst you that you used to come to that determination.

Jack: Oh God.
Me: (Reiterating): From each group I am going to get, What is it? And ten beliefs or belief systems you had to use to come to that conclusion.

Once everybody settles in, they are working on the task, conversing, joking, and cooperating. Not one to sit still I am moving between the two groups trying to gain a sense of their thoughts, and the usefulness of what I have come to call “The Circle Exercise”. Amongst it all I can hear terms being tossed around “geometry”, “circle”, “soup bowl”, “filled in blue”, “blue shaded circle”, “syrup”, “have to believe that color is blue”, were some of the things I heard. I guess I’ll start with syrup. Actually, I’ll let group 1 explain:

Maya: We can make it essentially anything we want it to be.

Jen: If it can be anything we want it to be, let’s be creative. (Group mates agree in unison).

They eventually decided it was a waffle. However, just a run of the mill waffle would not do for Jen:

Jen: “I’m talking way beyond syrup. I’m thinking whipped cream, sprinkles, cherry on top...”

James: Oh Nice!
Jen: (Sharing the limitless possibilities) We can add chicken, chicken, and waffles... If you say waffle, I say, sounds good!

Jen stops me as I walk by to clarify:

Jen: (Asking inquisitively) “So ten beliefs...”

Me: (Pointing to the board) You saw this thing, you called it something... give me ten things you would absolutely have to believe in to call it that.

Sensing she is once again satisfied with my explanation I continue to circulate and came across this conversation happening amongst group two at some point:

Steve: (Arguing with Jon) I’m a physicist! It’s a sphere! I see a sphere!

Jon: Well, I think you’re seeing it more abstract...

Steve: Well I’m a physicist!

Paula: (Paying them no mind wonders to the group) Don’t we see colors differently?

Steve: That’s actually like a huge scientific thing, like do humans like see blue the same? I think it’s been proven that we like see different shades.

Me: (Interjecting) There’s a good chance you are “seeing” wavelengths of light differently.
Jon: My wife kills me. I like totally don’t understand things so, she’s like well that’s baby blue, and I’m like, no! That’s blue! And she’ll explain, no, no, no, that’s royal blue, and I’m like, no it’s blue!

Me: (Teasing) Jon’s got like four colors he rolls with. (Laughter)

Jon: I got red, blue, yellow... (Laughter)

Once each group decided on what they were going to call the object, and finalized the ten beliefs they used to come to this determination, it was time for them to share as I recorded their answers in two columns on the white board. Steve spoke on behalf of group 2, “It’s a circle”. His group mate Jon offering more information added, “It’s a geometric shape, because it’s an imperfect circle.” Unmoved, Steve dismissively repeats, “It’s a circle.” After some indiscernible arguing they finally agreed that it is a “blue circle.” I will discuss their reasons in a bit, but first let me present group 1’s rather “original” take on the matter.

Speaking for group 1, Jen excitedly shared “It’s a waffle and we are proud of it! We are proud of it!” Jon, “You are insane!” Somebody else scoffs at the idea of a blue waffle, to which Jen replied, “Color had nothing to do with it!” When it came time to share their beliefs, I wrote responses under the
appropriate column (Group1/Group 2), and made use of playful, leading questions, wanting to maintain an air of impartiality, and encourage further thinking.

Referring to their “waffle”, Jack said they subscribed to the belief that “2D images can represent real 3D objects”, to which I asked, “So yours is the belief that it is actually there?” Clarifying, Jack added “More like it’s the belief that (my drawing) can represent a waffle.” We continued:

Jack: We believe that Belgian waffles are circular.

Me: Via experience?

Jack: Yeah?

Me: Well, having ordered one from a truck in Brussels I don’t think all Belgian waffles are circular.

Jack: Where you in the right Belgium? (Laughter)

Undaunted Jack went further,

Jack: Waffles have hatched patterns.

James: (Explaining to me) You started out with hatched patterns at the bottom.

This is true. When shading my circle blue, I began using a crisscross pattern, but realizing the tedium of shading such a large drawing I soon resorted to circular scribbles to complete the job. This did not go unnoticed by the group:
Maya: (Referring to my circular scribbles) The whipped cream has the same shape as the frozen waves.

Me: (Looking at the board) “The whipped cream has a? Where is the whipped cream?! 

Steve: (Chimes in form the other group) What!? 

Jack: (Fires back) I’m sorry y’all just though it was a boring ol’ circle!

Maya likewise defended her group’s decision, and in the face of this lighthearted assault reminded her opposition her group is well within the rules and spirit of the exercise, “Hey! We said it was a waffle and these are our top ten beliefs why we think it’s a waffle!”

I now return you attention to the first group whom decided the object I had drawn was a “blue circle”. I began with them by asking, “What is the first belief that led you to say this is a geometric shape?”, to which Steve replied “geometry”. Truth be told, when I developed this exercise, geometry was the first “belief system” that came to my own mind. That is, my recognition that it is a circle, required I “believe in geometry”, and essentially all the theory, math, and perspective that encompasses this field of study (More on this in a minute). Steve also shared that they “believe in the plane of the board”, before allowing Jon to assume the reigns,
Jon: We think it’s imperfect.

Me: What do you think is imperfect about it?

Jon: The shape, the shading...

Me: (Pushing him a bit) Compared to what?

Jon & Steve: (In unison) A true circle!

Me: Oh, so you believe in circles and if you are a circle you are symmetrically perfect?

Jon: Yes.

James: (Jumping in) What about imperfect circles?

I really like this exchange because it shows even though the object of the conversation may seem silly, or arbitrary (both may very well be true in this case), the CoP members engaged in the challenging of beliefs of ourselves and others. This was exactly my intention as I explained when Jon expressed “We believe you have done this before”, to which I respond:

Never! Never! You want to know? I was like how can I get them to tease out beliefs, even to where it’s absurd? We discussed earlier how we don’t see our own beliefs. I wondered how I could get you guys to where you would have to tap into beliefs you’d never think of? So, in my mind I said I would draw a blue circle on the board
Steve (Enthusiastically Interjects): “Yo! We’re right!

(Laughter)

Of course, there was ultimately no “right” or correct answers, and I summed up the exercise for them in the following:

So, these are your beliefs (Pointing to the two columns on the board). I didn’t go so off the rails as to call it a waffle (laughter) but number one on my mind was, one we have to believe in geometry, we would have to believe that geometry was right (valid), and you guys brought one up earlier (pointing to group 2) and you would have to believe in blue.

By doing so we are in essence going through the process of believing the wavelength that I see “blue” at, is the same wavelength that (you) see “blue” at, when you talk about refraction of light (in the eye). In a sense I would have to agree with all the science that goes into that, all that foundational science.

Jack stopped me to ask, “Do you have to really believe in the science behind it to believe that it’s blue, because we’re just told that it is blue? Like since we grew up?” I respond:

True, right, good point. By just assuming it. Because we don’t confirm every single thing, right? Even as science teachers we don’t. There are things where we are like
“alright it’s been proven”. For example, if we increase water’s temperature the molecules are going to move faster. It’s been proven we’ve seen it enough. But that’s not how we describe it right? We say we are boiling water. But it’s a great point Jack, because we go through the world like that, right? Like oh, that’s a chair...

I then referred to a side conversation Jack and I had earlier in the class where he inquired about “common knowledge”. He wondered if common knowledge were beliefs, and I explained that common knowledge is comprised of nothing more than widely held beliefs. I reminded them that the week’s article touched on this very topic and explained how myths are also widely held beliefs, “Myths about people, places, things, waffles in Belgium, right?” (Laughter).

Jack’s thought process and line of questioning was in lock step with the overarching point I wanted to make with the circle exercise. That is, just like the group identified and considered both obvious and more obscured beliefs when making sense of the object I had drawn (Fine Steve, a blue circle), as people we filter the world through both conscious and unconscious beliefs. This includes the physical world, as well as how we judge and interact with others in it. I argue, in order to grow in this later respect, individuals, and groups of individuals, must be
diligent in critiquing the beliefs they and others use to make sense of themselves, others, and any situation they might encounter. To impress this point upon them, I offered the following hypothetical, and personal experiences (posing a question):

What if picked an ethnic group and threw it up here on the board instead of this circle and had you list beliefs? Now, I probably wouldn’t do that today (Laughter), but you get the idea. But can you see how it can happen? We could be brought up somewhere and our perceptions of a group could be entirely different, or even subtly.

To highlight how our context can work to shape our view of the world, expectations, and “reality” I shared the example of me moving to Florida from the “Blue Bubble” of Massachusetts back in 2004, and literally being dumbfounded that most people were going to vote for George Bush:

I had just come from a belief bubble, and we have them in our regions, in our households, we have them in universities... We create all these bubbles. And you (Jen) mentioned it. You don’t like how some people run their classes. Well your classrooms are also going to be little belief bubbles, and your job as a teacher is to consider all of your students’ beliefs when creating this bubble.
That is what this circle exercise was about. Even if we disagree. Even if I say man that is a pretty decent circle, and you guys crapped all over it (laughter) you have to consider (the beliefs of others). Especially as a teacher.

Expanding, I described how, as teachers we have expectations of ourselves and our students. Classroom expectations are essentially beliefs about roles, jobs, and abilities is in the classroom. This is true of students and teachers a like, and the latter can sometimes run into trouble when they view classroom expectations solely through the lens of their own belief systems. I was working my way towards making the point that when things go bad in the classroom, truly reflective teachers will look to analyze how their own beliefs and actions led to this undesirable outcome, as opposed to putting the onus on the beliefs and actions of their students. As a new teacher, Jen provided us with some recent classroom experience that helped me arrive there:

Me: As a teacher, when somebody doesn’t do their best, you’ll kind of get a little pissed off.

Jen: (Interjects) I got pissed off today.

Me: Did you?

Jen: Yeah, I did. Yeah, I did. It was if we had never done this before, and I was like everybody sit here! Don’t
talk! Be quiet! We’re going to sit here in silence. I did because I spoon fed them...spoon fed them, the day before. The notes are on the board, you can use your notes on your quiz and I ask for an example of asexual reproduction in a plant and an animal. And put a picture of a jellyfish and a strawberry on the board... (smacks her palm on the table). I got orange! Cat! Dog! (frustratingly reminds us this was asexual reproduction), and (smacking hands) We-Went-Over-It! (laughter). I-GAVE-IT-TO-THEM! So yeah, I was mad (laughter).

Truly appreciating Jen’s anecdote, I finally got around to my point regarding the importance of teachers being willing to critique their own beliefs and actions:

So, these are things you’re going to have to go through. You do that (gesturing to Jen). You put all of this into it and you don’t want to crush this kid, but you do want to crush them... (Laughter) You know? So that they get it right. You want to crush them so they get better. But at the same time, we’re human and you put all this work into it. Well, the sad part is, (in the classroom) a lot of things that really matter, your improvement will come because somebody will point out that you are doing it wrong. Your biggest
areas of growth, it sucks and it hurts but as you get better, you get better at taking it.

I believe this is a challenge for many teachers, and offered this advice to Jen and the rest of the group:

Me: The minute you’re like what about me? I put so much into this lesson and they didn’t get it! If it’s like ‘they, they, they, you better start looking at ‘you, you, you’”. Because you’re not doing your job.

Jen: Yeah. The whole thing with that quiz I gave them today. You failed them somewhere is what I’m saying to myself. That’s on me. It sucks. And trying to figure out how to fix it.

Vital to this process of reflection, improvement, and growth, is recognizing, and when necessary, challenging the beliefs, common knowledge, and myths, we and our students bring to the science classroom. Moreover, this was a perspective I wanted to cultivate amongst the scholars throughout the course of the practicum and our CoP. Judging by the number of times the scholars referred to the conversations surrounding the circle exercise I would say it provided a good starting point for the development of such perspectives during our time together.

Article sharing. Having delved a bit into the constructs of beliefs, and how they shape the way we view the world, the
remainder of our first CoP meeting was dedicated to the scholars sharing the main points from an article of their own choosing, and how it related to the Cohen (2012) chapter. By introducing their own literature to the group, and relating it to ideas in the “assigned” article, both the discussion board and the accompanying in class discussions served as viable means for accessing each of these new teachers’ beliefs. I base this assertion on their freedom to decide inherently led to them presenting beliefs with which they agreed, or disagreed. Thus, revealing their position (or beliefs) regarding the various issues raised in the week’s reading, and/or our face-to-face meetings.

*Jack’s article.* The article Jack posted to our first discussion board, and discussed during our first full meeting, was African-American versus White Children and the Transition into Junior High School (Simmons, Black, & Zhou, 1991). In his discussion post he writes that in this study,

student success (among other variables) was measured in samples of black and white students from sixth to seventh grade”, and found that the “samples of black boys and girls had a lower mean GPA... higher mean number of probations or suspensions than ... their white counterparts”, and “scored higher on the ‘problem behavior scale’” All of which
according to Jack indicates “a higher level of ‘delinquency’ in middle-grade-aged black youth.

He relates it to Cohen (2012) based on both articles suggesting discrepancies in GPAs among white and black students is “born out of the difference in treatment of black and white students by teachers and other school faculty.” Jack also points out the following differences in the two studies:

“Cohen’s research specifically tested the effect of teacher affirmation on black students, ultimately finding that teacher affirmation had a positive correlation with trust and grades in black youth”; while Simmons et al., (1991), asserts,

The effects of self-fulfilling prophecy cannot be ruled out in the behavior of black youth (i.e. black youth are socialized into believing the myth that black people are more inherently delinquent and less likely to do well in academia).

Jack concludes comparing Cohen (2012) and Simmons, et al., (1991) furthered his understanding of:

The need for teachers to be conscious about racial discrimination in schools and how it affects the grades and punishment of racial minorities and, furthermore, a need
for teachers to be proactive in building trust (through affirmation) with their racially-marginalized student[s].

Jack was the first to “present” his article to the group, and once again raised the possibility that the preexisting beliefs of teachers and administration, is leading to the disproportionate punishment of black children, with Jon, extending his point:

Jack (Speaking about a ‘self-fulfilling prophecy):

Kind of expecting the black students to be (a certain way), because there’s that stereotype, right? There’s this myth that like black students are going to be inherently more delinquent. (Referring to his article) It was kind of as if the administration staff already had it in their mind they would punish them to a higher degree

Jon adds, “that’s not just in the school system. I mean you see that in the judicial system” (everyone enthusiastically agrees), and continues, “It’s not a belief just there.” To which Jack enthusiastically agrees, “Um hmm... um hmm... exactly.” Finishing his point about self-fulfilling prophecies, Jack offers:

“It’s kind of a self-fulfilling prophecy. You’ve been told your whole life you are this. People who look like you are this way. So, then they become that way because there’s this box and I have to fit in it.”
Although he does not say explicitly, Jack seems to recognize the far-reaching impacts negative belief systems can have on students’ learning, and sense of self, and discussed the importance of affirming student beliefs:

When black students were taught by black teachers they performed at a higher level.” He goes on and offers his opinion as to why he thinks this is so. “Because they’re able to build that trust you know. The affirmation that you are not these (negative) expectations…

Expanding on Jack’s thoughts, and providing a possible reason as to why students perform better when they share their teacher’s race, I reminded the CoP of a part in the Cohen article where he suggested (and I agree) that if you share the world view of a person it is easier “to persuade them to change their beliefs, right?” (Group agrees).

Marie’s article. In her discussion board post Marie described how Cohen (2012), “emphasizes the role of identity in how one reacts to other groups of people”, and the tendency for people to “hold identities, beliefs, and ideologies which can create bias when dealing with groups of people who are different from themselves.” It is this later point she related to her article The Preference for Belief Consonance (Golman,
Loewenstein, Moene & Zarri, 2016), which she described in the following terms:

a similar but different approach of belief analysis in that people can hold onto their beliefs because they care about other people’s opinions, about what other people think. People can feel uncomfortable when confronted with the idea that people hold beliefs and values that are different from their own.

Marie thought both articles relevant to education because, “openness to other identities and beliefs is needed”, especially considering in “In many cases, a white teacher teaches minority students.” She identified trust as being of “critical importance and research indicates that affirming alternative sources of identity and using self-affirmation techniques can increase openness and understanding.” However, she cautioned that, “protecting one’s own views, beliefs, and identities causes one to selectively listen or receive information”, and concluded “people do not consciously or simply decide to hold a belief. Instead, people acquire beliefs by sifting through evidence selectively.” Oftentimes, instead of seeking out new information which might challenge or expand their point of view, people tend to seek information that validates their own arguments.” In our meeting, Marie explained the points above this way:
People hold on to their beliefs because they care what other people think about them. That’s one of the main reasons people are so protective of their beliefs is because, they’re surrounded by people with similar beliefs and it kind of strengthens their own identity.

A “stereotypical example” Marie provided is:

People who are ultra, ultra conservative. They want to watch Fox News the whole time. They only watch Fox News. They only want to watch media that supports their own view and it becomes like their own bubble. If they get outside information, they kind of reject it, and they’re more stubborn and really don’t want to relinquish their beliefs because every day they’re in their little bubble.

She concluded the way to overcome this inter group conflict is through empathy, and being to see things from other peoples’ perspectives.

James’ article. If you recall, in the “scholar backgrounds” above I mention James is a self-described contrarian. True to assessment his take on the Cohen article differed from Marie, and to be frank, everybody else (myself included). An ongoing theme throughout the CoP for sure, but as you will see below, his contradictory nature led to truly meaningful exchanges, and caused me to expand upon my own belief systems. More
specifically, I realized I must do a better job of realizing there will be times where I will be teaching students, and interacting with people whose perspectives might very well be blind spots in my own belief systems that I need to be more conscious of. Additionally, I learned a valuable lesson about the ability of people to help us gain greater understanding of ourselves and others, even in the face of constant disagreement.

James began his discussion board post by suggesting Cohen (2012) can best be summarized by the following idea “People manipulate themselves into thinking they aren’t racist, and telling someone they’re a good member of their social group will make them open their mind to new ideas.” Having had the chance to question James, I know now in this instance he was referring to Cohen’s point that when we value aspects of other peoples’ culture and identity, they may be open to new ideas. James saw this as a “sort of deliberate manipulation” that “is effective in the short term”, but leads to distrust once the “manipulation” is discovered. This view was largely based on a story Cohen (2012) uses to demonstrate how “affirming alternative sources of identity” (p. 392), and focusing on “sources of self-worth beyond the persuasion or negotiation topic” (p.392) can make it less painful for people to change their minds. It is actually an anecdote he credits to President Jimmy Carter, who was serving as a mediator during peace
negotiations at Camp David between Israeli Prime Minister, Menachem Begin, and Egyptian President Anwar Sadat. At some point the negotiations stall, and Begin is ready to walk away, “Then, Carter gave Begin a series of photographs of him, Carter, and Sadat. Carter had personally addressed each of the photographs with the name of one of Begin's grandchildren” (Cohen 2012, p. 392). Carter described how upon noticing the individual grandchildren’s names accompanying each autographed photo, Begin began to talk about his favorite grandchild, and discussing the others. The two men then shared an emotional conversation about how peace in the matter would benefit both their grandchildren and they ultimately broke the stalemate. Cohen (2012) suggests this action broadened Begin’s perspective “beyond the economic and political calculus that can dominate negotiations” (p. 393), and offers self-affirmation of this nature can prove beneficial in conflicts. I remembered this story and recalled thinking is was a good example of “connecting with people”, and “relationship building”. James saw the outcome as something entirely different and asserted, “The anecdote of Reagan and Begin would have been very different had Begin understood the tactic, and one would expect the conversation to quickly melt down.” Two things, first, as our conversation will reveal, James saw Carter’s use of the pictures as a deliberate, underhanded trick, and second, no matter how many times we all
remined James it was President Carter, and not Reagan, he was not going to get it right. It became a running joke in the CoP, and I can report he even confused the two in his final reflection paper! All that aside, I was eager to access James reasoning in our face-to-face meeting, and pressed him to share what he took away from the Cohen article:

Basically, we’re all running around saying we’re not racist and yadda yadda yadda… Because we’re all the hero of our own story. He didn’t say that but, that’s something that I have in my box (take away). And then he said, we can fix that and the way we can fix that is by telling people that if they’re a good member of their social group, then you are open to new ideas.

Expanding James continued unprovoked,

Hey! You’re a great ah, great minority kid! A great black kid! Great Asian kid! A great white kid, whatever. And they’ll be like oh yeah I am aren’t I? and then they’ll be open to new ideas and then you’ll be able to reach them. By the way, I’d believe that all of us are racist. If you acknowledge that then you are good to go. If you don’t think you are, please think about it.

Jen taking note of his last few statements asked,

Jen: Are you sure that it’s not prejudiced or biased?
Jack: It’s all semantics, we get the point.

Jen: I thought racist was that you believe that your own race is supreme to another. I thought that’s what the definition of racism was.

I felt they were both correct in some respects in this instance, but needed to jump in to provide some clarify. I simply differentiated the terms in the following way “prejudice is a belief”, and “racism is an act”. I continued, “when you are racist you are physically picking a side, “prejudice you can have thoughts in your head, like a dislike (based on racial superiority).

In hind sight, I really wished I would have delved into this point further. This is because when we are uncertain about things, we are less inclined to bring them up in discussion and learn from others. Racism, prejudice, and I will throw bigotry in their as well, are power structures with which these new teachers and their students will have to contend. Increased understanding of each may better prepare these teachers to combat them. Anyway, back to James’ story.

James thoughts on racism were great and all, but what I really wanted to address with him was the Carter, Begin, Sadat story.

Me: You brought a perspective (About the Carter Story) that was a bit different, and maybe I interpreted it
wrong... but you saw it as like a little underhanded almost.

James: Oh yeah, he was totally manipulated by Reagan.

Me: You thought? I didn’t see it that way. It was Carter by the way.

James: Was it, no it was Reagan.

Group: No it was Carter.

James: But anyways, yeah. So... the pictures. This is what was, what I was referring to. I'm like, that was deliberate and a manipulation. Um, you're like, oh yeah, yeah. You, you want these signed pictures, autographs, you know, for the grandkids. Right. But I know you only give them to your grandkids. If we did something here, that's fine. As a is a deliberate manipulation.

Sharing how he would deal with the situation:

James: if I knew that you're deliberately manipulating me, I’ll shut down. I'm just putting up a wall. And if I am the leader of a country that's not a wall you're going to like. It worked. Yeah, it worked. It worked. But my thought process is, well, yes, cause' Begin’s a moron,
and then didn't realize that Reagan, (Carter) who is it, Carter?

Me: So he fell for a trick?

James: He fell for a trick, yeah...Yeah.

Me: To the group) Did everybody, did anybody else see it that way?

Jen: What I said when I saw it was why the hell would his grandkids want a picture? That's what I'm like, Who the hell would want that if I was a grandkid? Like God.

Jack stopped the conversation to ask, “I just completely don't remember this part of the article. So, can we go over it real quick?” “Sure”. I reminded the group of the scenario and bring it around to self-affirmation:

And so what they were saying is we’ve been talking about with self-affirmation right? Well sometimes if you could, like you (gesturing to Marie) we’re talking about liberal and conservative earlier. Let's say you meet somebody at a bar and, like if you started off with politics, you might never become friends with that person. (Jack: “Yeah”). Okay. Whereas if you went to somebody like, hey man, that's a cool shirt. or you like the Red Sox or something like that (you might have a better chance of bonding).
I went further, attempting shed light on Cohen’s views, “(He) labeled it as kind of a negotiation tactic and I saw it and I see it (as a negotiating tactic), Okay?”, and presented them with a familiar example, “How many times you see a kid you're like, Oowe! I like your new sneakers! Or I watched the football game the other day? All that. Right?” (Group agrees). I go on:

Let's say the student has got an F in your class, you're not only going to relate to that kid about science, right? Because by doing that, that like he (James) just said, that wall's going to be up. You're never going to get to them. Whereas if you can find other points of negotiation...

I then explained the situation in terms of our intersectionality:

We're all these things that intersect at our being. It might be how we dress, it might be our gender, it might be our age. It might be you know what region we're from, all these things that come together to construct our identity. So instead of focusing on one… aspect of our identity where we’re… at odds… There's always going to be some sort of commonality. Whether it can be, we've all got five fingers, we can talk about how…we all got five fingers, right? And the guy with four fingers is going to hate us. (Laughter) Right? (Gesturing towards James) So for me… I did not...I'm
not saying you're wrong because you could be right, but I can be right too...I didn't see it as something underhanded. I did see it. I see it as... something a leader of the world would do... If you're a good leader, you would do your homework and know about the people that you're going to try to mediate with... That's how I saw it, but I can't, I can't prove that you're wrong either, you know? I'm not Jimmy Carter.

James responded, “See, I think he did do his homework to find out how can I get at this guy? Yeah, you know, how can I work him?” Our exchange prompted others in the group to consider Carter’s intent, and led to the following exchange:

Steve: I love listening to James because I'm just like, I disagree with everything he says...

Group: (Raucous Laughter).

James: I bring you a new perspective you said that earlier!

Steve: I know... I love that because every time you talk I'm just like, what the hell is this guy going on about! (More Laughter)

Jen: (Defending James’) But I like I like the angle... I like the angle... I do...
Steve: Even if, even if you're doing completely opposite of mine, and I disagree with all of them... You have (pausing)... Points... (Still more laughter)

In a sense agreeing with Steve, I add:

Me: That's what struck me because I had not considered that. I was like, Ohhhh... And I had not considered it a manipulation.

Jack: Some may see it as like a good negotiator.

Jen seemed to get something entirely different out the Carter, Begin interaction, “I see it as like he's, he's pretty full of himself that he is assuming that his grandchildren want a picture a signed autographed picture... But then I think about it from the kids' perspective.” I reply, “Think of the ego you have to have to be president.”

Steve: You got to have the ego to get stuff done! I’m on that belief... To get points across and get stuff done...

Jon: Well in extreme cases egotism brings about like, genocide.

Me: But... also greatness, right? Think of writers, think of athletes...Being that driven to have... your identity so tied up in the belief that you have to be good at that. That you'll be nothing without it. Right? That's a very
strong and driving belief you know? And you know what? It's just a belief! We just think (oh they're just) beliefs. We were poo pooing beliefs before tonight. THEY’RE EVERYTHING! It blew my mind! All right? Like it blew my mind.

Perhaps my last point was a little dramatic, however, I wanted to drive home the importance of paying attention to beliefs, when interacting with others. What came out in the conversations shared here, as well as others was, these new teachers seemed to recognize the power of our beliefs, shared some strong beliefs of their own, and were able to realize how our personal beliefs can cause us to view seemingly identical situations in an entirely different way. I must thank James for helping me to illuminate this last point, and showed my appreciation for his views in our conversation:

Me: So yeah. No, I thought it was great that you (James) brought that perspective to be honest with you. I certainly like, yeah, I don't agree with anything you said (Laughter). But like I did! I did!

James: But I converted Jen. I converted Jen so I feel like...

Jen: The whole situation is beyond odd (Laughter).

Steve’s article. Steve chose to focus on a study discussed by Cohen (2012) that looked at differences in what were
perceived as beneficial attributes for male and female police officers seeking promotion. At one point his explanation got him is some hot water with the female members of our group, before seeming to back track a bit, and reframe his argument. He begins:

God, the thing that really stood out to me was the girl cop versus the guy cop that they treat them differently. I see that in the fricking class already. Like, I haven't been practicum one day and I can tell you that a guy teacher, it's a teacher and a student... a girl teacher and it feels like a mom and a disobedient child, and it's fascinating and I'm not saying that that's because that's the way it is, but it's almost the way that it comes off. And it wasn't until I went to lunch with them and like there was the guys on one side and the girls on one side and they didn't sit that way on purpose but you could cut a line on what they thought of their students and the stress level. Like all of the females in the class were just like, oh, I hate my classes and all the students are really bad and they're so disobedient and....

Jen interrupted him, “These are all the teachers or the students?” Steve replied,
These are the teachers that I went to lunch with and all of the
guys were just like how my classes are pretty cool... I'm not
meaning to generalize. It was just like, I like saw and there
was, there was only, there was only like eight people in that
lunch room...

Jen: (Interrupting) See...You’re painting women a certain way
right now (which I agreed), and I’m like, ummmmmmm, not
happy.

Steve: (Half helping/Half hurting his cause) I'm saying that
that's based on the biases that I think everyone grows
up with, which is what (in) that article stood out to
me. I was even talking to my girlfriend about this last
night. I was like, it's so weird because like I am
seeing that, but am I seeing that because of the
biases? Because I'm always, you always hear about, I
always heard about the, the stressful, you know, a
woman teacher, and the guy being really chill, and
whatever.

Jen: (Composing herself) But this... Okay... Okay... All right,
okay. I don’t know...

Jack: (Keeping the peace) I think I'm misunderstanding both
sides. Like right now, like I, I mean I just don't
understand. I guess because basically what I'm hearing....

Steve: (Interrupting) There's a lot of subliminal messaging, at least there has been in my life. Um, that dictates the girl teachers. There's more stress and the guy teachers are more laid back. I am in college and I can understand, wow, that's a bias and that's not good and I shouldn't think like that. But a high schooler I think doesn't have that conception. I didn't have that conception back in high school. I was just like, yeah, it's the stressed teacher, and I was always relating it to the girl and so I sat there and was like, what are the high schoolers thinking? Do they subliminally, subconsciously think ... like the people in the study who rated the girl cop is, oh, that was a bad quality... (But for) the Guy cop (it) was a good quality. I'm like, does that happen in their minds to all of the teachers? And is that what's causing all of this? Yeah, that's, that's the point.

As you can see, Steve altered his language to reflect that he “used to” think like that as a high student, but has come around since entering college. Additionally, he brought up the very real possibility that this may have an impact on relationships
in the classroom. However, Jen was having none of it, “My students could care less, whether I'm a female, male, if you're a dick, you're a dick, period.” They continue,

Steve: What I'm saying women teachers don't know.

Jen: The teacher next to me is the one who is, he's a male and the first day of class we walked in, he was like, oh, I'm so nervous. And I'm like, he's been teaching for 30 years. After 30 years. I'm like, you're still nervous. Still gets nervous! He's the one that's the butthole. I don't really get stressed with my students per se, as much as I'm like sit down and be quiet.

I jumped in to try to help Steve clarify his point and move the conversation along,

What I think he is pointing out, and I think it is a thing ...We have beliefs about like what our roles are.... Certainly, the beliefs of what a gender role is like a dominant gender role and things that go along with it. Right? And, and I would, I mean if we were to poll, you know, a thousand people, whatever and say, 'who would you think would be more, you know, emotional' and you only gave them one choice, either one, male or female...

Jen finishes my thought, “It's going to be a female every time.” I add, “Because of the belief...I think that's what he's getting at... But he's not saying it’s the case every time.” Jen questions
Steve further, “but you're saying but you kind of are saying that what you've observed and like you're studying…”

Steve: (Interrupting) What I observed was like I didn't believe in that… I was like yeah whatever the girl cop, the guy cop, that doesn't happen, that's just in a study. But when I went to a school I was like holy shit, this might actually happen. It was in front of me and like I saw the people, I saw the students, the bad students disrespecting, the girl teacher and then I saw the same bad students being like ‘yo what up bro?’, to the guy teacher and I was like this actually happens.

Jen: I think that is situational.

Steve: (Agreeing) No, it is situational, but from what I saw I was like, oh shit…There might be a reason why it might happen statistically more often.

I bring this debate to a close by offering the merits of both their arguments to the group:

Just because… objectively it, it's not right. I guess we could say right. It's not fair? But that's not to say that subjectively… and not picking on women, but actually I'll do men too. It's not to say that women don't believe that, like don't believe like that their the job is to nurture or men don't believe that… They might have the belief that their job is to be
a disciplinarian, or to not emotionally attach to children. These dominant roles that've become beliefs in our society, that have (been) perpetuated... in television ... before we even know what ... is going on. Who's the hero when you're a kid? The damsel in distress? (Group agrees)

While there is certainly room for improvement with any endeavor, I feel our first CoP was successful in getting the scholars to not only develop their conceptualization of what beliefs are, but also begin to see how the beliefs of themselves and others can have tangible effects on peoples’ lives. Additionally, I feel the importance of our identity and sense of belonging, to the acknowledgement, and perpetuation of beliefs also came through in our interactions.

**COP Meeting 2**

During the two-week span since our first meeting I asked the practicum students to read Urban science education: examining current issues through a historical lens (McLaughlin, 2015), which truth be told, I had not originally intended. I was reminded of it during our first meeting when the scholars expressed, they had limited knowledge of the various demographic shifts that have shaped out nations’ classrooms. I told them about the “Old Deluder Satan Act (1647), ratified in Puritan Colonial Massachusetts; which required a reading school for
settlements of 50-100 families, and both reading and grammar schools for those with more than 100 families, thus serving as the first documented form of compulsory education in the future United States. I also described how the first large scale cultural discord in classrooms arrived with predominantly Catholic, Irish and European settlers, who needed to assimilate to Protestant school culture. Moreover, I was surprised to find they were entirely unaware, nor had the heard the term “Great Northern Migration”, which of course refers rural southern blacks seeking opportunities in northern cities during a time roughly spanning “Jim Crow” through the “Civil Rights Era.” Given the entire point of participating in the CoP was to better understand such divides, along with the influence of the above events that persists to this day, I felt it was worth dedicating a week’s reading and discussion to the topic.

Other than finding it extremely influential in my development as a scholar, I chose McLaughlin (2015) for two reasons. First, it provides an account of how historical events have shaped the challenges faced by urban science teachers today (p. 886), and summarizes over a decade’s worth (2000–2013) of science education literature concerned with issues of diversity, cultural congruence, and multicultural education. I found this paper particularly useful early on in my program, because it contains an extensive table providing citation information, and
summaries of research conducted by many of the most cited authors in science education today. Despite Jack wondering “Who would ever read it?”, I have no doubt, that searching for, and reading publications listed within that table, has helped shape my research focus, and trajectory. In this way, I thought McLaughlin (2015) was perfect for not only providing these beginning scholars with some understanding of the implications of America’s history of compulsory education, but also served as a resource to help them learn more about teaching science in diverse settings.

**Poster contest.** As I read through the students’ discussion posts prior to our second meeting, I noticed each (except for Steve) had identified and written about unique issues, or concepts relevant to teaching science to high-need students. Considering this, I decided to “change things up a bit” for our second CoP meeting and introduce and element of competition to keep everybody involved. This was done by having a “poster contest” where each “contestant” presented a “theme” using their article and whatever resources they could gather in the time allowed (ended up being 30 minutes). I assigned these themes based on what I read in discussion boards posts. Additionally, I allowed students the freedom to choose another theme if they disagreed with mine, although none did so. They were encouraged to use diagrams, flow charts, organizers, etc., and “lots of
color!” I also advised them that we would be playing for a gift card (yes, the very same Dunkin Donuts card discussed in Paula’s Background), and decided “we’ll all vote on the prettiest one.” James liking what he hears offers me encouragement, “Oh that’s a great idea!”

So with that, the scholars per usual, were actively engaged in the task, asking questions of me and others, carrying on side conversations, and of course giving each other a hard time as I survey the room:

Steve:  (To Jon) Man, you need to get better handwriting.
Jon:    Me? Nobody needs to read this but me.
James:  Students are going to rip you apart.
Jon:    (Squinting, mimicking a student) What is it called?

Noticing everybody is hard at work, and I am simply walking around listening, I jokingly point out my “pedagogical expertise”. “This is called student-centered kids, get to work!” (Laughter) “Look at me student centering you guys right now.” (Laughter). Joking aside, I thought it was important to point out because there were several instances throughout the CoP where the scholars questioned whether student-centered and/or inquiry-based can “really work” in high-need classrooms, and I think the more experience they have recognizing and participating in either can only help them.
As students were finalizing their posters the banter continued as James accused Jack “You cheated!” Jack wonders “What are you talking about!?” James claimed he “can’t be done yet (because) I haven’t even started yet!” Unfazed, Jack answered, “Well listen, I'm not trying to make mine pretty, I'm just trying to make mine literate, ok?” (Laughter). Steve was the first to finish and hung his poster on the wall:

Steve: (Referring to a rocket he has drawn) Yo! So I ascended into space!

Jack: Oh, that’s pretty cool. That’s pretty cool. I will admit that’s pretty cool.

Steve: (Belches Again) Excuse me.

Jon: What is with you man!?

Steve: So I am that rebellious child and got that bad habit from my ex-girlfriend's mother, because she absolutely hated whenever I liked burped and so I'd make it a point when I was over there to like do the loudest, most of obnoxious...

Jon: (Interrupting Sarcastically) And you guys broke up?

(Laughter)

Me: Now you’re that “gross boy.” (mimicking a female voice) Who was that gross boy? He had no manners.
Jon: What was his name again? (Laughter)

Once the students had all hung their posters, I drew names to decide whose turn it was to address the group, with each having eight minutes to do so. Below are some of the more meaningful exchanges resulting from this activity. For each, I first explain how the theme I selected was relevant to their discussion post, and relay the understandings gained as they shared with the group.

Paula’s poster. Paula’s name was the first I drew, and the theme I identified in her writing was “cultural dissonance”. The article chose for the week was Teacher Beliefs and Cultural Models: A Challenge for Science Teacher Preparation Programs (Bryan & Atwater, 2002). This is one of my favorites, and if you recall I draw heavily from it when developing my “framework of beliefs” in this dissertation. Paula related it to McLaughlin based on both suggesting “teachers’ beliefs impact multicultural science education and...teacher education programs should prepare teachers to effectively teach in diverse classrooms.” She described how the lack of diversity amongst teacher preparation program graduates “creates a divide in the classroom the must accommodate for” when working with culturally diverse students. At one point she wrote about a point in both articles she found particularly salient:
One of the most eye-opening beliefs that both articles stated was that teachers believe students from diverse backgrounds are less capable, leading to lower expectations for these students. Teachers make simpler goals and activities for the students, such as book work or lecturing, which removes the students’ voice in the lessons...

During our poster contest she explained her theme (cultural dissonance) in terms of the diminished expectations above, “So it (student/teacher cultural dissonance) causes (teachers to hold diminished) teacher beliefs regarding their culturally diverse students in their class, curriculum, assessments, and ... interactions.” She emphasized that it is possible, “they don't realize it in their head and then (it can) go on to impact...what they teach, how they teach, how they view the social interactions of their students.” For example, “they slow down their teaching, give...like read the book (text-based instruction), or becoming an authority figure because they don’t think the students are capable of achievement on their own.” She asked “Where does this belief come from? Why do they (teachers) think this?”, and surmises from the two articles “they’ve heard rumors and it is what they’ve always been told.”
Using English for Speakers of Other Languages (ESOL) students as an example, Paula also talked about the belief that when students come from diverse backgrounds “their parents were less supportive of their learning”, but offered instead that perhaps “they're sending emails and standard report cards, if they can like interpret it properly, the teacher's going to like read it as, oh they're not involved in the student's life. And really there's just like a barrier…” She also recommended “getting teachers during their pre-service period, like into classrooms of diversity so they can like see for themselves the students' abilities and understand that these differences exist. But it's something we have to like, overcome.” I thought this was a great point, especially considering it was a main motivator behind me constructing the CoP the way I did.

Jon wondered, “Did your article at all go into, um, as teachers possibly gained more and more experience that they may have changed their beliefs, or do they continue with the same beliefs? Paula looked a little unsure, and I jumped in, “Paula, don't you worry about this cause’ I got you!” (Laughter)

Me: The Cohen article, what it talks about quite a bit and what you'll see in society as well and what you'll see in education is, once we get rooted into our core
beliefs of what we think works for us, it’s very hard to get us a deviate from that.

Paula: (Jumping in excitedly) It says you have to challenge it! Like you have to confront them with their beliefs. Otherwise... they're not going to realize they have the belief. You have to like kinda' hit them with it. Otherwise it won't (change). Even if (you do confront them) it may still not change. It's like you've told... you tell them about it... But the first step is like...

Me: That’s what my intent of this is here (The CoP). Whether you know, I change your beliefs or whatever, that's not even my focus. My focus (is) to hopefully provide you guys with a toolbox to think, to examine your beliefs.

Turning back to Jon’s original question I continue,

Me: The problem (with experienced teachers) is, what they (researchers) have found, and why they (Bryan & Atwater, 2002; McLaughlin, 2015), said it, do it with pre-service teachers is because you guys theoretically haven't established...your classroom beliefs...backed by like five years of what works for you or five years and you becoming comfortable. (More experienced teachers) are less inclined to change their beliefs to, to meet
the students' needs. Not to say that they don't meet their students' needs, but they're less willing to incorporate new things that might help them get to that goal. Because we become, it's human nature, we become rooted in the way we do things.

Jon: (Half asking me) I kind of believe that these beliefs are not so much rooted (in) a teacher/student relationship. (These are) probably beliefs that these people had before they even thought about being a teacher. And that's what's carried over? Are we going to get to that?

Me: That’s a fantastic point, right? We keep talking about identity. We're teachers, we're not just bringing out teacher identity... I'm bringing up all the shit that happened to me whether I know it or not, because that's what we bring every day, everybody's got their problems. We say it all the time, right? (Group agrees). They don't automatically melt away... (Referring to James) Or like you said, you can only be... You were in the military so long, that's the way you are. It was a big part of your development. (Agrees). That don’t stop at the (classroom)door, right? They're there. How, why we act the way we do... These belief systems are what
drives our actions. So, even outside of the scope of whether you're doing the right thing, or the wrong thing. Teaching, we're all going to have my own way of doing it just based on who we are.

The exchanges above not only reveal Paula's and Jon's understanding of the power our beliefs, and the need to be mindful of how we project them on to others; but also serve as a good example of how knowledge was often generated during our classroom sessions. The students came each week with their ideas, perspectives, and questions regarding the weeks' reading, and other topics; and it was my job to guide the conversation, provide support where necessary, extend concepts when possible and answer questions when I could. I think it was a system that worked and in this instance we were able to generate understanding of widely held deficit-based beliefs that serve to devalue diverse students; the manner in which such beliefs can be entrenched over time and become part of our identity; and the importance of challenging the beliefs of ourselves and others in order to overcome cultural dissonance. Perhaps more important than all this, was Paula's eyes being opened to the fact that students from non-traditional backgrounds are often seen less capable. A realization worth noting when recalling her privileged background. This receptiveness, along with a
willingness to challenge her own belief systems should serve her well in the classroom.

James’ poster. The theme I identified for James’ board post was “pseudoscience”, because he opened his discussion by calling McLaughlin (2015), “40 pages” of it. He insisted those suggesting a “one best system” of education is failing our nation’s diverse students, are supporting a “straw-man” argument because “there is no, there never has been a one best system in the United States!” He contended:

The theorists that she cited did not perform any kind of controlled study as the learning and development theorists from previous generations did. These theorists should be referred to as ‘hypothesists’, because they do make reasonable arguments, they just haven’t taken that next step to test or verify they are correct.

For the sake of focusing on one problem at a time, I will look past that fact that all the studies contained in McLaughlin’s review needed to meet the criteria of including a research design, data collection, data analysis, and discussion, and were no doubt informed by the perspective of prior theorists. The last part of his statement regarding “that next step”, another claiming these “theorists...did not perform any kind of controlled study”, and one more stating that “McLaughlin
doesn’t actually have any evidence, she uses strong emotional arguments that would make any reasonable person feel good for agreeing with her”, led me to believe James does not recognize the value of qualitative research designs. A stance supported in comments he made during our first CoP when talking about what he considers “pretty typical of the modern stuff” (education research), “It’s just some random opinion. And I honestly, I, I no longer care about random opinions. I, I want some data! We deserve data. We're paying for data. I want data!” And by “data” he means “quantitative data”, or something “measurable” as he put it. I thought it was important I address this misconception with James, especially if he was to become an education practitioner who employs evidence-based practices in his physics classroom.

Having drawn his name this is how it played out in our face-to-face meeting:

Me: James! Let's do it James!

James: Alright. I didn't mean to hijack the class.

Me: No it’s good.

James: All right.

Me: Quick 20 second timeout! Yeah. Uh, everybody saw his post, right? Okay. So, he doesn't, and I'm cool with
it. He dubbed it as pseudoscience what she did in the article.

Jon: Like astrology... (Laughter)

Me: (conceding) Yes... Like astrology.

James: Which thank you for making my point.

There are mixed signals as to how far I got with James in this case. First, James went about criticizing McLaughlin (2015) for not recognizing that the original purpose of school was to “get people out of poverty.” To which Jon replied, “ Doesn’t it say it was to control people?”, to which I add “and establish a workforce.” I spent some time trying to get James to see the difference between the altruistic intent of educating somebody to “get them out of poverty”, and the interest convergence involved when nation building and establishing an economy. A process where lifting people out of poverty is seen as almost an afterthought in the grand scheme of things. After some more back and forth he conceded, “I'll accept that. Get people to work, good people to work, not get them out of poverty. They can be an impoverished but working, I'll accept. All right.” Next, he took issue because “McLaughlin didn’t have an original thought”, and “just tied together other people’s work.” I explained that is what a literature review is, and her “original thoughts” could be found in the discussions and conclusions, which did not seem
to convince him. Finally, we got to his stance that her work is pseudoscience. While pointing to a part of his poster providing a list of “Types of evidence that are relevant”, and listed things that are “relative and measurable... quantitative stuff you could actually measure”. He provided “poverty”, “the learning gap”, “prison rates”, “college acceptance rates”, and “who the hell ends up being successful in life” as examples. “These things are measurable, but they're not being measured in the paper”, despite their being “quantitative data out there but we’re not looking at it.” I offered James the following scenario:

All right, you know, the prison rate is this, the graduation rate is this, and these groups aren't graduating at comparable to this group, right? That's telling you what happens. Cool. We know already know what happens. But as far as education, what good (does) just knowing what happened do for us? As far as education goes... We're not answering questions of what happened in education. We're answering questions of why... it happened so we can fix it? That's where the qualitative, that's where that type of work comes in.

I am not sure I explained the point well enough however, as he referenced how we “changed everything” with “No Child left
Behind”, and how it was time to “look at the data, was it a good change, was it a bad change?” I suggested we know it’s not working by almost every measure, to which he asks, “Then why are we still talking about doing it then?” At this point his time was up and I had to move on to the next poster. Perhaps James will come to value the understanding that can be gained through qualitative exploration in the science classroom. Additionally, I hope at some point he sees it just as important as statistical comparison when it comes deciding what is best for children in the science classroom.

Maya’s poster. In her discussion post Maya stated:

In McLaughlin’s Urban science education: examining current issues through a historical lens (2014), the disparity in education quality among groups of lower socioeconomic, ethnolinguistic, and racial status are explored through the examination of literature containing the subject of teaching in urban schools.

Throughout her post she described how those from socioeconomically, ethnically, and racial marginalized backgrounds are caught in “systemic inequality within education (that) can be traced back to the nineteenth century where educators attempted to assimilate the influx of immigrant children into American society through the public-school
system.” Where she really honed her attention, however, was on how “educational structures and the innate biases within those structures” incentivize educators to “remove ‘trouble’ students and lower performance expectations for them, leading to students exiting school with little to no literacy skills.” A widespread problem she suggested is often present in the form of teachers “removing disruptive students as a classroom management strategy.” She continued:

This system has a positive feedback loop where the education system acts a disservice and these students don’t have the skills or experience for achievement in school and consequently, are not ready for future employment which deepens the criminalization, delinquency, and marginalization of these individuals.

This she contended can become imbedded in marginalized students’ identities, and expectations of themselves. This is the point she used to connect McLaughlin (2015) to her chosen article:

The article I chose to compare the McLaughlin piece to is Young African American Children Constructing Academic and Disciplinary Identities in an Urban Science Classroom by Kane 2011. This article delves into the specific identities that African American students form in urban academic environments and how those unique identities
ultimately contribute to the need for teachers to listen and acknowledge students’ stories and experiences in tandem with observing their actions in the classroom to get the full picture of how these students see themselves in school and specifically science.

In our meeting as I was assigning themes for posters, I half asking, half sharing my thought process address Maya, “Maya, for you I have identity? That’s what I have for you. Even though you had acknowledging students’ stories and experiences. I put (wrote in my notebook) identity but…” Maya agreeing with me “I think that… Yeah… Yeah…” I justify further, “I thought a little more ‘umbrella-rey’?” Maya, “Yeah…”

In retrospect having Maya address the topic of identity with the CoP turned out to be a great decision. She discussed two specific “identities” as outlined by Kane (2011), (i.e., disciplinary, and academic), and caused me to engage in considerable reflection regarding the former. Her conversation centered on an African-American third grader named “Tamara”, and explains what she sees as an interrelatedness between Tamara’s academic and disciplinary identities. Before getting into Tamara’s story she introduced her poster topic:

My main topic was, identity… This article by Kane…talked about…how identity is formed in school… because students
are kind of formulating and reformulating who they are and what their places in the world through their interactions with peers and with (other) students or with their teachers.

Maya recognized and shared the relational aspect of identity building in the classroom, and pointed out it is no different for teachers. That is, different aspects of our “teaching identity” can come to surface based on how we perceive the identities and actions of our students. Maya agrees “Exactly…”, and described what she meant by disciplinary and academic identities:

Disciplinary identity… relied on … identity formed at home. Um, even though they didn't go into too much detail about those identities formed at home, it was more just talking about like a self-ingrained identity that they brought to school with them. Then academic identity of course, being (smart) or not being smart type of thing.

Maya characterized Tamara’s discipline identity this way:

she didn't want to be hollered at and she mentioned this multiple times … The reason why she's quiet in class and behaves well and listens to the teacher, (is) because she doesn't want to be hollered at. Also, that when she tries to speak up or wants to speak up in class with her peers,
that she's afraid of her... peers kind of putting her down.
Um, because they felt like she wasn't adequate. And so that
actually ends up influencing her academic identity...

I asked the group “Have you guys heard the term self-efficacy?
(Some say yes) “Do you know what it means? (Unsure) I briefly
explained which led to the following exchange:

Me: It’s like how, um, you feel you will do at something.
So, let's say students self-efficacy beliefs and when
they say things like, I'm a bad student, I'm a good
student, I hate science, I love science, I'm good at
science. Those are all self-efficacy beliefs.

Maya: And she (Tamara) didn’t (feel she was a good student)

Me: Which by the way, becomes part of your identity,
right? I could ask all of you ‘Why do you like science?
Why are you good at science?’ and might reply ‘I’ve
always been good at it.” I’ve heard pretty much
everyone in this room call themselves a scientist. That
becomes part of who you are. Sorry.

Turning back to Tamara’s disciplinary identity Maya continued:

Maya: No, you're fine... They don't really specifically address
where this fear of being yelled at...But that's why it's
kind of the under her disciplinary identity. It's
obviously something that's brought in and then
unfortunately reinforced in the classroom by her peers.

As far as her academic identity Maya offered:

she does see herself as a helper... within the classroom,
(and) at one point during like a graphing activity... she
asked one of her group mates to come help her and he was
like, well, you didn't help me. So she was like, fine,
yeah, let me come you, and ... felt the need to go around and
help the rest of her classmates outside of her group with
their graphing thing because (she) felt that was her place.

Maya finished by discussing how both Tamara’s disciplinary and
academic identities were intertwined:

so they did kind of allude to her personal life that she
did say that she, she is very obedient at home, likes to do
chores and... to be...I guess, uh, (a) disciplined child. And
so that kind of again is (alluding) to but not specifically
(stating) her place at home is... reflected in the classroom.

What stuck out to me about Maya’s story was how much fear seemed
to drive this child’s behavior and actions. Based on the
information Maya provided, avoiding “being hollered at”, and
harsh criticism seemed to make Tamara a compliant member of the
classroom, but at the expense of participation and learning in
the classroom. This is where I really thought back to my own
time as a secondary science teacher. I can remember many times “well-behaved” students were teased for their disciplinary identities constructed under the watch of “strict parents”. Oftentimes, the object of ridicule, and apparently source of humor, was the less compliant students pointing out they behave if only to escape corporal punishment at home. Admittedly, not that I wanted to see any of students hurt, but I always saw strict parents as a good thing in my classroom. For one thing, it made my job easier, and seemed to indicate that their parents “cared”. However, after listening to Maya, I began to think of some of my well-behaved students, with strict parents, and wondered how it affected their participation, and willingness to take chances in my science classroom. Maya closed out her eight minutes with some recommendations I think bode well for her chances in her future high-need chemistry classroom:

Teachers just need to be able to recognize that their students are unique. They have very unique self-perceptions and it's not just cut and dry... Like, oh, they see themselves like this because of x, or y, you know? It's, it's a complex kind of set of factors that, that contribute to their formation of identity. As teachers, it's our responsibility to recognize these differences... and pinpoint some of these things... Like one student's really good at art, let's incorporate more of, you know, drawing diagrams...
Just being encouraging in general. It can really make all the world of difference, you know, for these students, especially the ones that have been dis-serviced (by) Institutional inequity.

Jen’s poster. Jen arrived at class late (traffic) and did not have the chance to put together a poster. I had however, caught her up to speed on what we were doing and let her know the theme I identified for her, “relationship building”. Jen was willing to “give you the gist of what mine was about, what I wrote about.” Jen began “What I wrote about was, I can’t remember the name of the article and I can't remember who wrote it. It's been a very long week and it was a very long day today.” The article she wrote about on the discussion board was Reversing the “standard” direction: Science emerging from the lives of African American students (Seiler, 2001). In her writing she pointed out how she agreed with McLaughlin (2015)’s criticism of teachers who constantly interrupt the “ebb and flow” of lessons by “correcting behavior that was unwarranted or unjustified” and compromised “the learning experience for the rest of the class.” A practice she referenced specifically to African-American adolescents who she suggested are often “called out based off cultural differences”, further establishing their “position as an oppressed minority.” As a first-year teacher she offered this perspective from the classroom, “What I have seen
are... teachers in my own school taking away from important instructional time to address behaviors that should be blatantly ignored.” When speaking to the group she cautioned “being hard on the kids” does not promote relationships, which “if you don't have that, then it's, you're not going to get anywhere.”

Bringing us back into her school she told us about a coworker:

Jen: We're just going to call this teacher Mr. C.

Jon: (Interrupting) What!? I had a Mr. C he was a great teacher.

Jen: Well, that's not his name, but that's what I'm going to call him...He cannot get control of his class because he never established that (control) from the beginning. And I feel for this man so desperately, because I know that he cares so much, that he wants to do the job, and he genuinely likes what he does... But his kids run all over him and he does it have that, doesn’t have that relationship with them?

Turning the lens of introspection on herself she continued, “It takes time, and I'm still building this with my students, and I know that it's going to take me, I think the entire year.” A reality she suggested is unavoidable because as she shares, “I don't know what class I said it in this class, but this job is
the most unpredictable job I've ever had in my life”, which means:

Everyday … Everyday is different… You cannot expect, you can't expect what happened yesterday to be repeated again the next day because it just doesn't like that. So it's, if they're wonderful one day don't have that expectation the next day, and like they're going to come in and be like wonderful again. It just, it every single day is different.

Jon wondered aloud and shared a story:

I'm wondering and you might be able to answer… I have a friend that's a teacher and at times she will move up with (her) class. Yes. She's an elementary school teacher. (At) third Lunch… somebody mentioned that they moved up with their class. I would think that you would build more of a rapport with your class there. You would know what their strengths and their weaknesses are. If there's any kind of study about them moving up?

I assured Jon that there were in fact studies identifying the benefits of having teachers progress with their cohorts. I also shared a story about a group of students that I got to know in 8th grade, and was able to teach, and develop our relationships all the way up to, and after graduation. I described how spending so many years together definitely afforded me a certain
level of access with them, and other students around school. It essentially allowed me to establish a track record of trust, and commitment, that I think they respected. Jen added her own thoughts, “I’ve already had students ask me to, (move up), and I've had administrators ask me if... I'll move up.” I ask, “Would you move up with your classes?”

Jen: “Yeah. Well… I mean I would, I would still get some of them, but yeah, I wouldn't have the, I wouldn't have the same all the same students (Jen teaches middle school). Another thing too is that if you, if you are good with your students and, and other kids who don't know you see that, they're like, oh she's, yeah, she's, she's cool. She's in the know. They tend to behave more for you.

Me: (Agreeing with her point) Yup. They'll respect you around the school too. Even if they're not your student, and you see some kids doing some dumb shit in the corner, and you yell at them to knock it off... Like they'll listen to (you), because they know who you are. They know that you care about your students, (and) you're not just there to ride them every day.

Steve shared some thoughts a teacher in his placement had regarding this very situation:
He's like, you know... I feel bad for like the bad teachers because they don't have this, but all the students love me. So, if someone starts acting up in my class, I'll hear them be like not here next period. And I'm just like, I feel bad for next period, but it works for me, for us.

Jen turned her attention back to Mr. C.’s situation, and gave her views about what student behavior or words are “worth fighting about”:

It's these kids...they're like...(This girl) blew up, 'Fuck you Mister C!'... I've never not ever had one of my kids ever say this to me. Not that it would offend me. Those things... Things like that don’t bother me because I know it's not like, I don't feel like it's a personal attack against me. But he (Mr. C.)... There are teachers that get so offended by this and it's like, you gotta let that shit go...

Another of Mr. C.’s altercations spoke to Paula’s earlier point regarding of using “removal” as a form of classroom management. Jen talked about how animated he was when he came in her room and told her about how he had one of her students arrested, “Andrew. I put him in jail...” Jen shared her thoughts upon hearing this, “And I'm like, oh my God. He put one of my students in jail because... Okay, we’ll go back. He stole (Mr.
C.’s) phone... But this kid... He steals everything from everybody.”
(Laughter) She then provided Mr. C.’s rational:

He’s like, I’m going to help this kid because somebody needs to do something. And I could see his point of view like where he was coming from. Maybe this is like the stuff that we'll get this kid help... but I don’t know. He was so animated about it, and was like, this was the right thing to do. And I'm like, Oh God, you know? And I came out (of her room) the other day, and one of the students was like, Fuck You Mr. C.!”

I feel for Mr. C. because I have seen quite a few new teachers lose this battle. Not only is it a futile venture, but now this student who is struggling to adjust to school classroom expectations, will spend more time away, and will likely return holding more of a grudge. A situation, which if not resolved can linger as potential conflict throughout the school year. Jen closed our discussion by sharing how she feels about her students with the group:

I have not had, I have had kids that are extremely challenging, but I don't have one bad kid...Not one...Not one. I mean, like my fifth period and my eighth period classes, they're off the chain. I mean getting through. There are
days when we get where we get through bell work and I feel like it's a success. (Laughter)

Ending our class I congratulated everyone, “Good job peeps”, and with people collecting their things I remember “Oh wait we have to vote!” I am not sure if what happened after would be considered a vote, but as luck would have it Steve would be receiving a gift card to purchase “tea and pastries” from Dunkin Donuts. Given how prominent he has been in conversations thus far, I wanted to include the voices of other CoP members above. Just know his inclusion of a concept diagram, “three-dimensional model” (using the very term loosely), a “rocket ship”, and “plenty of color” were too much for the other contestants to overcome.

**The Noyce Scholar Panel and Discussion Board**

At the beginning of the semester the professor of record informed me he would need to miss one of the five scheduled meeting times. Seeing as we met on the same dates, but in different locations, he asked me if I would mind leading a combined undergraduate/graduate section that week. This posed two problems as far as my research. First, trying to incorporate 19 people into our CoP and journal club for a single week did not seem feasible. The second was, even if I did somehow figure out a way to pull an expanded journal club, none of the
undergraduates had been through the IRB consent process, and I would not be able to use their contributions in my research.

Instead I decided we would hold an in-class event. Which came to be known as “The Noyce Scholar Panel”. While it is true, I intended for the Noyce CoP to engage the scholars in literature, and discussion that would help recognize and address issues in diverse science classrooms; I also wanted the CoP to foster supportive peer networks amongst the scholars. In line with this later focus, the panel was a small event where we invited three first-year science teachers (Two former Noyce Scholars, and another recent USF graduate) to come to our combined classroom, share their experiences, answer questions, and interact with the pre-service teachers in the practicum course. We served pizza, soft drinks, snacks, and had gift bags made for the teachers, who were willing give their time, plus fight traffic on a Friday evening, to be with us after teaching all week.

Even though I knew we would not have the chance to discuss it in class, I still assigned the journal club an article to read, relate to another article, and post on the discussion board. The paper I chose for this week was *Pathologizing the Language and Culture of Poor Children* (Dudley-Marling (2009). I selected it in order to familiarize the scholars with the notion
and influence of “deficit-based discourses”, and/or deficit-based perspectives (Dudley-Marling, 2009). I thought it might help the crystalize some of the ideas they raised in our prior meetings such as: Jack’s discussion on how teachers and administrators projecting negative beliefs onto black students, contribute to them engaging in a self-fulfilling prophecy; or Paula’s realizations regarding teachers holding diminished beliefs regarding their culturally diverse students. If anything, I thought it might give them the “words” for things they may see in schools. Hopefully, this exchange between Jack, Jon, and myself will explain what I mean:

Jack: (Talking about ELLs) The disconnect between teachers’ and students’ cultures, which is cultural dissonance. I just didn't have the nice word. So yaye!

Me: Isn’t it great that you have the words?!

Jack: Yeah!

Me: (Showing off) Also, cultural incongruity, cultural disconnect, a lack of cultural synchronicity… There’s a bunch of them.

Jon: I feel like an English language learner! (Laughter)

Jokes aside, I feel having “words” for the interactions they are likely to encounter in diverse classrooms, will allow them to
gain a fuller understanding of situations, conditions, and their students.

I do not find it is necessary to go through each of the discussion board responses to the Dudley-Marling and Lucas (2009) article. For one, a lot of it is them communicating the ideas in the paper, and such information is probably better coming from the source. However, another, and I think more promising reason is, without any prompting on my part, the Noyce scholars incorporated many of these ideas in their ideas and conversations in our final CoP meeting. This to me indicates during the week of the panel, they independently engaged in the literature, and did so at a level where they were applying what they read to things they had experienced, and/or were seeing in the classroom.

**COP Meeting 3**

For the final entry of our journal club I actually assigned two different but related research articles to be addressed on our online discussion board. The first, *What does playing cards have to do with science? A resource-rich view of African American young men* (Schademan, 2010); examined the resources (skills) young African American men developed and utilized playing the card game Spades, which have many similarities to the practices we use it the science classroom.
Schademon (2010) recognized that when playing this game these high schoolers made observations, drew inferences, and made evidence-based decisions regarding their future actions. He describes these as “fertile ground to nurture pedagogies in science education” (p. 377), and recommends educators take a “resource-rich view” (p. 362), that values, and uses what students “bring” to the classroom.

The second article Cultural Resources of Minority and Marginalised Students Should be Included in the School Science Curriculum (Chigeza, 2011) was written in response to Schademon (2010), and expands on his use of a resource-rich view, and suggests the need to adopt a “capacity building perspective” (Chigeza, 2011, p. 401), that promotes a sense of agency, and rejects deficit models by affirming the language, experiences, and knowledge of marginalized students (Chigeza, 2011). He builds his argument around a heat transfer lesson he conducted with 9th grade Torres Island Natives, which centered on the building and understanding of a “Kup Mauri”, which he describes as:

A Kup Mauri is a shallow hole on the ground with a layer of smooth rocks. You set a wood fire to heat the layer of rocks to high temperatures. Heat energy transfers from the fire to the rocks. You wrap the food in coconut or banana
leaves, or aluminum foil. Normally meat (e.g., pork) is put next to the hot rocks and vegetables at the top. (p. 409)

I chose these two articles because I thought they would benefit the scholars in two ways. First, it was an opportunity for them to see how researchers identify and make sense of the cultural resources students bring to the classroom. Additionally, it is a nice example of scholars building on the work of others to move the field of science education forward. However, I did not simply have everybody read both papers, and instead used a random list generator to assign the reading in the following manner: Schademon (Jon, Marie, Paula, and Steve), and Chigeza (Jack, Maya, James, and Jen). The former would eventually be called “Team Shady”, and the latter “The Chigezas”. Although the potential of having Jack’s disapproving glare fall on me was certainly a consideration, my experience with the previous Noyce CoP, taught me to be weary of “overwhelming” these students with a “bunch” of reading. I saw it as a “less is more” approach, where they could focus on a single piece of research, and extend their understanding as they collaborated with others to bring forth the ideas in their respective articles. Below, I convey how this “looked” in our meeting, and present three instances where our collaboration focused on the ways we determine what we value as far as knowledge, culture, and resources.
I pressed record, and began our final CoP meeting, “We’re rolling!” I present Steve with the Dunkin Donuts card I promised him during our last meeting:

Me: Steve! Good job! (Tosses gift card)

Paula: Winner, winner, chicken dinner!

Steve: Getting some ‘Dunks’ tomorrow morning!

The scholars kept me busy with questions regarding their reflection papers. Referring to the course syllabus posted on the screen I instructed them, “Alright, put all this stuff in there and we're going to go six pages, double spaced. That's not terrible.” They approve, “Mwah!”, “That is perfect!”, “Nice!”. I instructed them to “not make it crap”, and to have it to me by rapper “Jay Z’s Birthday” (December, 4th It’s a the title of song by the way), before once again clarifying things on the course page for Jon who had accused me of not posting survey links on the site, the only “logical explanation”, as he couldn’t find them:

Me: So now that's out of the way now to shoot down Don

(laughter)

Jen: Oh... My favorite pastime...

Jon: What are you finding for me?
Me: The links that I sent you guys. I sent you guys a link!

Jack: (Notices Jon’s confusion, and starts laughing).

Jon: I'll do it now!

Me: You don’t have to do it now.

Jon: I’ll do it sometime this weekend. I don't have a problem with doing it! I just don't know. I haven't seen any links before.

Me: It was like the first week of class, first day maybe...

Jack: But also you didn't even know that we had to do the discussion posts, so...

Jon: Yeah... (Laughter)

Jack: You were just really out of it at the beginning of the semester? Man! (laughter)

Jon: I’m old. (Laughter)

Me: He’s like ‘I’m old.’

Jon: I think it’s dementia. (Laughter)

Jon did not in fact complete the surveys “now”, or “sometime this weekend” as he indicated in class that day. However, he was nice enough to do so months later when I was compiling my data.
and reached out to him via email. Not that I mind, it was nice to catch up with Jon for a bit, and told me he looked forward to seeing me at an upcoming event, and I responded in kind.

Resource-rich view and capacity building perspective. I advised the scholars that we would be “doing a little organizer”, which was actually done on 36” by 42” chart paper. I reminded them of Schademon’s resource-rich view and Chigeza’s capacity building perspective. Hurrying to draw a sample organizer on the white board I explain:

Me: You guys as your groups, are going to come together…
(stopping to draw)

Jack: Not right now, in a few minutes, bud doomp, boomp …

Steve: (Sings) Come together… right now…

Jack: (Stopping the music) Um… Actually, he said in a few minutes! (Laughter)

Rejoining the discussion, I instructed them to “come together as teams” and “tell me what you think” a resource-rich view, and/or capacity building perspective is. I tried to clarify, “If you bumped into to me, and I was like ‘Hey! Tell me about this capacity building perspective!’ (Laughter), what would you say?”

I summarized, “I want you guys to come together, and come up with a ‘definition’. Below this definition I instructed the members of each group to use a bullet to summarize how the
article they chose connected to either Schademon (2010) or Chigeza (2011). Just as I finish Jen hurried in:

Me: You’re just in time! What’s up!?

James: You’re here early today.

Jen: I left straight from school.

A short time later Jen’s teenage daughter visited the classroom briefly, and she assured her, “whenever we take a break I will go get you some food.”

Jon noticed a “typo” in my research notebook, and mistakenly accuses me of knowing his name:

Jon: So, here’s the issue.

Me: What’s up?

Jon: See, because I’m looking at the schedule (something I scribbled down in my notebook), and you’ve been sending shit to Ron! (Laughter)

Me: No! No! No! It’s Jon, I even put you in my notebook as ‘Big Jon’.

Jon: Maybe that’s why I don’t get stuff.

Me: No, no, because I do it through the course....

Maya: Excuses, excuses, excuses. (Laughter)

Me: (Shaking head) Get it together Ronny. (Laughter)
I know I shared part of this story earlier, but figured I would provide it in context. Back to the meeting. The groups were busy working on their organizers, and once again I moved around the room, observing, offering clarification, and answering questions. Jen half thought aloud, and half asked me, “so capacity building is taking, taking, using their culture…” Pointing to her group’s chart paper instructed her to “do it here, I want to get you guys’ ideas (before) we get too far ahead.” Collecting her thoughts, “so, come together to find either the resource-rich view, or capacity building perspective…” She is interrupted by Jon, “You Chigezas are loud man!”, and fired back, “You Shadies ain’t working!”

As I circulated I heard students carrying on conversations, trying to define and make sense of their respective approaches. One in particular is noteworthy, especially considering it occurred as “The Chigezas” tried to make sense of the capacity building perspective and valuing the culture of others:

Jack: So, I'm going to read what they have right here. A capacity building perspective acknowledges the multiple strengths that minority or marginalized students, they marginalised with an s, which I really hate, students bring to science classrooms and serve the larger purpose of social and racial justice.
Jen: But what you have below it, he has it. But I should, I should define using students’ elements of cultural resources suggest and attempt to help a student negotiate... Okay, wait, hold on. There’s more to this exactly fits it.

James: It's just, it's just using what they, what the kids are already know.

Jen related this idea to socio-scientific issues (SSI) (Wessel, 1980), “From their community... Taking issues that are related in their home life and in their community and bringing it into science. Yeah. Yes. Socio scientific issues. I mean...” James challenges this point using an article he read about medical practices in an aboriginal community:

James: Well socio-scientific issues (aren’t) necessarily... like SSI is something that's debatable but either side could be right...I read an article... on the aborigines in Australia. Maybe we all did I don't know.

Jen: Wait... What is this?

James: I read a historic article, on ah aborigines... Their like, idea of medicine... In terms of medicine, completely bat Shit crazy. There is no, there is no....

Disagreeing with James’ assessment that these people are “batshit crazy”, Jack challenged his opinion, “According to like
your own perspective. Like your...” James seeming to miss his point responded, once again falling back on his old friend “evidence”, “According to evidence Right? According to evidence...” Jack still not backing down asked, “From your perspective, or evidence?” James further tried to defend his position, as Jack stood by his:

James: Like if you got sick, that meant somebody cursed you.

Jen: (Seeming to be processing it all) Okaaay.... Right, right, right, right...

Jack: I mean I just don't think that's bat shit crazy. I think that's just different cultures.

James: Ok you’re right It's not crazy, but it's not based on evidence.

While I am glad to see James sort of came around on his harsh criticism of these people’s culture, his contention that their medicine is “not based on evidence” did not sit well with me, or others in the CoP, as was evident when this conversation was picked up again later with the entire group. Somehow James and Maya got on the subject of his opinion of aborigines and their medical practices, which at this point had “progressed” from “batshit crazy”, to them having “no freaking clue”:

James: My article. Is it because aborigines they really understood the circulatory system, I'll give them that,
but other than that, they had no freaking clue... Like you’re not even on the right track in terms of real medicine...

Maya: (Presses him) Don't you think in your view it might not be completely correct... You can still be like this is how this scientific concept might relate...

I see Maya’s comments as encouraging James to recognize that perhaps he should not consider that these individuals have no current knowledge, and instead suggest viewing their current understanding as a foundation from which to build, versus a decrepit vestigial structure that must be destroyed before progress can be made. This to me would amount to enacting the resource-rich views championed by Schademon. Additionally, if this approach was introduced in a manner that included aboriginal ways of being, communicating, and learning into the knowledge building process, this would in my view progress to the implementation of a capacity building perspective. Where the former (resource-rich view) recognizes the resources that in this case the aborigines bring to the table, while the latter (capacity building perspective) includes a sense of agency that makes the aborigines part of the knowledge construction process. Or as I tried to simplify for the scholars, and relate it to the classroom:
So, like, so the, the story of, you know, I can, I can fish for you, give you a fish, but if I teach you to fish, you can eat every day. That type of deal. That's what that's about. Empowering students become a part of the classroom.

Moreover, as he is want to do, and I have mentioned, it appears James once again only considers one type of “evidence”. However, Jen and Maya, did what I think is a great job dispelling his notion of evidence:

James: Referring to aboriginal medicine) If an enemy of yours had a magic charm... So, if you’re a witch doctor and they took a big bone out of you...

Jen: So, there's a lot that goes into the power of believing and like positive thinking...

James expresses disbelief in the power of beliefs, and contends they have no physical affect, and that “positive thinking” cannot heal individuals:

James: Yeah, yeah, yeah, yeah... So... for self-limiting things... I don't know, what do you guys think? (To the rest of the group)

Jen: So, I think that there's relevance to that because it also shows the importance of communicating...Maybe with other villages and other people throughout the
community… So that you can learn more about other ways to cure... Do you understand what I'm saying?

Maya: (Maybe) this is just common practice, when somebody is sick in this culture this is what they do... Look at their types of medicines and what is done for those same type of symptoms so you can relate to that... you know... when somebody in our culture is sick with these symptoms, this is what is done.... So then now I can see how western medicine goes about it...And then they I (the aboriginal doctor) can later say.. Oh, I see these symptoms and I have more options at to what is done... Not to just pounce... But just to be able to relate that back... (to their traditional knowledge).

Jen: On top of that... Here... Why don't you take this pill and come back in two weeks?

James: Science is based on evidence, so that ain't science...

Jen: Well it's not western science.

James: Well it's not, it's not, based on evidence though...

Jen: Then why would they continue to do it? Why would they continue to do the same things over and over again, without some...

James: Because it doesn’t work.
Jen: But they believe it works! Do you know what I'm saying?!

Jen made a great point here, by asking “why would they continue to do it?” Here I think she is indicating that they (the aborigines) do have some “evidence” that the treatments they are prescribing do have some level of success, because why else would they keep going back to it? In addition, I feel she provided a solid contradiction to James’ narrow view of evidence when she opposed his stance that this “ain’t science”, with her assertion that “well it’s not western science.”

James’ response involved him relaying a story of how the “researcher” was able to confiscate a “bone”, that was “extracted” from a patient during a ceremony, and it turned out to be a stick:

Like a bone from a dead person. Right. Had gotten into you and that's why you're sick and you had to remove the bone to get, well the witch Dr. Guy would suck the bone out and go, look, it's the bone! ... (T)he other guy, the, the guy doing the research asked one time... Hey, can I throw that out for you? And so, he took the, took the bone and threw it, but he didn't throw it. He (had) like, you know, pocketed it... It was like, oh, it's just a stick. It's just a piece of wood and there's no way the witch Dr. Guy
thought that he got a real bone out. Right. I mean, he knew that what he was telling the person wasn't what was actually happening.

This caused him to determine, much like with the Carter, Begin example, something underhanded must be at play, and they continue to use practices because “there’s a witch doctor that makes a lot of money.” Although I question how much capitalism has a hold on aboriginal society. Ultimately, he decided the aboriginal people “were being swindled, they were being actively swindled.” I countered this with the following:

Or perhaps he doesn't consider it like it's not in his thought process to conduct statistics to see if his means are viable. Like perhaps this (The ‘bone’ extraction) is how he's always been taught and perhaps sometimes it has worked. So, he goes with what knowledge base he has. My point is, and I'll let you go, it's like, it's not necessarily vindictive. Not being exposed to a body of knowledge does not necessarily mean... An act of, you know, I want to say unkindness, (malice) but whatever, you know what I mean? Something negative.

Although we ended up ultimately disagreeing, James to his credit, and as was often the case, remained open to my alternative take on the matter and offers, “maybe you're right,
you're like, oh yeah, that's part of the ceremony. They have to believe that or whatever.”

While I disagreed with James regarding both the Carter situation and this one here, I do recognize there are people like him who tend to air on the side of self-preservation, even if it means vilifying the motives of others. However, that is perhaps the biggest lesson my interactions with him taught me. That is, this process showed me how much value can be afforded from differing perspectives, even those with which I vehemently disagree. Here, earlier, and in numerous instances throughout the CoP, James brought forth ideas that differed from pretty much everybody else. However, I can honestly say, the conversations, disagreements, self-reflection, and new understandings generated as we discussed his opinions were among the most valuable to occur during the Noyce CoP.

Soon “Team Shady” and “The Chigezas” were done with their organizers and were ready to share their ideas regarding the resource-rich view, and the capacity building perspective. Beginning with the team who examined Schademon (2010) I asked:

Me:  Alright so what do we got for resource rich view?
Jon:  As in definition?
Me:  Yeah, yeah... Give me that...
Jon: Utilizing skills from your daily life in the school setting. So, activities that you do normally, but using those skills to promote yourself in school.

Steve: (Add) Bringing in the experiences of just normal everyday activities that most people would usually look down upon and or not applied towards the school setting and being like, Nah, they apply.

Me: I liked....

Jon: That’s pretty much what the whole article was about.

Me: Well Ron.... (Laughter)

Jack: Oh Ronald...(Laughter)

Me: (Continuing): Well I like your definition because you brought up a good point... about the children's...Students’...Whatever...Recognizing these skills that they can use in the classroom... That's what's hard, that's our job, right?

I provided an example from my own time in the classroom:

I can't think of one time where I was talking about percentages with my high school kids that I didn't bring up basketball... I've even had them play trashcan basketball... to get percentages because that can be such a tough thing... Then...they realize...they're using some skill that they have,
same thing with the paper footballs. You can do that too, you know what I mean? Of course, they're going to yell and scream whatever but it's fun. So, I liked that (about their definition) and I liked that the kids are, you know, the ones recognizing the skills.

We then moved on to defining the capacity building perspective:

Me: All right. Uh, capacity building give it to me...

Maya: Taking cultural content from the community and applying scientific concepts... So that they (students) become a part of their own education, promote self-efficacy, and ultimately empowering (themselves)... It sounds very SSI like where you have this framework work of relevance to interweave concepts as opposed to the other way around where you're just taking science content and just trying to stick random, you know, maybe culturally relevant points. You're framing it differently for students and instead of, um, having that deficit model of you're different and therefore it's bad... you're not bringing what we need to the table in terms of like academic language and academic skills. (Instead recognize) Your (students) are bringing something to the table... bringing some sort of, um, wealth, and we should be utilizing that to
empower... To (recognize)... the scientific skills that (they), pretty much already had. Just... Connecting those, those things together... pretty much.

As it should, their definition relied heavily on the use of student culture as a framework for promoting creation of scientific knowledge in the classroom. I used this opportunity to discuss what I see as a difference between culturally responsive teaching, and culturally relevant pedagogy:

As teachers... What are you doing in the class? You're putting out fires. You are responding to shit, right? So as cultural issues come up in the classroom, you, you, are responding to cultural interactions in your classroom, right? Now ‘culturally relevant’ should be with pedagogy, all right? That's a long-term process, not something that's going to change day to day...

I tell the students that although it seems arbitrary, much like with our previous discussion of “racist vs. prejudice”, I pointed out the how confidence in an area can lead us to pursue additional growth in that area:

I wanted to make that distinction so you guys are sure (of the difference between culturally responsive teaching, and culturally relevant pedagogy). Because you’re (going to hear the) back and forth... And what happens is, at least for
me anyway... When you hear them (the terms) just being flip flopped, you think about it less... it doesn't carry the same weight and in your teaching, if you're not clear, in what you... Just like anything else, if you're not confident in it. You're not going to enact it. Right? So, like the sense of it, you should be looking to develop as a culturally responsive teacher who enacts culturally relevant pedagogy. Okay. Those are those two distinctions...

Jack: I really don't understand the difference.

Me: Responding is an action.

Jack: Okay...

Me: Right. Actions in the classroom, and we've talked about beliefs and actions... Beliefs drive our actions and what determines whether shit hits the fan in our classroom or not. Our actions, our students' actions, and how we manage that, how we respond to those.

Jack: (Getting it now) Okay.

After responding to that situation, I moved our discussion back toward explaining how the capacity building perspective differed from the resource-rich view:

Now the difference between that over there (pointing to the poster with resource-rich view) is... The capacity building a
perspective, at least in my estimation, and I've read that article a bunch of times and I presented a bunch of times... To me what the difference is, is that empowerment you (The Chigezas) talked about... you guys were in your own conversations... So, with the capacity building perspective, you’re building capacity... Like building lung capacity, right? We do sprints... (Referring to Steve) Spor-teeee!! (laughter) Like, you do sprints right to build up your lung capacity? So then later it's easier to run... Same thing...

Jen understanding my point aptly related it to her experience:

Jen: It's the same thing with our education here right (in the CoP)... now... because I'm definitely brighter and more intelligent...

Jon: (Teasing) Well... (Laughter)

Undaunted Jen continued, “I have the verbiage now that I didn't have before and the knowledge that that goes along with that.” Extending her thought I added, “because we're constructing new knowledge, right?”, to which Jen agreed, “Yeah.” I related my “wind sprint analogy” to Jen’s situation, “So it's almost like, you (have) built some lung capacity right?” She agrees, “Yeah.” I suggest that, “now... when you're going into a school, you’ll have energy to do other things. You’ll have energy to run sprints or to get fast at your sprints, so to speak. Right? And
that's what the capacity building part...” I moved on to focus on the aspect of the capacity building perspective associated with student empowerment. I drew a cartoon fish on the board:

Maya: It's cute.

Me: (Talking to my fish): You should be happy... (Draws a smile) There you go buddy. (Laughter) So, there’s, the story of, you know, I can, I can fish for you, (and) give you a fish, but if I teach you to fish, you can eat every day. (It’s) that type of deal. That's what that's about. Empowering students become a part of the classroom (Teaching them to 'fish' for themselves).

Having covered the resource-rich view, and capacity building perspective in some detail, it was now time for the scholars to share their bullet points relating their chosen article to these concepts. In particular, below I share the discussion around Jack’s, and Jon’s bullet points, which centered on language-based oppression, and cultural responsivity in the classroom.

**Jack’s bullet.** Jack’s bullet was in reference to a book chapter he shared on the discussion board from Language and Culture (Kramsch, 1998). In his post he borrowed from Kramsch and wrote, “Language is the most sensitive indicator of the relationship between an individual and a social group” and presents the following stance regarding linguicism:
Linguistic cases in which a country’s majority culture is nationalist, linguistic prejudice and discrimination (and therefore cultural prejudice and discrimination) are prevalent. Ultimately, (this) leaves those that do not exist within the majority’s speech community as being considered “barbaric”.

Jack summarized his post by emphasizing two points from the literature, the first was:

It is important for science educators to be aware of how non-majority languages and cultures are socialized and to be active in unlearning harmful prejudice...[And] It is important for science educators to do more than just “be aware.”

The second of these of course, followed Chigeza (2011)’s call for a capacity building perspective that not only recognizes the cultural capital students bring to the science classroom, but also, ensure they are affirmed in a manner that provides students with sense of agency, and empowerment.

In our meeting Jack shared that he found Kramsch (1998)’s ideas relevant to Chigeza (2011) because:

he was using the example of the Kup Mauri Ovens. He incorporated creole words into that...and basically... What like Kramsch was saying was... cultural and linguistic
imperialism has kind of made it to seem where it's like these other cultures... they're seen (as) lesser... Like more barbaric is the term that Kramsch would use...

Describing his though process further, he said he wants to get across that:

Incorporating...culture... is making it like, okay... What we were talking about earlier... Where it's like you guys got on me because I said like bridging the gap or something. It's not like there's a gap. It's like, you know, it's just everyone has a different culture and we don't need to like...We don't (need) to bridge anything. It's just like you have your own way so...

Jon and Jen jumped in:

Jon: You’re allowed to have your own thing, and it’s ok.

Jack: Yeah, exactly. Yeah. You don't need to speak with the, the accepted words, scientific discourse, you know, or western scientific discourse. I should say...

Jen: You know what I thought about the other day? Language evolves and changes over time.

Jack: Yeah.
Jen: And (it’s) every single culture. I mean ours is fucking changing for the worst right now... But it’s changing...

Me: (Jokingly to Jen) That’s quite a deficit perspective...

(Raucous Laughter)

At this point I wrote the word “epistemicide” on the board. Jack, “Quite a word.” I explained that epistemicide is essentially what Jack was talking about, and broke down the word, “epistemology, the study of knowledge, like the construction knowledge... and then, of course ‘cide’ killing it.” I explained how we can potentially be guilty of epistemicide as science teachers:

(Epistemicide) It's like that whole entire knowledge base is crushed and you can do that... with kids...you know what I mean? Devalue in a sense and engage in epistemicide when (students) come in and they have a different way of talking or being or things like that.

Jon asked me, “But don't you think that... in science and math and a lot of coursework that is, it's almost like its own language and you still have to learn that language in order to function within?” I replied as earnestly as I could, “Well Ronny, the thing is... (Laughter), you’re right, you’re dead right.” I then referenced something Maya had brought up earlier, “But the
problem is, and what Maya was talking about...the normalized standard...” Prompting them to think in a historical context I asked, “Who wrote this language?”, It was... you know, white men from Europe back in 15 hundred probably earlier, right.? So that is like the language ... So that’s what we're trying to get these kids to subscribe to...” I continued that we (educators) must consider more, “the disconnect when we're trying to jam these kids in there and teach them the scientific language? It has to be a consideration. I don't think if it's not given enough of consideration that I've seen in classrooms.” Jack provided some of his experience surrounding science teaching and language:

Jack: When I'm tutoring organic chemistry... for example... A lot of the students, they don't tend to use the language that's used in the courses. For example, when you're saying like something attack(s) (something else) .... They'll say, oh, so this goes over here. You know what I mean? And like you know, you could correct them and be like, oh well it's like you, you should say oh this attacks. But it's like how much is that going to help them if they understand the point you know what I'm saying. That's all that matters.
Jon: You still have to be able to communicate to...not just your peers but like if you go to China or you go to Germany, you know, carbon is still, carbon, you know...

Jack: Of course, there's stuff like that, but there's also like, like it shouldn't be that they have to sound like a scientific journal when they're describing something, if they describe it in their own way, as long as they understand. Exactly. Like with my example, with the attack... It's not like the molecules are actually attacking each other. That's just like the accepted language. Do you know what I mean? So, saying, oh it goes over here. Like you know, what's the difference?

Steve: I didn't know, attacking was the standard language. I almost got a doctorate in it.

Me: I feel old now because I hadn't heard attack.

Jack: A nucleophilic attack...

Steve: Oh Wow. No, I've never heard of. I've always heard nucleophilic reaction or tendencies. not attack.

I used the word “attack” to segue to Jon’s bullet, which resulted in a group discussion regarding cultural responsivity in the classroom.
Jon’s bullet. In his final discussion board post, Jon related The Educational Benefits of Video Games (Griffiths, 2002), to the resource-rich view discussed in Schademon (2010). He also cited Nasir (2000; 2005), and Shapiro (2015), as he made his case that:

the use of games in and out of the classroom have secondary effects on the student other than pure enjoyment. By employing the right games as a tool for education, students will improve many skills needed to succeed including math, language, social, crossing demographics, inferences, giving and following instruction and maybe most important setting goals and objectives.

In our CoP meeting, Jon centered his thoughts on video games in the classroom around the social interactions they facilitate, and suggested age is a factor in not recognizing their benefits, “older people who don't play video games have a very uh, uh, bad opinion of kids that sit there and play on their video games”, and wondered, “How do you know what this kid (does or) doesn’t get out of (it)?” Incorporating some parental experience, he continued talking about how video games “have a lot of social interactions... I don't know if you've ever heard, like your kids sitting there and talking about Fortnite, I mean they just go off!” A game he thinks promotes “social interaction because they
have something in common.” To illustrate his stance to the group further Jon shared what he felt was a “really good” example of this (and I agree), Pokémon Go:

as far as improving reading skills, because some of the words in there are, there's like 700 different characters and these kids have them use memory skills to remember what the characters are and what they do. They have to be able to read these funky names I can’t understand half the time... But again, it goes back to the social skills because now they get together and they start talking about, okay, this one did this, this one does that. It's just like a big, uh, a big classroom fun...

I liked his example because Jon not recognized the practices these children are engaging in that are applicable to science (memorization, categorization, and communication), as well as the classroom in general as they collaborate to construct new knowledge. Jon concluded, “The kids already love the video games, so let's bring those in because they're, it engages them... and they're already enjoying it.” I agreed and asked the group a question, which led to a discussion that allowed CoP members to gain greater understanding of what “culture” is, and its evolving nature, “Is using video games in the classroom culturally responsive?”
Jen: No, I don’t think so.

Me: Yes or no…

Jen: Like as in, their teaching, they teach. They're culturally okay. Can you, can you, can you expand on that for me?

Jon: The way I look at it is… This generation of children moderate, their own cultural relevancy Jen, just talked about it.

Jack: I've been called a fag a couple times on video games (online). So, like, I don't know how culturally, tolerant they are...

Jen: I think I'm misinterpreting this. Like so. I don't know. Culturally representative. I don't because I don't believe that they are...

Me: Well, culturally representative… I know what road you're going down. Like are they representing all cultures (in the game). That's not what I'm saying.

Jen: Oh... Okay...

Me: Marie, you say yes, what do you got?

Marie: Oh, I see this because a lot of like a middle school high school kids, a lot of them play video games and I...
think as a teacher, if you bring in things like who you're responding to, them and their culture.

Me: Yeah.

Group: Ooohhhh...

Marie: Not necessarily mine....

Jon: Not black or white or Hispanic you are responding to your students as a culture...

Me: Exactly.

Jen: They are the culture... ok I got it...

Steve: Like Fortnite is a culture.

Before moving onto the next person I closed this exchange by offering the scholars the following thoughts:

We've got to think of our classrooms as micro cultures, right? You go in other people's classes, they got a different style of teaching... There's going to be a different culture in their classroom. So, yeah, Marie you hit the nail right to the head. We talked about the talents, the skills that kids have plus the interest, so it's really no difference whether what no point of intersectionality you're looking at. It's all about accessing the preexisting experiences and making it work.
I find this exchange meaningful because it is an instance where the Noyce CoP collaborated to challenge the notion that “culture” only applies to non-white people. Moreover, it afforded understanding regarding the elements of students’ identities, teachers must consider when constructing their classroom culture. In a broader sense, our final CoP meeting can best be encapsulated by the term “value”. We explored what we value as knowledge, as was the case with our debate surrounding aboriginal medicine; we considered what is, and is not valued culturally, a conversation, which if you recall, centered on language; and finally using video games, we looked at how we value resources students bring to the classroom.

My intent in this chapter was to use elements of portraiture to bring the reader “inside” the 2018 Noyce CoP meetings, and afford them a sense of how we interacted with, and learned from, each other. In the next chapter I summarize my interpretations of what took place during the Noyce CoP by presenting general themes of the scholars’ beliefs in the areas of identity, home-life, and sociocultural-interactions. Additionally, I use these themes as evidence of the success of the 2018 Noyce CoP, provide a metaphor depicting how I see ideas, and understandings from the CoP playing out in middle and secondary science classrooms, and conclude by tying it all back
to my research question and conceptual framework outlined in chapter 2.
CHAPTER 5: DISCUSSION

New Teacher Beliefs

Throughout the CoP I was encouraged by the willingness of the scholars to engage in recognizing, critiquing, and challenging belief systems that have come to construct our identity, and social standing in the world. This includes the science classroom, where I was equally emboldened by the level to which these new teachers were willing to consider how the confluence of theirs, and their students’ identities, home-lives, and ways of being and interacting, influences teaching and learning. They readily shared, explored, and developed beliefs in each of these areas (and others), not only in the conversations I shared in chapter four, but also others not included in this dissertation. In the remainder of this section I provide my interpretations of these new teachers’ beliefs, as derived from my experiences in the Noyce CoP, writing this dissertation, and reflecting on all of it throughout the process. I accomplish this task by first, constructing my three themes of teacher beliefs (i.e., (identity, home-life, sociocultural-interactions, and science teaching and learning);
and then using what I uncovered to describe what occurred during the 2018 Noyce CoP (i.e., my quintain).

**New Teacher Beliefs About Identity**

Conversations, and writings lending understanding to how race, gender, ethnicity, orientation, ability, SES, formative setting, and language, shapes the views and beliefs of CoP members were coded as “Identity”. The instances I draw from to develop my theme of the Noyce scholars’ beliefs about identity and science teaching and learning are summarized in the Identity Beliefs Matrix I developed (Appendix H). It includes the source of these exchanges (i.e., did they occur in face to face meetings, reflection papers, discussion posts, etc.); the participants involved; an abbreviated context for these exchanges; as well as their relevance to this theme of new teacher beliefs about identity, and science teaching and learning.

The CoP delved into issues surrounding identity in four ways: 1) the recognition of their own identity, and factors that shaped its formation; 2) the role of identity in our meaning making processes; 3) how societal forces and stereotypes have an impact on identities; 4) and the association of disparities in education, and identity. Table 2 displays the ways the Noyce CoP engaged with our beliefs about identity and science teaching and
learning (column headings). The items populating the cells below each heading contain my interpretations beliefs expressed, explored, and developed during this process. Readers seeking to determine the context from which these interpretations were drawn are once again referred to appendix H.

Table 2: Ways Noyce CoP members engaged with beliefs about identity, and my interpretations of the beliefs expressed, explored, and developed in each of these areas.

<table>
<thead>
<tr>
<th>Beliefs about identity expressed, explored, and developed in this study</th>
<th>Recognition &amp; Shaping of Identity</th>
<th>Identity &amp; Meaning Making Processes</th>
<th>Societal Forces &amp; Stereotypes</th>
<th>Disparities in the Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiences shape and form our identity.</td>
<td>Identity determines how we make sense of the world.</td>
<td>Presence or lack of privilege influences our identity.</td>
<td>Educational outcomes differ along racial lines.</td>
<td></td>
</tr>
<tr>
<td>Sexual orientation is important to our identity.</td>
<td>Gender and sexuality are fluid and complex.</td>
<td>Need to challenge and examine identity stereotypes.</td>
<td>Intolerance remains in America’s classrooms.</td>
<td></td>
</tr>
<tr>
<td>Factors such as race, ethnicity, gender, orientation, SES coalesce to form identities.</td>
<td>Ways of meaning making are themselves aspects of one’s identity.</td>
<td>Social and institutional pressures shape and affirm our identities.</td>
<td>Power structures contribute to classroom inequity and inequality.</td>
<td></td>
</tr>
<tr>
<td>Identity is developed relationally.</td>
<td>Identity and ideology are interrelated</td>
<td>Acknowledged the presence and influence of tribalism.</td>
<td>Students’ culture must be more valued in classrooms.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>Identity is constructed as we navigate the world.</th>
<th>It is important to affirm students’ identity.</th>
<th>Ethnicity and language are factors in societal power dynamics.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Race is very influential in identity development.</td>
<td>Aspects of identity such as age can serve as a source of cultural disconnect.</td>
<td>Race plays a role in determining appropriate classroom behavior.</td>
<td></td>
</tr>
<tr>
<td>Age and race are factors in teaching and learning.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recognition and shaping of identity.** CoP members’ recognition of identity and exploration of factors shaping it were evident throughout conversations as the scholars and I considered amongst other things: the importance of gender, and sexual orientation to identity; how these factors along with race, ethnicity, and SES coalesce to form one’s identity; ways our identity is constructed as we navigate the world around us; and the manner in which specific factors such as age impact science teaching learning. The CoP also explored ways this shaping of identity can contribute to how we make sense of the world around us.

**Identity and meaning making processes.** Understandings relevant to the role of identity in our meaning making processes...
bore out as CoP members examined: ways our identities determine how we make sense of the world around us; the fluidity and complexity of gender and sexuality; the interrelatedness of ideology and identity; the importance of affirming students’ identities; and ways aspects of our identities such as age, can contribute to cultural disconnects. CoP participants also seemed to support the notion, the meaning making processes surrounding identity are subject to societal forces, and include stereotypes.

**Societal forces and stereotypes.** The CoP was also home to beliefs that credited societal forces with influencing identity, as well as others challenging stereotypes. The former seemed to recognize how privilege or lack thereof, contributes to one’s identity; ways social, and institutional pressures shape and affirm out identities; and elements of tribalism in contemporary society. The latter surrounded thoughts regarding the role of race in determining appropriate classroom behavior; race and ethnicity’s place in societal power dynamics; and acknowledgement of tribalism in our society. The beliefs contributed in each of these areas suggest CoP members were well aware of the relational way in which identity is constructed in society. The fourth way I contend they navigated the concept of identity suggest they believe the categorization involved in this process can lead to disparities in the classroom.
Disparities in the classroom. The CoP shared views positioning certain aspects of identity as a source of marginalization in the classroom. Throughout the CoP writings, discussions, and literature shared, supporting the: recognition of differing educational prospects, and outcomes along racial lines; the critique of power structures contributing inequity, and inequality; valuing of different cultures both in and outside of the classroom; as well as the recognition of the presence of intolerance in each of these settings.

Throughout the 2018 Noyce CoP participants not only engaged in the dissection of their personal identity, but also used what they learned to create opportunities to better themselves and others. Elements of each were present when: Jen helped Steve to reconsider his preconceptions, and opinions regarding the ability of “girl teachers” to manage their classroom; Maya and Jen challenged James dismissal of aboriginal knowledge construction; as well as Jack’s cautioning Jon, and the group against being too quick to associate one’s genitals with their gender. Each of these instances provided a glimpse into the level of insight CoP members have regarding the interplay of identity in our day to day lives.

If I had to use a single word to summarize the Noyce scholars’ overall beliefs about the influence of identity on
science teaching and learning, I would have to go with, promising. I have addressed issues of identity, culture, and power in the science classroom with students in the past. This has included a previous CoP, multiple summer internship programs, as well as with several courses for pre-service elementary teachers. I can say unequivocally, these scholars were the most knowledgeable, engaged, and committed group to date, and it showed up each week in their preparation, participation, and continued reflection. This to me, holds promise for the potential for these new teachers to successfully navigate the forces of intersectionality in their current and future classroom, and best serve students whose identities might not only differ from their own, but also that of dominant society.

New Teacher Beliefs About Home-life

A focus on experiences “outside of school”, and pertinent aspects of the self, that teachers and students carry into the classroom were used to develop my themes of the Noyce scholars’ beliefs about home-life and science teaching and learning. The instances I drew from to develop this theme are summarized in the Home-life Beliefs Matrix I developed (Appendix I).

Much like when exploring the concept of identity, scholar beliefs about the influence of home-life on science teaching and
learning existed in four spaces: 1) the role of personal experience in the classroom; 2) how different settings and environments contribute to how we navigate the world; 3) the merging of home and school cultures; and 4) the need to challenge deficit perspectives, and affirm students’ home culture. Likewise, below in table 3 I have used these spaces as column headings organizing my interpretations of the beliefs the CoP expressed, explored, and developed, with respect to home-life, and science teaching and learning.

Table 3: Ways Noyce CoP members engaged with beliefs about home-life, and my interpretations of the beliefs expressed, explored, and developed in each of these areas.

<table>
<thead>
<tr>
<th>Beliefs about home-life expressed, explored, and developed in this study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal Experience in the Classroom</strong></td>
</tr>
<tr>
<td>Our experiences shape our interactions.</td>
</tr>
</tbody>
</table>
### Table 3 (continued)

<table>
<thead>
<tr>
<th>Personal &amp; Professional experiences shape classroom beliefs.</th>
<th>Similar settings have contextual differences, that shape us differently.</th>
<th>Students’ home language should not be devalued in the classroom.</th>
<th>Students’ home culture should be affirmed not devalued in the classroom.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiences from outside the classroom can be used to facilitate teaching &amp; learning.</td>
<td>Aspects of our upbringing and personal development follow teachers into the classroom.</td>
<td>Students’ and teachers’ home-lives shape their ideas regarding classroom culture.</td>
<td>There are benefits to viewing non-dominant culture as a form of capital.</td>
</tr>
<tr>
<td>Acknowledged a separation of “life” inside and outside the classroom.</td>
<td>Ways of being are developed in the home.</td>
<td>Forcing a separation of students’ home and school lives can lead to marginalization.</td>
<td>Culturally responsive teaching should be an important component of their teaching practice.</td>
</tr>
<tr>
<td>Prior experiences within a context can impact how we engage with others within it.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Personal experience in the classroom.** CoP members readily shared ways they believed personal and professional experiences: shape their interactions with others; contribute to beliefs in the classroom; shape classroom dynamics; and outside the classroom should be used to facilitate science teaching and learning. Throughout, CoP members acknowledge a separation
“life” within the classroom and outside, suggesting the context within which we act can impact how we engage with the world around us.

**Impact of setting/environment.** All Noyce scholars at one point or another in the CoP acknowledged how the setting and environment they grew up in, shaped who they are today. This occurred as they not only considered this, but also how similar settings can vary when viewed in a broader sense. This was the case when Jon presented his “Southern Suburban” upbringing as different for the other suburban contexts offered by the other CoP members. While other CoP members differentiated their suburban upbringings along the lines of SES. Regardless of their “version of suburbia”, CoP members expressed how aspects of their upbringing and personal development will follow them into the classroom.

**Merging home and school culture.** Along with recognizing their and their students’ home-life will be a factor in science teaching and learning; the CoP also presented views suggesting how home and school cultures are melded can go a long way in promoting or inhibiting science teaching and learning. Both positions were contained in writings, and discussions examining home language in the classroom; and how ways of being are developed in the home environment. Each of which were not only
explored with an acknowledgment of the interrelatedness of students’ “home” and “school” lives; but also, how this separation can lead to marginalization in the classroom.

**Affirming students’ culture.** CoP writings and conversations also included beliefs supporting the challenging the promotion of deficit perspectives, and the need to affirm students’ home culture in the science classroom. The CoP explored the benefits of valuing non-dominant culture; recognizing and utilizing the cultural capital students bring to the classroom; working towards empowering students; critiquing the normalization of dominant culture; and making culturally responsive teaching an important component of their teaching practice.

I am optimistic the scholars in the 2018 Noyce CoP will be successful in continuing to negotiate theirs and their students’ home-lives in the classroom for many reasons, none less than the following: 1) the “younger” members of the CoP demonstrated they were knowledgeable, active, and curious about factors that contribute to the classroom environments; and 2) the “older” CoP members consistently shared life experiences suggesting they have a level of understanding and respect for people from all walks of life, that evokes a sense of empathy, not sympathy. Whether discussing a boy whose mother died, or a girl who was removed from her home because a family member was sexually
assaulting her, scholars moved past “feeling bad” and sought to examine what was taking place in the classroom. For example, when discussing the bulling of this poor girl who was molested, Jen describes how the other students, “at school are calling her a ho, and she believes what they’re telling her.” She goes on to share how she brought this up with her daughter (also the victim of bullying), and came to the following realization, “‘You believe what they say don’t you?’ I was like, you believe it don’t you? And she was like ‘yeah’.” To which Steve, adds, “That’s why it affects them so much. It wouldn’t affect them if they didn’t believe it.” Each of these statements contains a level of empathy, and understanding that I am not sure I had when began teaching. Admittedly, I have been guilty of dismissing some student problems as “rites of passage” that they will get through like the “rest of us.” What this small exchange revealed to me was my failure to truly see these problems from the students’ point of view, and to consider how they are making sense of it in their own mind, not just my own. I am convinced, such understanding combined with a sense of social responsibility, and a growth mindset, will position these scholars to successfully deal with anything they or their students bring to their classrooms.
New Teacher Beliefs About Sociocultural-Interactions

The intent of this theme was to present how the Noyce scholars negotiated social situations, and exchanged cultural capital, as they delved into issues related to diversity. Evidence of such interactions were present in the dialog constructed in the CoP, which many times included these new teachers not only responding and contributing to issues of diversity, but also, shedding considerable light on how they approach socio-cultural interactions. The context of such interactions, and their relevance to the development of my sociocultural-interaction theme can be found in appendix J.

CoP participants’ beliefs regarding the relationship between sociocultural-interactions and science teaching and learning, followed the same pattern of my previous themes, and could be categorized into four different areas: 1) approaches to sociocultural-interactions; 2) remaining respectful when interacting with others; 3) ways of interacting, and building relationships with students in the science classroom; and 4) the willingness to engage is self-reflection surrounding sociocultural-interactions. Additionally, like its predecessors, below I use these areas as column headings, which organize my interpretations of the beliefs about sociocultural-interactions.
expressed, explored, and developed during the 2018 Noyce CoP (Table 4).

Table 4: Ways Noyce CoP members engaged with beliefs about sociocultural-interactions, and my interpretations of the beliefs expressed, explored, and developed in each of these areas.

<table>
<thead>
<tr>
<th>Approaches to SC-I</th>
<th>Respect for Others</th>
<th>Interacting with Students</th>
<th>Willingness to Reflect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for humor, patience, and understanding.</td>
<td>Appreciation, care, and willingness to support others.</td>
<td>Acknowledge and accept students’ ways of being.</td>
<td>Challenged personal biases, and stereotypes.</td>
</tr>
<tr>
<td>Relationship building is a continual, long-term process.</td>
<td>Consideration for unfamiliar meaning making processes.</td>
<td>Use relationship building as a management technique.</td>
<td>Recognized disparate rates of punitive measures.</td>
</tr>
<tr>
<td>Must not let resentment linger after conflicts.</td>
<td>Affirming non-dominant cultures.</td>
<td>Recognize the importance of identifying and nurturing students’ strengths.</td>
<td>Challenged deficit-based views of marginalized people.</td>
</tr>
<tr>
<td>Promotion of equity.</td>
<td>Discourse leads to understanding, even if not agreement.</td>
<td>Affirm students’ identities and utilize their cultural capital.</td>
<td>Uncovered opportunities to turn disagreement into growth.</td>
</tr>
</tbody>
</table>
### Table 4 (continued)

<table>
<thead>
<tr>
<th>Use cultural commonalities to promote interaction and learning.</th>
<th>Valuing the views, opinions, perceptions, of others even when opposed.</th>
<th>Construct cooperative, challenging, and fun learning environments.</th>
<th>Sought ways to tap into students’ cultural and social capital.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place relationship building above all else.</td>
<td>Appreciation of diversity in teaching and learning.</td>
<td>Choose your “battles” wisely.</td>
<td>Critiqued the worldviews of themselves and others.</td>
</tr>
</tbody>
</table>

**Approaches to sociocultural-interactions.** It became clear early, the scholars were a good-natured group, who did not shy away from using humor to establish relationships with others. While I certainly recognize teaching science requires more than a keen wit, I do contend that more often than not for new teachers, the ability to form relationships with students, will trump any content knowledge they bring to the table. The Noyce scholars seemed to agree, and through their writings and words expressed that relationship building: is a continual long-term process; requires understanding and patience; cannot succeed in the presence of lingering resentment; involves recognizing and challenging oppression; should be rooted in equity; and should utilize cultural commonalities to promote interaction and learning.
Respect for others. Each of the approaches to sociocultural-interactions the Noyce scholars put forth during the CoP were unified by the common theme of respect. This was evident interactions throughout the CoP as participants: valued the views of others even when opposed; exhibited a willingness to appreciate, support, and care for others; valued diversity; considered the perceptions of others; acknowledge the need to values students’ ways of being; emphasized the importance of self-affirmation; accepted non-dominant ways of constructing knowledge; considered unfamiliar meaning making processes; and valued students’ language and ways of being.

Interacting with students. When sharing their beliefs regarding interacting and building relationships with students, CoP participants expressed: they felt relationship building is very important to science teaching and learning, a continual, long-term process, and a way of overcoming classroom management challenges; a willingness to make space for creativity in the classroom; their acknowledgement of the need for patience, and empathy when dealing with students; the importance they place on valuing students’ ways of being; an openness to constructing knowledge in cooperative, challenging, and fun learning environments; the intent of identifying and nurturing students’ strengths, and utilizing their cultural capital; their desire to use cultural familiarity to promote a sense of agency; they
placed importance on building relationships at school-wide level; their commitment to empowering students to become more involved in their education, and fostering a collaborative classroom environment. I argue if CoP members continue to develop and enact beliefs about interacting and building relationships with students like those above, they will be successful in facilitating positive, productive collaboration with their students. In addition, I contend each of the belief types listed here, could not be put forth without some level of self-reflection. It is such self-reflection that is at the center of the final area of beliefs the CoP expressed, identified, and developed about sociocultural-interactions and science teaching and learning.

Willingness to reflect. Throughout the CoP all members shared and acted on beliefs that provided evidence of their motivation to engage in self-reflection. These beliefs involved a willingness to challenge personal biases, and perceptions; reconsider their own worldviews; seek opportunities to turn disagreements into growth; confront the normalization of dominant cultures; challenge gender bias, stereotypes, and deficit perspectives; and work to improve their practice to meet students’ needs.
While it was clear to me the scholars were a good-natured group, who did not shy away from using humor to establish relationships with others; I recognize successful science teaching requires more than a keen wit, I do contend that more often than not for new teachers, the ability to form relationships with students, will trump any content knowledge they bring to the table. Moreover, the CoP revealed scholars also understood how our personal biases (whether conscious or unconscious), affect how we develop relationships with students, and thus affect science teaching and learning. This could be Marie, and Jen’s realization that “sometimes you just have to relinquish control” in the classroom, in order to maintain “control”, stands in contrast to Jen’s “Mr. C.”, who seemed to exhibit less control, the more he “put his foot down”. Or, Maya’s contention that we should reconsider how we use email and send report cards, and instead seek ways to better involve ELL parents in their child’s education.

Throughout, scholars expressed the need for teachers to recognize, value, and use the cultural capital, and resources students bring to the classroom. Likewise, many of the conversations and writings centered on ways of ensuring aspects of the “deficit model” do not make it into classrooms. While there were times when some of the scholars seemed to be subscribing to deficit-based thinking, when brought to the rest
of the group, such tendencies were often, recognized, critiqued, challenged, and dispelled. Additionally, this was done in a way that was simultaneously informative, nurturing, and reflective, for all involved. This indicated to me that the scholars cared about the issues we were confronting, their practice as educators, and the other members of the CoP. Moreover, I argue it is an approach they can use in the classroom as they learn to value their students’ skills, determine how best to utilize them, and form valuable educational partnerships with their future students.

The Noyce CoP

Recalling figure 1, “Concept diagram showing the Noyce CoP’s position as a quintain, which was understood via themes constructed using portraiture”, the time has come to share my interpretations of what occurred during the 2018 Noyce CoP. Understandings relevant to the CoP as a whole, occurred in four main areas. First, the CoP proved effective in fostering personal and professional connections amongst the CoP. This was not only apparent in the friendly, supportive environment that came to characterize the CoP, but also in the continued communication, and collaboration the CoP members engage in to this day. It is worth noting this has not been the case with many former CoP participants, and Noyce scholars, thus pointing
to the success of the 2018 Noyce CoP in this area. This is not an indictment against any individuals from my past CoP work, however, some of the problems I have encountered with previous CoP work were noticeably absent from the 2018 edition of the Noyce CoP. First and foremost, even though the embedding of the CoP in a field practicum course required we meet for three hours of Friday evenings, these scholars had perfect attendance at all CoP related meetings and events. This was a departure from previous CoP attempts where it seemed every meeting there was at least one person who encountered car trouble, fell ill, or simply did not show up class. Additionally, unlike the past where it became apparent to me that students were not reading, let alone engaging with our journal club articles, participants in the 2018 Noyce CoP made valuable contributions the course discussion board, and came to our meetings armed with insightful questions, ideas, and critiques that served to increase the knowledge base of all involved. Moreover, this commitment has extended beyond the scope of the 2018 Noyce CoP as the scholars have shown a willingness to attend various social functions, and workshops put together by the Noyce scholarship team as a means of promoting continued relationship building and improvement of teaching practices. However, I do not wish to lead the reader to believe the comparative improvements demonstrated in the 2018 Noyce CoP solely resulted entirely from these scholars’ sense of
personal, and professional responsibility. This is because in light of the challenges I faced with past CoPs, I decided I would alter my approach entirely for this group of students. For example, instead of simply having students read articles, post their thoughts on them to a discussion board, and discuss them in class, I incorporated more active learning strategies such as: requiring them to search for and present their own research articles relevant to the week’s topic; and utilized group and competitions during our face to face meetings. My willingness to make such changes to the course was born of not only more experience as an instructor, academic, and mentor; but also a devil may care attitude, centered on the notion that “I am going to teach how I know how to teach best, and will deal with potential repercussions as they come”. Luckily my approach paid off, and several scholars made it a point to thank me for making the course interesting, productive, and fun, despite having to fight traffic to attend Friday evening classes, after working and attending classes all week.

The second area of understanding the 2018 Noyce CoP was associated with is its success as a forum for members to offer and obtain feedback from their peers. This occurred as they collaborated to understand the ideas contained in the research articles presented in the course, and related these ideas to their lives and experiences in and outside of the classroom. One
example of such feedback would be CoP members seeking advice from Jenn, who was already teaching fulltime when she enrolled in the CoP. Another could be when scholars would tap into each other’s areas of interest and knowledge base as they asked and fielded questions regarding their selected articles during the activities in our face-to-face meetings. Either representing instances where CoP members were able to share their thoughts on the literature, experiences, and teaching practices, while receiving valuable feedback from, and offering it to, their peers. These first two areas of understanding were in many ways hoped for, if not expected. This is because I envisioned for the 2018 Noyce CoP to establish enduring professional networks amongst its participants by positioning them as confidants that are in many ways following the same path. However, the last two areas of understanding were not expected and bore out as I analyzed my data and constructed the themes I intended to use to describe what occurred during the CoP.

With that, the final two areas of understanding regarding the CoP involved its existence as an arena for these new teachers to critique: 1) their preparation program and pedagogical practices they witnessed in schools; and 2) the usefulness of science education research publications to new teachers. For example, several CoP members at one time or another expressed surprise at the conditions they encountered,
and felt their preparation program had painted as Jen put it, “too rosy a picture” of what they will face classrooms; or James who suggests his “formal training” inadequately prepared him for “working with students living in poverty”. The CoP also, provided a forum for them to share their thoughts receive feedback, and collaboratively reflect on the teaching practices they were witnessing in their classrooms, and practicum placements. Finally, the scholars expressed frustration towards science education research on many occasions and criticized it for: being difficult to read and therefore inaccessible; too often honing in on a single specialized situation that they might never encounter, thus making it very difficult to apply in their own classroom; and not providing explicit examples of how to structure one’s science classroom, and deal with challenging students. When I consider their thoughts, alongside my inability to engage past CoP scholars in the literature, I feel their concerns are valid. Moreover, it raises the question of just how well we as science education researchers are ourselves enacting culturally relevant pedagogy, that allows these students access to this knowledge base.

To address the disconnect these science new teachers identified amongst themselves and both their preparation and science education research I offer several recommendations. First, TEPs should focus more on helping pre-service teachers
gain practical experience in high-need classrooms by extending the scope of their field placement efforts. Such efforts should include increasing tutoring, mentorship, and internship opportunities in hard to staff schools, and doing so in a manner that allows pre-service teachers (PST) to make connections between pedagogical theory and their professional practice throughout their preparation program. This approach would allow for increased opportunities for these to new teachers to draw connections between what they are “learning” during preparation, and what they will “see” once they enter the classroom. Thus, differing from many TEPs, where PSTs are only exposed to the realities of classroom life toward the end of their program. Using such an approach, many of the theories and principles covered in their course work are relegated to the rear-view mirror, inhibiting the bridging of theory and practice. My second recommendation involves the scholars expressing how science education research literature is for the most part inaccessible to them in a communicative sense. I recall encountering this problem myself early on in my doctoral program, despite completing both a B.S. and a M.S. I believe more consideration must be given in this area, particularly for pre-service teachers focused on STEM disciplines, whose nature and language lie outside the epistemological confines qualitative educational research. I find it ironic that today,
one can peruse any journal related to science education and find work lauding the importance of recognizing, affirming, and utilizing cultural capital in science teaching and learning. Yet, science teacher education at the post-secondary level continues to reinforce canonized language, methods, and ways of disseminating information, despite the changing student body entering today’s TEPs. What is needed is the allowance for a middle ground in each of these areas that falls in between staunch academia found in highly rated science education journals, and the “cook book” lessons one can find in many teacher practitioner journals. Recognizing the penetration of the cannon of academia is a difficult task at best, I recommend TEPs incorporate the methodology I have employed in this study into their curriculum to help their PSTs engage with literature from their field, bridge the gap between theory and their classroom practice, and foster supportive networks that will allow them to do so. Below I discuss the implications of studying new science teachers’ beliefs for the field of science education, and how they manifest at the curricula, instructional, and individual levels.

Implications for Science Teacher Education

The methodology used in this may prove useful to science education researchers seeking to examine new teacher beliefs as
a means for preparing them for diverse classrooms. This is because the CoP served as an arena for scholars to not only examine “beliefs” as a construct, but also gain understanding of how beliefs have an impact on science teaching and learning at the curricula, instructional, and individual levels. This examination of beliefs at the curricula level involved the: sign systems we use to communicate (e.g., language, art, movement, math, etc.); knowledge systems we rely on to make sense of the world (e.g., the fields of biology, chemistry, history, philosophy, etc.); and ways of personal and social knowing, which includes knowledge obtained via personal experience, and the knowledge required to be part of a social group (e.g., The Noyce CoP) (Short & Burke, 1996). Throughout the CoP participants negotiated beliefs regarding peoples’ language and ways of being, challenged the criteria for constructing knowledge, as well as how and when to value it, and shared personal experiences, all while demonstrating a level of cultural competency that allowed us function within, and make contributions to the CoP. Moreover, I contend we questioned our beliefs, in some cases leading to difficult changes in them, which Short and Burke (1996) assert is required to make transformative curriculum change. I am not suggesting we broke substantial ground in this area, but argue we at least took a step in this direction.
At the instructional level, the scholars collaborated to create shared understandings within the what I have termed a “belief action cycle”. Figure 2 depicts this cycle, and how I view the relationships amongst collaborating to change new teacher beliefs and the influence of such work on teacher actions in the classroom (i.e., at the instructional level); as well as how this process has the potential to impact student beliefs, and their subsequent actions.
Figure 2: Diagram depicting the “belief action cycle” occurring as new teachers collaborate to challenge their beliefs at the instructional level.

The belief action cycle in figure 2 can be summarized in the following way: 1) as new teachers collaborate to challenge their beliefs about themselves, their students, their teaching practice, etc.; 2) the process will serve to inform and drive their actions in the classroom; 3) their students will view and judge these actions through the lens of their existing beliefs; 4) which can potentially lead them to develop new beliefs about
themselves, their teacher, and their place in the science classroom; 5) and much like with new teachers, this has the potential to inform, drive, and alter these students’ actions in the classroom; 6) Hopefully, these students actions will be viewed and judge by reflective teachers; 7) who will continually adapt their beliefs systems to improve science teaching and learning in their classroom (Gray, ,2016).

Finally, as far as how we explored beliefs at the individual level, first, I would like to point out the entirety of the CoP was dedicated to collaborative, auto-biographical, self-reflection concerned with the ways: who we are (i.e., identity); conditions that shaped who we are (i.e., home-life); and how we make sense of ourselves and others (i.e., sociocultural-interactions), converge in the science classroom. More specifically, how their convergence contributes to who we are (science identity), how we feel we are valued (self-affirmation), and how empowered we feel (self-efficacy) in the science classroom. I feel this relational creation of student and teacher identities in the classroom can be fertile ground, or barren soil when it comes to creating a climate conducive to science teaching and learning. In fact, I feel this merging of “lives” is so crucial to success in the classroom, that I have taken the advice of Pea (2014) and now view the situation in diverse science classrooms through an ecological lens. Moreover,
I have taken this direction quite literally, and have developed a metaphor positioning the science classroom as a dynamic space, which doubles as the boundary for two distinctly homogenous environments.

**The Classroom Ecotone**

Have you ever heard of an ecotone? If not, here’s a textbook definition, “a narrow ecological zone which possesses a mixture of floristic and faunistic characteristics in between two differently and relatively homogenous ecological community types.” (Maarel, 1990, p. 135). What this definition fails to mention is, they are dynamic, unstable, prone to rapid change, and generally considered an environmental stress zone (Attrill, and Rundle, 2002). In other words, ecotones are the boundaries of two distinct habitats, and are home to plants and animals, that have adapted to the uniquely harsh environmental conditions they present. A common example would be the shore of a lake where although the substrate is the same; fluctuating hydric conditions create a transition zone that is sometimes wet, dry, or in between, as it connects the always wet lower and always dry upper zones (Maarel, 1990). An example here in Florida would be our coastal mangroves, adjacent marshes, and their unique fauna and flora, which sit between saline aquatic environments, and uphill grasslands.
Range, and Jones, 2013). What is noteworthy about mangrove habitats, and most other ecotones is, while these boundary zones are not generally home to a wide variety of species, they are very biologically productive (Smith et al., 2013). This is because their typology makes them the site of high fluxes of matter and energy (Maarel, 1990). Plainly speaking, in nature there is “a lot of action” at the boundaries of things.

From experience, I can tell there is also plenty of “action” in K-12 science classroom as well. In addition, despite a low level of speciation (although some might argue otherwise when dealing with adolescents), classrooms are some of the most productive places I can think of. However, the interactions taking place in these “ecotones” are concerned more and more with the convergence of socio-cultural, rather than abiotic and biotic factors. Often teachers from racially, ethnically, socioeconomically, homogenous backgrounds, find themselves at social, philosophical, and cultural odds with their students. This can be a result of their students being from homogenous backgrounds different from their own, or their students being exposed to a level of diversity, that is foreign to these teachers. At any rate, I see the classroom space, and the exchange of energy that occurs within it, as being akin in to what occurs in nature’s ecotones. To further explain what I mean, I will borrow from Maarel’s shoreline example.
Welcome to The Bay State.

I would like you to think of a coastline, but not just any coastline. I would like you to envision the shore running along the eastern extent of my home state, Massachusetts. If you are not familiar, the coastline of “The Bay State” is home to rocky littoral zones, steep bluffs, sandy beaches, and marshlands; all of which are subject to the variable, and harsh hydric forces of the Atlantic Ocean. Amongst the pounding of waves, the changing tides, and temperate temperatures, creatures adapted to survive on land, water, and everything in between, vie to make their contribution to the evolutionary gene pool. Fauna, and flora alike must be able to deal with ever changing, yet persistent conditions in order to meet their goal (of staying alive), and in doing so, participate in a massive exchange of energy. Figure 3 depicts three different ecotones (e.g., a sandy shoreline, steep bluff, and marsh, respectively), and points to the importance of respecting and valuing these dynamic spaces.
“a narrow ecological zone which possesses a mixture of floristic and faunistic characteristics in between two differently and relatively homogenous ecological community types.” (Maarel, 1990, p. 135).

<table>
<thead>
<tr>
<th>Breakwater Beach, Brewster, Ma.</th>
<th>Plymouth, Ma.</th>
<th>Plum Island, Newburyport, Ma.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Breakwater Beach" /></td>
<td><img src="image2.jpg" alt="Plymouth" /></td>
<td><img src="image3.jpg" alt="Plum Island" /></td>
</tr>
<tr>
<td>- Shore line is a common example.</td>
<td>- When not understood or respected...</td>
<td>- When they are understood and respected...</td>
</tr>
<tr>
<td>- Transition zone that is sometimes wet, dry, or in between.</td>
<td>- Can be inhabitable or a disaster waiting to happen.</td>
<td>- Amongst the most biologically productive places on Earth.</td>
</tr>
<tr>
<td>- Connects what is always wet, and what is always dry.</td>
<td>- In such cases each side suffers.</td>
<td>- Typology of these “two worlds” → great exchanges of energy.</td>
</tr>
<tr>
<td>- In other words, two homogenous environments.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Diagram depicting ecotones from the Massachusetts coastline, and describing the importance understanding and respecting these dynamic spaces. (Photos courtesy of tripadvisor.com, bostonglobe.com, and the United States Geological Survey, respectively)

The first example (Breakwater Beach in Brewster, Ma.) falls in line with Maarel (1990)’s typical shoreline example, and characterizes an ecotone as a transition zone connecting what is “always wet” and what is “always dry” (i.e., two homogenous environments). The second (a steep bluff in Plymouth, Ma.) shows the potential for disaster when ecotones are not understood or respected. In this case, over development along the bluff has placed these structures in the path of impending doom, but is also adversely affecting the ecological health of this coastal...
area via increased erosion, runoff, and sediment deposition in adjacent marine habitats. Finally, the last panel shows preserved marshland on Plum Island State Park in Newburyport, Ma. Given its status as a preserve, I contend this ecotone is both valued, and respected, thus allowing this area to reach its full ecological potential. A potential which seeks to maximize biological productivity and energy exchange.

While classroom goals are not generally so acutely “life or death”, there are situations teachers must negotiate daily, which can be at times mundane, and others changing minute to minute. Moreover, successful, and perhaps more so, unsuccessful attempts to meet the day to day, and minute to minute needs of a class full of students, involves a tremendous amount energy exchange by all involved.

Extending the metaphor, often it can appear as though teachers exist as the coastal terrace complete with the “sure footing” of pedagogy and experience; while students are the ocean fluid in their actions and powerful in their momentum. In between the two lies the shore (e.g., the classroom), or ecotone if you will, where students and teachers alike must venture, leaving behind the comfort of their familiar settings (Figure 4).
Students and teachers do not journey into this space alone and instead, bring with them all the things that make them, them. In the process students and teachers collectively construct their classroom identity, how they feel valued (self-affirmation), and how confident they feel participating in the science (self-efficacy). In addition, if the “classroom ecotone” and those who occupy it are not understood or respected, much like the eroding bluff in Plymouth, both sides will suffer. However, when this space and its inhabitants are understood and respected, much like Plum Island, it can be home to great exchanges of energy and a site of great potential.
So how are the metaphors described above relevant to the 2018 Noyce CoP and science teaching and learning? Well, in many ways the Noyce CoP was an exploration of the classroom ecotone. This is because throughout, its members read and wrote about, discussed, and developed their beliefs about factors that converge in the science classroom that: shape teachers’ and students’ identities; contribute to how valued they feel in this setting; and determines the level of competency they experience in the science classroom. Much like what occurs in ecotones, what is needed is a convergence along the shorelines our science classrooms, where students and teachers alike are, afforded the comforts of their adapted environments, while reaping the benefits that come with learning to utilize aspects of the other. This is no doubt stressful at first. However, if we think back to Native American tribes such as the Wampanoag, who utilized the Massachusetts’ coastline as a source of food, mode of transport and means of supporting agricultural processes; or our earlier evolutionary ancestors who moved from their pelagic, and benthic habitats, to the upslope terrain in search for food; we can also see how encounters along such boundaries can lead to profound opportunity and transformation. I contend continued exploration of teachers beliefs can serve to promote a shift in approaches to science teaching and learning, that will likewise afford students and teachers opportunities to transform science
classrooms into spaces where students can experience success regardless of their identity, home-life, or ways of engaging in sociocultural-interactions.
CHAPTER 6: CONCLUSIONS

The 2018 Noyce CoP was developed to support our university’s Robert Noyce Scholarship Program for STEM Majors’ intent of recruiting, preparing, and retaining quality instructors for local high-need middle and secondary classrooms. This NSF funded program is part of a larger effort to address declining interest and achievement in STEM curriculum, academia, and professions; and it is how the participants in this study became involved with the Noyce CoP. In addition, because our program requires graduates to commit to teaching in high needs school districts as defined by NSF upon completion of their Masters of Arts in Teaching (MAT), they are more likely to encounter marginalized student populations; whose participation and representation in STEM is disparately low. This points to our program’s commitment to equity and social justice, which extends to the 2018 Noyce CoP. Considering the high teacher attrition in the types of schools our MAT graduates will be teaching (the scholars in this study included), considerable attention has been given to the need to better prepare new teachers for diverse and challenging classroom settings. In
light of this reality, the Noyce team recognized the importance of preparing our MAT students for diverse classrooms, with the hope that such a focus will allow them to persist beyond their inductive years of teaching, and create a pipeline of qualified teachers for high-need middle and secondary classrooms in our area. Accordingly, the 2018 Noyce CoP was developed to not only make the new teachers involved aware of the cultural disconnects that have been credited with impeding the success of non-traditional students in STEM classrooms; but also engage them in the process of exploring and understanding how theirs and their students’ identities, home-lives, and approaches to sociocultural-interactions might be leveraged to overcome potential cultural discord in their own classrooms.

My role in the 2018 Noyce CoP required me to assume the roles of instructor, mentor, and researcher. One aspect of this dissertation included me communicating the experiences, understandings, and findings associated with each of these responsibilities. I am confident the perspectives I offered in each of these areas will prove useful to science education researchers seeking to better their practice in each of these areas. However, the more central, and in my opinion important intent of this work was to make known the thoughts, experiences, and beliefs of the scholars participating in the 2018 Noyce CoP. The latter of which were the foundation for my approach in this
study, and vital to any interpretations I derived from it. Accordingly, I guided myself using a research question concerned with how the new teachers participating in the CoP expressed, explored, and developed their beliefs as they, engaged with literature form the field of educational research, interacted with students and faculty in their practicum field placements, and collaborated to build competencies within the context of the CoP.

If you recall, in chapter two I presented five main reasons for using the study of beliefs as a vehicle for helping the CoP better understand factors new teachers must consider in order to promote successful teaching and learning in their high-need science classrooms. These reasons included: 1) the potential for the questioning and coming to terms with beliefs to be a transformative experience for new teachers (Johnson & Atwater, 2014); 2) how an understanding of their beliefs can amount to a form of cultural capital, which can be carried over into their classroom practice (Johnson, 2011); 3) a recognition of the ways preexisting beliefs can shape student/teacher interactions in culturally diverse classrooms (Johnson & Atwater, 2014); 4) an acknowledgement that teachers’ beliefs about themselves and others, frame their instructional goals, expectations, and orientations (Johnson, 2011); and 5) given the close ties between beliefs, expectations, and student performance, a shift
in each of the former can tap into unfound potential regarding the latter (Pajares, 1992; Bryan & Atwater, 2002; Irvine, 2003; Johnson & Atwater, 2014; Russell & Russell, 2014).

With respect to my first reason for studying beliefs, I cannot say based on my data that and of the scholars would describe their own exploration of beliefs within the context of the CoP as “transformative”. However, I have no qualms about applying this label to my own experience. I realized that prior to this work I had never really given much thought to beliefs outside of utilizing “positive thinking”. I could not have imagined I would come to see them as the lens through which we view, organize, and make sense of the world around us. Moreover, I was previously unaware of the body of education research literature that recognizes the impact of beliefs in the classroom, nor their potential to overcome cultural barriers, build relationships, and promote successful teaching and learning opportunities. At the risk of speaking for them, based on the thoughts and conversations presented in chapter 4, and the interpretations of them I shared in chapter five, I would argue that were I to follow up with the other members of the CoP, they would express some of the same sentiments I have. Perhaps future exploration in this area will allow me to establish with more certainty where the scholars stand in this regard. Nonetheless, as I stated previously, based on the
information currently available to me, I cannot say if they would go so far as join me in describing their experience in the 2018 Noyce CoP as transformative.

This leads me to my second reason for examining beliefs with these new teachers during the CoP, which contends an understanding of beliefs can amount to a form of cultural capital, which can be carried over into classroom practice. This was a theme that was revisited often in the CoP both in our face to face meetings and writings. More specifically, there were many instances during the CoP where the spoken, and written word of the scholars supported the notion that the beliefs students use to construct their identities, meaning making processes, and place in the world are something to be respected, fostered, and utilized in the science classroom. In addition, students in the 2018 CoP saw the affirmation of the students’ identities, cultures, and ways of being as necessary to establishing relationships, creating a classroom culture where everybody is valued, and promoting opportunities for both students and teachers alike to experience success in the science classroom.

Meanwhile my third motivation for exploring beliefs in this research (a recognition of the ways preexisting beliefs can shape student/teacher interactions in culturally diverse classrooms) was also evident in the conversations, and writing
produced by CoP participants. Many of which dealt with the notion of what, and whom determines appropriate classroom behavior, as well as the nature of discipline measures implemented to enforce such expectations. Additionally, these exchanges often touched on cultural disconnects, and their role in making such determinations, as well the need for teachers to reflect on they, and their students’ beliefs when making classroom decisions of this nature.

The last two reasons why I chose to investigate beliefs in this study shared common threads associated with the impact of teachers’ expectations on science teaching and learning. The first of which acknowledged teachers’ beliefs about themselves and others, frame instructional goals, expectations, and orientations. Much of the discussion in the CoP related to this point, surrounded the influence of teachers and student holding views of the latter’s ability that are based in the deficit model. As it pertains to teachers, scholars came to see how too often, those charged with educating students from non-traditional backgrounds placed a lower ceiling on their ability and potential to achieve. A fact that is not lost on these children, who can internalize such beliefs, leading to lowered self-efficacy in the science classroom. Meanwhile, the final reason why this research focused on beliefs, pointed to the potential of shifting beliefs, and expectations to access new
found potential with regards to student performance. Throughout the CoP, scholars cited the need for teachers to challenge and avoid deficit-based thinking in their classrooms. Instead, they suggested teachers (themselves included), need to become more proficient in viewing students’ diverse cultures, and ways of being as assets capable of increasing engagement, making connections, and promoting student success. Moreover, they also proposed that by making students knowledgeable participants in this process, will empower them and foster a sense of empowerment.

The methodology I employed in the 2018 Noyce CoP proved successful on many fronts. It allowed CoP members a level of access to, and engagement with education literature that they might not achieve on their own, or in other classroom settings. In addition, because this collaborative exploration of education research occurred alongside their field placements, these scholars were afforded unique opportunities to connect educational theory to their respective teaching practices. Moreover, this coupling of literature and practical experience in high-need classrooms, may be a step towards preparing these new teachers for working with diverse student populations, and addressing the disparate representation of marginalized peoples in STEM achievement, academia, and careers.
The CoP also proved effective in establishing a supportive scholarly network, which gave these new teachers opportunities to garner valuable peer feedback, and participate in collaborative autobiographical self-reflection. Each of which required they become comfortable with applying a critical eye towards their identities, preexisting beliefs, teaching practices, and interactions vital to successful science teaching and learning. However, their critiques did not stop there, as they also offered perspectives on the shortcomings of their TEP, and science education research in general. All of which I contend are relevant to improving the recruitment, preparation, and retention of teachers for high-need STEM classrooms.

Although I feel this study provided a comprehensive view of the potential of my methodology to help new teachers engage with educational research, examine their beliefs and how they make sense of the world around them, and become part of a professional learning community, I realize it includes inherent limitations that make it far from conclusive. This is because it was in many ways a snap shot in time of each of these areas. In other words, future work is required to determine if participation in the 2018 Noyce CoP was truly successful in shifting these new teachers’ beliefs long term, and if so, what impact has had on their classroom teaching practice? Likewise, only time will tell if CoP participants will continue to consult
education research as a means of improving their professional practice. The same can be said for determining just how enduring the relationships established in the CoP will be. Regardless, if nothing else, efforts associated with the 2018 Noyce CoP should be lauded for not simply leaving potential shifts in these new teachers’ beliefs to chance. In this way, it was an active attempt to better prepare these for diverse classrooms, and overcome cultural disconnects that continue to marginalize and exclude non-traditional students from succeeding STEM curriculum, academia, and careers.


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Appendix A: Collaborative Institutional Training Initiative Training (CITI) Completion Certificate.

Certificate of Completion

Frederick Bradley

Completed the Social and Behavioral Responsible Conduct of Research Basic Course on Thursday, January 1, 2015
Informed Consent to Participate in Research

Information to Consider Before Taking Part in this Research Study

IRB Study # 00018140

You are being asked to take part in a research study because you are receiving a scholarship and participating in the Robert Noyce USF Scholarship Program for Science Majors. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

We are asking you to take part in a research study called:

Robert Noyce USF Scholarship Program for Science Majors

The person who is in charge of this research study is Prof. Allan Feldman. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge.
The research will be conducted at the University of South Florida and in the Hillsborough County Public Schools. The National Science Foundation is sponsoring this research.

Purpose of the study

The purpose of this study is to:

Provide information for the evaluation of the Robert Noyce USF Scholarship Program for Science Majors.

Answer the following research questions:

How does the Program facilitate development of support networks for Scholars?

How do the Program support strategies affect the Scholars’ perceptions, understanding and implementation of reforms-based practices and the nature of science?

Study Procedures

If you take part in this study, you will be asked to:

Participate in two interviews and one focus group during the first two years of your participation, and then one focus group per year for the following two years. You will also be asked to complete three surveys during each of the first two years, and one survey per year for the following two years. Observations will be made of your teaching during your internship and the following two years of teaching.

Each interview and focus group will take no more than one hour to complete. Each survey will take no more than \( \frac{1}{2} \) hour to complete.

While you are enrolled at USF, interviews and focus groups will take place on the Tampa campus. Subsequent interviews and focus groups will take place in the Hillsborough County Public Schools.
groups will be arranged at your convenience. Observations of your teaching will be done at the school in which you are doing your teaching internship and then where you will be employed. The interviews and focus groups will be audio recorded and transcribed. You have the option not to be recorded, however, the interviewer will take notes during the interviews and focus groups. The audio recordings and transcriptions will be labeled with a code rather than your name. They will be stored in Prof. Feldman's office. The recordings and transcripts will be kept for five years, after which the transcripts will be shredded and all recordings erased.

Total Number of Participants

About 75 individuals will take part in this study at USF.

Alternatives

You do not have to participate in this research study.

If you choose not to participate in this study you may still need to provide information for reporting purposes to the National Science Foundation.

Benefits

The immediate potential benefit of your participation in this study is that the information collected will be used to improve the Program. There are potential long-term benefits to the Noyce Scholarship program, which may improve the preparation and supply of science teachers.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.
Compensation
You will receive no payment or other compensation for taking part in this study.

Cost
There will be no costs to you as a result of being in this study.

Privacy and Confidentiality
We will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

The research team, including the Principal Investigator, study coordinator, and all other research staff.

The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

Voluntary Participation / Withdrawal
You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study. Decision to participate or not will not
affect your grades in any of the courses that you take as part of this Program.

New information about the study

During the course of this study, we may find more information that could be important to you. This includes information that, once learned, might cause you to change your mind about being in the study. We will notify you as soon as possible if such information becomes available.

You can get the answers to your questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, or experience an adverse event or unanticipated problem, contact Prof. Feldman at afeldman@usf.edu or 813 974-2471.

If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638.

Consent to Take Part in this Research Study

It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true.

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

Signature of Person Taking Part in Study    Date
Printed Name of Person Taking Part in Study
Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

What the study is about;

What procedures/interventions/investigational drugs or devices will be used;

What the potential benefits might be; and

What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. This subject does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. This subject is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give informed consent.

_______________________________________________________________
Signature of Person Obtaining Informed Consent / Research Authorization Date

_______________________________________________________________
Printed Name of Person Obtaining Informed Consent / Research Authorization
Appendix C: Aspects of Identity Questionnaire

2017 Noyce CoP: Identity Indicators

Please answer as many of the following prompts as you choose. If you do not wish to answer, simply leave it blank.

Q1 Please provide your religious affiliation.

Q2 Please describe your socioeconomic status during your "formative years". Examples might include upper, middle, lower class. However, feel free to respond in a manner that suits you.

Q3 Please indicate your preferred gender status.

Q4 Please provide your self-identified race(s).

Q5 Please provide your self-identified ethnicity(ies).

Q6 Please describe the setting in which you were raised. Examples might include urban, suburban, rural, Northern, Southern, West Coast, or International. However, feel free to provide your best description.

Q7 Please provide your age.

Q8 Please provide the educational attainment of your parent(s) or guardian(s).

Q10 Please provide your political affiliation, as it pertains to the system recognized in the United States.

Q11 Please provide your sexual orientation.

Q12 Please provide your preferred spoken language.
Appendix D: Identity Card Sort (Adapted from Moore, 2012;2016)

2017 Noyce CoP Social Marker (Card Sort)

Q1
For this "survey" imagine you are holding twelve cards in your hand. On each card, is one of 12 " social identity markers" used to explain, define, or identify ourselves and others. Your task is to "lay these cards out in front of you, with the marker you think most "proximal" to your identity, placed closest to you. Essentially, you will rank them from : (1) most influential - (12) least influential in explaining "who you are". Have fun with it... If you do not feel an item applies to you positional identity simply respond "N/A".

_____ Religion (1)
_____ Socioeconomic Status (2)
_____ Gender (3)
_____ Race (4)
_____ Ethnicity (5)
_____ Upbringing (U/S/R/North/South/West/International) (6)
_____ Disabilities (7)
_____ Age (8)
_____ Educational Attainment (9)
_____ Political Affiliation (10)
_____ Sexual Orientation (11)
_____ Language (12)
Appendix E: Identify a Scientist (IAS) (Adapted from Walls, 2012)

Identify A Scientist (IAS)

SET 1

1A Using the photos above, enter the number for the ONE person you feel is most likely to be a scientist.

1B On a scale of 1 (least) to 5 (most), how confident are you in your selection?

1C Please share your reason for selecting this particular individual.
Appendix F: Miami University Diversity Awareness Scale (MUDAS) (Adapted from Mosley-Howard et al., 2011)

Please choose the descriptor which most aligns with your views regarding the following statements.

Q1 I am aware of my culture and ethnicity.
- Strongly disagree (1)
- Somewhat disagree (2)
- Somewhat agree (3)
- Strongly agree (4)

Q2 I am NOT comfortable talking about my culture and ethnicity.
- Strongly disagree (1)
- Somewhat disagree (2)
- Somewhat agree (3)
- Strongly agree (4)

Q3 I seek to learn about different cultures.
- Strongly disagree (1)
- Somewhat disagree (2)
- Somewhat agree (3)
- Strongly agree (4)

Q4 I seek opportunities to interact with people from different cultures.
- Strongly disagree (1)
- Somewhat disagree (2)
- Somewhat agree (3)
- Strongly agree (4)
Q5 I appreciate and welcome the challenges and opportunities that diversity brings.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q6 I do NOT share my appreciation of diversity with my friends.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q7 A conscious effort should be made to teach cultural expectations in schools and/or classrooms.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q8 Teachers should develop conflict management skills to solve cultural clashes.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q9 I recognize the privileges I might enjoy because of my race, class, gender, sexual orientation, lack of disability etc.
Q10 I consider cultural issues in my daily life.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q11 I do NOT speak up when I witness instances of social injustice.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q12 I do NOT have close friends from different cultures.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q13 It is NOT important for me to learn a second language.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)
Q14 People from different nationalities should NOT be encouraged to retain their various customs, traditions, and language.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q15 A wide variety of religious diversity is good for our country.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q16 I would welcome the opportunity to study abroad.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q17 Addressing economic class differences tend to be divisive in everyday life.

Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)

Q18 Although individuality is important in the United States, excessive differences in beliefs can hurt our society.
Q19 Stressing different cultural customs and traditions tends to reduce learning the basics (reading, writing, mathematics) in schools today.

Q20 The American public school system’s curriculum should concentrate more on our common American identity rather than on specific ethnic groups.

Q21 I am aware of the effects that my culture has on those whose culture is different from mine.

Q22 I check myself to see if an assumption I am making about a person(s) is based on facts, not stereotypes about a group.
Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)
Q23 I realize that if I commit to promoting social justice, I too must change.
Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)
Q24 I do NOT know how to learn about people and cultures unfamiliar to me without being offensive.
Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)
Q25 I would welcome the opportunity to work in an urban community.
Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree (3)
Strongly agree (4)
Q26 It is NOT important to value different sexual orientations.
Strongly disagree (1)
Somewhat disagree (2)
Somewhat agree  (3)
Strongly agree  (4)

Q27 Students with special learning needs should NOT be included in regular K-12 and college classrooms.

Strongly disagree  (1)
Somewhat disagree  (2)
Somewhat agree  (3)
Strongly agree  (4)

Q28 I will be comfortable working with individuals who have a variety of learning needs.

Strongly disagree  (1)
Somewhat disagree  (2)
Somewhat agree  (3)
Strongly agree  (4)

Q29 I believe that all individuals are capable of learning at a high level no matter what their personal background or culture might be.

Strongly disagree  (1)
Somewhat disagree  (2)
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Q30 Teachers (K-12) should be trained to effectively introduce issues of diversity in the classroom.

Strongly disagree  (1)
Somewhat disagree  (2)
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Q31 Teachers (K-12) should receive training in working with students that have diverse needs.

Strongly disagree (1)

Somewhat disagree (2)

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Q32 Professors should be trained to effectively introduce issues of diversity in the classroom.

Strongly disagree (1)

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Q33 Professors should receive training in working with students that have diverse needs.

Strongly disagree (1)

Somewhat disagree (2)

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Strongly agree (4)

Q34 I view promoting diversity wherever I can as an essential part of my role as a student.

Strongly disagree (1)

Somewhat disagree (2)

Somewhat agree (3)

Strongly agree (4)
Q35 I appreciate the range of cultural experiences that people bring to relationships or situations.

Strongly disagree  (1)
Somewhat disagree  (2)
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Appendix G: Codebook

<table>
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<th>Main Code/Sub-code</th>
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I loved this because of its recognition that how we view the world if unique to each of us. The same can be said for the unique belief systems we employ to view our world. |
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NOTE: You asked if he could recall any of the behaviors, but he couldn’t not, citing the fact he completed the assignment over a week prior. You could mention this and look at the criterion in his paper. Use it as an example of his engJENing in beliefs/research/reflecting on/whatever regarding the punitive normalization of certain school behaviors.

JACK

“both black boys and black girls scored respectively higher than white boys and white girls. Basically showing that on averJENe more black students were punished and considered problem student than their white counterparts ... and went cme to grade point averJENe they were lower...” (Kind of obvious so lump together rwith PBS..) He summarizes that the reason they are being punished more is due to racial discrimination. This is where he goes into student beliefs and self fulfilling prophecy.. JACK Raises the possibility it was the the preexisting beliefs of administration (and teachers) that led to black students being punished more in the situation (and others).

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Insights\Schoolars

JON Adds “that’s not just in the school system. I mean you see that in the judicial system” (everyone enthusiastically JENrees) He continues, “It’s not a belief just there”

JACK (JENreeing) “um hmm… um hmm… exactly”

Insights\Schoolars

JACK

Explaining his take “It’s kind of a self fulfilling prophecy. You’ve been told your whole life you are this. People who look like you are this way. So then they become that way because there’s this box and I have to fit in it.”

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JON: 01:33:10 'Um, I actually think a lot of this, uh, what they're talking about in the articles relates to, like we were saying earlier, racism and sexism and until you start really changing those ideas, do you see a solution happen? And it's like you said earlier, once we started admitting that we're all got some degree of racism, you know, sexism also... Like the little spat we just had here. (laughter) But you're not really going to get rid of any of these problems until that starts to be resolved. So I mean like you could look for a way to solve it through quantitative or qualitative or more quantitative like you're (JAMES) looking for, but you're not really going to resolve it until you start changing people's mindsets and getting rid of these biases. I think that they have, I think things have changed. When I went to college for the first time in 1991 I went to a physics classroom cause how many students in that physics classroom were not white men? Zero. Every last one of them was white man.... (polls group) Who didn't take physics. We all took physics. Yes. Wasn't just white men in the room. No...., totally different things are significantly different. We have a real problem. We have a real problem. I, I'm not pretending we don't have a real problem. I
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All right. How do I follow up with that? All right. So yes, stand. My main topic was, identity I'm gonna try not to, like the trip on one of these chairs was identity. And so what this article by Cain kind of talked about specifically as how identity is
formed in school, um, because students are kind of formulating in reformulating who they are and what their places in the world through their interactions with your peers and with their students or with their teachers. Um, I just spent what his life is. I've got it.

JACK: 01:06:16 Well I was just going to say like with that system, like when are they kind of tested, you know,

JEN: 01:06:23 It doesn't matter, I swear to God it doesn't matter if they want to be in an AP class. We learned this, we learned this when we talked to our earth and space science curriculum. Um, lady and Brandon, she had AP students in, in her AP environmental science class who are on a level two reading levels or reading level or really wanting because the class that you want to take a class.

MARIE: 01:06:42 Because they're just like yeah... I like the teachers.

JEN: 01:06:45 They can be terrible testers. But they get in

JACK: 01:06:45 I mean, I mean I personally find that okay. Because I feel like...

JEN: 01:06:52 I don't know, I'm not okay with it.

JACK: 01:06:54 I mean, I feel like if they are willing to at least put it in an effort, like I understand like maybe they don't have that reading level, but that's not always a failure on them. Most of the time it's a failure on the other teachers before or.....It's the system as a whole. Do you know what I mean? So it's like, I don't want to say these people can't take part in my class because they're necessarily not going to be able to like keep up, you know, if they're gonna if they feel like they're going to get something out of it, you know what I mean?

JEN: 01:07:23 I think there's a lot of variables that go into that. It's reading at that low of a level though.

JON: 01:07:29 You can't really put that all on the teachers. There has to be some responsibility towards the student also. I mean, yeah. Yeah. Okay. Somewhere down the line. Somebody did fail this kid but to be that far behind
and to be put into an AP class, to be wanting to be in an AP class, it's like, okay kid that you need to step it up because obviously somebody didn't help him...

Identity\Ability

Yeah. I mean my daughter's an AP history right now and she's, she's struggling. She's struggling. Yeah. And they, we went in there and he's like, oh she's pro, cause they hadn't been done but didn't have a records JENain. And they're like, well she's probably going to need to be an intensive reading classes and the counselor. And I'm like, no, no, no. She's going to let, he was like, Nah, she's, she's, she's probably, because most of the other kids are in intensive reading class. I'm like, no, she's, she's, she's pretty huge. He one listen to me, she was like the ar points later, like every single year for years. I think she's good on that. Of course they get her schedule and she was absolutely fine. But um, yeah, I mean there's, that's, I JENree with you,

Identity\Ability

JACK: 01:10:29 but no, I don't know. Yeah, I know exactly where you're coming from because obviously like if the students are going to be in here, they're not going to get out what every other student is getting out. Right. Cause they don't have the, you know...

MAYA: 01:10:39 the building blocks...

JACK: 01:10:40 Exactly the logos, you know what I mean? If, if it's all messed up, they can't build on it. It's just, I don't know, at the same time....

Identity\Age

31:00 JEN & JACK Older Teachers/Other teachers

I’m in a title I school and I’m convinced there’s not on enormal kid in there.. like one kid who has like a normal upbrining.. that’s what’s so.. that’s what’s so difficuMARIE..

JACK Do you think it’s that these teachers are power hungry?
JEN Every teacher is different. The lady who calls her students cockroaches has no business. She’s older. She doesn’t have the patience. You know what I’m saying. She doesn’t have that patience. You really gotta have that patience. Like I had a girl. She came at me verbally with some stuff and I’m like listen. Very calmly you talk to your mother like that, you’re not gonna talk to me like that. She got suspended. Not by me but by some other teacher she did that to and some tachers just can’t… they just can’t handle it. So yeah… sorry…

Identity\creativity

And it talks about how, um, these types of students, um, typically because of that they experience less effective teaching methods. They’re not getting the new, the newer inquiry, what we’re trying to promote in this program, which is using SSI and inquiry. You’re not typically receiving that. And of course there’s a big thing, lack of resources and a lot of these schools that are title line don’t get us great creative resources since the other schools. Um, and the other one was the idea of personalities that I’m like really effective teachers that have been doing it for like 20 years. They typically don’t want to teach in these, these types of environments. Um, just because of lack of support and just the high turnover rate. And the other part though I was talking about was the lack of priority for science because, um, because the reading levels are so low and the math scores are so low, a lot of these high needs schools, they’re trying to focus on bringing up this math and science scores or math and English scores so they’re not focused on sciences.

Identity\creativity

JEN If it can be anything we want it to be, let’s be creative. (Group mates JENree in unison).

This would eventually end up in one of my groups deciding it was a waffle. As they discuss JEN went “way beyond syrup, I thinking whipped cream, spries, cherry on top…

Identity\ELL

JACK: 01:30:56 Hi everyone (Group Hi!) So today I’m going to be talking to you about teaching English language, why are you laughing?
Because it just dawned on me that is it love and your trademarked it (laughter).

And so yeah, teaching English language learners. The article I read, I do not remember the entire name but it was a good name, but it was by Corey Buxton et al. (ME He's kind of the man Corey Buxton's cool). Yeah. It was funny because I wrote this, I wrote my summary and then we, we read an article by Buxton and Feldman's class. And I was like, oh my God, it was the same article. That'd be hilarious. Like.. but it wasn't so... Okay. So first, and how do you pronounce that name? McLaughlin. McLaughlin. McLaughlin. Okay. First McLaughlin article kind of mentioned my, the two like two difficulties of I teach two difficulties that English language face in um, like English schools. So the first being that they are struggling to learn science, that the medium of a new language, um, you know, just like it's difficult enough to try to understand science because the science can be a whole new language, but like doing that through like a language that they barely know, that's what's the most difficult. And then also the disconnect between teachers and students cultural dissonance. I just didn't have the nice word. So yaye! So is it a great,
Okay. Okay. So, um, basically like I just like included like, the nice stuff. It's like I think science, science learning and literacy development reinforce each other, right. That like learning science reinforces literacy and literacy helps you learn science better. Um, oh, and a reciprocal process. Yeah. Um, and then also, uh, one of the things that they mentioned is like how to teach literacy for sciences by providing expository science texts for the students, um, that have various language functions, various genres and various literary forms. Basically like the Big idea, The big idea was like, you don't want to just give them like one type of expository texts, right. Where like you use the same type of language. You seem to have a sentence structures. You just saying like grammar and all that because then they're not being exposed to all the different like, uh, like Symantec pronomatic of the language. So like exposing them to have like a big diversity of like how the language works is going to help you learning English literacy through science. Um, and then other strategies like just like general teaching strategies or um, sign for English language learners. The first one is, um, talking at a slower rate, but it's important to know not at a belittling slow rate. So you don't want to like make it make it sound like, oh, they're dumb. They don't know what I'm talking about, you know, but like to be cognizant to not speak fast. Right. To not like slur the words up because then it'd be like, it'd be difficult for them to understand what you just said. Um, and then shorter sentence structures and um, tangible demonstration. So like basically like obviously like this is just a good way to teach science. It's like always having a demonstration that like, it's tangible to them so they can have like, they can remember it easier. But specifically for students who are English language learners because having like a tangible demonstration means that they can learn something without having to learn it to the medium of language. You know, what we were talking about earlier was that, um,
what we were, what I was talking about her later. Um, but you know, that medium of languJENe, right? That languJENe barrier is kind of broken when you're doing a tangible demonstration, you know, because they can learn it just through, you know, touching it, you know, seeing. Um, and then lastly is the importance of, um, is the importance of not really necessarily having to know the entire languJENe, uh, that your students may speak like their primary languJENe, but, um, here I'll just do a quote. So in iBuxton's article they say teachers. Okay. Mood as I, um, I ended the quote too. Really, I didn't mean teachers

Speaker 3: 01:36:10 [inaudible]
JACK: 01:36:19 who know how to use students' home languJENe and science instruction as well as the importance of doing so. Basically like what the point was, it's like obviously like you don't need to know the entire languJENe. I know that some of us don't JENree that or say that might be difficuMARIE to like, um, you know, like know the languJENe of every single student. That's true. I completely JENree. However, it's important to, you know, try, you know what I mean? Learn a few words to try to incorporate them like as you're teaching, because even if it's like just a small word, right? Like you don't have to say like some scientific concept and they're like their target languJENe, right? You're not the perfect languJENe or primary languJENe, then it's going to help connect better. They're going to be like, oh, I know that word.
You know what I mean? And it's, it's going to help them. It.

JACK: 01:38:00 You see people are different. People are different, especially English language learners. So back to this (laughter). But um, the big ideas and my like, the conclusion we can come to is this, it's important to care. It's important to try your best to connect to these students who already find it hard to connect to the scientific concepts and really care... That's why I have a heart in the middle of my.... (MAYA Hello)

Identity\ethnicity: 01:24:57 if you were my student. I just be like alright we're done for the day. So this is kind of a, my article pinpoints and highlights through two examples. Um, they have a Haitian student and the Latino student to different minorities, it doesn't really matter

Identity\ethnicity: And then the Latino student, uh, got with a group of people, I think other Latinos, I'm not sure, uh, to construct an experimental set up and design and lab. Um, and usually he's like quiet and soft spoken and he's not really that good at performing in class. But when they let him be on his own and design this own lab, he was able, as it was dealing with ants, um, he was able to, because of like his home life he was and his curriculum, he has been taught about like, um, the value of life and perspectives. And he was able to put himself in the perspective that the ants and raise scientific questions like, well, what are they like? Well, they like dirt, so they must like the dark. Why don't they like the dark? Can I touch that? And he'd be like, well, what if I put two rooms on with a lamp and one with not. Would they go to the one without the lamp? It was like these really rudimentary things, but showed him thinking about all of that. And that's from
his, from his bacMAYAround. So basically the whole driving point of the argument and the article is that these kids are smart. They do know these things. Um, and if we encourJENe them to use their bacMAYAround knowledge, um, through cuMARIEure, through their identity development, through their languJENes, uh, through the interventions of us. Yeah. See I said that interventions of us and encourJENing them,

Identity\ethni city

JACK: 01:30:56 Hi everyone (Group Hi!) So today I'm going to be talking to you about teaching English languJENe, why are you laughing?

ME: 01:31:02 Because it just dawned on me that is it love and your trademarked it (laughter).

JACK: 01:31:08 And so yeah, teaching English languJENe learners. The article I read, I do not remember the entire name but it was a good name, but it was by Corey Buxton et al. (ME He's kind of the man Corey Buxton's cool). Yeah. It was funny because I wrote this, I wrote my summary and then we, we read an article by Buxton and Feldman's class. And I was like, oh my God, it was the same article. That'd be hilarious. Like... but it wans't so... Okay. So first, and how do you pronoicne that name? Mclaughlin. Mclaughlin. Mclaughlin. Okay. First Mclaughlin article kind of mentioned my, the two like two difficuMARIEies of I teach two difficuMARIEies that English languJENe face in um, like English schools. So the first being that they are struggling to learn science, that the medium

JACK: 01:32:00 of a new languJENe, um, you know, just like it's difficuMARIE enough to try to understand science because the science can be a whole new languJENe, but like doing that through like a languJENe that they barely know, that's what's the most difficuMARIE. And then also the disconnect between teachers and students cuMARIEures,
which is cumulative dissonance. I just didn't have the
nice word. So yaye! So is it a great,

Identity\gender

Speaker 9: 01:21:14 Okay, so the thing that I
presented or the thing that I laSTEVEhed onto is I read
the article and read the differences between you know how
color blindness and just that, God, the thing that really
stood out to me was the girl cop versus the guy cop that I
treat them differently. Holy Shit. I see that in the
fricking class already. Like, I haven't been practicum one
day and I can tell you that a guy teacher, it's a teacher
and a student..., a girl teacher and it feels like a mom
and a disobedient child. And it's fascinating and I'm not
saying that that's because that's the way it is, but it's
almost the way that it comes off. And it wasn't until I
went to lunch with them and like there was the guys on one
side and the girls on one side and they didn't sit that
way on purpose but you could cut a line on what they
thought of their students and the stress level, like all
of the females in the class were just like, oh, and I hate
my classes and all the students are really bad and and
they're so disobedient and

JEN: 01:22:16 These are all the teachers or the
students?

STEVE: 01:22:18 These are the teachers that I went to
lunch with and all of the guys were just like how my
classes are pretty cool.

Speaker 9: 01:22:23 Like yeah, I have some good really
like a little too much now and I'm, I'm not meaning to
generalize. It was just like, I like saw and there was,
there was only, there was only like eight people in that
lunch room

JEN: 01:22:38 because you're painting women like a
certain way right now. And I'm like, uhhhh... (not
happy)
STEVE: 01:22:42 oh, and I'm not, listen, you know what? I'll be JAMES. I'll be JAMES. Um, I have, I have beliefs too, but, and I'm not saying that that's their full, I'm saying that that's based on the biases that I think everyone grows up with, which is what that article stood out to me is that I was even talking to my girlfriend about this last night. I was like, it's so weird because like I am seeing that, but am I seeing that because of the biases? Because I'm always, you always hear about, I always heard about the, the stressful, you know, a woman teacher. I'm the guy being really chill and whenever.

JEN: 01:23:23 But this.... (Pissed)Okay. Okay. All right. Okay. I don't know. And I can be wrong. I'm not saying that I'm entirely,

JACK: 01:23:28 I think I'm misunderstanding both sides. Like right now, like I, I mean I just don't understand. I guess because basically what I'm hearing....

STEVE: 01:23:37 There's a lot of subliminal messJENing, at least there has been in my life. Um, that dictates the girl teachers. There's more stress and the guy teachers is more laid back and like I'm um, I am in college and I can understand, wow, that's a bias and that's not good and I shouldn't think like that. But a high schooler I think doesn't have that conception. I didn't have that consumption back in high school. I was just like, yeah, it's the stress teacher. And I was always relating it to the girl and so I sat there and was like, what are the high schoolers thing? Like do they subliminally subconsciously think that just like the people in the study who rated the girl cop is, oh, that was a bad quality and bad quality. The Guy cop us that was a good quality. That was a good quality. I'm like, does that happen in their minds to all of the teachers? And is that what's causing all of this? Yeah, that's, that's the point.

JEN: 01:24:31 My students could care less, whether I'm a female, male, if you're a dick or a dick period.
STEVE: 01:24:36 What I'm saying women teachers don't know.

JEN: 01:24:39 The teacher next to me is the one who is, he's a male and the first day of class we walked in, he was like, oh, I'm so nervous. And I'm like, he's been teaching for 30 years. After 30 years. I'm like, you're still still nervous. Still gets nervous. He's the one that's the butthole. I don't really get stressed with my students per se, as much as I'm like sit down and be quiet.

STEVE: 01:25:03 I'm not attacking you at all. I'm not saying that. But realizing

ME: 01:25:07 no, well no. But what he is pointing out though, and I think it is a thing like we will have beliefs about like what our roles are.... Certainly the beliefs of what a gender role is like a dominant gender role and things that go along with it. Right? And, and I would, I mean if we were to poll, you know, a thousand people, whatever it and say, who would you think would be more, you know, emotional and you only gave them one choice, either one, male or female.

JEN: 01:25:32 It's going to be a female every time...

(Ag almost finish my thought)

ME: 01:25:34 Because of the belief. Like I think that's what he's getting but he's not saying like it's the case everytime....

JEN: 01:25:39 But you're saying but you kind of are saying that what you've observed and like you're studying.

STEVE: 01:25:45 What I observed was like I didn't believe in that. Like I was like yeah whatever the girl cop the guy cop. That doesn't happen. Like that's just like in a study. But when I went to a school I was like Holy Shit, this might actually happen. Like it was in front of me and like I saw the people, I saw the students, the bad students disrespecting, the girl teacher and then I saw the same bad students being like yo what up bro? To like the guy teacher and I was like this actually happens.

JEN: 01:26:12 I think that is situational.

414
STEVE: 01:26:14 No, it is situational, but from what I saw I was like, oh shit. Like that. There might be a reason why it might happen statistically more often.

ME: 01:26:25 Well.... What I'm, what I'm saying is like just because like objectively it, it's not right. I guess we could say right. It's not fair, right? But that's not to say that like subjectively that you know and not picking on women, but actually I'll do men too. It's not to say that women don't believe that, like don't believe like that their the job is to nurture or men don't believe that. Like they might have the belief that their job is to be a disciplinary or to not emotionally attached with children like these dominant roles that've become beliefs in our society that have perpetuated like right? In television and everything before we even know what the hell is going on. Like you know, this is not like who's the hero when you're a kid, the damsel in distress, it's, that's what cartoons like, you know what I mean? All these things that like what we're not, we haven't had the life experience to look back on them. objectively and dissect though. But like they'll, we'll establish roles and do things to us and we'll behave in manners...

JEN: 01:27:22 My hallway. I can tell you that what I've observed is that if kids smell weakness, you're done. You're toast. So then their i see this equally, when I looked down my hallway, now look at all the teachers. There's a teacher, there's a male teacher, math teacher. He, he doesn't have a lick of control over his class. Okay. Um, there's, um, a teacher two doors down from me. Well there's two of them. They both, I, I looked at the lady like the second week of school, like every time I walk past your classroom, your kids are sitting in there and their client and they're doing the work. And I'm like, what's, what is, what's the secret? And she's like, sit down, do your work and be quiet. And for her it was establishing, she is, I see, I see what you're saying. I see that the biases are there. That's not what I think it goes. I think it's a both sides.
STEVE: 01:28:15 I just, I think it's, it's kind of along like you know the blacks are punished more than the whites. Yeah...It's, it's like, yeah, that's situational too. But I think that underlying bias is like maybe the explanation for that statistic.

ME: 01:28:28 I that's what I was trying to get at...

Yeah. Yeah.

PAULA: 01:28:30 Okay, mine, also goes with like gender bias. So I kind of did the third point of the article. The mine was looking at like the facuMARIEy's bias towards their students versus how other teachers, so the whole like good cop, bad cop thing. You had the same qualifications. Are they reviewed like differently wi

Another article, titled “Science FacuMARIEy's Subtle Gender Biases Favor Male Students” also delves into gender discrimination in the workplace through a controlled experiment (Moss-Racusn et al., 2012). The question of interest was if science facuMARIEy members exhibit gender bias JENainst female students and if this bias was contributing to the gender disparity in the scientific field. The study answered this question by providing 127 science facuMARIEy members application materials for equally qualified female and male students. The professors had to rank the students competence and hireability, and indicate the amount of mentoring and salary they would provide.

The study had significant resuMARIEEs and determined science facuMARIEy found female students less competent, less hirable, provided a lower salary, and provided less mentoring when compared to a male student with the same qualifications. The professors judged females with a different criteria than the male students, with a preference for the male, which was the same phenomenon referenced in Cohen (2012). Even when males and females had the same qualifications they were viewed in different lights.
However, this study had many more similarities than just the end result. In both papers, the authors emphasize that those who value their objectivity are actually more biased because they are unaware of their subtle bias. Moss-Racusn et al. (2012) actually measured the science faculty's subtle bias using the Modern Sexism Scale which measures unintentional negativity towards women versus blatant hostility. The study found the science professors to have preexisting subtle biases against women based on societies' negative stereotype of female scientists. The science faculty viewed themselves as objective because they had been rigorously trained in the STEM field which values critical thinking, but in reality they were just blind to the biases they had.

Moss-Racusn et al. (2012) brought up a few new viewpoints Cohen (2012) did not explore. The first interesting find was the gender of the evaluator had no effect on the gender bias towards the candidates. The female faculty still favored a male student over a female student with the same qualifications. Moss-Racusn et al. (2012) also surveyed the faculty to determine how much they liked the students which resulted in females being more likeable. These two points further support the fact the bias is unconscious and does not stem from hostility.

Finally, the two authors needed that the best way to combat gender discrimination is by establishing a clear set of criteria before evaluating students. This will prevent different standards being used for men and women. However, Moss-Racusn et al. goes one step farther by suggesting the stereotype causing the bias should also be addressed, for example the stereotype that females are less competent scientists. Moss-Racusn et al. specifically recommended working with science advisors to mentor female scientists and emphasize their self-worth. This is similar to the affirmation technique suggested by Cohen (2012) when addressing arguments that challenge long...
held beliefs. Overall, both articles deal with gender discrimination and methods to combat it.
where it was just seeing how... the teachers’ and administrative staffs’ beliefs kind of affected the performance and punishment of students. He explains his article was “specifically looking that the difference between white students and black students. He provides bacMAYAround for a “problem behavior scale” used in the paper he chose.

NOTE: You asked if he could recall any of the behaviors, but he couldn’t not, citing the fact he completed the assignment over a week prior. You could mention this and look at the criterion in his paper. Use it as an example of his engJENing in beliefs/research/reflecting on/whatever regarding the punitive normalization of certain school behaviors.

JACK

“both black boys and black girls scored respectively higher than white boys and white girls. Basically showing that on averJENe more black students were punished and considered problem student than their white counterparts ... and went cme to grade point averJENe they were lower…” (Kind of obvious so lump together rwith PBS.. )

He summarizes that the reason they are being punished more is due to racial discrimination. This is where he goes into student beliefs and self fulfilling prophecy..

JACK Raises the possibility it was the the preexisting beliefs of administration (and teachers) that led to black students being punished more in the situation (and others).

“Kind of expecting the black students to be (a certain way).. because there’s that sterotype right? There’s this myth that like black students are going to be inherently more delinquent. (Referring to his article) It was kind of
as if the administration staff already had it in their mind they would punish them to a higher degree”

Identity\race “When black students were taught by black teachers they performed at a higher level.” He goes on and offers his opinion as to why he thinks this is so. “Because they’re able to build that trust you know… The affirmation that you are not these (negative) expectations…”

“What I gather from both articles is… one understand how racial discrimination can affect not only how students are punished but also student performance in the class. And The need to be proactive, in trying to prohibit, well not prohibit but you know what I mean? Deter it.”

Identity\race EVERYBODY IS RACIST...

He was the only one to have an alternative take. I pressed him as to what Cohen’s paper said.

JAMES “Basically, we’re all running around saying we’re not racist and yadda yadda yadda.. because we’re all the hero of our own story… he didn’t say that but.. that’s something that I have in my box (take away)... and then he said.. we can fix that and the way we can fix that is by telling people that if they’re a good member of their social group.. then you are open to new ideas.

JAMES He ah.. you’re a great ah... great minority kid, a great black kid, a great Asian kid, a great white kid, whatever.. and they’d be like oh yeah I am aren’t I? and then they’ll be open to new ideas and then you’ll be able to reach them.

BTW.. I do believe that all of us are racist... if you acknowledge that then you are good to go... if you don’t think you are.. please think about it...

***So the above... JAMES sees it as another form if manipulation.. Need to bring together..

Identity\race JEN Are you sure.. that it’s not prejudice or biased

JACK It’s all semantics... we get the point
ME Well no actually... racism is a belief... prejudice is an act... so when you say you are prejudice against somebody you are physically trying to impede... like your taking a side... racist you can have thoughts in your head... like a dislike...

JEN I thought racist was that you believe that your own race is supreme to another... I though that's what the definition of racism was...

*** YOU ARE RIGHT IN THIS CONVERSATION... NEED THE EXACTS...****

ME Ok... (Write as if you reassured that what she said fell under the umbrella of which I was speaking... )

Identity\race o I, uh, looked at, uh, one that was relatively recent from last year, I think maybe three before it was called combating race relations, stress in the classroom. But it was basically the story about this kid Muhammad. Um, and he, he was disruptive and, and uh, not be good student, "good student". (JACK: Um), and uh, it was basically a whole thing was an anecdote of him. JAMES: 01:00:28 Uh, you know, like, oh yeah, he goes through his day, but he's not doing what we supposed to do. He gets up and his teacher yells at him, get back in here seat, and he says, oh, it's just cause you hate black kids. Um, and uh, uh, so the teacher's like, but that wasn't what I needed him get back to a seat. That's what he's supposed to do. Uh, so the fix action does, she wouldn't, and, uh, talked about her, uh, uh, her identity as a, as a white woman who never had to deal with any kind of problems. And then, uh, uh, so then when she dealt with, uh, uh, Mohammed and the future, all she had to do is look at him and he'd sit back down in his seat and there would be no problems. Well, that's wishful thinking! That's just a cool story that has nothing to do with anything but that, that I thought that was pretty typical of all the modern stuff that we're looking at and the publications. It's just some random opinion. And I honestly, I, I no longer care about random opinions. I, I
want some data! We deserve data. We’re paying for data. I want data!

Identity\race

STEVE: 01:28:15 I just, I think it's, it's kind of along like you know the blacks are punished more than the whites. Yeah...It's, it's like, yeah, that's situational too. But I think that underlying bias is like maybe the explanation for that statistic.

PAULA: 01:36:44 What block did you, do you want to measure the with like race issues? Like what, what are you trying to measure?

JAMES: 01:36:48 Well if you will, well if you cause the uMARIEimate, the uMARIEimate thing we want is our, our is to be... Cause school is the place where we make aduMARIEs Right? And our aduMARIEs are kind of jacked up. Right? Cause you look at the prison system and guess who's in there. It's not, not a bunch of white people. There are a bunch of white people but there's a disproportionately high number of non-white people in the prisons.

One thing that Cohen does not address in his research that Simmons does is the increased punishment of black youth over white youth. Simmons findings show that, in both sixth and seventh grade, black boys and girls, on averJENe, received more probations and suspensions than their white counterparts. While the effects of self-fulfilling prophecy cannot be ruled out in the behavior of black youth (i.e. black youth are socialized into believing the myth that black people are more inherently delinquent and less likely to do well in academia), Simmons describes this racial difference as “due to discrimination in punishment, with African-Americans punished more heavily than whites for the same offense.”
While the contents of each article are somewhat different, one can infer from both Cohen and Simmons the conclusion that there is a need for teachers to be conscious about racial discrimination in schools and how it affects the grades and punishment of racial minorities and, furthermore, a need for teachers to be proactive in building trust (through affirmation) with their racially-marginalized students.

The anecdote continued with one of Mohammed’s teachers participating in deliberate reflection of her how she was white and never had the kind of difficulties that Mohammed has to face. The next time Mohammad got up from his seat in the middle of the class, the teacher only needed to give him a look for him to sit back down without incident. The authors suggest that when teachers “reflect on their own racial identity with colleagues can better empathize and talk about race with an ever-growing diverse student population” (Sehgal, Jeffries, & Rappaport, 2017). Unfortunately, the anecdote seems more like wishful thinking and doesn’t actually provide a meaningful way for Mohammed to make gains in his social standing, become a better student, and learn better techniques to cope with the world around him.

Most authors that use real evidence to support their position on race and the classroom cite research dating back a generation or two. This author is certain this his parents and grandparents’ classrooms would have been an awful place to be a minority, but that has little to do the classrooms today. The numbers are readily available for the researchers to see disparity among races in academic achievement. The academic community needs a new round of study in this area to look at the progress and regressions we have made in various areas; to see which interventions provided long-term improvements, and which actually made things worse. Until this is done, the best approach to achieving true equality in the classroom is just a matter of opinion.
Black individuals continually receive disservice when given helicopter treatment, economic & legal opportunities, and while just existing in their communities and society which severely impacts their quality of life in “the land of the free”. Dovidio & Gaertner make a distinction between Dominative Racism and Aversive Racism in which Dominative is what we see as “old-fashioned” and blatant while Aversive is observed in individuals that believe in the principles of racial equality, but still may have unconscious misconceptions about Black individuals that result in subtle, indirect discrimination.

To support some of the claims mentioned in Aversive Racism, an experiment is described in which an emergency was staged in a laboratory situation that a white individual was to respond to. In the case where the individual thought they were the only person to witness the emergency, they treated the white and Black victims with the same sense of urgency. But when the individual was to believe that there were other witnesses to the same emergency, they were twice as likely to help the white victim than they were the Black victim.

Both pieces describe these aversive behaviors and how they happen in everyday decision-making to the detriment of Black individuals. Both articles also highlight that people think that because racial equality “ought” to be true that it is in fact true; that when people are told not to be biased or believe themselves to be non-prejudiced, that in truth their bias becomes exacerbated.
Identity\race

For a few years, before children, my wife and I completed contract work throughout the United States, her as an Occupational Therapist and me as a Physical Therapist Assistant. Our contracts lasted about six months and were very lucrative because the areas and facilities were typically less than ideal. One of our contracts was in OaJACKand California where we lived and worked in a predominately black area on International Boulevard. We had met quite a few people and enjoyed dinner, drinks and socializing through most of our contract, however we had also been spit on, spit at, hit for no apparent reason, called “sorry” and had “I hate white people” shouted at us from across the street numerous times from what appeared to be a teen JENed girl out with her friends. These occurrences happened almost weeJACKy and unfortunately, despite the wonderful times we had there, is what sticks out in our minds. I am telling this story, not to say “See black people do it too!”, but because I feel that we all, to some degree, have “isms” whether it is racism, sexism, partisanism or any other “ism” (probably a combination) everyone does it, JENain to some degree, and to deny that, I feel, is just lying to yourself. When you’re in someone else’s “bubble”, as a minority, your courses of actions are limited to putting your head down and ignore it or lash out and be labeled, neither of which is a great option. I was in a position to eventually leave and get out of that situation before any lasting effects, however this is not the case for everyone.

As I mentioned, when a minority is stuck in someone else’s “bubble” their options are limited. When they can’t find a way to get out of that “bubble”, or feel welcome in it (i.e. a black student with a white teacher), lashing out is inevitable which can then lead to labeling as a “problem” in which the minority may then begin to identify with. This can then perpetuate a cycle itself leading to more labeling and more problems. The author of this article (chapter) writes, “Theory driven interventions,
attuned to psychological processes, can reduce bias and change outcomes for the better", how long held beliefs can hinder negotiations and relating each party to a higher cause can improve the negotiations, how affirmation of alternate identities can improve the judgement of a victim's claim and commitment to hiring criteria before reviewing applicants can decrease discrimination. These are all fantastic ideas, but appear to be just a band aid on a much deeper seeded wound.

Is there a more complete solution? I like to think so; however, it would take the complete change of ideologies and beliefs of a whole society and probably won’t happen in my lifetime. The Civil War ended 153 years ago, the Civil Rights movement was 50 years ago and the Equal Rights Amendment was ratified 46 years ago yet we still have abusers like Harvey Weinstein and Larry Nassar, there is still the need for movements like Black Lives Matter and political parties cannot come to an agreement on such fundamental polices as health care reform. Every time a progressive activist such as Abraham Lincoln, Martin Luther King Jr. or John F. Kennedy starts to make headway, some chickenshit asshole kills them. That’s not to say these are the only problems. Groups like the KKK, NAACP, LGBT and neo-Nazis also promote the separation of society. I would never group these organizations together as far as violence and extremism, but they each do exclude other groups and look to advance their own agendas. If ever an organization like the NAAWP were started it would immediately be attacked as racists and exclusionary. If there ever is to be a society rid of “ism” it must be total and complete.
Exactly, and so I really liked how that kind of overarching kind of idea of related back to the Mclaughlin article. Um, and so this particular study that was done one and two, um, to kind of look at particular demographic that has been institutionally disservice. And so two researchers went to a elementary school that was a 100% African American population and that they had a 98% poverty rate and they specifically wanted to see how those students, um, kind of creative or their identities through the classroom. And so they specifically kind of talk about two separate types of identity, disciplinary identity and academic identity. And so disciplinary identity, um, very much a kind of relied on, uh, I guess identity formed at home. Um, even though they didn't go into too much detail about those identities formed at home, it was more just talking about like a self ingrained identity that they brought to school with them. Um, and so, and then academic of course it's identity. They form ask students. And so there were two researchers and they do kind of mentioned that, uh, that there are inherent biases as they weren't black. Both researchers, we're not black, but teacher that was teaching this course was white. And she was Kinda cool to note too, is that particularly teacher, she actually taught, um, this whole entire class in second grade and then popped it to go with them into third grade (ME Who was the author of this paper?)o Uh, cane. Yeah. So, so that's what's really cool is the teacher feMARIE that she could make a bigger impact in this community because even though she doesn't have that cuMARIEural bacMAYAround to relate with the students, that she can make a difference by continuously working with them from one grade to the next.
Identity\race  However you want to say it article and it touched a lot on the fact that there is definitely a gap in that one specifically in the urban communities, but in general those of minorities versus the general standard white male, middle class, upper class, their functional ability in school. So I picked an article, I don't know who it's from, um, that focused mainly on the, on on trying to figure out why that is and it actually ties into pretty much every single thing that you all are talking about, especially cuMARIEndissonance and identity. Um, so hey, so you, you two already, one who was it by? (ME Warren) Warren by Warren and it touched on the fact that there is really two perspectives that science teachers can take or teachers in general can take towards their students. Um, one is kind of the more standard and it's kind of what is subliminally messJENed and put into our minds from a very small JENE is that it's, you kind of have this science knowledge book smart versus your everyday knowledge or street smart. That's literally, they are slang names for that book. Smart and street smart. I mean, you waSTEVEh kids shows, you waSTEVEh documentaries, you waSTEVEh anything.

Identity\race  Speaker 9:  01:23:16  What the other perspective is basically every day knowledge of science because you use them. Both. The principles are the same. Critical thinking, observations, hypotheses. Um, knowing how to work your way around data. That tape that you use that in everyday, use that in the street smarts, you're not going to go and be a complete idiot and you know, get, naked on the streets. You have to know how to talk to people. You know, how to cater to people you have to like observe people, waSTEVEh them, know what they think. That is all of science as well. Um, and especially in the minorities since they come from such a diverse bacMAYAround in differences is that they actually bring a lot of that to the table. Um, some of them have to, you know, they grow up a little bit more poor so they have to kind of, uh, Info like know how to work around their parents or maybe
they have side jobs working as like, you know, um, gardeners are lawnmowers. That's what I did as a kid. Um, and they get along with their peers and they probably have experience and a whole lot of things that is sheMARIEErered white, middle class student doesn't. Um, so the main concepts in everyday science knowledge is that really you can bring them about in scientific inquiry. Um, and transactional discussions, how we talked about and evaluators, Dr z's isn't Zeidler Zigler. Look,

Identity\science Arguing about beliefs. “I am a physicist”

STEVE It’ s a sphere.. I see a sphere. JON well I think you’re seeing it more abstract. STEVE Well I’m a physicist ...

Identity\science to like his thing of like the people who think they're most objective have the most bias because these were all like science facuMARIEy who had been trained. They're like, we're stem, we know objectivity. Like that's our job. But they didn't actually, and there would just his bias. So that's kind of what mine went into. And it also went to the same, how we fixed it was we have to establish the criteria from the start versus like allowing ourselves to pick it out.
Let me get ahead. Let me get ahead, let me give you an experience. I know. I'm sorry. I'll shut up. (ME Do your thing) then you can fix it. All right. So, uh, the science you have clarifying language, pseudoscience, obscuring language, um, sciences, uh, you know, based on circular arguments and feelings and, uh, crap (his arguments were mixed up on his poster) frustrated. There's a backwards guys, this Arrow here, you guys. All right. So the types of evidence that are relevant. So the call it the politics of science that are relative and measurable as being a good citizen, being a good voter, you know, stuff, whatever, uh, quantitative stuff, stuff that you could actually measure people on poverty. Uh, the learning the gap, and you're going to talk about, um, prison rates, college acceptance rates. You know that, who the hell ended up being successful in life? Who didn't right those things that are quantitative? They are measurable. They may not be measured, but there are measurable. Um, now let's get to our paper, right? Um, there's these things are measurable, but they're not being measured in the paper. There's like the stuff she references, right? So like the getting out of, uh, getting people out of poverty, we've been doing it 20 years. Poverty rates really haven't changed. We're not getting people out of poverty. Um, I didn't look at prison rates, I didn't think about that till like 10 minutes JENo. Fine. I didn't think about college acceptance rates because you guys didn't mention it until a few minutes JENo. If these are things that we could look at, but they're not right. There's quantitative data out there, but we're not looking at it. We're only looking at the qualitative stuff, right? Like I'm good voters, right? Cause we got, we've had a series of fantastic presidents. Um, we're okay. What's that?

So yeah. So I need you to guys to fix me because
This is what you're missing. Um, so if you would to go through a lot of those articles, they would have your numbers you're looking for. So when an article like that, there's no sense in repeating the numbers because look, and this is what I said, this is what happened. So I can say to you, all right, um, you know, the prison rate is this, the graduation rate is this like, and these groups aren't graduating at comparable to this group. Right? That's telling you what happens. Cool. We know that that happens. But as far as education, what good is just knowing what happens do for us.

Well we'll play Bloom's taxonomy. I can't get to the, the high level stuff if I can't get the knowledge, I don't have the knowledge, I can't get pass that.

So in that sense, you're call it a pseudo science cause it's not quantitative. But in your, your analogy right there, you just placed that knowledge if your ranking, yet you placed it above just as quantitative, did you not?

No, so quantitative data is knowledge as well. is it not, (ME oh yeah), so it's the same. All right.

I'm stuck...

I'm goin to get you unstuck. No, I thought you brought up a great point. So look, this is what I keep saying. So as far as the poverty rates, prison rates, all that. Okay, we can look at that and it could be graphed and we'd give me like 1990 and then you know, 2016 whatever, 2016 and so you can look and say, Oh yeah, whatever this is we're looking at it increased between 1990 and 2016 right? Hooray..

It does. As far as education goes, right? We're not answering questions of what happened in education, right. In education, we're answering questions. Oh, why the hell it happened so we can fix it? All right. That's where the qualitative, that's where that type of work comes.
STEVE: 00:59:21 But we made broad sweeping changes 20 years JENo.

fb: 00:59:24 What talking about no child left behind? It was kind of a reformation of what had been happening.

Identity\science Um, and then the thing is though is she does see herself as a helper that within the classroom, um, at one point during like a graphing activity. Um, and she asked one of her group mates to come help her and he was like, well, you didn't help me. So she was like, fine, yeah, let me come you. (ME what grade is it?) Yeah, this is third grade (ME Wow). And so she, she feMARIE the need to go and then after that she went around and help the rest of her classmates outside of her group with their graphing thing because you feMARIE that was her place.

Identity\science Speaker 9: 01:22:33 Your parents, your peers were very young JENe. It's just like, oh, he's just really book smart. But you know, he sucks at common sense. So like, oh, that kid, man, he's got to make it good one day. But he can't understand like can't read a textbook that's just general, every like that. We don't even think about saying that. That's just how we go about talking about these differences. And really what my authors states is that, that's the principal source of the problem is that we set up this dichotomy. We set up this dissonance between people's everyday experience and science and in the classrooms. So we literally are just like, all right, here's this classroom of science. Completely eradicate everything that you've ever learned and you're going to pay attention to me. No, that's not exactly how it is. That's not how it should be.
And then the Latino student, uh, got with a group of people, I think other Latinos, I'm not sure, uh, to construct an experimental set up and design and lab. Um, and usually he's like quiet and soft spoken and he's not really that good at performing in class. But when they let him be on his own and design this own lab, he was able, as it was dealing with ants, um, he was able to, because of like his home life he was and his cuMARIEure, he has been taught about like, um, the value of life and perspectives. And he was able to put himself in the perspective that the ants and raise scientific questions like, well, what are they like? Well, they like dirt, so they must like the dark. Why don't they like the dark? Can I touch that? And he'd be like, well, what if I put two rooms on with a lamp and one with not. Would they go to the one without the lamp? It was like these really rudimentary things, but showed him thinking about all of that. And that's from his, from his bacMAYAaround. So basically the whole driving point of the argument and the article is that these kids are smart. They do know these things. Um, and if we encourJENe them to use their bacMAYAaround knowledge, um, through cuMARIEure, through their identity development, through their languJENes, uh, through the interventions of us. Yeah. See I said that interventions of us and encourJENing them,

the first being that they are struggling to learn science, that the medium

JACK: 01:32:00 of a new languJENe, um, you know, just like it's difficuMARIE enough to try to understand science because the science can be a whole new languJENe, but like doing that through like a languJENe that they barely know, that's what's the most difficuMARIE. And then also the disconnect between teachers and students cuMARIEEures, which is cuMARIEEural dissonance. I just didn't have the nice word. So yaye! So is it a great,

JACK: 01:32:40 Um, and then, okay, so in the buxton article, um, what are the first things that they're talking about is how science can be used to teach
literacy, especially for English language learners. And this is something that in Feldman's class, I know that like the one woman, what was her name?

JACK: 01:32:54 Ms. Jaque, yeah. Oh God. Yeah. But she came, she came in and she was like saying like, she's like, man, like this is the system just doesn't understand. Like, like you can teach literacy through science. Like they want to teach it through just like normal, like English classes. But anyway, point being...

Identity\Self-efficacy 24:00 JACK Self fulfilling prophecy...

One of the the things that I put in my thing was that.. kinda self fulfilling prophecy.. you're told your whole life you are like.. you are this and people who look like you are tis way.. Im told that's there is this box that I need to fit in.. .

Identity\Self-efficacy 01:10:49 Buut..to go full circle cuz Kory love, love's to go full circle. I look at the same time though. Things you have to consider. So two points and I'm not disJENreeing, I'm just saying like we've been doing both sides. What if there's this kid and they're like, I want to be an AP and they go in AP and they get a c, right? What's going to do them better? Choice A they go into AP and they get a c and it's really hard and whatever? Or window B where you as a person, as an aduMARIE. Tell this kid that they're not good enough to go.

JEN: 01:11:26 I would never tell a kid they're not good enough!
ME: 01:11:28 But, but, but, but, but, but like, as a kid, you're going to know that you weren't allowed to do that. So you don't have to tell him that because they're not stupid. Like my kids know, they're like, yeah, he's in stupid, reading. Like they know those turtle reading. (Laughter) And so like they would like know, they know who's in what classes and that like we were talking about self efficacy earlier. They project that on themselves. Like they see it as a deficiency. Like they'll see themselves like my kids did as not a good kid, not a smart kid. So there's like a certain amount of damage that can be done by denying that, that opportunity. A second thing, a real practical point that I've seen a lot and I'm sure you're going to see, um, it's far as no child left behind. What happens when you get to eighth grade and they, some kids about to be 16, right? And you're going to have him run around with like 13 year old girls and like, you know, so there's, there's all these different things that, that go into it. And then I can throw one more on top of that because I saw it happen a lot. Whereas like every, all the money is tied to school grade. So I have certainly, and I'll say it on tape, cuz I don't give a fuck...I have, I've given people a passing grade in my biology class cause they were like 20 years old and they were about to graduate out of high school and they still couldn't read. But I was encouraged to give them this grade because of graduation rate, which leads to school grade, which leads to money. Like do you see all these things? So, so as you were saying like I want, I want data, I want a solution, that's cool. But like at the same time you've got to factor in all these things that aren't related to numbers.
Identity\Self-efficacy

As I mentioned, when a minority is stuck in someone else’s “bubble” their options are limited. When they can’t find a way to get out of that “bubble”, or feel welcome in it (i.e. a black student with a white teacher), lashing out is inevitable which can then lead to labeling as a “problem” in which the minority may then begin to identify with. This can then perpetuate a cycle itself leading to more labeling and more problems. The author of this article (chapter) writes, “Theory driven interventions, attuned to psychological processes, can reduce bias and change outcomes for the better”, how long held beliefs can hinder negotiations and relating each party to a higher cause can improve the negotiations, how affirmation of a unique identities can improve the judgement of a victim’s claim and commitment to hiring criteria before reviewing applicants can decrease discrimination. These are all fantastic ideas, but appear to be just a band aid on a much deeper seeded wound.

Identity\Self-efficacy

Um, have you guys heard the term self-efficacy? Yes. Do you guys know what it is? Basically what she's like cell phones. You see like how, um, you feel you will do at something. So let's say students self-efficacy beliefs and when they say things like, I'm a bad student, I'm a good student. I hate science, I love science, I'm good at science. Those are all self-efficacy beliefs. So that's kind of what the bathroom.

MAYA: 01:12:34 Yeah. And so they didn't, m, and then she's very much an artist, so she absolutely loved because this is a science course. Um, all the units are science based and discourse space. And so what her favorite part was is of the experiment. She's able to like detail, you know, kind of the experimental setup or what's going on. And she really likes being able to draw. But at the same time though, it kind of plays into this like feeling not, not enough. She, even when she was very good at drawing and liked drawing, she says, oh, I'm not good at drawing type of thing. And so she kind of
gets down on herself, um, which kind of plays into this idea of I'm not good enough to be in this environment.

Identity\Tribalism

MARIE “Belief consonance is like beeif JENreement”. The arSTEVEle was about people holding on to their beliefs because they care what other people think about them. That’s one of the reasons people are so protective of their beliefs because they’re surrounded by other people who have the same beliefs. Provides them with a group identity, which strengthens their own identity. Also they want to

COMBINE THE TWO

37:23 MARIE Beliefs consonance (ie belief JENreement)
People hold on to their beliefs because they care what other people think about them... (GIST OF HER ARJAMESLE) That’s one of the main reasons people are so protective of their beliefs is because... they’re surrounded by people with similar beliefs and it kind of strengthens their own identity... people feel uncomfortable just knowing that people have different beliefs.. like how people seem to seek out information that fits their own point of view... a stereotypical example eis people who are uMARI ERA, uMARI ERA conservative.. they want to wathc Fox News the whole time.. they only wath fox news.. they only want to waSTEVEh media that supports their own view and it becomes like their own bubble.. if they get outside information they kind of reject it.. and they’re more stubborn and really don’t want to relinquish their beliefs because everyday they rein their little bubble..
She concludes by emphasizing the importance of empathy and taking the other person’s view.

Identity\Tribalism

JEN: 01:03:31 So there's always been discrimination.
Maybe the answer is to find something else. Like it went from religion to race maybe we can find like...

The article provides many examples of people resisting arguments if they might challenge long standing beliefs, even if the new argument might be more logical and/or even be of benefit. The role of affirmation was thus explored to create greater trust and reduce biases between groups of people. In general, the article heavily focuses on the idea that people hold onto their beliefs—even when presented with evidence that could refute their misconceptions—often to the point that they only accept and evaluate information if it aligns with their beliefs.

In comparison, Golman et. al’s The Preference for Belief Consonance takes a similar but different approach of belief analysis in that people can hold onto their beliefs because they care about other people’s opinions, about what other people think. People can feel uncomfortable when confronted with the idea that people hold beliefs and values that are different from their own. In a similar vein, this article attempts to explain the various roles in intergroup and interpersonal conflict.

Cohen’s article and its ideas expressed are relevant to education because openness to other identities and beliefs is needed. In many cases, a white teacher teaches minority students. Trust is of critical importance and research indicates that affirming alternative sources of identity and using self-affirmation techniques can increase openness and understanding. Like the Cohen article, Golman et. al’s The Preference for Belief Consonance also analyzes the role of beliefs in intergroup and interpersonal conflict and acknowledges that people wish to protect their core beliefs and values. The issue of protecting one’s own views, beliefs, and identities causes one to selectively listen or receive information.
In general, people do not consciously or simply decide to hold a belief. Instead, people acquire beliefs by sifting through evidence selectively. People tend to listen to news sources and receive information which are unlikely to challenge their beliefs. Instead of seeking out new information which might challenge or expand their point of view, people tend to seek information that validates their own arguments. Having this bias in mind, coupled with Cohen’s ideas of self-affirmation, one can begin the work of being more open to groups with differing identities and beliefs.

Another note of similarity is the talk of ideological extremism, which is essentially confirmation bias to an extreme form. This links to the non-generality of critical thinking and the inability to see the world from someone else's perspective and be clouded by bias. When you want to see something you will see it, and when you don't you won't. It also depends highly on what you're exposed to, and much research has shown that the influences and information we provide to a population will denote how easily they will fall for extreme ideologies. So, critical thinking seems to matter in these extreme cases, but still little evidence on smaller, possibly less drastic, stances and experiences.

For a few years, before children, my wife and I completed contract work throughout the United States, her as an Occupational Therapist and me as a Physical Therapist Assistant. Our contracts lasted about six months and were very lucrative because the areas and facilities were typically less than ideal. One of our contracts was in Oakland, California where we lived and worked in a predominately black area on International Boulevard. We had met quite a few people and enjoyed dinner, drinks and socializing through most of our contract, however we had also been spit on, spit at, hit for no apparent reason, called “sorry” and had “I hate white people” shouted at us from across the street numerous times from what appeared to be a teen JENed girl
out with her friends. These occurrences happened almost weejack and unfortunately, despite the wonderful times we had there, is what sticks out in our minds. I am telling this story, not to say "See black people do it too!", but because I feel that we all, to some degree, have "isms" whether it is racism, sexism, partisanism or any other "ism" (probably a combination) everyone does it, Jenain to some degree, and to deny that, I feel, is just lying to yourself. When you’re in someone else’s “bubble”, as a minority, your courses of actions are limited to putting your head down and ignore it or lash out and be labeled, neither of which is a great option. I was in a position to eventually leave and get out of that situation before any lasting effects, however this is not the case for everyone.

As I mentioned, when a minority is stuck in someone else’s “bubble” their options are limited. When they can’t find a way to get out of that “bubble”, or feel welcome in it (i.e. a black student with a white teacher), lashing out is inevitable which can then lead to labeling as a “problem” in which the minority may then begin to identify with. This can then perpetuate a cycle itself leading to more labeling and more problems. The author of this article (chapter) writes, “Theory driven interventions, attuned to psychological processes, can reduce bias and change outcomes for the better”, how long held beliefs can hinder negotiations and relating each party to a higher cause can improve the negotiations, how affirmation of aMarieernate identities can improve the judgement of a victim’s claim and commitment to hiring criteria before reviewing applicants can decrease discrimination. These are all fantastic ideas, but appear to be just a band aid on a much deeper seeded wound.
Is there a more complete solution? I like to think so; however, it would take the complete change of ideologies and beliefs of a whole society and probably won't happen in my lifetime. The Civil War ended 153 years ago, the Civil Rights movement was 50 years ago and the Equal Rights Amendment was ratified 46 years ago yet we still have abusers like Harvey Weinstein and Larry Nassar, there is still the need for movements like Black Lives Matter and political parties cannot come to an agreement on such fundamental policies as healthcare reform. Every time a progressive activist such as Abraham Lincoln, Martin Luther King Jr. or John F. Kennedy starts to make headway, some chickenshit asshole kills them. That’s not to say these are the only problems. Groups like the KKK, NAACP, LGBT and neo-Nazis also promote the separation of society. I would never group these organizations together as far as violence and extremism, but they each do exclude other groups and look to advance their own agendas. If ever an organization like the NAAWP were started it would immediately be attacked as racists and exclusionary. If there ever is to be a society rid of “ism” it must be total and complete.

Home-life 31:00 JEN & JACK Older Teachers/Other teachers

I’m in a title I school and I’m convinced there’s not on enormal kid in there.. like one kid who has like a normal upbrining.. that’s what’s so.. that’s what’s so difficuMARY..
people out of poverty anymore. Um, however the United States does feel that's what the purpose of school is. A supreme court said no, that this, this is what's, Speaker 1 fb: 00:50:45 I'm not saying exactly where, but I don't, I don't recall her saying that it's to no law like it, it was never about getting them out of poverty as I'm getting out of poverty.

STEVE: 00:50:58 Cause she says no, and it never changed. It originated with control. It, it was to make you the good, good, good citizen. (ME Okay). Right. It started with, you know, they've got to be a good citizen. Right. And then, then within a couple of things, still seventeen hundreds, it was get out of poverty or get a job.

fb: 00:51:18 That was the world war two stuff...

JON: 00:51:20 Where does it say it was originally to control people?

ME: 00:51:23 And establish a work force

STEVE: 00:51:24 Public schools as, as teachers in public schools. We are the government, right? We are the government where the institution, you know, um, and therefore we implement the policies of the government. The elected leaders decide those policies. These are the policies that those elected leaders in order to change these policies at this point, because of supreme court rulings that is voting on the new amendment to the constitution.

ME: 00:51:58 I personally don't think the, I mean, and I could be wrong, but I don't think think that the initial was get people out of poverty. I think it was an economic position where like, hey, we need workers. So I think what my point is, I think like that's a, the poverty things like an after effect. I think that's interest convergence (JAMES ok). Like, so if they, if they staff a workforce and a half is to get people out of poverty, great. But otherwise it's not the, so go ahead.
STEVE: 00:52:26 I, I'll accept that. Get people to work good people to work, not get them out of poverty. They can be an impoverished but working, I'll accept. All right, so that, that those are fixed. AMARIEhough she doesn't like,

JEN: 01:06:23 It doesn't matter, I swear to God it doesn't matter if they want to be in an AP class. We learned this, we learned this when we talked to our earth and space science curriculum. Um, lady and Brandon, she had AP students in, in her AP environmental science class who are on a level two reading levels or reading level or really wanting because the class that you want to take a class.

MARIE: 01:06:42 Becasue they're just like yeah... I like the teachers.

JEN: 01:06:45 They can be terrible testers. But they get in

JACK: 01:06:45 I mean, I mean I personally find that okay. Because I feel like...

JEN: 01:06:52 I don't know, I'm not okay with it.

JACK: 01:06:54 I mean, I feel like if they are willing to at least put it in an effort, like I understand like maybe they don't have that reading level, but that's not always a failure on them. Most of the time it's a failure on the other teachers before or.....It's the system as a whole. Do you know what I mean? So it's like, I don't want to say these people can't take part in my class because they're necessarily not going to be able to like keep up, you know, if they're gonna if they feel like they're going to get something out of it, you know what I mean?
Home-Professional Experience

JEN: 01:07:55 so just some body. But I being in the classroom right now, I can tell you where and how those kids slip through because you can't reach them on it is chaos. But this is what I told Laura yesterday, like you had to really relinquish all control because you like the things that you want. And like I'm a very organized person and my desk every day it looks like it looks like a bomb went off and it drives me nuts every single day. And I just, I have to, I'm having to like be patient and let go of those things because it's not, that's not how it works. And I mean, I'll, I'll get there eventually. I know I will. Um, but this one teacher failing it takes it, I would say as a whole, like the school failed him, the system failed him. And there wasn't just one teacher that where he slipped through the cracks. It was many teachers. And I think the worst thing is the no child left behind because they all get through now no matter what. No matter what they all get through every last one of them. Um, and so you've got, you've got kids who need that extra help. I think the way that my school is doing it right now is great, but I don't know how it's going to work because they, they're putting in all of these intensive reading classes. We have eight periods now. Um, and they're really taking these kids who are struggling with these sayings and saying, we're going to put, we're going to, we're really gonna focus on this. Um, but then JENain, like the variables that I was talking about with this, like having the student in their like, are they really going to be able to get what they need out of this class? Are they going to take away from other students? Is it, can they even, can they even grasp the curriculum if they're at a level 2 reading? Cause that's a college course. Don't they get college credit for that?
JEN: 01:09:51 Yeah. I mean my daughter's an AP history right now and she's, she's struggling. She's struggling. Yeah. And they, we went in there and he's like, oh she's pro, cause they hadn't been done but didn't have a records JENain. And they're like, well she's probably going to need to be an intensive reading classes and the counselor. And I'm like, no, no, no. She's going to let, he was like, Nah, she's, she's, she's probably, because most of the other kids are in intensive reading class. I'm like, no, she's, she's, she's pretty huge. He one listen to me, she was like the ar points later, like every single year for years. I think she's good on that. Of course they get her schedule and she was absolutely fine. But um, yeah, I mean there's, that's, I JENree with you,

New Speaker: 00:14:04 You can, you can.. You gotta mess with them.. save up your f bombs. Like if you gotta squeeze out one a year, that would be my advice. Just going to let them have absolutely got to let them have it. It was crazy. I was subbing a gym class the other day and that's what I do now. Like I won't like go in the classroom unless they're like science teachers that I know and they're like, you know, like hey we come, come to my class. I'll totally do it. But like otherwise I was kid like these little elementary gym classes and just hang outside. Well I'm looking at this girl and I'm like, she's like, I don't know, maybe I think she was second grade or something like that.

JON: 00:14:47 That's kind of sick Fred
New Speaker: 00:14:47 Well, no, no, no, because I recognized her, I recognize her. I'm like, wait a minute. I'm like, what's your name?

ME: 00:14:52 I'm like, what's your last name and she was like miles? I'm like, oh my, I had like our mother.

JON: 00:14:56 Oh wow!

New Speaker: 00:14:56 Yeah. And then I told myself, so this is the ghost. Like I had a mother in school, like I had a mother when she was a freshman. I remember my mom and her mother was pregnant with her as a freshman,
JON: 00:15:04 Was the one drink in the soda?
ME: 00:15:06 No, no, that was a different one, now that was Arneicia, that was another one... Alize was just mean and beat the hell out of everybody but then she became nice, you know...
JON: 00:15:18 Pregnancy will do that to you
ME: 00:15:18 I guess so. Then she was a meanie, but she is really nice girl and her daughter is sweet too.
STEVE: 00:15:36 (Belches loudly) Oh, excuse me.
ME: 00:15:36 It's good. It's good to keep it real. Keep it real.
JON: 00:15:39 It's on the tape.
ME: 00:20:38 (To JAMES) So as much as I bust your balls I love your takes though...

JAMES: 00:20:42 Oh, I, I, learn because I was in the military a long time, Right? If you don't have the knockdown drJEN out, people fucking die. (ME Okay). Right. So that's how I look at it.
ME: 00:20:59 Okay.. So if you don't have the knock down drJEN out people die... Like hit all the angles and hit em' hard like...
JAMES: 00:21:01 Cause if you, if you believe something and then you and you don't do something about it and then are you going to go explain to why you didn't know Johnny's mom, why he died? Because you didn't say something.
ME: 00:21:12 Okay. All right. I never considered that.. Yeah.
JAMES: 00:21:15 So, so, uh, that, that was my life for so damn long. I can't, I can't not be that person.. they'll just sit there and just poo poo everything throughout it.

tk: 00:47:46 I see that everyday I'm in high school.. Cause I go to lunch with them. Perfect. Perfect.
ME: 00:47:55 So you can see how it would be hard to change these people ideas. (STEVE) Oh yeah. I bet you if
you said, well why don't we try some cuMARIEural responsive pedJENogy like this,
STEVE: 00:48:04 They probably wouldn't even know what that meant
ME: 00:48:08 yeah, good. I'm glad you saw it. Cause. So that's like the reality of the situation. But I thought that was a really good example to me. Anyone when I read up like about how hard it can be, the change their ideas and we can even think about old poeple how hard it is to change their idea, like me...Old guys like me.
STEVE: 00:48:22 I don't know I'm pretty Flexible.
JAMES: 00:48:24 See in the military. They send me away to school for like a month, like every like three, four years. Like oh hey you're going to Biloxi for for a month and you're going to learn how to be better and then you come back.
JON: 00:48:37 Did you, did you get better?
ME: 00:48:40 I like to think I did. (Laughter)
tk: 00:48:42 So no (laughter)
STEVE: 00:48:42 (Concedes) So no
ME: 00:48:44 But there were certainly things that you disJENreed with what they were doing, right? (Yeah). Yeah. You would do it kind of out of duty or cause you had to. (Yes) And so the point is how much ownership do you take of something when you feel like you do it cause you have to right? And that's kind of like with this, I want it to make it like fun as laid back as possible because I don't want you guys to feel like you had to right. But there was a component that no offense to you or anybody to get work out of you guys, I kind of have to get you to do it. The has to be something, some incentive, but at the same time like I feel you will get more out of this if you don't feel like it's just something that you have to do that you have to suffer through basically as opposed to, and I think it would be a lot of that going on. Like I'm just getting through it. Like the same thing happens in teaching.
PAULA Wondering to her group, “Don’t we see colors differently?” I loved this because of its recognition that how we view the world is unique to each of us. The same can be said for the unique belief systems we employ to view our world.

STEVE That’s actually like a huge scientific thing, like do do humans like see blue the same? I think it’s been proven that see like different shades...

ME I interject.. There is a good chance you’re “seeing” different wavelengths...

JON my wife kills me... I like totally don’t understand things so.. she’s like well that’s baby blue.. and I’m like no.. that’s blue.. and she’ll explain, no, no, no, that’s royal blue, and I’m like no it’s blue...

ME “JON’s got like four colors that he rolls with”

JON “I got red, blue and yellow

JAMES: 01:05:06 Yeah. Like I had like 400 people in my, in my class, right. Like my graduating 400 people, I had essentially the same kids in every single class because we were the honors kids in the same was true of everybody else right then. And there were little groups, um, they had the same pool of people. But anyway, uh, so that, that, that, that was tracking and it wasn’t like soft coated like it is today. Like my son flip flop between AP honors and regular, and it was whatever he said he wanted essentially. And then I, I had the right of veto if I showed up at the school and I know he’s going to be an honors because I want him there and then they just change him. Uh, Yup. That’s exactly how they do it. And, uh, but the uh, like the back of the day it was, oh no, Oh your honors, you’re taking math all four years is going to be honors and you’re taking calculus as a senior periods. You don’t get an option. And then like, like that’s, it’s like when they, you’re filling out your thing that they tell you like you’re taking this class, this class, this class because class do you get to pick your one elective?
Whereas like every, all the money is tied to school grade. So I have certainly, and I'll say it on tape, cuz I don't give a fuck...I have, I've given people a passing grade in my biology class cause they were like 20 years old and they were about to JENe out of high school and they still couldn't read

For a few years, before children, my wife and I completed contract work throughout the United States, her as an Occupational Therapist and me as a Physical Therapist Assistant. Our contracts lasted about six months and were very lucrative because the areas and facilities were typically less than ideal. One of our contracts was in OaJACKand California where we lived and worked in a predominately black area on International Boulevard. We had met quite a few people and enjoyed dinner, drinks and socializing through most of our contract, however we had also been spit on, spit at, hit for no apparent reason, called “sorry” and had “I hate white people” shouted at us from across the street numerous times from what appeared to be a teen JENed girl out with her friends. These occurrences happened almost weeJACKy and unfortunately, despite the wonderful times we had there, is what sticks out in our minds. I am telling this story, not to say “See black people do it too!”, but because I feel that we all, to some degree, have “isms” whether it is racism, sexism, partisanism or any other “ism” (probably a combination) everyone does it, JENain to some degree, and to deny that, I feel, is just lying to yourself. When you’re in someone else’s “bubble”, as a minority, your courses of actions are limited to putting your head down and ignore it or lash out and be labeled, neither of which is a great option. I was in a position to eventually leave and get out of that situation before any lasting effects, however this is not the case for everyone.
As I mentioned, when a minority is stuck in someone else’s “bubble” their options are limited. When they can’t find a way to get out of that “bubble”, or feel welcome in it (i.e. a black student with a white teacher), lashing out is inevitable which can then lead to labeling as a “problem” in which the minority may then begin to identify with. This can then perpetuate a cycle itself leading to more labeling and more problems. The author of this article (chapter) writes, “Theory driven interventions, attuned to psychological processes, can reduce bias and change outcomes for the better”, how long held beliefs can hinder negotiations and relating each party to a higher cause can improve the negotiations, how affirmation of alternate identities can improve the judgement of a victim’s claim and commitment to hiring criteria before reviewing applicants can decrease discrimination. These are all fantastic ideas, but appear to be just a band aid on a much deeper seeded wound.

Is there a more complete solution? I like to think so; however, it would take the complete change of ideologies and beliefs of a whole society and probably won’t happen in my lifetime. The Civil War ended 153 years ago, the Civil Rights movement was 50 years ago and the Equal Rights Amendment was ratified 46 years ago yet we still have abusers like Harvey Weinstein and Larry Nassar, there is still the need for movements like Black Lives Matter and political parties cannot come to an agreement on such fundamental policies as health care reform. Every time a progressive activist such as Abraham Lincoln, Martin Luther King Jr. or John F. Kennedy starts to make headway, some chickenshit asshole kills them. That’s not to say these are the only problems. Groups like the KKK, NAACP, LGBT and neo-Nazis also promote the separation of society. I would never group these organizations together as far as violence and extremism, but they each do exclude other groups and look to advance their own agendas. If ever an organization like the NAACP were started it would immediately be attacked as racists and exclusionary. If
there ever is to be a society rid of “ism” it must be total and complete.

Home-
life\Personal
Experience

STEVE:   00:31:26  (Belches) Excuse me.

JON:  00:31:35  What is with you man.

STEVE:   00:31:35  So I am that rebellious child such that bad habit from my ex girlfriend’s mother because she absolutely hated whatever I liked burped and so I'd make it a point when I was over there to like do the loudest most of obnoxious and

JON:  00:31:51  And you guys broke up? (Laughter)

ME:  00:31:57  now your that gross boy. Who was that gross boy? He had no manners.

MAYA:  01:12:46  No, you're fine. And so they don't really specifically address where this fear of being yelled at and uh, originated from. Um, but that's why it's kind of the under her disciplinary identity. It's obviously something that's brought in and then unfortunately reinforced in the classroom by her peers
However you want to say it article and it touched a lot on the fact that there is definitely a gap in that one specifically in the urban communities, but in general those of minorities versus the general standard white male, middle class, upper class, their functional ability in school. So I picked an article, I don't know who it's from, um, that focused mainly on the, on on trying to figure out why that is and it actually ties into pretty much every single thing that you all are talking about, especially cuMARIEural dissonance and identity. Um, so hey, so you, you two already, one who was it by? (ME Warren) Warren by Warren and it touched on the fact that there is really two perspectives that science teachers can take or teachers in general can take towards their students. Um, one is kind of the more standard and it's kind of what is subliminally messJENed and put into our minds from a very small JENE is that it's, you kind of have this science knowledge book smart versus your everyday knowledge or street smart. That's literally, they are slang names for that book. Smart and street smart. I mean, you waSTEVEh kids shows, you waSTEVEh documentaries, you waSTEVEh anything.

Your parents, your peers were very young JENE. It's just like, oh, he's just really book smart. But you know, he sucks at common sense. So like, oh, that kid, man, he's got to make it good one day. But he can't understand like can't read a textbook that's just general, every like that. We don't even think about saying that. That's just how we go about talking about these differences. And really what my authors states is that, that's the principal source of the problem is that we set up this dichotomy. We set up this dissonance between people's everyday experience and science and in the classrooms. So we literally are just like, all right, here's this classroom of science. Completely eradicate everything that you've ever learned and you're going to pay attention to me. No, that's not exactly how it is. That's not how it should be.
What the other perspective is basically every day knowledge of science because you use them. Both. The principles are the same. Critical thinking, observations, hypotheses. Um, knowing how to work your way around data. That tape that you use that in everyday, use that in the street smarts, you're not going to go and be a complete idiot and you know, get, naked on the streets. You have to know how to talk to people. You know, how to cater to people you have to like observe people, waSTEVEh them, know what they think. That is all of science as well. Um, and especially in the minorities since they come from such a diverse bacMAYAround in differences is that they actually bring a lot of that to the table. Um, some of them have to, you know, they grow up a little bit more poor so they have to kind of, uh, Info like know how to work around their parents or maybe they have side jobs working as like, you know, um, gardeners are lawnmowers. That's what I did as a kid. Um, and they get along with their peers and they probably have experience and a whole lot of things that is sheMARIEered white, middle class student doesn't. Um, so the main concepts in everyday science knowledge is that really you can bring them about in scientific inquiry. Um, and transactional discussions, how we talked about and evaluators, Dr z's isn't Zeidler Zigler. Look, And then the Latino student, uh, got with a group of people, I think other Latinos, I'm not sure, uh, to construct an experimental set up and design and lab. Um, and usually he's like quiet and soft spoken and he's not really that good at performing in class. But when they let him be on his own and design this own lab, he was able, as it was dealing with ants, um, he was able to, because of like his home life he was and his cuMARIEure, he has been taught about like, um, the value of life and perspectives. And he was able to put himself in the perspective that the ants and raise scientific questions like, well, what are they like? Well, they like dirt, so they must like the dark. Why don't they like the dark? Can I touch that? And
he'd be like, well, what if I put two rooms on with a lamp and one with not. Would they go to the one without the lamp? It was like these really rudimentary things, but showed him thinking about all of that. And that's from his, from his bacMAYARound. So basically the whole driving point of the argument and the article is that these kids are smart. They do know these things. Um, and if we encourJENe them to use their bacMAYARound knowledge, um, through cuMARIEure, through their identity development, through their languJENes, uh, through the interventions of us. Yeah. See I said that interventions of us and encourJENing them,

Another example they gave of a belief was that students from more diverse bacMAYARounds, their parents were less supportive of their learning. And it will say a lot of this like this support is because the community maybe differently. I mentioned like ESL learners and like maybe if they're sending emails and standards report cards, if they can like interpret it properly, the teacher's going to like read it as like, oh they're not involved in the student's life. And really there's just like a barrier that they're not able to overcome a solution to kind of want to like reform mechanisms just like make did. And they really emphasize getting teachers during their pre service period, like into classrooms of diversity so they can like see for themselves the students abilities and understand that these differences exist. But it's something we have to like overcome.

tamara specifically, um, for her disciplinary identity, she's specifically kept saying she didn't want to be hollered out and she mentioned this muMARIEiple times, but the reason why she's quiet in class and behaves well and listens to the teacher, it's because she doesn't want to be hollered at. Also that when she tries to speak up or wants to speak up in class with her peers, that she's afraid of her, her, her peers kind of putting her down. Um, because they feMARIE like she wasn't adequate. And so
that actually ends up influencing her academic identity of not being smart type of thing.

Home-life\parenting style
MAYA: 01:12:46 No, you're fine. And so they don't really specifically address where this fear of being yelled at and uh, originated from. Um, but that's why it's kind of the under her disciplinary identity. It's obviously something that's brought in and then unfortunately reinforced in the classroom by her peers.

And so they did kind of allude to her personal life that she did say that she, she is very obedient at home, likes did you chores and make sure you know, to be, um, I guess, uh, discipline child. And so that kind of JENain is alluded to but not specifically for her place at home is, is being reflected in the classroom.

So some of the things that hopefully you saw on our student characteristics. So like their ability to achieve like if they think they're capable, external influences. Like teachers have this in their head which leads into have more similar lessons. Like they slow down their teaching and to give more just like read the book or like there are more becoming an authority figure because they don't think the students are capable of achievement on their own. So kind of how in the So the whole beliefs of like how their parents influenced their lives and maybe like the home life is affecting their school life and they come in with these assumptions and then also social and behavioral responses. So things, they're not a typical too, like maybe more like yelling in the classroom you need to move. Like they're just different from how they would respond to social situations and they come in with these beliefs. So some of the examples that my article gave was that it has been found like statistically that students of diverse bacMAYAaround or less capable.[McGloughlin] said this like one best system, the teachers, the authoritarian, it only further like
encourages that based off the activities they choose. And the one thing that my article went into is like where does this belief come from? Like why do they think this? And a lot of they found is it's just they've heard rumors and this is

Another example they gave of a belief was that students from more diverse backgrounds, their parents were less supportive of their learning. And it will say a lot of this like this support is because the community maybe differently. I mentioned like ESL learners and like maybe if they're sending emails and standards report cards, if they could interpret it properly, the teacher's going to like read it as like, oh they're not involved in the student's life. And really there's just like a barrier that they're not able to overcome a solution to kind of want to like reform mechanisms just like make did. And they really emphasize getting teachers during their pre-service period, like into classrooms of diversity so they can like see for themselves the students abilities and understand that these differences exist. But it's something we have to like overcome.
if you were my student. I just be like alright we're done for the day. So this is kind of a, my article pinpoints and highlights through two examples. Um, they have a Haitian student and the Latino student to different minorities, it doesn't really matter. Um, and they talk about how they each bring about their own kind of, I have no idea what time it is, but they each go about their own ways of figuring out science and they're viewed from a teacher teaching perspective and from a societal perspective as lesser developed and not as capable as all the other students. But when you let them kind of be on their own, they're just as capable, if not more than some of the normal cookie cutter. The best system exists. Um, way of going about doing things like one person, they, their English was not their main language connected to all young. Um, and it was a very underdeveloped language. Like, you know, for an easy way to describe this is that the word zero English has a lot of different ways of saying that zero, no nothing. Some we had hoped for ways of saying that naught whereas in their language all they would have is zero and that would represent everything. So in science that can be a little difficult, especially when you get in the specifications of things. Sometimes you need to explain like the same kind of thing. We need like five different words because it's likely different variations like change, growth, uh, progress. These are all ways of describing the same thing just with different
Speaker 9: 01:26:47  Okay, you're just not going to do as well. But when they took and transactional discussions with other students and with people have their own languJENe, they realized that even talking about different things using the same words, they struggled a little bit more. But they were able to grasp the concept that this same word that they're using for all these different things can mean different things. Like even if we observe them externally to be like, oh, they have no idea what they're talking about when they're engJENing in conversation, they're like, wait, no, okay. I used the same word but it's for a different thing. It means this. And they were kind of like finding ways to work around their own languJENe, even if that was the way their mind goes set. So that shows that they have everyday knowledge that they can bring the science. It doesn't hinder them slightly does, but they can use it to their advantJENe as well.

Talking about getting to know her students. “You get to know their stories, and if you think it’s not going to affect you, you’re wrong because it does. The thing that really affects you is that you have no control, and you can’t (JACK interjects, “cross over that line, there’s boundaries) JEN “Yeah or change their situation”.

Telling the story of a girl who had to “move in with her mom because a family member touched her. But that’s why she moved here and the students at school are calling her a ho, and she believes what they’re telling her. And then I realized this with my daughter. Like what she’s going through like when she gets picked on and I like.. ‘You believe what they say don’t you?’ I was like, you believe it don’t you, and she was like yeah.

STEVE: That’s why affects them so much. It wouldn’t affect them if they didn’t believe it.
Oh, that's what I want to talk to you guys about taking issue with the use of the word urban, right? And we think about urban, like you said, poverty hasn't changed everything like that. Well, you know what has changed, uh, urban environments, right? Whereas now if you look at the census, there were more people of color living in the suburbs, suburbs that were tracked to suburbs. Then are living in urban areas. So here's this whole body of science in education and everybody says urban, urban, urban. But if you look at urban schools, like if you go to downtown Boston, like nobody, it's rich white kids going to the urban schools, right? Everybody else is kind of on the outside. Like when you think about urban centers. So that's something to keep in mind, kids, right?

JON: 00:08:19 That's a damn rich white parents moving around, Kicking people out.

JAMES: 00:08:23 So is it urban areas are how rich white people..

ME: 00:08:26 When you go to a lot of cities yeah think about it.

JAMES: 00:08:29 I thought they just worked there and then they...

ME: 00:08:30 (interrupting) That's what it used to be. That's what it used to be. Things done change.

PAULA: 00:08:41 (Pointing to herself and MARIE) We live in downtown Tampa...

ME: 00:08:42 Yeah, exactly.

Socio-cultural Interactions\Bias/Fairness

0, from a scientific point of view, do teachers really have the power to raise a scientific community that can critically think outside of the classroom? Do we need to go beyond general science concepts and touch highly on the concept of viewpoints and bias in topics outside of science and normal cookie cutter experiences? Will it matter? It's a great question to wonder and ask ourselves. Furthermore, what is an effective way to debias someone? This is perhaps why much research has not been posted. Will we know that our methods are working by tests and
such? Especially when kids most of the time are perceptive to what is being asked of them.

People’s attempt to be objective and fair, they actually create different criteria for each candidate based on their unconscious bias. He used an example of gender bias while hiring a police chief and how employers judge female and male candidates based on different criteria.

Another article, titled “Science Faculty’s Subtle Gender Biases Favor Male Students” also delves into gender discrimination in the workplace through a controlled experiment (Moss-Racusn et al., 2012). The question of interest was if science faculty members exhibit gender bias against female students and if this bias was contributing to the gender disparity in the scientific field. The study answered this question by providing 127 science faculty members application materials for equally qualified female and male students. The professors had to rank the students' competence and hireability, and indicate the amount of mentoring and salary they would provide.

The study had significant results and determined science faculty found female students less competent, less hirable, provided a lower salary, and provided less mentoring when compared to a male student with the same qualifications. The professors judged females with a different criteria than the male students, with a preference for the male, which was the same phenomenon referenced in Cohen (2012). Even when males and females had the same qualifications they were viewed in different lights.

However, this study had many more similarities than just the end results. In both papers, the authors emphasize those who value their objectivity are actually more biased because they are unaware of their subtle bias. Moss-Racusn et al. (2012) actually measured the science faculty’s subtle bias using the Modern Sexism Scale which measures unintentional negativity towards women.
versus blatant hostility. The study found the science professors to have preexisting subtle biases against women based on societies’ negative stereotype of female scientists. The science faculty viewed themselves as objective because they had been rigorously trained in the STEM field which values critical thinking, but in reality they were just blind to the biases they had.

Moss-Racusm et al. (2012) brought up a few new viewpoints Cohen (2012) did not explore. The first interesting find was the gender of the evaluator had no effect on the gender bias towards the candidates. The female faculty still favored a male student over a female student with the same qualifications. Moss-Racusm et al. (2012) also surveyed the faculty to determine how much they liked the students which resulted in females being more likeable. These two points further support the fact the bias is unconscious and does not stem from hostility.

Finally, the two authors needed that the best way to combat gender discrimination is by establishing a clear set of criteria before evaluating students. This will prevent different standards being used for men and women. However, Moss-Racusm et al. goes one step by farther by suggesting the stereotype causing the bias should also be addressed, for example the stereotype that females are less competent scientists. Moss-Racusm et al. specifically recommended working with science advisors to mentor female scientists and emphasize their self-worth. This is similar to the affirmation technique suggested by Cohen (2012) when addressing arguments that challenge long held beliefs. Overall, both articles deal with gender discrimination and methods to combat it.

Socio-cultural Interactions\Bias/Fairness

Black individuals continually receive disservice when given healthy treatment, economic & legal opportunities, and while just existing in their communities and society which severely impacts their quality of life in “the land of the free”. Dovidio & Gaertner make a distinction between Dominative Racism and Aversive Racism in which
Dominative is what we see as “old-fashioned” and blatant while Aversive is observed in individuals that believe in the principles of racial equality, but still may have unconscious misconceptions about Black individuals that result in subtle, indirect discrimination.

To support some of the claims mentioned in Aversive Racism, an experiment is described in which an emergency was staged in a laboratory situation that a white individual was to respond to. In the case where the individual thought they were the only person to witness the emergency, they treated the white and Black victims with the same sense of urgency. But when the individual was to believe that there were other witnesses to the same emergency, they were twice as likely to help the white victim than they were the Black victim.

Both pieces describe these aversive behaviors and how they happen in everyday decision-making to the detriment of Black individuals. Both articles also highlight that people think that because racial equality “ought” to be true that it is in fact true; that when people are told not to be biased or believe themselves to be non-prejudiced, that in truth their bias becomes exacerbated.

Speaker 3: 00:10:21 If you agree with what I gave you you put that on the top your point's right. What you want to get across? You don't even have to like summarize your article if you don't want to like whatever your main points like you thought we should know like you know what I'm saying? There'll be different. That's a summary. That's fine. But if there's something else like pseudo science, he's going to pick that up. It's fine. (Laughter) That's a good point. They're all valid points. (JACK Can I put quotes?) It's beautiful.

PAULA: 00:36:42 Yeah... So that's the start of the problem. So then it causes teachers beliefs regarding their cuMARIEurally diverse students in path, their curriculum assessments and student interactions. So upholding thing's like even if they don't realize it in their head and then go on to impact what like what they
teach, how they teach, how they view the social interactions of their students.

JON: 00:39:16 Did your article at all go into, um, as teachers possibly gained more and more experience that they may have changed their beliefs or do they continue with the same beliefs?

fb: 00:39:28 Julie Chase, don't you worry about this cause I got you. All right. So, um, and this goes along the lines of what we were thinking. I happen to know her article very well cause I read a lot of times just because I liked the idea of looking at beliefs and You have yours, a student characteristics. A external influences. Yeah. And so that's what though the Brian and Atwater looked at. All right. I use that as a framework and I looked at identity, home lives. All right. And then the last one was social cuMARIEural dynamics meaning like the building of relationships. And only reason I changed the languJENe was I liked the aspect of identity because you weren't just looking at the student, right? You were looking at yourself kind of like what we're doing here. Like it's, so this intervention that they did there with teacher education programs, that's essentially what we're doing here. So when I take all our data back and I go back and I look all right and I listened to it and I listened to it, I'm going to try to tell the stories of how we address each of those beliefs in here. Identity, homelife like you guys' thoughts, like through your words like how you came across and viewing sex. Not Right. Not Wrong, just like kind of trying to tell the story of new teachers, of pre service teachers. Um, and so as far as it as, as you gain more experience, well what happens is, and you might, and I know, I know like I've thrown a lot at you. I hope you go back and revisit these whenever you have a second when you're laying on the beach, whatever. But like that Cohen article, what a talks about quite a bit and what you'll see in society as well and what you'll see in education is
once we get rooted into our core beliefs of what we think works for us, very hard to get us a deviate from that. So another thing that that Brian Atwater paper said

PAULA: 00:41:09 (Jumps in) It says you have to challenge it... like you have to like confront them with their beliefs. Otherwise like they're not just going to realize they have the belief you have to like Kinda hit it with them. Otherwise it won't. Even if it may still not change it's like you're told like you tell them about it. But the first step is like,

Speaker 3: 01:37:35 Okay. Point being.. Also to be very fair, like let me explain my bias. I like every time I've been introduced to philosophy through friends, talking about it through having classes on it, I've literally hated it. So I think having these big philosophical debates, you know, it just, it really just like bothers me

JACK Do you think it's that these teachers are power hungry?

JEN Every teacher is different.. the lady who calls her students cockroaches has no business.. she's older.. she doesn't have the patience.. you know what I'm saying.. she doenst have that patience. .You really gotta have that patience.. Like I had a girl.. she came at me verbally
with some stuff and I’m like listen. Very calmly.. you
talk to your mothe tlike that, you’re not gonna talk to me
like that.. she got suspended.. not by me but by some
other teacher she did that to and some tachers just can’t…
they just can’t handle it… So

ME: As a teacher, when somebody doesn’t do their best,
you’ll kind of get a little pissed off..

JEN (Interjects) I got pissed off today..
ME did you?
Ag yeah I did... yeah I did.. it was if we had never done
this before, and I was like everybody sit here! Don’t
talk! Be quiet! We’re going to sit here in silence.. I did
because I “spoon fed them...spoon fed them” the day before..
the notes ar e on the board, you can use your notes on your
quiz and I ask for ann example of asexual reproduction in
a plant and an animal... and listed a picture of a jellyfish
and a strawberry and I put it on the board... (taps in
table).. I got orange, cat, dog, (frustratingly reminds us
this was asexual reproduction), and (smacking hands) We-
Went-Over-It! (laughter). I-GAVE-IT-TO-THEM! So yeah, I
was mad (laughter)..

ME So these are things you’re going to have to go
through.. You do that... you put all of this into you it and
you don’t want to crush this kid, but you do want to crush
them (laughter) so that they get it right. You want to
 Crush them so they get better. But at the same time we’re
(teachers) are human and you put all this work into it. T
Well, the sad part is, (in the classroom) a lot of things
that really matter, your improvement will come because
somebody will point out that you are doing it wrong. Your
biggest areas of growth, it sucks and it hurts but as you
get better, you get better at taking it...

JEN “There are doctors that should be doctors, lawyers
that shouldn’t be lawyers and teachers that should be
Interactions\caring\ teachwrs. There’s a teacher at my school, she’s a sub. She calls her students cockroaches.”
(Surprise by the group) “jesus, interesting, wow” Kl (asking sarcastically) “Does she like her job?” ME “Does she say it jokingly? Like “you little cockroaches.. haha?” JEN (Laughing) “Yeah.. no. you know how students will come into your class and bitch about other teachers? Well they come in my class all the time and they bitch about this lady and she’s mean. She’s mean as hell. And.. I hate that. Just they way she calls them cockroaches it’s not even…” ME “You can feel the distain behind it huh?” JEN “Yeah, yeah.. and there ar ea lot of things I can handle but what I don’t do well with is, hearing and seeing the children be abused, because that’s what it is. It’s there and it’s more prevalent than you ever could imagine. That gets me and when children are ugly to each other. Just so blatantly hurtful and say messed up things to each other. That’s really hard nad seeing teachers belittle students as well.”
She adds that the teacher next door is “lik efface to face he’s so nice, he’s a great guy, but they come in an tell me all the things that he says and it’s like ‘no way!’” “He called this one kid who I love dearly whose mom died last year. He called him fat an lazy.. and I was like (you fucker).. How could you say that to a kid?. I’m in a title one school and I don’t know one kid who has a normal upbringing. That’s what’s so difficult” MARIE. “JACK “DO you think that these teachers power hungry” JEN “Well every teacher is different. The lady who call her students cockroaches clearly has no business (in the classroom). She’s older, she doesn’t have the patience. You really gotta have the patience. I had a girl come at me and I told her you don’t talk to your mother like that, you’re not going to talk to me like that. She got suspended, not by me. She did something to another teacher
and some teachers just can’t, can’t handle it so… sorry
(for talking for a while)

(Group reassuringly) “No, no…"

Socio-cultural Interactions\caring

Talk about how the schools are challenging.. and extend to say and these students are going to need you. “The minute you’re like what about me? I put so much into this lesson and they didn’t get it! If it’s like ‘they, they they’, you better start looking at ‘you, you, you’”. Because you’re not doing your job.

JEN “Yeah. The whole thing with that quiz I gave them today… you failed them somewhere is what I’m saying to myself. That’s on me. It sucks. And trying to figure out how to fix it…”

HLF

JEN

Talking about getting to know her students. “You get to know their stories, and if you think it’s not going to affect you, you’re wrong because it does. The thing that really affects you is that you have no control, and you can’t (JACK interjects, “cross over that line, there’s boundaries) JEN “Yeah or change their situation”.

And I will admit this and this being recorded like as a teacher you'll be and that it would probably be, don't like when people don't do that best work. Like they'll kind of get a little pissed off.

Speaker 3: 00:11:14 I got to piss today. Yeah, I did. And I've never done this before. I'm like, okay, everybody sit here with your, don't talk, be quiet and put your heads down that not put your heads down, but we're going to sit here in silence. I did. And I'm like, yeah, because
I, I spooned that them spoon fed them the day before the notes are on the board. The answer do, you can use your notes on your quiz and we get into next said, give me an example of asexual reproduction, what they plant and an animal. And I listed at jellyfish in a strawberry, I put it on the board, I got orange cat, dog ate it, this asexual reproduction

Speaker 1: 00:11:54 and we went over, we, I gave it to them. So yeah, it was mad.

Speaker 2: 00:11:59 That was bad. That was, these are things you're gonna have to go through. Like, you know what I'm saying? So the point is like you do that, you put all that into it, right? And you don't want to crush those kid, but like you want to crush them,

Speaker 1: 00:12:14 does that, they get, they get better and we're humans. Like you put all this work,

JEN: 01:24:31 My students could care less, whether I'm a female, male, if you're a dick or a dick period.

New Speaker: 00:14:04 You can, you can.. You gotta mess with them.. save up your f bombs. Like if you gotta squeeze out one a year, that would be my advice. Just going to let them have absolutely got to let them have it. It was crazy. I was subbing a gym class the other day and that's what I do now. Like I won't like go in the classroom unless they're like science teachers that I know and they're like, you know, like hey we come, come to my class. I'll totally do it. But like otherwise I was kid like these little elementary gym classes and just hang outside. Well I'm looking at this girl and I'm like, she's like, I don't know, maybe I think she was second grade or something like that.

JON: 00:14:47 That's kind of sick Fred

New Speaker: 00:14:47 Well, no, no, no, because I recognized her, I recognize her. I'm like, wait a minute. I'm like, what's your name?
ME: 00:14:52 I'm like, what's your last name and she was like miles? I'm like, oh my, I had like our mother.
JON: 00:14:56 Oh wow!
New Speaker: 00:14:56 Yeah. And then I told myself, so this is the ghost. Like I had a mother in school, like I had a mother when she was a freshman. I remember my mom and her mother was pregnant with her as a freshman,
JON: 00:15:04 Was the one drink in the soda?
ME: 00:15:06 No, no, that was a different one, now that was Arneicia, that was another one... Alize was just mean and beat the hell out of evrybody but then she became nice, you know...
JON: 00:15:18 Pregnancy will do that to you
ME: 00:15:18 I guess so. Then she was a meanie, but she is really nice girl and her daughter is sweet too.
STEVE: 00:15:36 (Belches loudly) Oh, excuse me.
ME: 00:15:36 It's good. It's good to keep it real.
Keep it real.
JON: 00:15:39 It's on the tape.

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ME: 00:25:10 Niiliicceee!!! You know what's funny when I was thinking about doing this, I was almost like I should have them draw a picture. But then I thought you guys would get pissed at me. (laughter)
MAYA: 00:25:22 Honestly, nooooolllll!
ME: 00:25:22 URGH...I should have did it damn...
GROUP: 00:25:25 Waffle reference
ME: 00:25:31 Nice. You guys remember that?
JACK: 00:25:33 That was a really nice discussion. Yeah. I didn't think that even though like the timing of this class is the worst thing in the world, (ME it's pretty bad). I really like enjoy our discussions
ME: 00:25:43 Thank you. I'm glad you like it. That's what I'm saying. I'm like, I got to make it like so you guys enjoy it because, en you'll just hate life....
STEVE: 00:25:51 Well you got us engaged, which I super appreciate... I'm not like dying, falling asleep in the damn seat. You just see me falling asleep next to you and see.

JON: 00:26:04 I don't know if I should knudge you or just let you go...

MAYA: 01:08:00 Exactly, and so I really liked how that kind of overarching kind of idea of related back to the McLaughlin article. Um, and so this particular study that was done one and two, um, to kind of look at particular demographic that has been institutionally disservice. And so two researchers went to a elementary school that was a 100% African American population and that they had a 98% poverty rate and they specifically wanted to see how those students, um, kind of creative or their identities through the classroom. And so they specifically kind of talk about two separate types of identity, disciplinary identity and academic identity. And so disciplinary identity, um, very much a kind of relied on, uh, I guess identity formed at home. Um, even though they didn't go into too much detail about those identities formed at home, it was more just talking about like a self ingrained identity that they brought to school with them. Um, and so, and then academic of course it's identity. They form ask students. And so there were two researchers and they do kind of mentioned that, uh, that there are inherent biases as they weren't black. Both researchers, we're not black, but teacher that was teaching this course was white. And she was Kinda cool to note too, is that particularly teacher, she actually taught, um, this whole entire class in second grade and then popped it to go with them into third grade (ME Who was the author of this paper?)o Uh, cane. Yeah. So, so that's what's really cool is the teacher feMARIE that she could make a bigger impact in this community because even though she doesn't have that cuMARIEural bacMAYAround to relate with the students, that she can make a difference by continuously working with them from one grade to the next.
Okay. Okay. So, um, basically like I just like included like, the nice stuff. It's like I think science, science learning and literacy development reinforce each other, right. That like learning science reinforces literacy and literacy helps you learn science better. Um, oh, and a reciprocal process. Yeah. Um, and then also, uh, one of the things that they mentioned is like how to teach literacy for sciences by providing expository science texts for the students, um, that have various language functions, various genres and various literary forms. Basically like the Big idea, The big idea was like, you don't want to just give them like one type of expository texts, right. Where like you use the same type of language. You seem to have a sentence structures. You just saying like grammar and all that because then they're not being exposed to all the different like, uh, like Symantec prhmatics of the language. So like exposing them to have like a big diversity of like how the language works is going to help you learning English literacy through science. Um, and then other strategies like just like general teaching strategies or um, sign for English language learners. The first one is, um, talking at a slower rate, but it's important to know not at a belittling slow rate. So you don't want to like make it make it sound like, oh, they're dumb. They don't know what I'm talking about, you know, but like to be cognizant to not speak fast. Right. To not like slur the words up because then it'd be like, it'd be difficulE for them to understand what you just said. Um, and then shorter sentence structures and um, tangible demonstration. So like basically like obviously like this is just a good way to teach science. It's like always having a demonstration that like, it's tangible to them so they can have like, they can remember it easier. But specifically for students who are English language learners because having like a tangible demonstration means that they can learn something without having to learn it to the medium of language. You know, what we were talking about earlier was that, um,
what we were, what I was talking about her later. Um, but you know, that medium of language, right? That language barrier is kind of broken when you're doing a tangible demonstration, you know, because they can learn it just through, you know, touching it, you know, seeing. Um, and then lastly is the importance of, um, is the importance of not really necessarily having to know the entire language, uh, that your students may speak like their primary language, but, um, here I'll just do a quote. So in Buxton's article they say teachers. Okay. Mood as I, um, I ended the quote too. Really, I didn't mean teachers

Speaker 3:  01:36:10  [inaudible]
JACK:  01:36:19  who know how to use students' home language and science instruction as well as the importance of doing so. Basically like what the point was, it's like obviously like you don't need to know the entire language. I know that some of us don't JENree that or say that might be difficult to like, um, you know, like know the language of every single student. That's true. I completely JENree. However, it's important to, you know, try, you know what I mean? Learn a few words to try to incorporate them like as you're teaching, because even if it's like just a small word, right? Like you don't have to say like some scientific concept and they're like their target language, right? You're not the perfect language or primary language, then it's going to help connect better. They're going to be like, oh, I know that word.
You know what I mean? And it's, it's going to help them. It'

JACK: 01:38:00 You see people are different. People are different, especially English learners. So back to this (laughter). But um, the big ideas and my like, the conclusion we can come to is this, it's important to care. It's important to try your best to connect to these students who already find it hard to connect to the scientific concepts and really care... That's why I have a heart in middle of my.... (MAYA Hello)

But this is what I told Laura yesterday, like you had to really relinquish all control because you like the things that you want. And like I'm a very organized person and my desk every day it looks like it looks like a bomb went off and it drives me nuts every single day. And I just, I have to, I'm having to like be patient and let go of those things because it's not, that's not how it works. And I mean, I'll, I'll get there eventually. I know I will. Um, but this one teacher failing it takes it, I would say as a whole, like the school failed him, the system failed him. And there wasn't just one teacher that where he slipped through the crack

JEN: 01:24:39 The teacher next to me is the one who is, he's a male and the first day of class we walked in, he was like, oh, I'm so nervous. And I'm like, he's been teaching for 30 years. After 30 years. I'm like, you're still still nervous. Still gets nervous. He's the one that's the butthole. I don't really get stressed with my students per se, as much as I'm like sit down and be quiet.
JEN: 01:27:22 My hallway. I can tell you that what I've observed is that if kids smell weakness, you're done. You're toast. So then their i see this equally, when I looked down my hallway, now look at all the teachers. There's a teacher, there's a male teacher, math teacher. He, he doesn't have a lick of control over his class. Okay. Um, there's, um, a teacher two doors down from me. Well there's two of them. They both, I, I looked at the lady like the second week of school, like every time I walk past your classroom, your kids are sitting in there and their client and they're doing the work. And I'm like, what's, what is, what's the secret? And she's like, sit down, do your work and be quiet. And for her it was establishing, she is, I see, I see what you're saying. I see that the biases are there. That's not what I think it goes. I think it's a both sides.

PAULA: 00:36:06 Ok... My article kind of focused on teachers' beliefs and our difference of beliefs with the muMARIEicuMARIEural students. So one of the first callers my article identified was the disproportion of diverse teachers to their students. So this is automatically going to create an issue if you're not maSTEVEhing with what your students are cause differences exist. Like we can't ignore that. So then what this causes, Another example they gave of a belief was that students from more diverse bacMAYArounds, their parents were less supportive of their learning. And it will say a lot of this like this support is because the community maybe differently. I mentioned like ESL learners and like maybe if they're sending emails and standards report cards, if they can like interpret it properly, the teacher's going to like read it as like, oh they're not involved in the student's life. And really there's just like a barrier that they're not able to overcome a solution to kind of want to like reform mechanisms just like make did. And they really emphasize getting teachers during their pre service period, like into classrooms of diversity so they can like see for themselves the students abilities and
understand that these differences exist. But it's something we have to like overcome.

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JEN: 01:06:27 I, you know, there's even like, like this biology curriculum that I'm people losing my mind over because it's like, I swear that the questions that they had in the student test that we did, that was that the county proctored was, I swear it was at the level that I had in college, like college biology questions. And I'm like, this is fucking ridiculous. And these kids, I know that all of my students fail. There's no doubt in my mind because it's, they're not, they didn't write this languJENe, they didn't write this test in the languJENe for seventh graders. And this is where, this is where we're failing our kids. And this whole socio socio, what does it say? (JAMES SSI?) Yes. You teach them what they love. You teach them what they're interested in, you get them engJENed. It's a whole nother ballgame. It's a whole nother student. It's a whole nother child.

Um, so that's what she did. And so, um, they didn't say how many students were in the entire class, but, um, the researchers wanted to focus particularly on one group of students that have been working with each other continuously throughout the school year. And, um, so it was for students, um, but they really honed in on two Joe and tamara. And so, um, they kind of set up this, this experiment is very qualitative. And so there, there's three kind of main methods of, of collecting data on these two students. So one was being a scientist interview, so they did before the school year, during the school year and after the school year saying, um, go ahead and draw a picture of you doing science, um, talk to us about you being assigned test type of thing.
And then the next one was journal entries throughout the whole entire year. So these are unit specific. And so they were able to kind of do like a dear diary. Like this is what we did in class this that and the other, and then they were also able to draw pictures as well. So it's kind of like a muMARIEi type media type of thing. And then lastly, they did what they call studenting student-ting. And so they were at kind of just seeing the students in their natural environment. So they're taking the video, I'm kind of taking transcripts of each lesson as they happen throughout this whole entire school year. And so what the researchers kind of, um, brought up and um, reiterated is that tamara specifically, um, for her disciplinary identity, she's specifically kept saying she didn't want to be hollered out and she mentioned this muMARIEiple times, but the reason why she's quiet in class and behaves well and listens to the teacher, it's because she doesn't want to be hollered at. Also that when she tries to speak up or wants to speak up in class with her peers, that she's afraid of her, her, her peers kind of putting her down. Um, because they feMARIE like she wasn't adequate. And so that actually ends up influencing her academic identity of not being smart type of thing.

Oh. So and so, so, so that was kind of the role of the researcher and they tried their best to be observers to see how these identities are formed and how they play on one another. Um, and uh, I think kind of just that main point coming back to identity in general is, is teachers just need to be able to recognize that their students are unique. They have very unique self perceptions and it's not just cut and dry like, oh, they see themselves like this because of x or y, you know, it's, it's a complex kind of set of factors that, that contribute to their formation of identity. And also as teachers, it's our responsibility to recognize these differences. Why they're happening and then be able to intervene. I know it's, it's not, uh, easy to, to try and
take it on because it is overwhelming to think each individual person has all these individual needs. But if, if you can just try and, and, and pinpoint some of these things while like one student's really good at art, let's incorporate more of, you know, drawing diJENrams or doing this or doing that. Just being encourJENing in general. It can really make all the world of difference, you know, for these students, especially the ones that have been dissertved from inequity. Institutional inequity. ?

Socio- cuMARIEarl Interactions\C RT/CRP


fb: 01:17:55 Your question real quick. You tie, it ties in nicely though with the whole little one size fits all. One size fits all. It doesn't and it never will.

STEVE: 01:18:09 There never was never one size fits all!

ME: 01:18:10 No? Even when they were all in the same school house together? Not even separated by grade? Where everybody had to read from the Bible that was one size fits all.

STEVE: 01:18:25 So B. C. Dot. I had the teacher ever did that individualized study for kid.

ME: 01:18:30 I can tell you from my own experience, I don't recall that growing up. Like somebody like taking me aside and differentiating instruction for me. I don't remember that at all.

STEVE: 01:18:41 So what, that when I was a kid, right, everyone's experience is different. Yeah. But I was a kid. My, uh, uh, the only teachers I can remember really my seventh and eighth grade with any real details, something in eighth grade. And my seventh grade teacher gave me a, uh, like a workbook on how to have a program like computers and stuff. So I did this workbook, but that was the only kid in the whole class. He did that and then they
started sending me to the helper person or the schools. And then, uh, during eighth grade, uh, there was, there was eight different groups of kids that were like math kids. You did like extra math and English gives you did extra writing, whatever. And it was differentiated even though the entire eighth grade and seventh grade in the classroom with a teacher. So, so when they say, oh, it's not the way it used to be.. I'm like Well, clearly you weren't there.

ME: 01:19:44 I guess it depends. I mean cause that's the only way it was for. But no that's cool that you had that.

STEVE: 01:19:51 Yeah,

STEVE: 01:19:53 not, my fauMARIE I had a good teacher I just thought they were all good teachers

MAYA: 01:19:58 Yeah but.. don't you think that was cuMARIEurally responsive pedJENogy too. They , they knew you had a specific interest and they catered to that?

STEVE: 01:20:02 oowe.. that's kind of like the article

MAYA: 01:20:02 Yeah (Laughter)

And then the Latino student, uh, got with a group of people, I think other Latinos, I'm not sure, uh, to construct an experimental set up and design and lab. Um, and usually he's like quiet and soft spoken and he's not really that good at performing in class. But when they let him be on his own and design this own lab, he was able, as it was dealing with ants, um, he was able to, because of like his home life he was and his cuMARIEure, he has been taught about like, um, the value of life and perspectives. And he was able to put himself in the perspective that the ants and raise scientific questions like, well, what are they like? Well, they like dirt, so they must like the dark. Why don't they like the dark? Can I touch that? And he'd be like, well, what if I put two rooms on with a lamp and one with not. Would they go to the one without the lamp? it was like these really rudimentary things, but showed him thinking about all of that. And that's from his, from his bacMAYAround. So basically the whole driving
point of the argument and the article is that these kids are smart. They do know these things. Um, and if we encourJENe them to use their bacMAYAround knowledge, um, through cuMARIEure, through their identity development, through their languJENes, uh, through the interventions of us. Yeah. See I said that interventions of us and encourJENing them,

Socio- cuMARIEural Interactions\C RT/CRP

JACK: 01:32:00 of a new languJENe, um, you know, just like it's difficuMARIE enough to try to understand science because the science can be a whole new languJENe, but like doing that through like a languJENe that they barely know, that's what's the most difficuMARIE. And then also the disconnect between teachers and students cuMARIEures, which is cuMARIEural dissonance. I just didn't have the nice word. So yaye! . So is it a great,
Okay. Okay. So, um, basically like I just like included like, the nice stuff. It's like I think science, science learning and literacy development reinforce each other, right. That like learning science reinforces literacy and literacy helps you learn science better. Um, oh, and a reciprocal process. Yeah. Um, and then also, uh, one of the things that they mentioned is like how to teach literacy for sciences by providing expository science texts for the students, um, that have various language functions, various genres and various literary forms. Basically like the Big idea, The big idea was like, you don't want to just give them like one type of expository texts, right. Where like you use the same type of language. You seem to have a sentence structures. You just saying like grammar and all that because then they're not being exposed to all the different like, uh, like Symantec prJENmatics of the language. So like exposing them to have like a big diversity of like how the language works is going to help you learning English literacy through science. Um, and then other strategies like just like general teaching strategies or um, sign for English language learners. The first one is, um, talking at a slower rate, but it's important to know not at a belittling slow rate. So you don't want to like make it make it sound like, oh, they're dumb. They don't know what I'm talking about, you know, but like to be cognizant to not speak fast. Right. To not like slur the words up because then it'd be like, it'd be difficuMARIE for them to understand what you just said. Um, and then shorter sentence structures and um, tangible demonstration. So like basically like obviously like this is just a good way to teach science. It's like always having a demonstration that like, it's tangible to them so they can have like, they can remember it easier. But specifically for students who are English language learners because having like a tangible demonstration means that they can learn something without having to learn it to the medium of language. You know, what we were talking about earlier was that, um,
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ME: 01:39:22 Do you have like an interest in English learners.

JACK: 01:39:28 Yeah... One of my majors is Spanish and learning about second language acquisition right now actually in the classroom.

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MAYA: 01:16:33 Oh. So and so, so, so that was kind of the role of the researcher and they tried their best to be observers to see how these identities are formed and how they play on one another. Um, and uh, I think kind of just that main point coming back to identity in general is, is teachers just need to be able to recognize that their students are unique. They have very unique self perceptions and it's not just cut and dry like, oh, they see themselves like this because of x or y, you know, it's, it's a complex kind of set of factors that, that contribute to their formation of identity. And also as teachers, it's our responsibility to recognize these differences. Why they're happening and then be able to intervene. I know it's, it's not, uh, easy to, to try and take it on because it is overwhelming to think each
individual person has all these individual needs. But if, if you can just try and, and, and pinpoint some of these things while like one student's really good at art, let's incorporate more of, you know, drawing diJENrams or doing this or doing that. Just being encourJENing in general. It can really make all the world of difference, you know, for these students, especially the ones that have been disserviced from inequity. Institutional inequity.

And then the Latino student, uh, got with a group of people, I think other Latinos, I'm not sure, uh, to construct an experimental set up and design and lab. Um, and usually he's like quiet and soft spoken and he's not really that good at performing in class. But when they let him be on his own and design his own lab, he was able, as it was dealing with ants, um, he was able to, because of like his home life he was and his cuMARIEure, he has been taught about like, um, the value of life and perspectives. And he was able to put himself in the perspective that the ants and raise scientific questions like, well, what are they like? Well, they like dirt, so they must like the dark. Why don't they like the dark? Can I touch that? And he'd be like, well, what if I put two rooms on with a lamp and one with not. Would they go to the one without the lamp? it was like these really rudimentary things, but showed him thinking about all of that. And that's from his, from his bacMAYAround. So basically the whole driving point of the argument and the article is that these kids are smart. They do know these things. Um, and if we encourJENe them to use their bacMAYAround knowledge, um, through cuMARIEure, through their identity development, through their languJENes, uh, through the interventions of us. Yeah. See I said that interventions of us and encourJENing them,
Okay. Okay. So, um, basically like I just like included like, the nice stuff. It's like I think science, science learning and literacy development reinforce each other, right. That like learning science reinforces literacy and literacy helps you learn science better. Um, oh, and a reciprocal process. Yeah. Um, and then also, uh, one of the things that they mentioned is like how to teach literacy for sciences by providing expository science texts for the students, um, that have various language functions, various genres and various literary forms. Basically like the Big idea, The big idea was like, you don't want to just give them like one type of expository texts, right. Where like you use the same type of language. You seem to have a sentence structures. You just saying like grammar and all that because then they're not being exposed to all the different like, uh, like Symantec prEdmatics of the language. So like exposing them to have like a big diversity of like how the language works is going to help you learning English literacy through science. Um, and then other strategies like just like general teaching strategies or um, sign for English language learners. The first one is, um, talking at a slower rate, but it's important to know not at a belittling slow rate. So you don't want to like make it make it sound like, oh, they're dumb. They don't know what I'm talking about, you know, but like to be cognizant to not speak fast. Right. To not like slur the words up because then it'd be like, it'd be difficuMARIE for them to understand what you just said. Um, and then shorter sentence structures and um, tangible demonstration. So like basically like obviously like this is just a good way to teach science. It's like always having a demonstration that like, it's tangible to them so they can have like, they can remember it easier. But specifically for students who are English language learners because having like a tangible demonstration means that they can learn something without having to learn it to the medium of language. You know, what we were talking about earlier was that, um,
what we were, what I was talking about her later. Um, but you know, that medium of language, right? That language barrier is kind of broken when you're doing a tangible demonstration, you know, because they can learn it just through, you know, touching it, you know, seeing. Um, and then lastly is the importance of, um, is the importance of not really necessarily having to know the entire language, uh, that your students may speak like their primary language, but, um, here I'll just do a quote. So in Buxton's article they say teachers. Okay. Mood as I, um, I ended the quote too. Really, I didn't mean teachers

Speaker 3: 01:36:10 [inaudible]
JACK: 01:36:19 who know how to use students' home language and science instruction as well as the importance of doing so. Basically like what the point was, it's like obviously like you don't need to know the entire language. I know that some of us don't JENree that or say that might be difficult to like, um, you know, like know the language of every single student. That's true. I completely JENree. However, it's important to, you know, try, you know what I mean? Learn a few words to try to incorporate them like as you're teaching, because even if it's like just a small word, right? Like you don't have to say like some scientific concept and they're like their target language, right? You're not the perfect language or primary language, then it's going to help connect better. They're going to be like, oh, I know that word.
You know what I mean? And it's, it's going to help them. It'

JON asked somebody for a piece of paper and I joked with him that “first you didn’t have your homework, now you don’t have paper?” and joked further asking “Do need a pen too?”

ME 21:56 “ImJENine this is nicely shaded... and I did my best.

This is what I need from you two groups, and this is what you will have on your paper when you’re done:
What I want from you guys:
One, as a group you are going to decide this... as a group you are going to decide, “What is this? Give it a name. Ok? What do you call it? What is it?
JON Giving it a name not as what we inesvision it be? JEN So it will be like Bob? Bob the dot?
ME No! That’s what I don’t want you to say
JEN No..
ME Just what is it? If I gave you this object, what is it?
JEN Like a nucleus?
ME Alright, so Im going to say this JENain... Don’t say anything (Group laughs)
JEN I’m sorry, I’m sorry...
ME Youre good, youre good... Do what you are doing now, do it with your group is what I’m saying. What you’re doing is fantastic but I want you to do it with your group...
JEN Ok.. with your group...
Ag yeah I did... yeah I did.. it was if we had never done
this before, and I was like everybody sit here! Don’t
talk! Be quiet! We’re going to sit here in silence.. I did
because I “spoon fed them...spoon fed them” the day before..
the notes ar e on the board, you can use your notes on your
quiz and I ask for ann example of asexual reproduction in
a plant and an animal... and listed a picture of a jellyfish
and a strawberry and I put it on the board... (taps in
table).. I got orange, cat, dog, (frustratingly reminds us
this was asexual reproduction), and (smacking hands) We-
Went-Over-It! (laughter). I-GAVE-IT-TO-THEM! So yeah, I
was mad (laughter)..

I ask them “who wants to be worng?” (listen 39:45 JENain)

I relate to group identity... politics.. “you can’t wear
youre MJENA hat nowmore.. people don’t want to be worng..
they don’t want to change their bumper stickers. .

JEN It’s like a penis piss...I’m gonn aput my name on top of
your familiy’s name... It’s like domination!

ME I believe the kids say “Big Dick Energy” (Rousing
laughter)

STEVE (Interjects and says aloud to the group) “I love
listening to JAMES, because I disJENree with like
everything he says (Laughter)”

JAMES (Defends himself) “I’m giving you another
perspective!”

STEVE “I get that but every time you talk, I’m like, what
the hell is this guy talking about (Laughter)..<psr>Even
though I usually feel the complete opposite... you h but you
have ‘points’” (Laughtr)

JEN: 00:55:34 Bif Dick Energy? What is that?Wow
It's like toxic masculinity.
Oh it has nothing to do with masculinity. It has everything to do with just being confident. No it's not. it's not toxic...
I know girls do it too. Oh really?
It doesn't have to be toxic? Oh, okay.
Let me think...Oprah.. Massive BDE!
(Laughter) Massive! It's the confidence! It's the knowing who you and asserting that..
That can be toxic...
(So yeah. No, I thought it was great that you brought that perspective to be honest with you. I certainly like, yeah, I don't JENree with anything you said...(laughter), but like I did.. i did...
But I converted JEN... I conveerted JEN so I feel like Dunkin donuts is my baby... I almost said Dunks.
Dunks!? (Laughter)
Yeah, we call it dunks.
I like dunks....He goes, dude,
I hope that like little thing like really help
(To JON) Man you need to get better hanJONriting.
Me? Nobody needs to read this but me.
Students are going to rip you apart.
What is it called?
I can't read this! (Me mocking studetns)
This is called the students centered kids get to work.
Look at me student centering you guys right now...
JAMES: 00:11:53 I have to write it down but the more Write it down.
ME: 00:12:03 Do your thing man. That's why I figured I'd give you guys 20 munites you know, so you dont feel rushed.
STEVE: 00:12:22 Take some different colors, make it pretty like...
To STEVE) You my Dog Man. And he got a little flow chat. Come on son!
Socio- cuMARIEural Interactions\H umor
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STEVE: 00:13:31 My, dude!
JON: 00:15:39 It's on the tape.
ME: 00:15:39 It's all good. Oh the tapes are hilarious. You know what I do like literally I listen to them. I'm like, well, I'm working out and junk...like you just get to memorizing them. Walking the dogs and then all the themes that are coming out. JAMES I'm so proud of you. Youre doing a great job. He wants to crush me.
JAMES: 00:15:58 No, no, no... I have to get my thoughts on here. I'm havingto scribble it out like oh that's not good there, and move it up here and over there...
JON: 00:16:09 JON just gets to it.and sometimes it just gets too it
STEVE: 00:16:11 What kind of sanJONich (To JON eating)
JON: 00:16:13 Ah...turkey with ham and cheese.
JAMES: 00:16:17 (To JACK) You cheated!
JACK: 00:16:18 What are you talking about?
JAMES: 00:16:19 You can't be done yet I havent even started yet... well I'm not trying to make mine pretty, I'm just trying to make mine literate (Laughter).
STEVE: 00:16:28 Warrant interventions,
ME: 00:16:57 That's why I did a gap because I was like, I don't know how to spell achievement. You know what sucks is I, I struggle with that, right? Like the "i" in the "e" thing, even though I knew the rule and everything. Well, I've probably typed the word beliefs at least 4 billion times and my dissertation and I spelled it wrong like at least 3 million times.
JAMES: 00:17:16 That's why word just fixes it for you.
ME: 00:17:16 I know, but I had to keep doing even when I'd like, I'd be like, I'll type up, let's get it right. I'd guess and get it wrong...terrible.
JON: 00:17:22 Well, you know what? We all have to know our strengths are our weaknesses and ah... In that writing is one of my weaknesses and I recognize it. I'm fine with it. I'm okay with that.
ME: 00:17:41 Very ah, self forgiving, I like that. Alright, so forgiving..
JON: 00:18:00 Guys. You've got 20 minutes man, c'mon. JAMES you haven't even started buddy...
JAMES: 00:18:07 I started three, five minutes.
ME: 00:18:08 Oh yeah, you guys are six minutes in, it's fine.
JACK: 00:18:11 I thought you were saying there's six minutes left..
JACK: 00:18:22 Oh No, you're good handJONriting.
ME: 00:18:26 My goal is for you guys to get something out of this....Light a little spark...
JAMES: 00:18:37 These are nice pens. These are nice pens. It didn't look like it at first.... But they are....
GROUP: 00:18:39 Laughter...Wow...
JACK: 00:18:39 Wait are you calling these pens cheap?
JAMES: 00:18:39 Yeah! (Laughter)
ME: 00:18:43 My feelings are not even hurt... at all... cuz Like everything in there is dollar tree. I had to buy all that...
MAYA: 00:19:08 For the Holla Tree these are great
JACK: 00:19:08 (Laughing) Holla Tree...
MAYA: 00:19:08 Hollahhhhh!!!! (laughter)
Kl: 00:19:11 I literally forget writing this.
ME: 00:19:11 It's good to know you did it like a month
JENo didn't you? (Laughter) Yeah. Well you know what's
funny. He did it right and I was like, Oh crap, do we have
class this week? (Laughter) I was like oh my god I'm have
to prepare.. and was like oh no.. I have to get my
proposal done.
JACK: 00:19:23 No, see I um, I just never know if I'm
going to have enough time the week of to do it. So if I
find time I'm going to do it when I can....
ME: 00:19:34 JACK you're a better man me, I'll tell
you that.
JACK: 00:19:37 Listen. I do whatever I can to minimize
my stress level.
JON: 00:19:40 I don't know anything about that. I just
figured out this semester and that I'm the biggest
procrastinator I figured out this semester if I get things
done ahead of time, it feels really good.
JACK: 00:19:50 Right. (Laughter)
STEVE: 00:19:52 Just figured that out. Dude. Monday
was death for me because I'm going to be gone this weekend
and then since we have no class next week, except Tuesday,
I haven't gone for a week and a half because I'm on
vacation. So I had to do like all of my homework for three
weeks on Monday. Oh my God. I was, I was just in the
library for like 10 hours, but now it's all done it, I'm
just like, Yo,... (Laughter)
ME: 00:26:36 He was probably like, 'Do you knwo how
hard it is to drJEN this body around all day!? (Laughter)
you waking me up?
STEVE: 00:26:37 (Laughing) Absolutely
ME: 00:26:52 love it Right? I think you should win.
(to STEVE)

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ME: 00:27:00 He's hitting all my little heart strings over here. He's got pictures and flow diagrams like, yeah.....
STEVE: 00:27:04 We got dinosaurs over here....
MAYA: 00:27:04 It's a whale. Thank you...
Tk: 00:27:14 Oh sorry (Laughter)
JACK: 00:27:15 It's a whale... (mocking, more laughter)
ME: 00:27:19 STEVE are gonna pull them up like with the kids. Ooh, what a nice picture. Tell me about it?
MAYA: 00:27:25 I remember for one of my geology exams you had to explain that energy of like this scene and I just like drew over it all with a little, whale, and my TA loved it. I was like thank you! I like my whales like I like my rocks... (we never got the punch line).
MARIE: 00:28:09 There's so many geology puns...
MAYA: 00:28:10 There's a lot...
MARIE: 00:28:11 So many. I've just been like buying geology tee shirts with all the puns on them.
MAYA: 00:28:14 Really?
MARIE: 00:28:15 Yeah. It's been like my streak that I've been wearing them.
ME: 00:28:18 You gotta have sweet science shirts.. (Group.. yeah) What else are you going to wear on fridays!?
STEVE: 00:28:20 Yo!.... So I ascended into space..
MAYA: 00:28:24 Oh, (STEVE posts his poster) that's pretty cool. That's pretty cool. I will admit that's pretty cool.
ME: 00:28:30 I kind of don't want to look at.
STEVE: 00:28:34 So it starts as like a little like flower and tree and then it goes to the sky with clouds and then in the space and stars
JACK: 00:28:41 Are those mountains in the back?
MAYA: 00:28:47 No that's his flow chart. It's carrots...
STEVE: 00:28:47 Those could be positioned correctly.
JON: 00:28:50 In the right direction.
MAYA: 00:28:51 Yes In the right direction
STEVE: 00:29:18 Tim! You wrote it out on a piece of paper and you still had to like scraSTEVEh. (Laughter)
JAMES: 00:29:25 Strenegths and weakenessed right. Know your strengths and your weaknesses. I know mine.
ME: 00:29:31 I would always like for classes. if I was going to make make something like that. I did that before school...Like had it all perfect because if you mess up at all.. They won't pay attention. That's garbJENe! Look at that! But if it's nice like how'd you do that?
JAMES: 00:29:50 Is that a whale? (Laughter)
ME: 00:29:50 Yeah..
New Speaker: 00:29:50 I speak whaaaallllllee.. (Laughter)
ME: 00:29:56 You should do your presentation, as a whale.
MAYA: 00:30:25 the whole thing, the whole, the whole God damn thing.
MAYA: 00:30:28 If I, if I can guarantee to be Thomas, I'll do it.. I'll do it.
ME: 00:30:32 As a whale?
STEVE: 00:30:33 You gotta do a whale but in his (ME) accent though...
ME: 00:30:33 a Boston whale?
JON: 00:30:44 A Boston, whaler...
ME: 00:30:57 A Boston Whaler... (Laughter)
JON: 00:30:57 That's a boat reference (Laughter)
Socio-cuMAREural Interactions
H umor
STEVE: 00:31:26 (Belches) Excuse me.
JON: 00:31:35 What is with you man.
STEVE: 00:31:35 So I am that rebellious child such that bad habit from my ex girlfriend's mother because she absolutely hated whatever I liked burped and so I'd make it a point when I was over there to like do the loudest most of obnoxious and
JON: 00:31:51 And you guys broke up? (Laughter)
ME: 00:31:57 now your that gross boy. Who was that gross boy? He had no manners.

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ME: 00:49:57 quick. 22nd timeout. Yeah. Uh, everybody saw his post. Right. Okay. So he doesn't, and I'm cool with it. He dubbed it As pseudoscience what she did in the article.

JON: 00:50:10 Like astrology.. (Laughter)

fb: 00:50:12 Yes like astrology...

STEVE: 00:50:13 Which is thank you for making my point.

Speaker 3:JAMES 00:50:15 Yes, that's a good. All right. So, uh, the, the purpose of school apparently up for debate, but it's not right, is to get people out of poverty and to make good citizens that that is the purpose. School...always been the purpose of school. Uh, Maclaughlin apparently doesn't think it's about getting people out of poverty anymore. Um, however the United States does feel that's what the purpose of school is. A supreme court said no, that this, this is what's, Speaker 1 fb: 00:50:45 I'm not saying exactly where, but I don't, I don't recall her saying that it's to no law like it, it was never about getting them out of poverty as I'm getting out of poverty.

STEVE: 00:50:58 Cause she says no, and it never changed. It originated with control. It, it was to make you the good, good, good citizen. (ME Okay). Right. It started with, you know, they've got to be a good citizen. Right. And then, then within a couple of things, still seventeen hundreds, it was get out of poverty or get a job.

fb: 00:51:18 That was the world war two stuff...

JON: 00:51:20 Where does it say it was originally to control people?

ME: 00:51:23 And establish a work force
STEVE: 00:51:24 Public schools as, as teachers in public schools. We are the government, right? We are the government where the institution, you know, um, and therefore we implement the policies of the government. The elected leaders decide those policies. These are the policies that those elected leaders in order to change these policies at this point, because of supreme court rulings that is voting on the new amendment to the constitution.

ME: 00:51:58 I personally don't think the, I mean, and I could be wrong, but I don't think think that the initial was get people out of poverty. I think it was an economic position where like, hey, we need workers. So I think what my point is, I think like that's a, the poverty things like an after effect. I think that's interest convergence (JAMES ok). Like, so if they, if they staff a workforce and a half is to get people out of poverty, great. But otherwise it's not the, so go ahead.

STEVE: 00:52:26 I, I'll accept that. Get people to work good people to work, not get them out of poverty. They can be an impoverished but working, I'll accept. All right, so that, that those are fixed. AMARIE though she doesn't like,

ME: 00:52:43 Do you see, what difference do you see the difference because that's like an AMARIErastic thing. Like we want to help people that wasn't there. It wasn't because they wanted to help people. It's because they wanted to have an economically viable country, which I'm not cutting you out to you and I'm stealing this line. And that's the other, that's why this program is here. Right. The, the Noyce program, right. The initiative funded by the NSF, it was dollars from Obama to fund a trained workforce. It wasn't cause like we want people to have great jobs. Like there was a work shortJENE. A, stem workforce shortJENE. Right. And so what they place a lot of blame on is stem education saying we weren't preparing people enough. So they initially it wasn't that like, and I'm not arguing with you I just want it to be clear. The
initiative wasn't like, Hey, you know, I think you know, the kids in over in east Tampa, they deserve to have a good job in STEM. That wasn't the initiative. All right. The initiative was like, hey man, United States keeps, lJENging, keeps lJENging and STEM and the numbers just keep going down and oh by the way it happens to the effect of people of color or English language learners disproportionately. So it wasn't like they were like, hey we want to, you know, get people of color of poverty. It was like we need to fund our work for us and that happens to be an added bonus. So I'm sorry. (JAMES You're good).

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ME: If you are residing in someone’s “worldview”.. you’re going to have more in an in to pursue them.. to be able to change their beliefs... if you’re this kid and noone’s ever graduated from highschool... and you’re “I don’t do school” I’m not good at school... and that’s your belief... If you understand your teacher... if they look like people you’ve been around...it’s more likely they can change their beliefs.. ME that’s what teaching is.. essentially persuading someone to change their beliefs... Right? Theyre going from something that they don’t know, and you have to persuade them.. take it to a belief and then take it to knowledge..

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JAMES: 01:16:58 the point I'm making isn't so much that we should do whatever it didn't mark does. It's, well hell Denmark can do a study. This is America do we not have a couple of school districts that we can,

Speaker 3: 01:16:58

ME: 01:17:16 THE PROBLEM IS... How you're getting these numbers cause you look at the numbers, right? You're getting it based on achievement, weight. But you get a base on achievement tests that are written to everybody's native languJENg that's written the way that everybody's used to speaking. That's been there. Their native languJENg.
JAMES: 01:17:32 No this is America. We can do the same type of longitudinal study... We chose not to.

ME: 01:17:38 My point is. No. My point is a test would be biased because what we talked about earlier with the roots of positivism, everything like that, it's got to be based in dominant hegemony, sorry, dominant cuMARIEure, dominant discourse, which in our country. There's so many different discourses, contributing to the conversation that you're inherently going to be biased JENainst people because it's not going to be white kids are all we to do better. You know what I mean? Cause it's going to be in that middle class, dominant languJENe, the middleclass dominance scenarios, like all these things.

Socio- cuMARIEural Interactions\Intersectionality

PAULA: 00:36:06 Ok... My article kind of focused on teachers' beliefs and our difference of beliefs with the muMARIEEicuMARIEural students. So one of the first callers my article identified was the disproportion of diverse teachers to their students. So this is automatically going to create an issue if you're not maSTEVEEhing with what your students are cause differences exist. Like we can't ignore that. So then what this causes,

Socio- cuMARIEural Interactions\Intersectionality

C: 00:41:09 (Jumps in) It says yo uahev to challenge it... like you have to like confront them with their beliefs. Otherwise like they're not just going to realize they have the belief you have to like Kinda hit it with them. Otherwise it won't. Even if it may still not change it's like you're told like you tell them about it. But the first step is like,

ME: 00:41:24 that's like kind of what my intent of this is here. Like whether you know, I change your beliefs or whatever, that's not even mine. My focus, my focus like, and I stated in my dissertation. to hopefully provide you guys with a toolbox to think, to examine your beliefs. Like if you're in class and you're going, it's like, man, these guys suck. Like these guys suck. I can't get them to do this. I can't, I can't, I can't right? Well, as a new teacher, you're going to do that because the whole world's going to seem like it's crashing down on
you. Right. Well, once you're in that though, like hopefully when the year's over and you can step back like you, you stop to see it from like, um, what's being done to you, like what's happening to you. Right. And you see it as, you start to see it as their (Students) experience.

ME: 00:42:07 Like what am I doing to them? All right. Where did I come up short that this keeps happening right where, alright I win't even get there (Pointing to JAMES's poster) yet... (Laughter) We could measure it but like why? Why are we not closing our achievement gap? Right. Why are my ELLs struggling? Okay. Why does it seem like I just can't get along with these damn kids? Like, you know what I'm saying? Like so that this is like supposed to be like the first step and you guys kind of dissecting them. Um, and then I'll shut up. Sorry. The last thing was though, the problem is what they have found is and why they, particularly those two people said it, do it with pre service teachers is because you guys theoretically haven't established like your, your classroom beliefs on backed by like five years of what works for you or five years and you becoming comfortable. So the point is what they have found, and I and I, it was Vaino and then this other literature where they found it as teachers get past that third year, they are way less inclined to change their beliefs to, to meet the students' needs. Okay. Not to say that they don't meet their students' needs, but they're less willing to incorporate new things that might help them get to that goal. Because we become, it's human nature will become rooted in the way we do things. And it really takes a lot. Like it really takes you telling yourself you suck at things to get you to move to that next point, which who wants to tell themselves, particularly with teaching, we're like, you're working your ass off, right? There's no way you could suck because you're doing it all weekend. Like you're going to see like your first, are you going to work all the frigging time?
So how can I suck if I'm working all the time? Well, you know what, you will, you will suck. (Laughter) It's because like it's, it's just a craft much like I'm, you know, Jujitsu or something like that. You won't jump into a black belt no matter. Like if you're doing the wrong thing, the wrong technique, you might never get to a black belt. Like, you know what I mean? And it really takes that like, um, outside of like, you know, feeling appreciated. Like you, you're going to feel so unappreciated. You're going to feel unappreciated more than you feel appreciated. Like, and that's just the way it goes. But then as you get more confidence, like if you're willing to dissect what you're doing and say I was wrong, I was wrong, I was wrong and make it right. Like it takes time. But then you'll see that after the fact and there'll be a couple of years down the road, which sucks. But that's the way it works.

JON: 00:44:28 I kind of believe that these beliefs are not so much rooted as a teacher student relationship. That is probably beliefs that these people had before they even thought about being a teacher. And that's what's carried over.?

JON: 00:44:48 We're going to get to that?

MAYA: 00:44:52 A-gap

ME: 00:44:52 That's a fantastic point. Right? Cause like what? Well we keep talking about identity. Like what we're teachers, we're not just bringing out teacher identity and they're like, hi Mr. Bradley. Like you know, I'm bringing up all the shit that happened to me whether I know it or not. Cause that's what we bring every day, like everybody's got their problems. We say it all the time. Right. They don't automatically make away or you said like you can only be like you were in the military so long. That's the way you are. It was like a big part of
your development. While all these things that are a part of our development, like they don't stop at the door. Right and they don't want that. They're there. How, why we act the way we do like these belief belief systems is what drives our ration. So whether, I mean even outside of the scope of whether you're doing the right thing, teacher the wrong thing. Teaching, we're all going to have my own way of doing it just based on who we are. Like our belief systems that construct our identities.

Socio-cultural Interactions

MAYA: 01:16:33 Oh. So and so, so, so that was kind of the role of the researcher and they tried their best to be observers to see how these identities are formed and how they play on one another. Um, and uh, I think kind of just that main point coming back to identity in general is, is teachers just need to be able to recognize that their students are unique. They have very unique self perceptions and it's not just cut and dry like, oh, they see themselves like this because of x or y, you know, it's, it's a complex kind of set of factors that, that contribute to their formation of identity. And also as teachers, it's our responsibility to recognize these differences. Why they're happening and then be able to intervene. I know it's, it's not, uh, easy to, to try and take it on because it is overwhelming to think each individual person has all these individual needs. But if, if you can just try and, and, and pinpoint some of these things while like one student's really good at art, let's incorporate more of, you know, drawing diJENrams or doing this or doing that. Just being encourJENing in general. It can really make all the world of difference, you know, for these students, especially the ones that have been disserviced from inequity. Institutional inequity. ? statistically that students of diverse bacMAYAround or less capable. [McGloughlin] said this like one best system, the teachers, the authoritarian, it only further like encourJENes that based off the activities they choose. And the one thing that my article went into is like where does this belief come from? Like why do they think this? And a
lot of they found is it's just they've heard rumors and this is what they've always been told. rThey don't have enough experience in the classroom to see that the students are capable of learning that just they hadn't been able to like to see it for themselves. It's just a mismatch.

C: 01:03:42 We talked about this, it's hard to separate things, but like, like I'll take tracking because it's something that I know has been studied not in the United States, uh, because we just said, hey, let's throwaway. Detracking cause it'll help people. So, okay. So when I went to school back in the day, uh, you were labeled, you showed up as a freshman in high school. Um, my, my k through eight was in the middle of nowhere. It was 200 kids from k through eight. So that didn't matter, there was no tracks. Uh, but I got to high school. You were labeled... Your an honor's kid. You are a college bound, you are the regular track or career track, career track and a, then there's the, you're on, uh, what's it called? A remedial and today the tracking has been thrown away. It still happens, but it's been not, it's not,

Finally, the two authors JENreed that the best way to combat gender discrimination is by establishing a clear set of criteria before evaluating students. This will prevent different standards being used for men and women. However, Moss-Racusm et al. goes one step by farther by suggesting the stereotype causing the bias should also be addressed, for example the stereotype that females are less competent scientists. Moss-Racusm et al. specifically recommended working with science advisors to mentor female scientists and emphasize their self-worth. This is similar to the affirmation technique suggested by Cohen (2012) when addressing arguments that challenge long held beliefs. Overall, both articles deal with gender discrimination and methods to combat it.
Another example they gave of a belief was that students from more diverse backgrounds, their parents were less supportive of their learning. And it will say a lot of this like this support is because the community may be differently. I mentioned like ESL learners and like maybe if they're sending emails and standards report cards, if they can like interpret it properly, the teacher's going to like read it as like, oh they're not involved in the student's life. And really there's just like a barrier that they're not able to overcome a solution to kind of want to like reform mechanisms just like make did. And they really emphasize getting teachers during their pre service period, like into classrooms of diversity so they can like see for themselves the students abilities and understand that these differences exist. But it's something we have to like overcome.

STEVE: 01:18:09 There never was never one size fits all!

ME: 01:18:10 No? Even when they were all in the same school house together? Not even separated by grade? Where everybody had to read from the Bible that was one size fits all.

STEVE: 01:18:25 So B. C. Dot. I had the teacher ever did that individualized study for kid.

ME: 01:18:30 I can tell you from my own experience, I don't recall that growing up. Like somebody like taking me aside and differentiating instruction for me. I don't remember that at all.
STEVE: 01:18:41 So what, that when I was a kid, right, everyone's experience is different. Yeah. But I was a kid. My, uh, the only teachers I can remember really my seventh and eighth grade with any real details, something in eighth grade. And my seventh grade teacher gave me a, uh, like a workbook on how to have a program like computers and stuff. So I did this workbook, but that was the only kid in the whole class. He did that and then they started sending me to the helper person or the schools. And then, uh, during eighth grade, uh, uh, there was, there was eight different groups of kids that were like math kids. You did like extra math and English gives you did extra writing, whatever. And it was differentiated even though the entire eighth grade and seventh grade in the classroom with a teacher. So, so when they say, oh, it's not the way it used to be.. I'm like Well, clearly you weren't there.

Socio-cultural Interactions

ME “Let’s say he has an F in your class. You’re not only going to relate to him about science. The wall is going to be up. Where as if you can find other points of negotiation... So instead of focusing on aspects of our identity and relationships where we may be at odds... we can focus on where we have commonalities... So for me, I’m not saying you are wrong, but I didn’t see it as something underhanded. I saw it as something a leader of the world would do if you are a good a leader. You would do your homework, and know about the people you are going to try and mediate with. That’s how I saw it but I can’t prove that you’re wrong either.”

JAMES “See, I think he did do his homework, to find out. How can I get to this guy? How can I work him?”

STEVE (Interjects and says aloud to the group) “I love listening to JAMES, because I disJENree with like everything he says (Laughter)”

JAMES (Defends himself) “I’m giving you another perspective!”

STEVE “I get that but every time you talk, I’m like, what the hell is this guy talking about (Laughter)… Even
though I usually feel the complete opposite... you have 'points’” (Laughter)

JEN (Agrees) “Yeah, I like the angle, I like the angle…

ME (to JAMES) “You’re position struck be because I had not even considered that was the case, and I was like oh!?"

SCI

JACK (Recognizes) “Based on your beliefs some can see it as manipulation and some can see it as a positive thing.”

**JEN Added yet another layer to the conversation...**

JEN “I saw it as he’s pretty full of himself assuming he would want a picture with his autograph.”

ME (Corrected) It was an autographed picture of the president and his grand kids.

JEN “That’s even more weird! ImJENine ht ego!”

ME “Well imJENine the ego you must have to be president?”

48:00 Talking about the begin pic

JAMES “I saw it as a deliberate manipulation. Oh yeah... you want these signed autographed pictures of our grand kids but I know you’ll only give them to your grandkids if we do something here. I saw it as a deliberate manipulation and if I know that your deliberately manipulating me I am putting up a wall…”

JEN “But it worked”

JAMES “Well in my thought process it did because Begin was a moron and didn’t realize (that he was being manipulated).

NOTE: We were all laughing by the end of his rant because the subject of it (should have been Jimmy Carter) kept getting confused with his successor (Ronald ReJENan) but
the group helped keep the subject to of his accusations straight.

ME “So you’re saying he fell for a trick?”
JAMES “Essentially, yes. He fell for a trick.

ME think of the ego you have to have to be president...
JEN To sign a picture of my family!?
STEVE You got to have the egos in the world to get stuff done... I’m on that belief.. you gotta have the extremeists and the egotisticals to get stuff done...
JON yeJEN but egotisticalism brings about genocide (group JENrees)

GS!!!
NOTE: Make sure you present this picture as... The president giving him as a gift a an autographed picture of his and his grand kids. The men then began to discuss their grand kids... You may need to revisit the story... We were working through some Important SCI related beliefs. I thought it was a nice thing.. They saw as manipulative, egotistical and weird.

Socio-cultural Interactions

STEVE: 00:51:48 I love listening to Tim because I'm just like, I disJENree with everything he says...
Group: 00:51:52 [Laughter].
JAMES: 00:51:55 I bringin you a new perspective you said that earlier....
STEVE: 00:51:59 I know.. .I love that because every time you talk I'm just like, what the hell is this guy going on about.
JEN: 00:52:03 But I like I like the angle... i like the angle I do...
STEVE: 00:52:06 Even if, even if you're doing completely opposite of mine, and I disJENree with all of them... You have points.... (Laughter)
ME: 00:52:10 That's what struck me because I had not considered that. I was like, Ooooh... And I had not considered it a manipulation.
JACK: 00:52:18 Some may see it as like a good negotiator,
JEN: 00:52:21 I see it as like he's, he's pretty full of himself that he is assuming that his grandchildren want a picture a signed autographed picture of the president. But then I think about it from the kids' perspective....
ME: 00:52:34 Time out... The picture was of the guy and his grandkids signed by the president,
JEN: 00:52:38 the guy,
ME: 00:52:39 so whoever the Egypt guy, it was him and all his grandkids...
JEN: 00:52:44 ...
ME: 00:52:44 And then the president autographed it. It's a little weird. I guess you're right.
JEN: 00:52:48 It's totally fucking weird. (Laughter) That is odd as hell
ME: 00:52:59 I mean, think of the ego you have to have to be president..
JACK: 00:52:59 You got to have the timestamp for that. Oh yeah.
JAMES: 00:53:10 Oh that's just, yeah. If you're going to sign a picture of my with my family, with your signature.
STEVE: 00:53:21 You got to have the ego in the world to get stuff done. I'm on that belief. You got to have the extremists and the egotisticals.. to get points acrsoo and to get stuff done... then that may then brings up the other people to say, wow that guy's egitistical, I'm going to try and not be like him... Or just you know, realizing Oh that is weird...
JON: 00:53:39 Well in extreme cases egotism brings about like, like genocide...
ME: 00:53:46 but you also bring about greatness, right? Think of writers, think of athletes like being that driven to have like your identity so tied up in the belief that you have to be good at that. That you'll be nothing without it. Right. Like you know, that's a very strong and driving belief you know? And you know... it's just a belief. We just think beliefs. We would just like poo poo beliefs before tonight. THEYRE EVERYTHING! It blew my mind! All right. Like it blew my mind.
JAMES: 00:54:26 Oh yeah.
PAULA: 00:54:26 What was your article? 
JEN: 00:54:57 I feel like that's a penis piss. He like, he's pissing on his like... It's like a WHO's penis is bigger. I'm not putting my name on top of your families' name
ME: 00:55:15 (Laughter) Youre still on that!?
(Laughter)
JEN: 00:55:15 It's like domination.
ME: 00:55:22 I believe the kids today are calling that Big Dick Energy... (Laughter)
ME: 00:55:28 Yeah, that's word for it
Socio-cultural Interactions
enegotiation
JAMES: 00:57:49 All right. So my, my thought process after reading about, how, manipulating people's, the way to go (Laughter) uh, I decided that since the research who was based on like the actual research was from the 70s and the early nineties like your paper that you read that you were was from 1991 (To JACK). Oh yeah, no it was like all my, all the time JENO. Yeah. So it was from long time JENO and I'm like, well you know what, hey, it's been a whole generation since the most current data. So let me look. I looked, I swear, I swear I looked for like current data cause you know, there's so much funding in this area, I could not find a thing other than yeah. Oh yeah. It's been real bad for generations so we should do this now. So I, I, that's why I picked it.
In Cohen’s chapter, Identify, Belief, and Bias, one could summarize it as two main ideas. People manipulate themselves into thinking they aren’t racist, and telling someone they’re a good member of their social group will make them open their mind to new ideas. The second idea was introduced as a potential means to intervene on the first idea. While there may be evidence that this sort of deliberate manipulation is effective in the short term, any trust will be lost once the manipulation is discovered. The anecdote of ReJENan and Begin would have been very different had Begin understood the tactic, and one would expect the conversation to quickly meMARIE down (Cohen, 2012).

A much better approach would be to look at current trends in research to see what is happening with regards to race relations in schools today. Unfortunately, there has been very little research done in this area in the past decade. As a typical representative of current publication on race in the classroom, the author reviewed the paper Combating Race-Related Stress in the Classroomby Sehgal, Jeffries, and Rappaport. This paper used an anecdote of Mohammed, a student who misbehaves in school as a reaction to the “micro-JENgressions” he goes through every day (Sehgal, Jeffries, & Rappaport, 2017). His misbehavior was his survival technique escape the onslaught of prejudice and mistrust. In effect, the authors reverted to the fatalistic trope that he was just a product of his environment.

JEN: 01:49:35 doesn't have that relationship with them?

And it takes time. And I'm still building this with my students and I know that it's going to take me, I think the entire year because it's, it's, I don't know what class I said it in this class, but this job is the most unpredictable job I've ever had in my life. And every day, every day is different. It is, you cannot expect, you can't expect what happened yesterday to be repeated JENain the next day because it just doesn't like that. So it's,
if they're wonderful one day don't have that expectation the next day and like th they're going to come in and be like wonderful JENain. It just, it every single day is different. Um, so that's essentially what I wrote about was that building that relationship with your, with your students is so crucial and it, and it, and it truly depends on your ability to be able to be an effective teacher and teach effectively throughout the year.

JEN: 01:55:22 I've already had students ask me to, if I will move up and I've had administrators ask me if I'll go, I'll move up. Would you move up with your classes? Yeah. Well No, no. I mean I would, I would get still at some of them, but yeah, I wouldn't have the, I wouldn't have the same all the same students. Um, and another thing too is that if you, if you are good with your students and, and other kids who don't know, you see that, they're like, oh she's, yeah, she's, she's cool. She's in the know. They tend to behave more for you. Um,

JACK I gotta say I really like when you bring stuff in...like your first hand experience... like I love listening to what you have to say about your experience in the classroom....

JEN Well thank you but I feel I always bring something negative thogh

MAYA(Reassuringly) No..no...

ME hitting the table.. “you’re kickin’ the real Annette! We need the real!”

Of course as with any group endeavor, there is going to be a learning curve when you get started. In particular we were giving JON a hard time because he didn’t do the first assignment because he didn’t know about it despite serveal emails and announcements.. JACK chimed in and asks if he completed some the other items the group had completed:
12:46 K1 Did you do the surveys? JON No (Laughter) Turns out he was only looking at an upcoming assignments list (Don’t know if you need).
I assured him that I was not “looking to penalize you guys at all”... and told him to get it to me whenever he could...

CoP BLDG

Me sharing with them as I was going through the process of writing my dissertation proposal. They were genuinely curious and it was great discussing it with them.

New Teacher Support\CoP\Instruction

Note: Groupings. Everybody is conversing. Lot's of laughing and cooperation. Doing the circle exercise. Getting the rules down... Annette... "Like Bob"...
Hahaha... Chicken waffles... Discussion about navy blue, royal blue, the electromagnetic spectrum...

New Teacher Support\CoP\Instruction

*Me drawing a big blue circle on the white board. I shaded it in as best I could using a blue dry erase marker. I used circular motions like when waxing a floor I guess, and countless "swirls" were visible in my "blue circle". I was behind a drop down screen so they were unable to see what I was doing.*
ME 21:56 “ImJENNine this is nicely shaded... and I did my best.
This is what I need from you two groups, and this is what you will have on your paper when you’re done:
What I want from you guys:
One, as a group you are going to decide this... as a group you are going to decide, “What is this? Give it a name. Ok? What do you call it? What is it?
JON Giving it a name not as what we envisioned it be?
JEN So it will be like Bob? Bob the dot?
ME No! That’s what I don’t want you to say
JEN No.
ME Just what is it? If I gave you this object, what is it?
JEN Like a nucleus?
ME Alright, so I'm going to say this JENNine... Don’t say anything (Group laughs)
JEN I’m sorry, I’m sorry...
ME: You're good, you're good... Do what you are doing now, do it with your group is what I'm saying. What you're doing is fantastic but I want you to do it with your group...

JEN: Ok... with your group...

So after I resolved that issue, I returned to explaining what we were doing. "One, tell me what this is...

STEVE: The nucleus... (We all laugh hysterically)...

ME: And number two... what you guys are going to come up with... you're going to give me 10 beliefs amongst you that you used to come to that determination.

JACK: Oh God...

ME: From each group I’m going to get: What it is? And 10 beliefs you had to use to come up with that... to describe what it is.

I originally said ten minutes.

NOTE: I sum up the exercise... So these are (your) beliefs... I didn’t go so off the rails as to call it a waffle (laughter) but number one on my mind was, one we have to believing in moetry, we would have to believe that geometry was right (valid), and you guys brought one up earlier (pointing to group 1) and you would have to believe in blue...

By doing so we are in essence going through the process of believing the wavelength that I see "blue" at, is the same wavelength that (you) see "blue" at, when you talk about refraction of light (in the eye)

In a sense I would have to JENree with all the science that goes into that, all that foundational science...

I would have to believe that you can project an object on to the bpoard...
New Teacher Support\CoP\Instruction

Speaker 1: 00:00:04  Somebody. So by the way, three reasons I wanted you guys to read the article. I wrote them down and I can remember two of them.. There were three... Do a three one um, (Laughs) Tim not to pick on your holmes. No, listen. So you said in it, right? She cited a bunch of other people's work and brought it together. Well that was a point that was like her lit review was considered one of the, like the more recently one of them really better ones that have been put out in recent years. And the reason being is like if you went through those tables and if you go on and your education would get other classes, pay attention is particularly if you're like taking a muMARIEicuMARIEural ed or something like that. Look at the authors that they cite and all those things that your class would use. If you look in that table, you'd be hard pressed not to find them in that table.

ME: 00:00:58  So by the article, whether you love it, hate it or whatever. What it is, that nice piece that brings all the body of work that's in a particularly like in urban education as they call it. All right? It brings that all together. So we're talking about these issues of like, you know, cuMARIEurally responsive pedJENogy, all that stuff. All those authors that are in there, those are like the heavy hitters. All right, those are the ones that I went through. And those are the ones that like, you know, um, I was told to see one or two I happened to stumble across this review. I think I was taking a critical race theory course and we had to like, find an article to present on or whatever. And I happened to stumble across it. And Luckily for me at the time I had done enough research where I'd seen all these office and I was like, holy crap, shebrings them all together.
ME: 00:01:35 And I liked what she had to say. I thought like it was cool to bring it from the time of history. And actually I think I did end up presenting it, but I want a little more in depth. Like, the first, uh, education act in the United States was called the dilutor act (Actually the "Old Satan Dilutor Act (1675). And you guys ever heard of the dilutor act? The Dilutor act is a colonial. (JON asks what year) This is puritan times. So like before, you know, I even before the United States. Yeah. If you had more than, um, 50 people in a town, you had to establish the school. And this was around eight? No, this was, um, 17, eighties, I believe it was. (Wrong!) So pretty much like, right. No, it was before. No, it was way before them. Those were 1620 by like 20 to 80, somewhere in between them.

Speaker 1: 00:02:20 Okay. It was like a little after Plymouth rock. I knew that from my home. I'm from Massachusetts we reference everything to Plymouth rock. So yeah, it was like after that, that was like the first law. So it Kinda, I kinda went through it like that, but I thought it would be good because we've all heard, you know how the school is based on factories. Right? Had you guys heard that prior to reading this? How, like how they set up school? All right. So basically what happened was industrial revolution happens, right? So you have the civil war, okay, this is the best of, I'm just going to give you a cliff notes. So what happens? All right, now you have supposedly all these people in the south that are free and you have all these people that have come over like to help fight the war, right?

ME: 00:03:03 Those people, different factions in it and everything like that. And so then you also had, you know the Germans, Irish, all the people that were mentioned in that. All right, well now war's over and it's time to like rebuild the country and all that and then the industrial revolution hit. So it kind of all kind of coincided, right? Like late 18 hundreds or guess like, yeah, his 1700's 1800s just through the turn of the
century. What would that finding is like, all right, we've got all these people and they're coming over to do work and everybody was coming over, right? Cause it was jobs in America, but we all seem like fivel goes west. All right, so everybody's coming over for jobs. Well, the problem is people would come over and they have a jobs, but they're also like having sex and having kids and like in all these things that happen.

So, uh, JACK, I had you as ELL. Um, if you didn't notice, um, interventions that was Don with the JASON (Gaming intervention). Alright. Yeah, JON: 00:05:55 (Asking ME) Had you ever heard of that before?

ME: 00:05:57 I think maybe I had stumbled across that article, but like actually, you know what, I was gonna kind of pressure you for us and maybe explain what it was a little bit if you could just, so everybody's kind of aware of what it is. MARIE I had you as reforms, right? Sorry. Let me to like throw it out there. JACK, Don the Jason project, MARIE reform, uh, Thomas you out of the A-Gap, bridging the gap. I was an O lineman I have to use the terms. Um, and then MAYA, I have identity. That's what I have for you. Even though you had acknowledging students' stories and experiences, I put identities but....

MAYA: 00:07:02 I think that...yeah.. (Agreeing)

ME: 00:07:04 I thought a little more umbrellaey...

ME: 00:07:04 Tim, you are pseudoscience.

Pseudoscience.

STEVE: 00:09:50 Can I ask you what A stands for?

ME: 00:09:55 A stands for achievement.

STEVE: 00:09:56 Got It. We'll keep a gap. Yeah. So if you guys want to revisit your, uh, you know, your post or whatever, I have more. Alright this is what we'll do it. We'll, we'll, we'll, we'll play for card whomever the prettiest one we'll all vote,
JAMES: 00:10:16 Oh that's a great idea!

Speaker 3: 00:10:21 If you JENree with what I gave you you put that on the top your point's right. What you want to get across? You don't even have to like summarize your article if you don't want to like whatever your main points like you thought we should know like you know what I'm saying? There'll be different. That's a summary. That's fine. But if there's something else like pseudo science, he's going to pick that up. It's fine. (Laughter) That's a good point. They're all valid points. (JACK Can I put quotes?) It's beautiful.

New Teacher Support\CoP\Instruction To STEVE) You my Dog Man. And he got a little flow chat. Come on son!

New Teacher Support\CoP\Instruction ME: 00:45:53 Great question. Like yeah, that's the thing. Like they have trouble and you'll see like once you start doing PD with teachers, like all these things are going to say to you, oh just do professional development with teachers. Well having done professional development with teachers. I know how that usually goes. It's usually the teachers and they're just complaining and pissed off and whatever. Like it happens quite a bit. We're not much gets done cause I were just kind of complaining about that personal situation. Um, so as much as to say like, you know, do PD, do PD,

JON: 00:46:22 what is PE PD?

ME: 00:46:23 Professional development

JON: 00:46:25 Like what are you doing in it?

ME: 00:46:26 like in, you know, in schools a lot of times you'll do what's called a lesson study or um, we've done book studies where less study like you and like three other teachers in your department right? Let's say you have three biology teachers, I don't know what your area, sorry. (JON replies physics..)
Speaker 1: 00:46:39 Um, it's physics. Physics. All right, so you and the other physics teacher, right? They'll say, all right, you guys are going to come together and one of you will teach a lesson. The other one will wasteve observe. Not critique it but take notes, then the other person would do one. Then you guys come together in you're meeting usually with your science coach is called it's PLC, professional learning community. You'll get all this stuff. Sorry. Um, I didn't know any of that. So what the point is, you get to see how each other teachers, how you both approach that lesson, what works for each other. Like, so that's the type of professional development they'll do. And sometimes they'll have coaches do it with you as well. If you're a new teacher maybe your administrator will be in on it, but usually they're too busy to do it. So those are the types of initiatives. But then the other ones could just be like one time, um, pds where you go when you have like your, they'll have training days. I think it's like four times a year, something like that. And you'll go for like this three hour session, you know. But the, the whole point of me ramble on about this was what you'll see a lot of times is the older, more established teachers. They'll just sit there and just poo poo everything throughout it.

fb: 01:29:46 Alright.. I had never heard of. And the dichotomy of like books smart versus street smart. I like that. I liked the, that was what I picked up on. I know I've heard that but like a research article wher eth ey use that as the dichotomy, like it's always been home life or someone who is student identity or personal experience and things like that. But well you know, if you guys are going to hate me cause it's two articles this week but they're both kind of show up. But they both listen to Mad Easy reads. They're mad easy reads and shut up JACK you're going to love it (laughter) shut the hell up because you're gonna love (laughter) what they talk about that right there and one of them occur is like in what we call an urban setting and the other one occurs on the Torrey
islands like north of Australia. So two different instances of cmARIEural resources being enacted in the classroom, but like really cool different ones. So whatever, just read them in and enjoy.

New Teacher Support\CoP\Issues

JON a hard time because he didn’t do the first assignment because he didn’t know about it despite several emails and announcements. JACK chimed in and asks if he completed some of the other items the group had completed: 12:46 K1 Did you do the surveys? JON No (Laughter) Turns out he was only looking at an upcoming assignments list (Don’t know if you need). I assured him that I was not “looking to penalize you guys at all”... and told him to get it to me whenever he could...

New Teacher Support\CoP\Meaningful Exchanges

MAYA we can make it essentially anything we want it to be...

JEN If it can be anything we want it to be, let’s be creative... (Group mates JENree in unison). This would eventually end up in one of my groups deciding it was a waffle. As they discuss JEN went “way beyond syrup, I thinking whipped cream, sprinJACKes, cherry on top... STEVE Oh nice!

JEN We can add chicken, chicken and waffles... If you say waffle I say that sounds good...

JEN ask me JENain... “So ten beliefs.... ME You saw this thing )pointing to my circle in the board, you called it something... give me ten things you would absolutely have to believe in to call it that... (BEST EXPLANATION)
(Groups discussing) Amongst a lot of laughing and engagement you can hear terms you can hear terms such as:

(Divide amongst the two groups)
geometry, circle, soup bowl, syrup, whipped cream,
chicken, filled in blue, blue shaded circle, have to believe that color is blue,
JEN, JACK, MAYA, JON
MARIE, PAULA, JAMES, STEVE

Waffle
Geometry
Whipped cream
Circle
Syrup
Soup Bowl
Chicken and waffles
Filled in blue
Two dimensional figure
Blue shaded circle
ImJENes
Have to believe that color is blue
Patterns
Believe in the flatness of the board
haSTEVEhed
Spheres

New Teacher
Support\CoP\Meaningful Exchanges

physicist

Atwater, like I did a round table at um, ASTE like a few years JENO. And I was like basically me taking issue with the, Oh, that's what I want to talk to you guys about taking issue with the use of the word urban, right? And we think about urban, like you said, poverty hasn't changed everything like that. Well, you know what has changed, uh, urban environments, right? Whereas now if you look at the census, there were more people of color living in the suburbs, suburbs that were tracked to suburbs. Then are living in urban areas. So here's this whole body of science in education and everybody says urban, urban, urban. But if you look at urban schools, like if you go
to downtown Boston, like nobody, it's rich white kids
going to the urban schools, right? Everybody else is kind
of on the outside. Like when you think about urban
centers. So that's something to keep in mind, kids, right?

JON: 00:08:19 That's a damn rich white parents moving
around, Kicking people out.
JAMES: 00:08:23 So is it urban areas are how rich
white people..
ME: 00:08:26 When you go to a lot of cities yeah think
about it.
JAMES: 00:08:29 I thought they just worked there and
then they...
ME: 00:08:30 (interrupting) That's what it used to be.
That's what it used to be. Things done change.
PAULA: 00:08:41 (Pointing to herself and MARIE) We
live in downtown Tampa...
ME: 00:08:42 Yeah, exactly.

ME: 00:20:38 (To JAMES) So as much as I bust your
balls I love your takes though...

JAMES: 00:20:42 Oh, I, I, learn because I wa sin the
military a long time, Right? If you don't have the
knockdown drJEN out, people fucking die. (ME Okay). Right.
So that's how I look at it.
ME: 00:20:59 Okay.. So if you don't have the knock
down drJEN out people die... Like hit all the angles and
hit em' hard like...
JAMES: 00:21:01 Cause if you, if you believe something
and then you and you don't do something about it and then
are you going to go explain to why you didn't know
Johnny's mom, why he died? Because you didn't say
something.
ME: 00:21:12 Okay. All right. I never considered that.. Yeah.

JAMES: 00:21:15 So, so, uh, that, that was my life for so damn long. I can't, I can't not be that person..

ME: 00:25:10 Niiiiicceee!!! You know what's funny when I was thinking about doing this, I was almost like I should have them draw a picture. But then I thought you guys would get pissed at me. (laughter)

MAYA: 00:25:22 Honestly, noooo!!!!!

ME: 00:25:22 URGH...I should have did it damn...

GROUP: 00:25:25 Waffle reference

ME: 00:25:31 Nice. You guys remember that?

JACK: 00:25:33 That was a really nice discussion. Yeah. I didn't think that even though like the timing of this class is the worst thing in the world, (ME it's pretty bad). I really like enjoy our discussions

ME: 00:25:43 Thank you. I'm glad you like it. That's what I'm saying. I'm like, I got to make it like so you guys enjoy it because, en you'll just hate life....

STEVE: 00:25:51 Well you got us engJENed, which I super appreciate... I'm not like dying, falling asleep in the damn seat. You just see me falling asleep next to you and see.

JON: 00:26:04 I don't know if I should knudge you or just let you go...

C: 00:41:09 (Jumps in) It says yo uahve to challenge it... like you have to like confront them with their beliefs. Otherwise like they're not just going to realize they have the belief you have to like Kinda hit it with them. Otherwise it won't. Even if it may still not change it's like you're told like you tell them about it. But the first step is like,
that's like kind of what my intent of this is here. Like whether you know, I change your beliefs or whatever, that's not even mine. My focus, my focus like, and I stated in my dissertation. to hopefully provide you guys with a toolbox to think, to examine your beliefs. Like if you're in class and you're going, it's like, man, these guys suck. Like these guys suck. I can't get them to do this. I can't, I can't, I can't right? Well, as a new teacher, you're going to do that because the whole world's going to seem like it's crashing down on you. Right. Well, once you're in that though, like hopefully when the year's over and you can step back like you, you stop to see it from like, um, what's being done to you, like what's happening to you. Right. And you see it as, you start to see it as their (Students) experience. Where did I come up short that this keeps happening right where, alright I win't even get there (Pointing to JAMES's poster) yet... (Laughter) We could measure it but like why? Why are we not closing our achievement gap? Right. Why are my ELLs struggling? Okay. Why does it seem like I just can't get along with these damn kids? Like, you know what I'm saying? Like so that this is like supposed to be like the first step and you guys kind of dissecting them. Um, and then I'll shut up. Sorry. The last thing was though, the problem is what they have found is and why they, particularly those two people said it, do it with pre service teachers is because you guys theoretically haven't established like your, your classroom beliefs on backed by like five years of what works for you or five years and you becoming comfortable. So the point is what they have found, and I and I, it was Vaino and then this other literature where they found it as teachers get past that third year, they are way less inclined to change their beliefs to, to meet the students' needs. Okay. Not to say that they don't meet their students' needs, but they're less willing to incorporate new things that might help them get to that goal. Because we become, it's human
nature will become rooted in the way we do things. And it really takes a lot. Like it really takes you telling yourself you suck at things to get you to move to that next point, which who wants to tell themselves, particularly with teaching, we're like, you're working your ass off, right? There's no way you could suck because you're doing it all weekend. Like you're going to see like your first, are you going to work all the frigging time? So how can I suck if I'm working all the time? Well, you know what, you will, you will suck. (Laughter) It's because like it's, it's just a craft much like I'm, you know, Jujitsu or something like that. You won't jump into a black beMARIE no matter. Like if you're doing the wrong thing, the wrong technique, you might never get to a black beMARIE. Like, you know what I mean? And it really takes that like, um, outside of like, you know, feeling appreciated. Like you, you're going to feel so unappreciated. You're going to feel unappreciated more than you feel appreciated. Like, and that's just the way it goes. But then as you get more confidence, like if you're willing to dissect what you're doing and say I was wrong, I was wrong, I was wrong and make it right. Like it takes time. But then you'll see that after the fact and there'll be a couple of years down the road, which sucks. But that's the way it works.

JON: 00:44:28 I kind of believe that these beliefs are not so much rooted as a teacher student relationship. That is probably beliefs that these people had before they even thought about being a teacher. And that's what's carried over.?

JON: 00:44:48 We're going to get to that?

MAYA: 00:44:52 A-gap
ME: 00:44:52 That's a fantastic point. Right? Cause like what? Well we keep talking about identity. Like what we're teachers, we're not just bringing out teacher identity and they're like, hi Mr. Bradley. Like you know, I'm bringing up all the shit that happened to me whether I know it or not. Cause that's what we bring every day, like everybody's got their problems. We say it all the time. Right. They don't automatically meMARIE away or you said like you can only be like you were in the military so long. That's the way you are. It was like a big part of your development. While all these things that are a part of our development, like they don't stop at the door. Right and they don't want that. They're there. How, why we act the way we do like these belief belief systems is what drives our ration. So whether, I mean even outside of the scope of whether you're doing the right thing, teacher the wrong thing. Teaching, we're all going to have my own way of doing it just based on who we are. Like our belief systems that construct our identities.

STEVE: 01:18:09 There never was never one size fits all!

ME: 01:18:10 No? Even when they were all in the same school house together? Not even separated by grade? Where everybody had to read from the Bible that was one size fits all.

STEVE: 01:18:25 So B. C. Dot. I had the teacher ever did that individualized study for kid.

ME: 01:18:30 I can tell you from my own experience, I don't recall that growing up. Like somebody like taking me aside and differentiating instruction for me. I don't remember that at all.
STEVE: 01:18:41 So what, that when I was a kid, right, everyone's experience is different. Yeah. But I was a kid. My, uh, uh, the only teachers I can remember really my seventh and eighth grade with any real details, something in eighth grade. And my seventh grade teacher gave me a, uh, like a workbook on how to have a program like computers and stuff. So I did this workbook, but that was the only kid in the whole class. He did that and then they started sending me to the helper person or the schools. And then, uh, during eighth grade, uh, uh, there was, there was eight different groups of kids that were like math kids. You did like extra math and English gives you did extra writing, whatever. And it was differentiated even though the entire eighth grade and seventh grade in the classroom with a teacher. So, so when they say, oh, it's not the way it used to be.. I'm like Well, clearly you weren't there.

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JON: 00:39:16 Did your article at all go into, um, as teachers possibly gained more and more experience that they may have changed their beliefs or do they continue with the same beliefs?

fb: 00:39:28 Julie Chase, don't you worry about this cause I got you. All right. So, um, and this goes along the lines of what we were thinking. I happen to know her article very well cause I read a lot of times just because I liked the idea of looking at beliefs and You have yours, a student characteristics. A external influences. Yeah. And so that's what though the Brian and Atwater looked at. All right. I use that as a framework and I looked at identity, home lives. All right. And then the last one was social cuMARIEural dynamics meaning like the building of relationships. And only reason I changed the languJENe was I liked the aspect of identity because you weren't just looking at the student, right? You were looking at yourself kind of like what we're doing here. Like it's, so this intervention that they did there with teacher education programs, that's essentially what we're doing here. So when I take all our data back and I go back and I
look all right and I listened to it and I listened to it, I'm going to try to tell the stories of how we address each of those beliefs in here. Identity, homelife like you guys' thoughts, like through your words like how you came across and viewing sex. Not Right. Not Wrong, just like kind of trying to tell the story of new teachers, of pre service teachers. Um, and so as far as it as, as you gain more experience, well what happens is, and you might, and I know, I know like I've thrown a lot at you. I hope you go back and revisit these whenever you have a second when you're laying on the beach, whatever. But like that Cohen article, what a talks about quite a bit and what you'll see in society as well and what you'll see in education is once we get rooted into our core beliefs of what we think works for us, very hard to get us a deviate from that. So another thing that that Brian Atwater paper said

<table>
<thead>
<tr>
<th>New Teacher Support\CoP\Relationship Building</th>
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<tr>
<td>JACK I gotta say I really like when you bring stuff in...like your first hand experience.. like I love listening to what you have to say about your experience in the classroom...</td>
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<tr>
<td>JEN Well thank you but I feel I always bring something negative thogh</td>
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<tr>
<td>MAYA(Reassuringly) No..no...</td>
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<tr>
<td>ME hitting the table.. “you’re kickin’ the real Annette! We need the real!”</td>
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<tr>
<td>STEVE It’s a circle JON It’s a geometric shape because it’s an imperfect circle... STEVE it’s a circle.. It’s a blue circle (settled on blue circle)</td>
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<tr>
<td>JEN It’s a waffle and we are proud of it! We are proud of our waffle!</td>
</tr>
<tr>
<td>JON (Not in their group) You are insane!</td>
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New Teacher Support\CoP\Relationship Building
JACK “I gotta say. I really like when you bring stuff in (her day to day classroom experiences, like your day to day experience. I love hearing what you have to say about what it is like in the classroom.”
JEN “Thank you. But I always feel like I bring something negative though.”
(Group) “No! no..."

NTS
*Discuss it as JEN at this point brought up what the CoP members would express as an underlying theme? Issue surrounding the way we are preparing new teachers.

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JEN: 00:56:28 (To JAMES) You opened up like the best can of worms in here. I'm loving this...

JAMES: 00:56:32 I'm controversial! I like to throw it in the man's face.
JACK: 00:56:37 I just want to say you got her to say fuck
JEN: 00:56:39 Oh I say fuck all the time....
ME: 00:56:44 That's fine. It's a free form conversation people... Was like, so that it's not an interview cause you guys wouldn't be the same. We want to be talking about big Dick Energy. (Laughter) You know what I'm saying?

New Teacher Support\CoP\Relationship Building
Speaker 1: 00:03:42 And so what there we're finding is that they had this mass populous that was generally uneducated. And if you waSTEVEh old movies you would see like, you know, I don't know what was it? I know it's a fake movie, but the gangs in New York like kinda how people just roaming the streets. That's kind of how it was. It wasn't really, oh, I mean base I was at, I went to the five points, like in April we were the, there were dead Rabbits and there were, yeah. Well, you know, one of the places I went was called, oh, it's called the dead rabbit and it's this bar over on, uh, right on Wall Street. But like right as if you were going to take the
ferry over to Staten Island. Yeah, yeah, yeah. And it was a bother. And I guess it had been there for like 300 years, something like that.

Speaker 1: 00:04:25 Hey, so I was so like, oh, what do you go to this bar? Because it looks awesome. It's this Irish bar, there's no TVs, nothing like this really cool place, narrow step stairways and everything get up top. Right. Um, and there's all these different floors and anything anyway. Well, while I'm in them, I'm like, man, if this place ever caught fire. Oh my God. It literally, like two weeks after I went to that place, I think burned down. The thing had been there forever, but it was the dead rabbit is what it was called, but it was supposed to be like that. Yeah, please.

JON: 00:04:53 When we were in Washington DC we went to this bar because it claimed to be the oldest bar within the DC metropolitan area, the oldest bar in Washington. We went to this bar. It was established in 1991 you weren't allowed to have bars in DC. (Laughter)

JON: 00:05:15 Cheese balls man. I'm thinking I am going to be at the cool old bar like that (referring to Dead Rabbit). 20 years.

ME: 00:09:11 Dunkin donuts is my baby... I almost said Dunks.

MAYA: 00:09:20 Dunks!? (Laughter)

ME: 00:09:28 Yeah, we call it dunks.

STEVE: 00:09:39 I like dunks... He goes, dude, hanJONriting.

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JON: 00:11:27 (To JON) Man you need to get better writing.

STEVE: 00:11:27 Me? Nobody needs to read this but me.
STEVE: 00:11:33 Students are going to rip you apart.
JON: 00:11:38 What is it called?
ME: 00:11:46 I can't read this! (Me mocking students)
This is called the students centered kids get to work.
Look at me student centering you guys right now...
JAMES: 00:11:53 I have to write it down but the more
Write it down.
ME: 00:12:03 Do your thing man. That's why I figured
I'd give you guys 20 minutes you know, so you don't feel
rushed.
STEVE: 00:12:22 Take some different colors, make it
pretty like...

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lationship
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ME: 00:15:39 It's all good. Oh the tapes are
hilarious. You know what I do like literally I listen to
them. I'm like, well, I'm working out and junk...like you
just get to memorizing them. Walking the dogs and then all
the themes that are coming out. JAMES I'm so proud of you.
You're doing a great job. He wants to crush me.
JAMES: 00:15:58 No, no, no... I have to get my
thoughts on here. I'm having to scribble it out like oh
that's not good there, and move it up here and over
there...
JON: 00:16:09 JON just gets to it. and sometimes it
just gets too it
STEVE: 00:16:11 What kind of sanJONich (To JON eating)
JON: 00:16:13 Ah...turkey with ham and cheese.
JAMES: 00:16:17 (To JACK) You cheated!
JACK: 00:16:18 What are you talking about?
JAMES: 00:16:19 You can't be done yet I haven't even
started yet... well I'm not trying to make mine pretty,
I'm just trying to make mine literate (Laughter).
STEVE: 00:16:28 Warrant interventions,
ME: 00:16:57 That's why I did a gap because I was like, I don't know how to spell achievement. You know what sucks is I, I struggle with that, right? Like the "i" in the "e" thing, even though I know the rule and everything. Well, I've probably typed the word beliefs at least 4 billion times and my dissertation and I spelled it wrong like at least 3 million times.

JAMES: 00:17:16 That's why word just fixes it for you.

ME: 00:17:16 I know, but I had to keep doing even when I'd like, I'd be like, I'll type up, let's get it right. I'd guess and get it wrong...terrible.

JON: 00:17:22 Well, you know what? We all have to know our strengths are our weaknesses and ah... In that writing is one of my weaknesses and I recognize it. I'm fine with it. I'm okay with that.

ME: 00:17:41 Very ah, self forgiving, I like that. Alright, so forgiving...

JON: 00:18:00 Guys. You've got 20 minutes man, c'mon. JAMES you haven't even started buddy...

JAMES: 00:18:07 I started three, five minutes.

ME: 00:18:08 Oh yeah, you guys are six minutes in, it's fine.

JACK: 00:18:11 I thought you were saying there's six minutes left..

JACK: 00:18:22 Oh No, you're good hanJONriting.

ME: 00:18:26 My goal is for you guys to get something out of this....Light a little spark...

JAMES: 00:18:37 These are nice pens. These are nice pens. It didn't look like it at first.... But they are...

GROUP: 00:18:39 Laughter...Wow...

JACK: 00:18:39 Wait are you calling these pens cheap?

JAMES: 00:18:39 Yeah! (Laughter)

ME: 00:18:43 My feelings are not even hurt... at all... cuz Like everything in there is dollar tree. I had to buy all that...

MAYA: 00:19:08 For the Holla Tree these are great

JACK: 00:19:08 (Laughing) Holla Tree...
MAYA: 00:19:08 Hollahhhhh!!!! (laughter)

Kl: 00:19:11 I literally forget writing this.

It's good to know you did it like a month

ME: 00:19:11 JENo didnt you? (Laughter) Yeah. Well you know what's funny. He did it right and I was like, Oh crap, do we have class this week? (Laughter) I was like oh my god I'm have to prepare.. and was like oh no.. I have to get my proposal done.

JACK: 00:19:23 No, see I um, I just never know if I'm going to have enough time the week of to do it. So if I find time I'm going to do it when I can....

ME: 00:19:34 JACK you're a better man me, I'll tell you that.

JACK: 00:19:37 Listen. I do whatever I can to minimize my stress level.

JON: 00:19:40 I don't know anything about that. I just figured out this semester and that I'm the biggest procrastinator I figured out this semester if I get things done ahead of time, it feels really good.

JACK: 00:19:50 Right. (Laughter)

STEVE: 00:19:52 Just figured that out. Dude. Monday was death for me because I'm going to be gone this weekend and then since we have no class next week, except Tuesday, I haven't gone for a week and a half because I'm on vacation. So I had to do like all of my homework for three weeks on Monday. Oh my God. I was, I was just in the library for like 10 hours, but now it's all done it, I'm just like, Yo,... (Laughter)

ME: 00:26:36 He was probably like, 'Do you knwo how hard it is to drJEN this body around all day'!? (Laughter)you waking me up?

STEVE: 00:26:37 (Laughing) Absolutley

ME: 00:26:52 love it Right? I think you should win. (to STEVE)

ME: 00:27:00 He's hitting all my little heart strings over here. He's got pictures and flow diJENrams like, yeah.....
STEVE: 00:27:04 We got dinosaurs over here....
MAYA: 00:27:04 It's a whale... Thank you...
Tk: 00:27:14 Oh sorry (Laughter)
JACK: 00:27:15 It's a whale... (mocking, more laughter)
ME: 00:27:19 STEVE are gonna pull them up like with the kids. Ooh, what a nice picture. Tell me about it?
MAYA: 00:27:25 I remember for one of my geology exams you had to explain that energy of like this scene and I just like drew over it all with a little, whale, and my TA loved it. I was like thank you! I like my whales like I like my rocks... (we never got the punch line).
MARIE: 00:28:09 There's so many geology puns...
MAYA: 00:28:10 There's a lot...
MARIE: 00:28:11 So many. I've just been like buying geology tee shirts with all the puns on them.
MAYA: 00:28:14 Really?
MARIE: 00:28:15 Yeah. It's been like my streak that I've been wearing them.
ME: 00:28:18 You gotta have sweet science shirts.. (Group.. yeah) What else are you going tow ear on fridays!?
STEVE: 00:28:20 Yo!.... So I ascended into space..
MAYA: 00:28:24 Oh, (STEVE posts his poster) that's pretty cool. That's pretty cool. I will admit that's pretty cool.
ME: 00:28:30 I kind of don't want to look at.
STEVE: 00:28:34 So it starts as like a little like flower and tree and then it goes to the sky with clouds and then in the space and stars
JACK: 00:28:41 Are those mountains in the back?
MAYA: 00:28:47 No that's his flow chart.. It's carrots...
STEVE: 00:28:47 Those could be positioned correctly.
JON: 00:28:50 In the right direction.
MAYA: 00:28:51 Yes In the right direction
STEVE: 00:29:18 Tim! You wrote it out on a piece of paper and you still had to like scraSTEVEh. (Laughter)
JAMES: 00:29:25 Strengths and weaknesses right. Know your strengths and your weaknesses. I know mine.
ME: 00:29:31 I would always like for classes. If I was going to make a make something like that. I did that before school...Like had it all perfect because if you mess up at all.. They won't pay attention. That's garbJENe! Look at that! But if it's nice like how'd you do that?
JAMES: 00:29:50 Is that a whale? (Laughter)
ME: 00:29:50 Yeah..
New Speaker: 00:29:50 I speak whaaaallllleee....
(Laughter)
ME: 00:29:56 You should do your presentation, as a whale.
MAYA: 00:30:25 the whole thing, the whole, the whole God damn thing.
MAYA: 00:30:28 If I, if I can guarantee to be Thomas, I'll do it.. I'll do it.
ME: 00:30:32 As a whale?
STEVE: 00:30:33 You gotta do a whale but in his (ME) accent though...
ME: 00:30:33 a Boston whale?
JON: 00:30:44 A Boston, whaler...
ME: 00:30:57 A Boston Whaler... (Laughter)
JON: 00:30:57 That's a boat reference (Laughter)

SHE IS TALKING ABOUT USF

JEN This is what pisses me off about this school they paint this picture that we’re all da da da da da.. and do this and do that... and here’s this really beautiful curriculum... and blah blah blah.. and I am like.. that is not how this shit works when you get in there... it’s not an accurate depiction or description and you learn that really quicJACKy.. even like the first week.. but I had that sense and that feeling going into it anyway."
hey need to read the whole goddamn thing. Um, and it is biased and it's, and like they say do like this study I read, this was in foundations that I read this, that they did this study in somewhere in California and they made sure that the group had equal representation of different levels of poverty and this and that. I'm like, this is such bullshit. And it's not, it's, it's not accurate. And I don't think that it's fair and I don't think that it's, I don't think it represents truly the demographics of what is going on and our in our nation, these, these studies and, and another thing that I'm sick of like, okay Feldman was like beats. He beats in this like inquiry based teaching inquiry based learning inquiry, base learning. It's just how we failed our students. This is how we feel. Our students and you look back and they started doing this and what the seventies and eighties saying that science is, we're teaching our children all wrong with ink, not teaching them inquiry based teaching. That's all I heard. I'm like where's the goddam solution? He sat there and he didn't say anything... And he goes well you're solution. And I'm like okay that's not the answer I was looking for.

ME: 00:21:39 Actually no they haven't come up with any definition. Like a consensus of beliefs. Like that's the big problem. I think I wrote about like 40 pJENes of belief stuff. You would think they would have...Hundred and 75

JON: 00:21:59 Thought it was 180?

ME: 00:21:59 No, I did it. 175 was what my proposal as well.

JACK: 00:22:06 Speaking of pJENe numbers, if ever give us a 40 pJENe article JENain...

JACK: 00:22:11 Minus... Whoa whoa you didn't do the minus!

JON & JACK: 00:22:13 What like 10 pJENes?

ME: 00:22:14 What that thing was like 16 I counted them. I counted them in pdf. 16 pJENes a table minus those minus the references.

JON: 00:22:22 Did anybody read the table?
ME: 00:22:22 It was 26 pJENes. I told you in the email. So all had to do is read half a pJENe. It would have less stress.

JACK: 00:22:30 No, no, no. I read the email, I read the email, I skipped the tables. Of course. Yeah. I don't know who would read them, but still it was so long and like I know that you're used to that. But like I said in the beginning of this class, I can't read. So it's just, ME: 00:22:44 Well, oh, you work that muscle JACK...
I'm making you better baby. .

ME: 00:22:51 So do you guys not read in the Master's program? Is that what'? (the problem is?)

JAMES: 00:22:54 Oh, we do. You can just don't like it.... We have so much of it.. We have so much of it..

JON: 00:22:58 All we do is read and write. Those were the two worst things on that is reading and all I do this semester is reading and writing. I can write a lab report, that's easy. To actually think about something and actually..

JACK: 00:23:13 That's the one thing I hate the most. Like it was truly just is so, you know?

ME: 00:23:32 Laura, for some reason I always want to say you are an English major.

ME: 00:23:35 Were you?

MARIE: 00:23:37 I have an english degree.

ME: 00:23:38 Okay, there we go. All right, cool.

JON: 00:23:39 She writes that good doesn't she?(laughter)

ME: 00:23:48 Yeah. You don't want to be teaching read 180 for 20 years of your life, you'll kill yourself.

MARIE: 00:23:53 I mean it's useful now. That's all we do is read an write. That's all we do.
Oh, I like, I really like, like the, uh, comparing what do we know that specific I was looking for because this was about race relations in my mind (I wish I would have harped on this and made him realize these difference in beliefs affect mor than just race relations). Uh, it's, it's trivial to look at it and he states statistics because they publish it all, um, and say like, Oh yeah, Asians are doing okay. Whites are doing.(Eh...) And if you're anything else, you're, you're freaking trash as far as, uh, your, your test scores (Fb achievement). Um, and so the, uh, to me that that's obvious that there's, there's a discrepancy that we need to fix somehow. The data... What I'm looking is what is what is going to actually work. Uh, what, what studies have actually been done to look at that as opposed to.. Well stuff's been bad forever. So let's try this.

Yeah, I mean, good. That's all. That's all I see is I think, and we're changing the stuffs that we changed based on data that's as recent as the 90s. When I was in school, I retired now y'all, um, things have changed an entire career and generation. Um, so I really was looking for it. You don't like what's, what's out there, but I couldn't find anything... Actual evidence based, anything other than some cool opinions.

So I, uh, looked at, uh, one that was relatively recent from last year, I think maybe three before it was called combating race relations, stress in the classroom. But it was basically the story about this kid Muhammad. Um, and he, he was disruptive and, and uh, not be good student, "good student". (JACK:Um), and uh, it was basically a whole thing was an anecdote of him.
JAMES: 01:00:28 Uh, you know, like, oh yeah, he goes through his day, but he's not doing what we supposed to do. He gets up and his teacher yells at him, get back in here seat, and he says, oh, it's just cause you hate black kids. Um, and uh, uh, so the teacher's like, but that wasn't what I needed him get back to a seat. That's what he's supposed to do. Uh, so the fix action does, she wouldn't, and, uh, talked about her, uh, uh, her identity as a, as a, as a white woman who never had to deal with any kind of problems. And then, uh, uh, so then when she dealMARIE with, uh, uh, Mohammed and the future, all she had to do is look at him and he'd sit back down in his seat and there would be no problems. Well, that's wishful thinking! That's just a cool story that has nothing to do with anything but that, that I thought that was pretty typical of all the modern stuff that we're looking at and the publications. It's just some random opinion. And I honestly, I, I no longer care about random opinions. I, I want some data! We deserve data. We're paying for data. I want data!

ME: 01:01:33 Wow. So I had to learn this. You guys, so like I had never done any qualitative, some questions, some problems can't be solved with numbers by looking at trends. (JAMES..But), so this is the way I've always done it this way. I describe it is we, we're looking at that like, I'm not saying it's not useful. Right. All right. So what number wasn't going to tell you? Generally speaking... Is what happened. Okay. What qualitative research, like what we're doing here, it'll tell you why it happened or at least lead you in that direction. Right. And at the same time, think about social problems like they-take-for-ever to change. Right. If we started, we looked at society in the 1800's, you know, like we can pick out a bunch of things that were great and a bunch of things that were shitty. Okay. And like for them to change, it takes a long time.
JAMES  01:13:13 The numbers aren't hard to get right. So how would you get some Scandinavian country? I think it was Denmark, similar problem. (I try to jump in) I know, New Speaker: 01:13:25 but I disJENree with it already. Go ahead. (Laughter)

Speaker 7: 01:13:32 It's different I know... We didn't do the work, so this was what I got. Uh, they, they, they were looking at 
d tracking because in America, who kind of leads the world we're in because we are super awesome. I do believe that. I still believe in American exceptionalism, even though our numbers, we don't think say it....

JON: 01:13:49 ow anything right? Right there quantitative don't show anything right.

STEVE  01:13:52 But, uh, there, uh, that's a different topic because the other country's cheat by our standards. (So maybe it's our standards that are the problem?) The, uh, so they, they wanted to fix there. (ME I do JENree with that. Go ahead). They want to Denmark or whichever Scandinavian country, wanted to help their, their lowest achieving kids, which was basically their poverty, impoverished people. Yes. They were a bunch of white kids. They weren't black kids or whatever. There was still there, impoverish impoverished class. Um, the, uh, and, and they were doing, they were doing tracking because we were doing tracking. And if you were in that remedial track, it's really hard to get out of that remedial track. And, uh, uh, so like, you know, we'll, we'll give duty tracking so they can, they can move wherever you want and they took a few districts instead. Okay. Tracking we're taking that off. We can see what the ouSTEVEomes are. And, uh, so they did the study for, I think it was 10 years that it's been a while since I read the article but... Uh, then, the, the, there was also the study where, okay, so we did the t tracking those work. The worst of the worst kids got marginally better, marginally better in life, right. Their initial income I eat and all that stuff,
name, hey, that, that's an improvement. Everybody else got significantly worse.

ME: 01:15:12 Hmm. (Me letting the use of the term significant slide)

JAMES: 01:15:13 And the, uh, the thought process was, uh, oh, so if you're not forcing your smart kids to work hard, the youth and the option to the slack, we're going to slack...

Ag: 01:15:23 , yeah, Oh hell yeah.

JAMES: 01:15:25 Yeah. And, and so they said, wow, that's really bad. You know, it sucks for those kids on that remedial track that really does suck.

Speaker 6: 01:15:35 We're not doing it. Huh. All right.

JEN: 01:18:09 So just I foundations of measurement classes you're taking right now, they go over that. Yeah. And I don't believe their bullshit studies. Pearson is the worst test writer on the face of the Goddamn planet. First of all, just say that. And Florida has this like monopoly, not monopoly. Pearson has this monopoly on Florida's testing. Um, which, and it's, it's terrible. It is biased. It is not. It is not written for equally for every student at all. Um, I read over some of the tests questions today and they're bullshit. I don't know how they, it's there. They're written at such a higher level and these kids I'm telling you right now are not at this level. It's such bull shit
JAMES: 01:32:12 I see what you're saying, but we keep on doing the Oh, same problems, try this same problem. try this... same problem try this... Let's try this. We can only so much. I try so much to that for like, let's make sure we still have that same problem. Make sure that problem hasn't modified some.
JACK: 01:32:30 Well don't they like when they try new things, they, they're looking at the data to see like if it's fixed the problem or not.
JAMES: 01:32:36 But we, no, we haven't looked at the data. We haven't gotten new data. Newest data's from the 90s.
JACK: 01:35:29 So can I ask you, or what you said is what you're saying is like it's less of a, we need to figure out like it has an education system, how to fix it. And more of a, as a teacher, like as an on an individual basis, what we can do to work to fix the problem in one classroom.
ME: 01:35:46 (NOTE: I'm saying it's both) Almost like an organism. That's how I view it anyway. And that's like, I haven't, look, you're right. I haven't seen any like quantitative studies that can fix that. And if you look through education, David, you'll see very few quantitative studies. The only ones you will see them for. I like to districts and stuff like that that want more money. Like where they're looking. We got improvement in this area. Like what for true, like, you know, um, pedJENogical, uh, behavioral, like all these things, uh, even, I mean content and a lot of respects happens in qualitative like analysis like this.
JAMES: 01:36:25 But we think if you say, oh, let's change this, we should take a snapshot before take snapshot after it's just test scores or whatever it is that you're saying. Do you want to change it? And then, you know, then you go like, oh, it made it better.
Speaker 5: 01:36:40 Okay.
Speaker 7: 01:36:40 It made it better. So give me a promotion or it made it worse. Maybe you need to fire me.
PAULA: 01:36:44 What block did you, do you want to measure the with like race issues? Like what, what are you trying to measure?
JAMES: 01:36:48 Well If you will, well if you cause the uMARIEimate, the uMARIEimate thing we want is our, our is to be... Cause school is the place where we make aduMARIEEs Right? And our aduMARIEEs are kind of jacked up. Right? Cause you look at the prison system and guess who's in there. It's not, not a bunch of white people. There are a bunch of white people but there's a disproportionately high number of non-white people in the prisons.
JON: 01:37:13 But then that goes right back to what we were talking in the very first person that uh, uh did their critique of that. It's just proportional disproportional. Um, what other races versus white races are getting as far as penaMARIEies,
JAMES: 01:37:29 right? Yeah because we have judges who are also aduMARIEEs that need fixing.
ME: 01:37:35 Okay, but what I'm saying is that's not something you can quantify. Well because it's the same thing happens in school.
JAMES: 01:37:42 If you get beyond the, beyond what the school... Like if you did a study right?Because everyone has a social security number and it doesn't take a whole lot to track your kid. Like, I'm going to track you for the next five, 10 years. Uh, parents sign this piece of paper saying we can do that. Kids sign a peice of paper... Do some kind of thing and then track them. Like say, oh, did they go to college? Did they graduate college? How much are they getting paid?
JEN: 01:38:09 I think you're on the right track, but I think there's so much there's doing that there'd be so much more involved and you can even wrap your head around right now even with this idea... Like they're different variables that things that are going on.
ME: 01:38:24 (Interupting) That's essentially what they're trying to do with all this testing.
JAMES: 01:38:27 But they're not doing it....
ME: 01:38:29 because when I'm saying it's the wrong tool,
JEN: 01:38:32 they're using the wrong tools to try and get our social problems. You can't solve social problems with a test. You can't. You can't. Well, I then to us, I said college,
Speaker 1: 01:38:43 I think that there's a lot, the discussion, the idea is there, but solving it through guys. I mean, I'm not keeping no tests. I'm just going to keep going.
JACK: 01:38:57 It's been real fam like really great...
JEN: 01:39:10 For it being friday night.... really... this is great....
ME: 01:39:10 Nice. All right, cool. You guys willll like the next arti
STEVE: 00:54:09 All right. So that's it. That's the fun part, right? The fun part. Science for pseudoscience. We're all trained scientists. Science teachers, right. Science. Hey peer review. I want feedback. Tell me when I'm wrong. Thank you. As soon as can they don't they do the, you know I keep saying that you, because you JENree with me, you cite me cause I JENree with you. Right. All right.
ME: 00:54:36 I'm not, I'm not, I'm not like, I just want you to see it. Cause look to say that was a literature review, right? Look at that. Look at the references. All in peer review journals. So that all went through the peer review process.
STEVE: 00:54:48 There are peer reviewed astrology journals.
fb: 00:54:51 This is true, but there's, these are science education journals. Like what was that? More science education journals.
STEVE: 00:54:56 This is my point!
ME: 00:54:57 So how's this pseudoscience? And she was referencing all well established science education.
STEVE: 00:55:01 That's my point though. The, the recent, uh, recent science education kind of pseudo science
fb: 00:55:08 based on what?
STEVE: 00:55:10 the evidence, there's no evidence. Y
ME: 00:55:12 You said there's no peer review, but..
STEVE: 00:55:13 Let me get ahead. Let me get ahead, let me give you an experience. I know. I'm sorry. I'll shut up. (ME Do your thing) then you can fix it. All right. So, uh, the science you have clarifying languJENe, pseudoscience, obscuring languJENe, um, sciences, uh, you know, based on circular arguments and feelings and, uh, crap (his arguments were mixed up on his poster) frustrated. There's a backwards guys, this Arrow here, you guys. All right. So the types of evidence that are relevant. So the call it the politics of science that are relative and measurable as being a good citizen, being a good voter, you know, stuff, whatever, uh, quantitative stuff, stuff that you could actually measure people on poverty. Uh, the learning the gap, and you're going to talk about, um, prison rates, college acceptance rates. You know that, who the hell ended up being successful in life? Who didn't right those things that are quantitative? They are measurable. They may not be measured, but there are measurable. Um, now let's get to our paper, right? Um, there's these things are measurable, but they're not being measured in the paper. There's like the stuff she references, right? So like the getting out of, uh, getting people out of poverty, we've been doing it 20 years. Poverty rates really haven't changed. We're not getting people out of poverty. Um, I didn't look at prison rates, I didn't think about that till like 10 minutes JENo. Fine. I didn't think about college acceptance rates because you guys didn't mention it until a few minutes JENo. If these are things that we could look at, but they're not right. There's quantitative data out there, but we're not looking at it. We're only looking at the qualitative stuff, right? Like I'm good voters, right? Cause we got, we've had a
series of fantastic presidents. Um, we're okay. What's that?

STEVE: 00:57:15 (ME No, I just figured it out). Yeah. So yeah. So I need you to guys to fix me because

fb: 00:57:20 This is what you're missing. Um, so if you would to go through a lot of those articles, they would have your numbers you're looking for. So when an article like that, there's no sense in repeating the numbers because look, and this is what I said, this is what happened. So I can say to you, all right, um, you know, the prison rate is this, the graduation rate is this like, and these groups aren't graduating at comparable to this group. Right? That's telling you what happens. Cool. We know that that happens. But as far as education, what good is just knowing what happens do for us.

STEVE: 00:57:55 Well we'll play Bloom's taxonomy. I can't get to the, the high level stuff if I can't get the knowledge, I don't have the knowledge, I can't get pass that.

ME: 00:58:08 So in that sense, you're call it a pseudo science cause it's not quantitative. But in your, your analogy right there, you just placed that knowledge if your ranking, yet you placed it above just as quantitative, did you not?
STEVE: 00:58:23 No, so quantitative data is knowledge as well. is it not, (ME oh yeah), so it's the same. All right.

STEVE: 00:58:35 I'm stuck...

ME: 00:58:38 I'm goin to get you unstuck. No, I thought you brought up a great point. So look, this is what I keep saying. So as far as the poverty rates, prison rates, all that. Okay, we can look at that and it could be graphed and we'd give me like 1990 and then you know, 2016 whatever, 2016 and so you can look and say, Oh yeah, whatever this is we're looking at it increased between 1990 and 2016 right? Hooray..

ME: 00:59:05 It does. As far as education goes, right? We're not answering questions of what happened in education, right. In education, we're answering questions. Oh, why the hell it happened so we can fix it? All right. That's where the qualitative, that's where that type of work comes.

STEVE: 00:59:21 But we made broad sweeping changes 20 years JENo.

fb: 00:59:24 What talking about no child left behind? It was kind of a reformation of what had been happening.

New Teacher Support\wicked problems

his is how we feel. Our students and you look back and they started doing this and what the seventies and eighties saying that science is, we're teaching our children all wrong with ink, not teaching them inquiry based teaching. That's all I heard. I'm like where's the goddam solution? He sat there and he didn't say anything... And he goes well you're solution. And I'm like okay that's not the answer I was looking for.

ME: 01:19:57 Well cause I'm going to say there's a term for this. Okay. It's called a a wicked problem. (Laughter anf Boston Jokes) I went to a conference on it all on knowledge Democracy and wicked problems.

New Teacher Support\wicked problems

I think this part of Cohen’s study (and some components of the other research presented on discrimination) can be supported by Aversive Racism as it talks about how the general social consensus is that integration and equal
treatment for all individuals should be implemented, though in practice, it is not implemented.

As I mentioned, when a minority is stuck in someone else’s “bubble” their options are limited. When they can’t find a way to get out of that “bubble”, or feel welcome in it (i.e. a black student with a white teacher), lashing out is inevitable which can then lead to labeling as a “problem” in which the minority may then begin to identify with. This can then perpetuate a cycle itself leading to more labeling and more problems. The author of this article (chapter) writes, “Theory driven interventions, attuned to psychological processes, can reduce bias and change outcomes for the better”, how long held beliefs can hinder negotiations and relating each party to a higher cause can improve the negotiations, how affirmation of alternate identities can improve the judgement of a victim’s claim and commitment to hiring criteria before reviewing applicants can decrease discrimination. These are all fantastic ideas, but appear to be just a band aid on a much deeper seeded wound.

Is there a more complete solution? I like to think so; however, it would take the complete change of ideologies and beliefs of a whole society and probably won’t happen in my lifetime. The Civil War ended 153 years ago, the Civil Rights movement was 50 years ago and the Equal Rights Amendment was ratified 46 years ago yet we still have abusers like Harvey Weinstein and Larry Nassar, there is still the need for movements like Black Lives Matter and political parties cannot come to an agreement on such fundamental polices as heathcare reform. Every time a progressive activist such as Abraham Lincoln, Martin Luther King Jr. or John F. Kennedy starts to make heathcare reform, some chickenshit asshole kills them. That’s not to say these are the only problems. Groups like the KKK, NAACP, LGBT and neo-Nazis also promote the separation of society. I would never group these organizations together
as far as violence and extremism, but they each do exclude other groups and look to advance their own JENendas. If ever an organization like the NAAWP were started it would immediately be attacked as racists and exclusionary. If there ever is to be a society rid of “ism” it must be total and complete.

New Teacher Support\wicked problems

STEVE: 00:59:30 We completely changed everything. School when I grew up was nothing like today's school. (ME True)Troll nothing today. School. (JEN Yeah). We completely changed everything.

JEN: 00:59:39 Even the way that they teach is different,

ME: 00:59:42 right? So I don't, all right.

STEVE: 00:59:44 So we changed everything. So let's look at the data. Like was that a good change? Was it a bad change?

fb: 00:59:50 What do you think? All those tests that they're taking, all that is, that's all that data that you're looking at. Like when you go to teach, you're going to have to have all that data on your wall every day. I mean, time you're in a classroom, every test that you get, particularly if you're in secondary school or if you're in a middle school and you'll teach them what does it, uh, when do they do testing?

JEN: 01:00:07 eight grade science.

ME: 01:00:09 All right, so like all that stuff, that's the government collecting data,

STEVE: 01:00:13 right? Yes. But it's not getting back to us, right?

ME: 01:00:17 Exactly! Exactly! No, no, no. When you're a teacher, you can look that up. You can look up the data if you want...
JEN: 01:00:23 No it does get back to you. In fact, your school, we'll go over it meticulously with you.

STEVE: 01:00:27 Did you go back and compare to data from twenty years JENo?

JEN: 01:00:27 Well not compared to 20 years JENo but they go too....

fb: 01:00:31 Well they're different tests right? You can't compare two different variables.

STEVE: 01:00:34 Oh, so we made broad sweeping changes. We have no way to find out if it's good or bad. We could have had a good way to find out what good or bad we chose. Not to

STEVE: 01:00:43 only looking at it qualitatively only looking at a quantitative list. Yeah, fine. But that's not that article

fb: 01:00:50 Yeah.

fb: 01:00:51 Oh don't worry about articles. Say you compare no child left behind. Uh, you know, measurements that occurred prior

STEVE: 01:00:58 What's that?

fb: 01:00:59 to measurements that occurred prior. Like any tests that occurred prior. Like I used to have to take the MCAT in Massachusetts.

JEN: 01:01:04 That's my, I think we took the Iowa basic skills tests when we were younger. Is that what you're talking about? Comparing those tests back JENain?

STEVE: 01:01:16 any, any, anything across the boudary...

fb: 01:01:21 I get that....I get that..

fb: 01:01:23 look guys, the point of it and then we're going move to the next one. The point is you can get those numbers, which is cool. You can see what is happening. But Day to day in your class. No one that you know a certain group is failing at a disproportionate rate does just knowing that it happens, which is what that quantitative data tells you. Yup It's happening. It does nothing to fixing ameliorating the problem. It does nothing towards fixing it.

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STEVE: 01:01:49 It let's us know if the thing that were are doing is working, but the thing that we've been doing for 20 years, so let's us know if that's working. If it's, if it says oh well we didn't know,
ME: 01:01:58 we know it's not working by any measure,
STEVE: 01:02:00 Well them why are we talking about still doing it then,
ME: 01:02:04 what are we talking about doing? I didn't bring up anything about not child left behind...
JEN: 01:02:08 I know, I get what you're saying because this is important. When we, when we started with Feldman that very first semester kept talking about inquiry based science, inquiry based science, inquiry based science and how we're failing our kids and it's all this talk about it, but there's this massive lack of like solution and it drives me nuts and I remember looking at him one day and I'm like, what's the solution? He was like, you are. Well, he said you are well, yeah, as in the class as a whole.
And I'm like, hmm, that's not exactly what I was looking for.
fb: 01:02:40 So what's the solution to global warming?
JEN: 01:02:43 Reduce emmissions? Electric cars..
fb: 01:02:43 Ok... Do it... Why can't you do it?
JEN: 01:02:49 I'm one person, I mean I can do it.
fb: 01:02:51 No..no..no...We want a bunch of people do it. Think of all the opposing forces that aren't going to want you to reduce emissions. All right. That I'm going to want to change over their factories that I banks that aren't going to want it to happen because the whole financial structure will go toDon crap.
JEN: 01:03:05 't you think though globally... That people are starting to make a massive change.
I think they make an incremental change and good. You brought me to my point my point. My point is with institutional problems like that, there isn't like how do we just fix it? It's just like a society. Like society isn't the same as it wasn't a 17 hundreds everything is incremental. We're dealing with human problems. That's why we need qualitative research. That's why we need to know the why instead of a what and that. So that we can make those incremental changes. But the point is, and I think is what he was trying to get at. If we don't make changes here, like if we're not working towards change here five years from now that's you know, five years where the change hasn't been work towards. So it's like, then when I say I'm wicked problems, that means that there's definitely no solution and the thing that we've had right, not in our structure.

JEN: I think that there are solutions and I, and I think it really begins at the, at the elementary level and below.

fb: That's what I'm saying. I think there are solutions but I think implementing them like getting uh, you know, some pre-service elementary Ed students that hate science to teach science, that's a big problem. Like it's a huge problem. A lot of elementary kids don't get taught science cause they elementary Ed students that they don't, they don't like it.

JEN: I think what I should have clarified what I should have said was that it's really reading basic fundamental reading levels. My school is, I'm surprised at how well the students I have are up to par. But I've been in schools where our third graders are reading at like a four year olds level.

JON: But that's nothing new though either. I mean...

JEN: That's new for me though. At the same time though, I I've realized recently like what a privileged community I grew up in. Um, cause I was not
exposed and I didn't see those things. Um, but this was, that was also like 20, 30 years. So...

JON: 01:04:59  yeah, I remember being in elementary school and you always hearing about reading levels
JEN: 01:05:05  but it wasn't as, I don't think this is what is, is as broad as it is now as affecting so many, many, many, many more students. I mean there's always going to be kids who are struggling with reading, but at such a large scale is what I'm saying.

tk: 01:05:25  Fred, your a good teacher. (ME What's that?) When you were up there. I was like actually paying attention to you. So props...
fb: 01:05:30  Thanks dude. (Laughter)
fb: 01:05:35  No, it does what the and the guy's like, that's like a, I was an environmental science major. Right. And then we'll get them on the next one and I'll shut the hell up. But all these classes that I wouldn't be it. Right. Oh, this is great. It's great. What's the solution? Shit, that's never going to happen. So we would study all science behind what was going on like in the soil and the water and everywhere. But like I said, the practical, implementing it and fixing it, there's so many gears. That motion, there's so much more momentum basically towards capitalism. Right.

STEVE: 01:06:04  Some of them we could fix over night....

ME: 01:06:09  It takes generations, generations to fix this stuff. Okay, so what all like you don't really think history like with this, like that small sliver, right? And what all like that momentum that's getting built towards it. You know what I mean? Like it, it takes hundreds of years to fix things like this. You know, if, if even that
JEN: 01:06:27 I, you know, there's even like, like this biology curriculum that I'm people losing my mind over because it's like, I swear that the questions that they had in the student test that we did, that was that the county proctored was, I swear it was at the level that I had in college, like college biology questions. And I'm like, this is fucking ridiculous. And these kids, I know that all of my students fail. There's no doubt in my mind because it's, they're not, they didn't write this language, they didn't write this test in the language for seventh graders. And this is where, this is where we're failing our kids. And this whole socio socio, what does it say? (JAMES SSI?) Yes. You teach them what they love. You teach them what they're interested in, you get them engaged. It's a whole nother ballgame. It's a whole nother student. It's a whole nother child.
<table>
<thead>
<tr>
<th>Source</th>
<th>Participants</th>
<th>Context</th>
<th>Relevance to Theme</th>
</tr>
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</table>
| CoP1   | Steve, Me    | Steve attributing his harsh criticism of journal club literature to his military background, and he describes how he “can’t not be that person”. | • Recognition of how our experiences serve to shape and form our identity.  
• Awareness of how our identity determines how we make sense of the world. |
| CS     | Paula        | Identifies her privileged upper SES background with being most core to the development of her identity. | • Recognition of how privilege or a lack thereof, influences our identity. |
| CS QA  | Jack         | Self-identification as a cis male, homosexual, whose preferred pronouns are he, him, and his. | • Understanding of the importance of gender, and sexual orientation to one’s identity.  
• Awareness of the fluidity and complexity of gender and sexuality. |
| QA     | Maya         | Self-identification as a pansexual, black, female. | • Recognition of how many factors such as race, sexuality, and gender, coalesce to form one’s identity. |
| CoP3   | Maya         | Describing how oppression can itself become a culture, which shapes identity, and use black women in America as an example. | • Recognition of social, and institutional pressures that shape and affirm our identities. |
| CoP2   | Jen, Steve   | Jen confronting Steve regarding some generalizations he was making about female teachers. | • Willingness to challenge and examine identity stereotypes. |
| CoP1   | Jon, Steve   | When arguing while attempting to define the object during “The Circle | • Evidence of belief in a “science identity”. |

Appendix H: Identity Beliefs Matrix
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Statement/Action</th>
<th>Points</th>
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<tbody>
<tr>
<td>DP1</td>
<td>Jack</td>
<td>Discusses the disproportionate under achievement, and punishment of black children in schools.</td>
<td>• Recognition of differing educational prospects, and outcomes along racial lines.</td>
</tr>
<tr>
<td>DP1</td>
<td>Marie</td>
<td>Discusses how people seek information that validates their own arguments, surround themselves with others who agree with their views, and remain resistant to change.</td>
<td>• Acknowledgment of tribalism.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Interrelatedness of ideology and identity.</td>
</tr>
<tr>
<td>CoP1</td>
<td>James</td>
<td>Describes himself as a “contrarian”.</td>
<td>• Ways of meaning-making are aspects of identity.</td>
</tr>
<tr>
<td>CoP1</td>
<td>Group</td>
<td>Discussing the difference between racism and prejudice.</td>
<td>• Recognition of power structures contributing to classroom inequity, and inequality.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Maya</td>
<td>Presents the removal of challenging students as a classroom management policy as negative feedback loop; leading to disparate life outcomes, and that become embedded in the identities, and expectations of students.</td>
<td>• Relational aspect of identity development.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Importance of affirming students’ identities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Importance of valuing students’ culture.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Maya</td>
<td>Discusses both discipline and academic identities of African-Americans.</td>
<td>• Construction of identity as one navigates the world.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Role of race in the development of identities.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Maya</td>
<td>Addresses how African-American students are often “called out” in the classroom based on cultural differences, further establishing them as an oppressed group.</td>
<td>• Role of race in determining appropriate classroom behavior.</td>
</tr>
<tr>
<td>CoP3</td>
<td>Jack</td>
<td>Discusses the oppression of ESOL individuals in society.</td>
<td>• Role of ethnicity and language in societal power dynamics.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| CoP3 | Jon | Suggest older people (teachers), who do not play video games are too dismissive of the use of video game in the classroom, and fail to see their benefits. | • Age as a factor in teaching and learning.  
• Age as a source of cultural disconnect. |
| CoP3 | Jack | Discusses being subject to slurs regarding his sexual orientation online. | • Acknowledging the presence of intolerance. |

Source Abbreviations: Community of Practice Meetings (CoP), Discussion Post (DP), Reflection Paper (RP), Card Sort (CS), Demographics Questionnaire (QA).
## Appendix I: Home-life Beliefs Matrix

<table>
<thead>
<tr>
<th>Source</th>
<th>Participants</th>
<th>Context</th>
<th>Relevance to Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoP1</td>
<td>Steve, Me</td>
<td>Steve’s assertion that his military background is a big part of who he is.</td>
<td>• Acknowledgment that person experience influences how we interact with the world.</td>
</tr>
<tr>
<td>RF</td>
<td>Steve</td>
<td>Steve concludes his ESOL class was the only useful part of his preparation program.</td>
<td>• Acknowledgment that language is an important consideration in the classroom.</td>
</tr>
<tr>
<td>CS</td>
<td>Paula</td>
<td>Identifies her privileged upper SES background with being most core to the development of her identity.</td>
<td>• Recognition of how the environment we grow up in influences who we are.</td>
</tr>
<tr>
<td>QA</td>
<td>Jon</td>
<td>Self-identification of his formative setting as “Southern Suburban”.</td>
<td>• Recognition of how similar settings can differ according to region in the United States.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Paula</td>
<td>Explains that although parents of ESOL students are often seen as less involved, perhaps it is more of a communication problem as opposed to a lack of interest.</td>
<td>• Challenging deficit-based beliefs regarding diverse families. • Acknowledging the need to consider knowledge bases, means of communicating, and ways of being outside of dominant societal expectations.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Jon</td>
<td>Shares his belief that deficit-based perspectives are not only the product of teacher/student interactions, and the seeds were likely planted before they even began teaching.</td>
<td>• Role of personal and professional experience in shaping classroom beliefs.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Paula</td>
<td>Eyes were opened to the fact that students form non-traditional backgrounds are often seen as less capable.</td>
<td>• Recognition of the normalization of dominant culture.</td>
</tr>
<tr>
<td>CoP2</td>
<td>Maya</td>
<td>Presents the idea of a self-ingrained home disciplinary identity that students bring to the classroom. Reference to a young girl’s fear of being yelled at, which seems to make her compliant in the classroom.</td>
<td>• Personal experience influencing classroom dynamics. • Ways of being developed in the home environment.</td>
</tr>
<tr>
<td>CoP3</td>
<td>Jon, Steve, Paula, Marie</td>
<td>Define resource rich view in terms of utilizing skills and experiences from “daily life” in classroom.</td>
<td>• Recognition of cultural capital students bring to class. • Acknowledging the interrelatedness of students’ home, and school “life”.</td>
</tr>
<tr>
<td>CoP3</td>
<td>Maya</td>
<td>Cites the need to recognize students bring a form of “wealth” to the classroom that should be utilized to empower them.</td>
<td>• Recognition of cultural capital students bring to class. • Challenging of deficit-based perspectives. • Working toward empowering students.</td>
</tr>
<tr>
<td>CoP3</td>
<td>Jon</td>
<td>Provides <em>Fortnite</em> and <em>Pokemon Go</em> as examples of games that require</td>
<td>• Recognition of cultural competencies</td>
</tr>
</tbody>
</table>
| memory, reading, geography, and communication skills. | students bring to the class.  
| | • Utilizing experiences outside the classroom to facilitate teaching and learning.  
| | • Culturally responsive teaching.

Source Abbreviations: Community of Practice Meetings (CoP), Discussion Post (DP), Reflection Paper (RP), Card Sort (CS), Demographics Questionnaire (QA).
## Appendix J: Sociocultural-interactions Beliefs Matrix

<table>
<thead>
<tr>
<th>Source</th>
<th>Participants</th>
<th>Context</th>
<th>Relevance to Theme</th>
</tr>
</thead>
</table>
| CoP1   | Steve, James| Steve interrupts James to jokingly state that he “disagrees with everything he says”. | • Humor to make connections with others.  
• Valuing the views of others even when opposed. |
| RP     | Paula       | Describes how the CoP allowed her to see the diversity present in classrooms, and importance of not seeing differences as deficits. | • Recognition of the impact of diversity on teaching and learning.  
• Exploring the notion of deficit perspectives. |
| CoP3   | Steve, Jack, Me | Steve complements me on my teaching, and Jack expresses how much he likes our conversations. | • Appreciation, care, and a willingness to support others. |
| CoP1   | Jon, Group  | Our ongoing joke referring to Jon as Ron, Ronny, and Ronald. | • Humor to make connections with others. |
| CoP2   | Jen         | Discussion about “Mr. C” and teachers who “throw the book at students” for “each and every infraction”. | • Acknowledges the need for patience, and empathy when dealing with students, and negotiating classroom situations. |
| RP     | Jen         | Discussing how her previous assumptions regarding the “unruly” students she would come to teach could not have been more wrong. And how she has come to | • Recognizes the importance of valuing students’ ways of being.  
• Confronting personal biases. |
<table>
<thead>
<tr>
<th>CoP1</th>
<th>Group</th>
<th>Considerable disagreement, and back and forth during the circle exercise. Everybody remains light hearted, and open to compromise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoP1</td>
<td>Jen</td>
<td>Relaying how she got “pissed” at her students for not performing on a quiz, despite “spoon feeding them” the information; but later conceded she was ultimately at fault.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Willingness to be reflective, and work to improve to meet students’ needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exhibiting the type of emotion that is born of dedication.</td>
</tr>
<tr>
<td>DP1</td>
<td>Jack</td>
<td>Describes how teachers need to be conscious of racial discrimination in schools, and cites the need for teachers to be proactive in affirming the identities, ways of being, and culture of their students in order to establish trusting relationships, and combat stereotypes often associate with minority students.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Importance of relationship building in teaching and learning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognizing the need to challenge biases, and perceptions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Importance of self-affirmation.</td>
</tr>
<tr>
<td>DP1</td>
<td>Marie</td>
<td>Discusses a tendency for people to hold identities, beliefs and ideologies that can lead to bias biases when dealing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognizing the need to challenge biases, and perceptions.</td>
</tr>
<tr>
<td>CoP1</td>
<td>James, Me</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>with people who are different from them.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I saw the Begin, Carter, Sadat negotiations as great negotiating. James saw it as &quot;deliberate manipulation&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Considering the perceptions of others.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reflecting upon personal worldviews.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Discourse that leads to understanding, even if not agreement.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP1</th>
<th>Steve, Jen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes how back in high school he always saw female teachers as &quot;stressed out&quot; and male teachers as &quot;chill&quot;. Wonders if all high schoolers subliminally feel this way. Jen states, her students do not care whether you are a male or a female, it’s all about how you treat students.</td>
<td></td>
</tr>
<tr>
<td>• Recognition of gender bias and stereotyping.</td>
<td></td>
</tr>
<tr>
<td>• Challenging of gender bias and stereotyping.</td>
<td></td>
</tr>
<tr>
<td>• Importance of relationship building in overcoming classroom management challenges.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP2</th>
<th>Paula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes how a lack of diversity amongst teacher preparation graduates leads to a &quot;cultural divide&quot;, which must be accounted for in the classroom. Suggests teacher education programs need to better prepare new teachers for diverse classrooms.</td>
<td></td>
</tr>
<tr>
<td>• Recognition of the impact of cultural dissonance in the classroom.</td>
<td></td>
</tr>
<tr>
<td>• Challenge myth that diverse students are less capable in the classroom.</td>
<td></td>
</tr>
<tr>
<td>• Teachers must engage in continual self-reflection in this area.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP2</th>
<th>Maya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discusses how innate biases within the institution of education incentivize the removal of</td>
<td></td>
</tr>
<tr>
<td>• Recognition of the impact of cultural dissonance in the classroom.</td>
<td></td>
</tr>
</tbody>
</table>
| CoP2 | Maya | “troubled” students from the classroom and lead to lower expectations. | • Acknowledgement of lowered expectations.  
• Acknowledgement of disparate rates of punitive classroom management procedures. |
| --- | --- | --- | --- |
| CoP2 | Jen | Discusses a young girl who is introverted in the science classroom but, seems to find comfort in being a “helper”. Suggests it a top priority for teachers to recognize such differences and incorporate classroom procedures that help these students thrive. | • Recognition of the importance of identifying and nurturing students’ strengths.  
• Utilizing students’ cultural capital in the classroom.  
• Affirming students’ identity.  
• Culturally responsive teaching. |
| CoP2 | Jen | Describes how the “ebb and flow” of lessons are interrupted as teachers correct behavior they see as in appropriate, and compromise the learning of the rest of the class. | • Acknowledging and respecting students’ ways of being.  
• Valuing diverse students meaning making processes.  
• Need for patience and understanding. |
| CoP2 | Jen | Shares “being hard on kids does not promote relationships, which if you don’t have that you’re not going to get anywhere.” | • Need for patience and understanding.  
• Places relationship building above all else. |
<p>| CoP2 | Jen | Describes how every day in the classroom is different and relationships with students can change from day to day. | • Recognition that relationship building is a continual, long-term process. |</p>
<table>
<thead>
<tr>
<th>CoP2</th>
<th>Jen</th>
<th>Makes the point that if teachers are “good” with students, others around the school will notice and will respect them.</th>
<th>• Importance of relationship building at school-wide level.</th>
</tr>
</thead>
</table>
| CoP2  | Jen | Discusses Mr. C., who by her account has trouble relating to students, and is often the target of students’ rage. | • Need for patience and understanding.  
• Being mindful of choosing your “battles” in the classroom.  
• Ensuring resentment does not linger when conflicts do arise. |
| CoP3  | James, Jen, Maya, Jack | Challenging James assertion that aboriginal medicine is “batshit crazy”, not based on “evidence”, and not “science”. | • Affirmation of non-dominant cultures.  
• Acceptance of non-dominant ways of constructing knowledge.  
• Consideration of unfamiliar meaning making processes.  
• Challenging deficit-based perceptions of marginalized people. |
| CoP3  | James, Me | Amicably, agreeing to disagree regarding the whether aboriginal medicine was evidence-based. | • Respecting, valuing, and considering the views, and opinions of others.  
• Uncovering opportunities to turn disagreements into growth. |
<p>| CoP3  | Maya, Jack | Define capacity building perspective in terms of taking cultural content from | • Empowering students, to become more involved with their education. |</p>
<table>
<thead>
<tr>
<th>CoP3</th>
<th>James, Jen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the community to make students more a part of their education, and empowering them.</td>
</tr>
<tr>
<td></td>
<td>• Using cultural familiarity to promote a sense of agency.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP3</th>
<th>Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notes the importance for science educators to be aware of how non-majority languages and cultures are socialized, and to be active in reducing prejudice.</td>
</tr>
<tr>
<td></td>
<td>• Affirmation of non-dominant cultures.</td>
</tr>
<tr>
<td></td>
<td>• Acceptance of non-dominant ways of constructing knowledge.</td>
</tr>
<tr>
<td></td>
<td>• Challenging oppression.</td>
</tr>
<tr>
<td></td>
<td>• Promotion of equity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP3</th>
<th>Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suggests there is no cultural “gap” to bridge, it is simply a matter of people having their own ways of being.</td>
</tr>
<tr>
<td></td>
<td>• Challenging the normalization of dominant cultures.</td>
</tr>
<tr>
<td></td>
<td>• Affirmation of non-dominant cultures.</td>
</tr>
<tr>
<td></td>
<td>• Acceptance of non-dominant ways of constructing knowledge.</td>
</tr>
<tr>
<td></td>
<td>• Challenging oppression.</td>
</tr>
<tr>
<td></td>
<td>• Promotion of equity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP3</th>
<th>Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Makes the point that when tutoring students often do not use the language presented in courses.</td>
</tr>
<tr>
<td></td>
<td>• Accepting alternative meaning making process.</td>
</tr>
<tr>
<td></td>
<td>• Valuing students’ language and ways of being.</td>
</tr>
<tr>
<td></td>
<td>• Making space for creativity in the classroom.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoP3</th>
<th>Jon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notes the ability of video games to promote social interaction amongst young learners, and attributes this opinion to games</td>
</tr>
<tr>
<td></td>
<td>• Promote collaboration in the classroom.</td>
</tr>
<tr>
<td></td>
<td>• Seeking different ways to tap into students’ cultural and social capital.</td>
</tr>
</tbody>
</table>
| CoP3 | Marie, Jon | Agrees with me that because so many students play video game, the use of them in the classroom can amount to culturally responsive teaching. Jon realizing cultural is not solely defined according to race, ethnicity, orientation, gender, etc. | • Using cultural commonalities to promote interaction, and learning.  
• Acknowledging the value of students’ culture.  
• Self-reflection. |

Source Abbreviations: Community of Practice Meetings (CoP), Discussion Post (DP), Reflection Paper (RP), Card Sort (CS), Demographics Questionnaire (QA).