


Teaching as Assemblage: Negotiating Learning and Practice in the First Year of Teaching

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Abstract

Recent accountability policies seek to “grade” teacher preparation programs by the teaching evaluations of their graduates. This article addresses the problematic nature of the linear thinking underlying such reforms by examining the construction of teaching practices of Mauro, a first-year secondary science teacher who taught environmental and earth sciences. Drawn from a larger data set, the study uses concepts from rhizomatics, a non-linear theory of thought and social activity, and elements of postmodern grounded theory. Despite holding key factors constant across the two subject area settings, differences in the ways the teacher, students, and contextual conditions worked together helped produce strikingly different teaching practices in each set of classes. This study provides evidence that enacting pre-professional learning is a complex undertaking shaped by the ways the elements present in the school setting work together, and, thus, teaching is a collectively negotiated activity. The author offers implications for teacher preparation practice and policy, advocating for an ontological turn in teacher education research that focuses on processes of teaching rather than outcomes alone.

Keywords

case study, qualitative research, teacher education preparation, urban teacher education, instructional practices

Research and policy in teacher education have reached a critical tipping point. Fueled by neoliberal logic—which emphasizes individualism, privatization, and competition—a wave of “corporate education” policy reforms aiming at accountability, productivity, and efficiency has taken hold (Henderson & Hursh, 2014). These reforms are informed by a simplistic view of education as a linear “input-output” transaction (Cochran-Smith, 2013; Strom, 2013) and reinforced by the privileging of positivistic research in legislation such as No Child Left Behind (St. Pierre & Roulston, 2006) and by organizations such as the Institute of Educational Sciences (IES; Lather, 2006; St. Pierre, 2004, 2011). Collectively, these reforms and policies have reduced our understanding of teaching to that of easily quantifiable indicators. In contrast to this movement, however, many researchers today characterize teaching as complex, contextually situated phenomena (e.g., Borko & Putnam, 1997; Cochran-Smith, 2003; Opfer & Pedder, 2011; Wideen, Mayer-Smith, & Moon, 1998) that defy easy measurement. Indeed, some have argued that the type of linear thinking bolstering popular accountability reforms is a major barrier to understanding how to prepare and support teachers in increasingly diverse and complex educational settings (Cochran-Smith, 2013; Cochran-Smith, Ell, Ludlow, Grudnoff, & Aitken, 2014).

Despite the above-noted resistance from the educational community, accountability policies and related reductionist

views of learning have proliferated in the past several years (St. Pierre, 2011). Within this policy context, calls to evaluate university-based teacher preparation programs on the value graduates add to their students’ standardized test scores have intensified (Cochran-Smith, Piazza, & Power, 2013). Two central assumptions underlie these accountability reforms: (a) pre-professional learning is a fixed set of principles and methods the teacher takes, whole, and puts into action in the classroom; and (b) the teacher is an autonomous actor who “does” teaching to students, and thus the action of teaching can be treated as a causal transaction that automatically results in learning (Cochran-Smith, 2003).

In this article, I argue that these assumptions, and the policies they inform, are flawed because the teacher is only one of multiple factors (or elements) within a system that shape teaching and its various products, including K–12 student learning. In addition, what the teacher learned from her preservice preparation is only one element within the *teacher herself* (together with other elements, including her beliefs about teaching, experiences as a student, and other background factors). Using

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data drawn from a larger study, I present one case study that examines the construction of teaching practices of a first-year science teacher in an urban school setting to illustrate the non-linear nature of teaching activity. The study was guided by the question, “How does a science teacher negotiate his preservice learning within his first-year teaching environment as he constructs his practice?” Rhizomatics (Deleuze & Guattari, 1987), a theoretical lens that emphasizes interrelationships among a multitude of interacting variables in a given social situation, provides for an analysis of the actions of a first-year teacher as part of a larger system that comprises multiple elements. This frame also facilitates an examination of teaching practice as emergent productions arising from multiple, ongoing interactions between the teacher, her work, and her environment. As such, this article adds to the extant knowledge base regarding teacher learning by providing evidence that enacting pre-professional learning is a complex undertaking shaped by the ways the elements present in the school setting work together, and, thus, teaching is a collectively negotiated activity.

Conceptual Framework

The two key assumptions noted in the previous section—the static, fixed nature of knowledge and the complete autonomy of individuals—are hallmarks of modernist thinking, also known as positivism (Hinchey, 2001) or rationalism (Giroux, 2003). To trouble normalized or “common sense” ideas related to this paradigm, and develop explanations about teaching that better attend to its inherent complexity, the teacher education research community requires alternate conceptual frameworks (Cochran-Smith et al., 2014). In this study, I draw on rhizomatics (Deleuze & Guattari, 1987), a non-linear theory of thinking and social activity that offers both concepts and language with which to disrupt the traditional, simplistic thinking patterns that underlie current educational reforms and related policy-driven research. Notably, the critique offered here does not encompass all use of quantitative research in education, but rather pertains to positivism and the linear thinking associated with it.

Central to rhizomatics is the *rhizome*, a tuber or bulb that grows unpredictably in all directions. For philosopher Gilles Deleuze and psychoanalyst Felix Guattari (1987), the rhizome offered an alternative to the linear thinking prevalent in Western society (which they called “arborescent” thought or “tree logic”; p. 12). In contrast to the rigid tree, which according to Deleuze and Guattari guides Western thought, a tuber is an a-centered constellation of heterogeneous elements connected to each other. Within the rhizome, new connections are constantly being made, and as new linkages are forged, the rhizome changes. Thus, a rhizome is always in a state of flux, constantly becoming different.

Rhizomatics offers a frame that breaks from the linear and transactional conceptualizations of teaching underlying teacher education reforms and policy (e.g., a teacher learns

in the university and then transfers that learning into action). Instead, rhizomatics provides tools with which to think differently and in more complex ways about teaching and classroom activity. Below, I discuss one such tool, the concept of “assemblage,” an analytic construct that lends itself to the study of teaching as a complex, co-constituted phenomenon and facilitates theorizing about the non-linear connection between pre-professional learning and first-year classroom practice. While Deleuzian and Deleuzo–Guattarian works offer many interesting and promising concepts to trouble normalized thinking, due to space limitations and the complexity of these ideas, in this article I focus mainly on the concept of assemblage.

Assemblage

An assemblage is a heterogeneous collective of elements, both material and non-material, that come into composition in different ways at different times to produce a particular activity (such as teaching or learning; DeLanda, 2004; Deleuze & Guattari, 1987). For example, driving a car requires a particular assemblage—that of a person with requisite knowledge of driving, a car and all of its constituent parts, a key, and a road. Likewise, a classroom assemblage that produces different teaching and learning activities “is composed of humans, writing implements, writing surfaces, texts, desks, doors, as well as disciplinary forces whose power and agency are elicited through various routines (singing the anthem) and references (‘In algebra, we always do this . . .’)” (de Freitas, 2012, p. 562). In rhizomatics, the term “assemblage” is used to refer both to the constellation of elements comprising it as well as the processes resulting from the different ways those processes combine and interact (i.e., come into composition; Livesey, 2005).

Viewing teaching as assemblage means considering the various components of the classroom—the students, the teacher, the content, the classroom, and so on—as working collectively to shape teaching practices, rather than viewing them as discrete variables that are independent of one another. As a part of this broader conception of teaching-assemblage, the teacher is no longer seen as an autonomous being who takes what she has learned about teaching in a preservice program and directly “applies” it in her first-year teaching situation. Instead, she is considered one element working within a constellation of multiple elements, all of which work together to jointly construct or shape her teaching practice. Thus, rather than the teacher “doing” teaching so that students can learn—a linear and unidirectional process–product transaction—each of the elements of the teaching-assemblage jointly contributes to the enacted practices as they continuously interact with one another.

A rhizomatic framework offers a way to conceptualize teaching as non-linear, multiply constituted, and inherently complex processes. In this article, I use the concept of assemblage as a tool to analyze the day-to-day work of the teacher

for the purpose of extending what we know about the experiences of first-year teachers from the existing body of research on this topic. Considering the teacher as working jointly within a larger amalgam of various discourses, bodies, ideas, objects, and institutional structures to negotiate and construct practice within a larger, stratified environment sheds light on processes that constitute the practices of first-year teachers. Insight into these processes not only contributes to the knowledge base in teacher preparation, but also can disrupt the notions of linearity in educational policy that currently overshadow the complex nature of teaching.

Literature Review

The research on first-year teachers generally suggests they tend to abandon learner-centered teaching practices learned in preservice programs (e.g., Allen, 2009; Zeichner & Tabachnick, 1981) and instead reproduce the type of instruction that has historically dominated our classrooms (e.g., Kagan, 1992; Veenman, 1984; Wideen et al., 1998). Various factors or elements within the teacher, the classroom, the school, the district, and the larger state/federal/policy contexts appear to contribute to this trend. The ways in which these elements combine and interact influence the construction of teaching practices in varying and sometimes unpredictable ways, as I discuss next.

The Teacher

The teacher brings to teaching many factors that help shape her work. These include her history and background experiences (Birrell, 1995; Hargreaves & Jacka, 1995), personal qualities (Hebert & Worthy, 2001; Tait, 2008), preservice learning (Beck, Kosnik, & Rowsell, 2007; Towers, 2010), beliefs (Bergeron, 2008; Grossman & Thompson, 2008), and needs (Brashier & Norris, 2008; Chubbuck, 2008; Cook, 2009; Farrell, 2003; Massengill, Mahlios, & Barry, 2005; Stanulis, Fallona, & Pearson, 2002). For example, Starkey (2010) examined the extent to which six high school teachers in New Zealand integrated technology into their instruction. While many elements were found to shape the teachers' technological integration, this study illustrates the powerful influence of teachers' beliefs in constructing practice. For instance, one of the six teachers in the study reflected that because he was inexperienced in teaching mathematics with technology, he felt less comfortable and confident doing so. Based on his own schooling experiences, he *believed* that math learning was most powerful when it was tactical, such as writing out problems by hand. This particular belief, in combination or interaction with the teacher's lack of experience and confidence using technology in the context of mathematics, contributed to practices that played down the role of technology in his teaching.

The Classroom Environment

Within the classroom environment, the teacher must attend to her students, and their diverse needs and dynamics as a class, with each of these elements recursively influencing her practices. For instance, in a study of 25 teachers' enactment of developmentally appropriate practice, Brashier and Norris (2008) found that to maintain order in their classrooms, participants tended to reduce—but not necessarily abandon—the use of learning centers and play they had learned in their preservice preparation programs. Discussing the factors that influenced her instructional decision, one teacher noted,

I feel like this time of the day is the most fun and one of the most meaningful (as far as learning goes) parts of the day for my students, but more children get in trouble during this time too. I see tendencies to become too loud, and even too violent. (Brashier & Norris, 2008, p. 35)

Similarly, Hargreaves and Jacka's (1995) case study of a beginning teacher revealed a negotiation of student behavior and preservice learning that produced hybrid practices. While the teacher was committed to progressive practices, such as collaborative grouping and democratic teaching, she felt forced to adopt a more authoritarian manner to maintain an orderly classroom environment. Although the teacher "disagreed" with more autocratic models of keeping order, she expressed, "I felt I had to do something because my classroom management wasn't working and I couldn't function that way in the classroom" (p. 52). Yet, despite this professed adoption of "behavior modification" techniques, she also continued to incorporate some methods that might be considered democratic, including holding class discussions regarding behavior and asking students for input in reaching a solution regarding classroom behavior norms. As another illustration, Stanulis et al. (2002) studied three beginning teachers who also experienced tensions between implementing their preservice learning and controlling their students' behavior with more traditional management strategies. Reflecting on having to raise her voice to her students, one teacher commented, "I've had to resort to the kind of things I really don't like doing to have a better-managed classroom" (p. 76).

The School Context

In the school environment, the teacher must interact with other teachers, administrators, parents, the collective school culture, and school policies and schedules, all of which have the potential for shaping teaching practice in unpredictable ways. For instance, in Scherff's (2008) comparative case study of two beginning teachers, one teacher felt that his administration supported students over teachers, creating a power imbalance that contributed to classroom management

problems. The teacher commented, “The administration makes us more like the students every day. The students can talk worse to us with no consequences . . . these kids know you can’t do anything to them” (p. 1323). Feeling powerless to hold his students accountable for their behavior or academic performance, the teacher’s attitude became increasingly negative over the course of the year, and he eventually decided to leave the profession.

A comparative case study of two first-year science teachers by Saka, Southerland, and Brooks (2009) illustrates the influence of students’ responses to instruction on beginning teacher practice. While the first teacher initially expressed a commitment to teaching through inquiry (a central pedagogical practice emphasized by his preservice program), he soon transitioned to a lecture-based style. This occurred in part as a response to his students, whom he felt did not have the foundational scientific knowledge required for inquiry-based projects, and in part as a response to his administration’s pressure to teach more traditionally. The teacher expressed he was adopting methods that would better meet students’ needs, allow more classroom time to address personal issues with them, and would fit the instructional expectations of the collective school community. Interestingly, rather than responding positively, students became more disruptive and disengaged. By the end of the year, the teacher not only had adopted practices that were the antithesis of the pedagogy he had learned in his preservice program, but also had become negative toward students and “came to think that some students simply could not be taught science” (Saka et al., 2009, p. 1011). The findings discussed above provide evidence of the co-construction of teaching practices that occurs between/among the teacher, students, and other contextual elements present in a classroom/school setting.

Research Design and Method

This study uses qualitative methods grounded in postmodern views of research, which some researchers have termed “post-qualitative” methodology (e.g., Lather, 2012; St. Pierre, 2011). Expressing both an affinity with “post” perspectives as well as a critique of traditional qualitative research grounded in positivist views of research (St. Pierre, 2011), post-qualitative methods are consistent with both the rhizomatic emphasis on disrupting normalized patterns of thinking and its ontological, non-linear focus. From such a perspective, concentrating on “what is” would be fruitless because the world is constantly changing and “becoming” (transforming) from moment to moment. Instead, post-qualitative research simultaneously seeks to provide alternate views of data, while attending to practices and their productive effects (Barad, 2007).

Post-qualitative research does not provide a set of protocols or favored methods, but rather seeks to “open up” existing methods while providing alternatives (St. Pierre, 2011). Thus, for the study from which the data for this article are

drawn, I created a “research assemblage” using qualitative conventions, such as interviews, participant observation, and coding, alongside postmodern analytic methods based in constructivist grounded theory (Charmaz, 2006; Clarke, 2003) to focus on the multiplistic, relational processes of complex phenomena—first-year teaching in this case. The decision to include traditional qualitative methods alongside more experimental ones was informed by an understanding that when attempting to push transformative ideas into mainstream outlets, departing too sharply from accepted norms could result in the exclusion of readers. Therefore, as Ellingson (2011) noted, “In order to reach our intended audiences, some work may have to accommodate conventions that may not fit comfortably with postmodern, feminist, or narrative sensibilities, but which currently constitute the cost of admission to disciplinary ground” (p. 606).

The presentation of study data—indeed, my use of the construct of “data” itself—is made with open acknowledgment that throughout the study, I made agential cuts, or decisions that shaped the story in particular ways (Barad, 2007) as well as influenced what count as data. Thus, while I legitimately claim the generation of knowledge/thinking, I do so with the understanding that it is only ever partial (Barad, 2007; Ellsworth, 1989; L. Richardson, 1994) and with explicit recognition that my prior role as a doctoral assistant involved in the preservice preparation of the participant, as well as my positionalities as a White, Jewish woman, former urban teacher, and teacher educator, necessarily informed and shaped the study. Given the innovative nature of the methodology used in this study, I describe it in detail below, expanding on the research purpose, the context for the study, and data collection and analysis procedures used. With regard to the latter, it should be noted that while these are communicated in a fairly linear way for organizational purposes, data collection and analysis were dynamic processes often occurring simultaneously (Charmaz, 2006).

Study Purpose and Question

In this case study, I aimed to study the ways that the pre-professional learning and experiences of a first-year teacher, Mauro (a pseudonym), moved across time and space into his new settings. The study was guided by the question, “How does a science teacher negotiate his preservice learning within his first-year teaching environment as he constructs his practice?” Although a small body of research documents what happens to teachers’ preservice learning on entering the teaching profession (e.g., Allen, 2009; Zeichner & Tabachnick, 1981), this literature sheds very little light on *how* these outcomes are achieved within the day-to-day classroom work of the teacher. Thus, beyond rendering descriptions of teaching as complex phenomena, I also sought to provide “thick descriptions” of processes of first-year teaching within a classroom setting to build our knowledge of the negotiations and interactions that occur at the

classroom level, and which contribute to the construction of the practices of novice teachers.

Context

Because the study builds on the preservice learning of the participant, a brief description of Mauro's preparation program and its pedagogical vision is warranted. Located in the north-eastern United States and attached to a large public university, the Northeastern Urban Teacher Residency (NUTR; a pseudonym) is a fifth-year "hybrid" teacher preparation program (Zeichner, 2010b) that entails a year of intensive apprenticeship accompanied by coursework. Situated entirely within a large urban district serving mainly low-income students of color, the program seeks to create a "third space" in teacher education that more closely links preparation and practice (Klein, Taylor, Onore, Strom, & Abrams, 2013). The program grounds itself in social constructivist views of learning (Vygotsky, 1978), social justice (Au, Bigelow, & Karp, 2007; Ayers, 2009), democratic education (Dewey, 1916), and inquiry (Freire, 1970; Short, Harste, & Burke, 1996). The coursework of the program is structured to provide experiential learning and frequent dialogue to "problematize" ideal notions of teaching practice (Klein et al., 2013). The curriculum itself is negotiated among residents, mentors, and faculty (Boomer, Onore, Lester, & Cook, 2005) to emphasize the deep learning opportunities offered by educational experiences co-constructed between teacher and student.

Participant. Mauro was a 25-year-old second-generation Cuban-Colombian who identified as gay. From a working class, suburban background, Mauro excelled in school, which he attributed to his parents' and grandparents' encouragement. Through his middle and high school years, Mauro developed an interest in the sciences, and he later attended Harvard to study environmental science. He took a position with the NUTR, Mauro reported, because it provided an opportunity to pursue his goals of teaching about environmental social justice issues. After graduating from the NUTR, Mauro accepted a position at Lincoln High School teaching freshman (9th grade) environmental science and 11th/12th grade earth science, both of which were "low-track" classes. I selected Mauro as a study participant because he had completed his residency year at Lincoln, and thus his school setting and student population stayed constant across his preservice year and his first year of teaching. In addition, the two sets of classes he taught offered the opportunity to study his construction of practices with different student age groups (9th and 11/12th grades) and in two different science disciplines (earth and environmental science). Lincoln was a large, diverse urban high school with a principal who supported the mission of the NUTR and advocated for inquiry-based approaches to teaching. Notable was the students' language learner population, which accounted for nearly a third of the total student population.

Data Collection and Analysis

I collected data over a 5-month period encompassing one high school semester (September-January). The sources of data for the study included observations, observation debriefs, and formal interviews. Because I sought to investigate teaching practice in particular, the main source of data was classroom observations, which I conducted as a participant observer (Adler & Adler, 1998). To document and analyze the construction of Mauro's teaching practice, I opted to observe him for a complete instructional unit. This strategy allowed me to see several consecutive classes supporting a larger learning objective. For the particular targeted unit, I observed five 80-minute lessons. I followed each observation with a 15- to 20-minute "debrief," during which I informally interviewed Mauro about the lesson in general and his teaching in particular. I also observed Mauro three times during the first two weeks of school and while teaching a "mini-unit" of four lessons toward the end of the semester, the latter to note any developments that might have taken place since my initial unit observations.

I conducted two formal, 60-minute, semi-structured interviews (Merriam, 2009) with Mauro at the beginning and end of the semester. These interviews provided a window into his thinking about practice, ways he saw himself developing as a teacher, and the "outside elements" he perceived to influence his teaching. These interviews were important member-checks, giving me an opportunity to present my emergent findings for Mauro's feedback, which helped me identify my own biases or potential misunderstandings (Maxwell, 2005). Each interview was audiotaped and transcribed verbatim for analysis.

To use analytic methods that would allow me to investigate the complex, situated, relational activities of teaching, I combined traditional qualitative analytic conventions (such as coding) with situational analysis, a postmodern form of grounded theory (Clarke, 2003), and elements of rhizoanalysis (e.g., Alvermann, 2000; Waterhouse, 2011), a methodology based on the properties of the rhizome. Situational analysis (Clarke, 2003), which is rooted in postmodern grounded theory, focuses on situated social activity within particular boundaries ("situations") and the negotiation processes that occur within them, an analytic approach that aligns well with both my theoretical grounding and inquiry focus.

After each observation or interview, I embarked on an open data coding process, during which I assigned flexible labels to phenomena and "mapped" them visually. As noted previously, this analytic process occurred throughout the data collection process. Moreover, although I use the term "coding" to describe this method, I attempted to avoid the hierarchical meaning-making process that "take[s] you 'away' from the data" (MacLure, 2013, p. 169), reducing complexity to a common denominator. Taking my cue from researchers who have expanded rhizomatics into a methodology (e.g., Alvermann,

2000; Waterhouse, 2011), I used the data software Inspiration to create rhizomatic maps, which resemble concept maps (Miles & Huberman, 1994) that are flexible and show multidirectional relationships among elements within them.

During coding, I read through data sources multiple times, marking or highlighting sections of interest and noting connections between the data and the theoretical literature, the empirical literature, and other data sources. I entered main ideas from this initial coding process into the maps, creating expandable “bubbles” containing each idea, and then I began clustering these data bubbles together in ways that related to the facets of constructing practice, such as “negotiating NUTR practices,” “constraining conditions,” and “negotiating with students.” Over the course of the study, I added data from observation scripts and interview transcripts to the clusters of ideas that supported linkages made. Rather than reducing the data to a category word or phrase, this kept me immersed in the detail and complexity of the data (MacLure, 2013). For example, as a support for “constraining conditions,” I linked data that provided evidence for standardized testing as a constraint on teaching practice, such as text from Mauro’s interview transcript indicating the difficulties posed in his earth science classes by the mandated midterm and final district assessments.

After these clusters began taking shape, I arranged the major elements I had identified as influencing Mauro’s construction of practice—such as his students’ characteristics, his own vision of teaching, and class sizes—into an “organized” chart. I then theorized the lines I had drawn between these elements in the maps, which I considered to be the social negotiations within each situation (Clarke, 2003), or in rhizomatic terms, each “assemblage,” through a process of analytic memoing (Charmaz, 2006). These memos helped me make sense of the emerging relationships between Mauro, his students, and elements in the classroom and school setting, as well as the ways the resulting linkages shaped his teaching practices. Finally, I used the memos to develop the main themes in greater detail and create lengthier descriptions of events that would later support the key findings.

Findings

To demonstrate the complexity of putting preservice learning into practice during first-year teaching, I present the case of Mauro, who taught 11th and 12th grade earth science and 9th grade environmental science in the same urban high school where he completed his NUTR residency year. In some ways, this case simulates a natural experiment—the school context and student population, as well as Mauro’s own beliefs and intentions regarding teaching, were held constant across his pre-professional preparation year and first year of teaching. Given these commonalities, one might expect Mauro’s practices to be similar in both his earth science and environmental science classes. However, the practices I observed in the two sets of classes were strikingly different.

Within his earth science classes, Mauro was able to successfully enact key ideas from his preservice learning, including practices of problem-posing and experiential, small-group activities. In contrast, his environmental science classes were more likely to be characterized by teacher-led, whole-class instruction, ideas that were contradictory of his pre-professional preparation.

Despite the common initial conditions noted above, I contend that key differences between Mauro’s freshmen and upperclassmen, their respective class contexts, and the ways the unique set of elements comprising each class interacted, or “came into composition,” help explain the dissonance in teaching practices I observed between his earth and environmental science classes, and, in turn, the ways that Mauro was able to successfully implement learning from his preservice residency year. In developing the case, I first describe student-related factors operating in Mauro’s two classes, detailing the ways he negotiated with his upperclassmen and freshmen to engage them in learner-centered instruction (a central emphasis of his teacher preparation curriculum) and how student responses to those negotiations influenced his teaching. I then turn to contextual factors in his two classes, examining how they constrained or enabled Mauro in constructing practices consistent with his pre-professional learning.

Student Factors

The most prominent feature of Mauro’s case was the stark contrast between his teaching practices in the two sets of classes I observed (9th grade environmental science and 11th/12th grade earth science). Key differences between his 9th grade students and his 11th/12th grade students contributed to this divergence in instruction and profoundly affected the ways he was able to apply learning from his preservice year. According to Mauro, his 11th/12th grade students were calm and receptive to the more active types of inquiry-based learning that had been emphasized in his residency year, whereas his 9th graders were more disorderly and often resistant to instruction that required their active participation. In an early interview, Mauro commented,

Whether I am teaching a first-year or an upper-year class . . . [there are] big differences in . . . the expectations and the levels of resistance and willingness to do more work or . . . if they don’t do more work, just accepting the consequences better. So I think that the upperclassmen have more developed decision-making skills and adult skills, compared to the first years.

Consistent with major themes from his pre-professional coursework, Mauro hoped to emphasize critical thinking and reflective processes, as well as one-on-one or small-group instruction, in his teaching. Mauro described “constant questions” as “a cornerstone of how I approach learning,” reflecting the NUTR’s focus on inquiry-based and problem-posing practices. He added,

I like to make it as question-based and just reflecting on those questions . . . providing them with . . . a bunch of questions to work with and giving them time for each question, to really think about it.

Because the learning activities he created often demanded active participation and higher level thinking on the part of students, as is consistent with practices grounded in social constructivism (Vygotsky, 1978), Mauro used different strategies to get them to “buy in(to)” lessons or to secure their cooperation in particular activities.

With his earth science students, Mauro relied primarily on two strategies to forge connections with his students and thus secure their participation in active learning tasks: transparency and what he referred to as “side conversations.” To him, being transparent meant giving students rationales for class activities and major instructional decisions that affected them. In doing so, Mauro hoped to show the students that he considered them adults and cared about their success. For example, when Mauro moved up the test date for the continental drift/spread unit by one day, he explained to students that he had changed the date because the “A/B” schedule—that is, the alternating scheduling of his classes—meant that too much time would pass between the review and the test date. As Mauro explained to the class, “The test for this chapter is slightly moved up . . . I did it because I didn’t want you to have the review on Thursday and then have to take the test on Monday.”

Another strategy involved engaging students in “side conversations”—short, divergent discussions in which they had an opportunity to share personal stories that often had some connection to the instructional content being studied. Mauro explained, “They make themselves open to conversations . . . we take the opportunity to get to know each other and then we go back to doing work.” Sometimes these were “enriching tangential conversations related to the [instructional] topic,” such as a side discussion about the tension between religion and science resulting from a lesson on the Big Bang Theory. However, even if the conversation was not immediately applicable to the topic at hand, Mauro still encouraged his students to speak their minds in class: “Even if it doesn’t have to do with science, I just like those opportunities where people can share thoughts.”

The combination of the earth science students’ characteristics (e.g., their maturity and calmness) and Mauro’s conscious attempts to build relationships with them supported the construction of teaching characterized by practices of problem-posing, collaborative activities, and experiential demonstrations. As an example of problem-posing, Mauro began his unit on continental drift by projecting a map of the world and asking his students, “How do you think the continents got their shape?” Later in the same lesson, the class viewed a video about Wegner’s theory of continental drift. Explaining that the theory was not immediately accepted by the science community, Mauro emphasized, “[Wegner] saw

something and it made sense, but he wasn’t explaining why . . . and in the science world, you need a ‘why.’”

His teaching also featured structured group activities and demonstrations, which were usually led by Mauro, but sometimes also involved student volunteers. For instance, during one lesson on the concept of density, the students analyzed a scenario that depicted a car traveling first through mud and then continuing onto concrete. After they shared their predictions of what would happen to the car as it crossed from one surface to the other, Mauro asked for volunteers to demonstrate the idea in the scenario. Two students then pretended to be the front wheels of the car, holding a meter stick between them as the car’s axle. Mauro asked the rest of the class to call out what the wheels would do when the car met the concrete, and the student volunteers acted out the predictions.

Mauro’s teaching looked very different in his 9th grade class, however. The lessons I observed were mainly teacher-led with relatively few opportunities for students to experience hands-on learning—teaching practices that departed sharply from those taught and practiced in his initial teacher preparation program. Mauro attempted to enact instructional methods that approximated those in his earth science classes, but differences in the 9th grade students’ responses and his difficulty negotiating classroom behavior norms with them often resulted in more teacher-centered teaching for the sake of maintaining order in these classes.

Encountering 9th grade resistance to active learning tasks early in the year, Mauro initially tried to forge relationships with his 9th grade students to gain their participation by using the same strategies as he did in his upper-grade classes. However, these strategies did not produce the same results in his environmental science classes. For instance, the “side conversations” that worked so well to build connections with his earth science students were unproductive with his freshmen. Mauro explained, “If I even choose to sort of, engage them in whatever social conversation they are having about life, it can get carried away, and then I can’t redirect them.” His attempts to be transparent, which were well-received in the earth science classes, were met with disappointing results in his environmental science classes. In discussing the 9th graders’ reaction to his transparency attempts, Mauro reported,

The freshmen have just been so difficult, to give them an honest conversation—I, I don’t think they fully get why I choose to be honest with them, or why adults should be honest with them. I don’t fully know.

Lacking the rapport he had with his earth science classes, which had helped him secure their active engagement in class activities, Mauro turned to more authoritarian classroom management practices. For example, during multiple lessons, I observed him adopt an in-the-moment tactic of stopping the lesson and waiting for students to stop talking. After halting the lesson during one class session, Mauro

shared his rationale for pausing with the students. As Mauro explained, he hoped to help them learn to regulate their own behavior by recognizing when a certain classroom behavior—such as talking—was appropriate, and when it was not. Although some students seemed to understand Mauro's intent, even "shushing" those who were talking around them, others responded with indifference or distaste. One particular student called the tactic "immature," and several others voiced their preference for a more direct method: "Just tell us to be quiet!"

With this often-turbulent classroom atmosphere and a lack of basic rapport with students, Mauro had difficulty enacting the type of active, inquiry-based learning for which he had been prepared in his pre-professional program. Instead, his instruction tended to be teacher-led and tightly structured in response to the nature of students in those classes (although still containing some open-ended questions). A lesson within a larger evolution unit illustrates this point. To support students' understanding of five different types of relationships between organisms in an ecosystem, Mauro created a three-page graphic organizer. On the first page, a three-column chart provided space for students to record the type of relationship in the first column (e.g., "symbiosis") and the corresponding definition in the second column ("a relationship in which both organisms benefit in some way"). In the third column, Mauro had provided "emoticons" (a smiley face, straight face, or sad face) to help students make sense of the nature of the relationship. A predatory relationship, for example, would require students to draw one happy and one sad face, because one party in the relationship benefitted whereas the other did not. To begin the lesson, Mauro projected a slideshow of notes on the board. After providing the term, a short definition, and a visual example of the relationship found in nature, Mauro then asked for student volunteers to share which emoticon they would assign to each organism in the relationship. After completing this section, Mauro guided students through a second activity in which he showed a set of video clips that demonstrated different types of organism relationships. Students were responsible for assigning a relationship to each video. Finally, the last lesson activity required students to independently read scenarios and identify the correct relationship based on the descriptions provided. As this description suggests, the overarching structure of the lesson was fairly traditional—Mauro first provided information to students, then guided students to apply the information, and finally asked students to practice using the information on their own.

Despite his challenges, Mauro did not give up completely on active learning in these classes, nor did he adopt deficit views of his students. He believed that his students had been conditioned to be passive learners. As a result, when asked to participate in activities that required them to make sense of ideas on their own, many "shut down." He speculated that the students responded in this manner because they felt

unsuccessful or vulnerable during such exercises, and he resolved to help them gain confidence in their own thinking processes. He noted,

I have to do more to convince them of why their thoughts are valuable . . . I'm really pushing them to realize that it's OK for them to think, and the other part is that it's OK for them to be wrong.

To try to create an environment where students were comfortable voicing their ideas, Mauro often referred to students' thinking in his elicitation of student talk. For instance, he would ask, "So what were some of you thinking?" or remark, "I'd like to hear your thoughts on this."

Contextual Factors

While students' responses to Mauro's teaching and the relationships he was able to develop with them influenced the construction of his teaching practices in significant ways, three other factors in the setting also functioned to constrain or enable Mauro's ability to enact the type of teaching he had learned during his residency year. First, because earth science did not have a standardized test associated with it, Mauro felt he had room to tailor his teaching to students' needs and interests. As he explained, "That's the great thing of being in [earth science], there's a lot of discretion from teacher to teacher, and it's great for students to have that discretion for their benefit." This flexibility allowed Mauro to comfortably adapt his instructional plans as the need arose, thus enabling him to be responsive to his students (a key facet of teaching for social justice that had been emphasized in Mauro's preservice NUTR work). For instance, during his instructional unit on continental drift, Mauro had only planned to spend a single lesson on calculating the rate of seafloor spreading. On quickly realizing that the students needed a review of proportions before they could successfully complete the planned activity, he made an on-the-spot decision to spend an additional class session reviewing the relevant skills needed.

Environmental science, however, was a tested subject and came with a curriculum guide that tightly controlled the pacing of instruction, dictating what Mauro and other environmental science teachers had to teach before the midterm and final assessments. Given such pacing expectations, Mauro was more likely to rigidly adhere to his original plans rather than modify them according to students' needs, as he felt heavier pressure to "cover" material for the tests. Commenting on this constraint, Mauro reported, "In environmental [science] we are rushing a lot more."

A second contextual factor that influenced Mauro's practice was his level of familiarity with the curriculum and experience teaching the subject as a preservice teacher. Having taught earth science during his residency year, Mauro felt more confident teaching this subject than environmental

science. He noted, “I think again, I’m more successful with the upperclassmen both because I know the content more, and because I taught the content last year, and a lot of things favor them right now, I think.” Recognizing Mauro’s strong content knowledge in earth science, his department chair asked him to lead the earth science common planning. Although this opportunity provided a chance to serve as a teacher-leader within the department, it also took time away from his preparatory work in environmental science. Mauro commented, “I have to focus so much on earth [science] that I depend on other people to invest in the environmental, and I’m not there for common planning. Earth is my prep.”

The size of his classes was a third contextual influence on Mauro’s practice. Two of the three earth science classes he taught had lesser than 20 students. Mauro considered this a factor in his success with these classes. As he explained, “My smaller classes just have better grades . . . functionally class size does have a determining effect on how students are able to learn things . . . smaller numbers are just easier to work with.” The smaller class sizes enabled Mauro to spend more time working with students in small groups or one-on-one, as he was easily able to rotate among the five or six pairs or trios of students to check for comprehension and ask probing questions. Mauro’s two ninth grade classes, however, were his largest, with approximately 30 students each. The large number of students often complicated social negotiations and contributed to the loss of instructional time as Mauro struggled to keep learners focused on the task at hand rather than talking to one another about other topics. In his ninth grade classes, then, the larger class sizes served as a constraining condition for enacting practices that allowed for the type of collaborative, active student learning activities that had been the cornerstone of his pre-professional learning.

Discussion

In the past three decades, some educational researchers have concluded that teacher preparation programs tend to have minimal impact on their graduates’ beginning teaching practices (e.g., Allen, 2009; Wideen et al., 1998; Zeichner & Tabachnick, 1981). The limited body of research investigating new teachers’ practices in relation to their pre-professional pedagogical preparation generally demonstrates that new teachers tend to revert to traditional transmission teaching methods (Cochran-Smith et al., 2010), although researchers disagree as to the cause of the abandonment of the learning gained from their teacher preparation program experiences. For example, is it teachers’ own deeply held beliefs about traditional teaching (Kagan, 1992; Pajares, 1992) or school cultures and processes of socialization (Cochran-Smith et al., 2010) that “wash out” pre-professional learning (Zeichner & Tabachnick, 1981, p. 7)?

The lack of evidence of a definitive impact of preservice university-based preparation on “teacher quality,” combined with concerns of teacher shortages and retention (Hanushek

& Rivkin, 2006, p. 1052), has served as the foundation of a call for increasing the accountability of teacher preparation programs through external methods (Sleeter, 2008; Zeichner, 2010a) and providing alternative pathways to teaching (Ballou & Podgursky, 1998; Goldhaber & Brewer, 2000). However, the findings of this study suggest a different interpretation of the “wash-out” effect (Zeichner & Tabachnick, 1981) that presents a more complex analysis of the role of pre-professional teacher preparation in the enactment of classroom teaching practices. I contend that by examining the conflux of elements present in the settings where new teachers teach and the ways those elements work together to shape practice—that is, by conceptualizing and analyzing teaching as *assemblage*—teacher education researchers will help advance the field’s understanding of teacher learning as continually transforming in relation to the teacher’s own experiences, her students, the classroom and school context, and the broader state and federal policies that bear down on her teaching. This, in turn, will help the teacher education community better grasp the complex relationship between pre-professional learning and how that learning is enacted (or not) in classrooms.

Assemblages are multiplicities, collectives of elements that work together for a particular purpose (Livesey, 2005). Extending this concept to Mauro’s case, the confluence of elements in his earth science and environmental science classes can be considered *teaching-assemblages*, each of which operated to construct particular teaching practices. The elements present in the assemblages included aspects of the teacher himself (e.g., Mauro’s preference to teach using questioning, his familiarity with the subject taught), students (e.g., their maturity level and orientation to schooling), and context (e.g., subjects tested district-wide, class size). Considering Mauro’s two sets of classes as their own teaching-assemblages—in other words, as amalgams of teacher–students–classroom–school and broader policy context elements—allows for a more complex discussion of teaching, one that recognizes practice as constructed by a multitude of influences, rather than a set of actions fully controlled by the teacher.

Using “assemblage” as an analytic construct—that is, examining the constituent parts of Mauro’s classes and the way they work together—generates a nuanced view of the production of Mauro’s divergent teaching practices and a more complex understanding of the ways his preservice learning influenced them. Although the earth science and environmental science assemblages had some elements in common (e.g., Mauro himself, the school setting, and a common student demographic), these “came into composition” with each assemblage differently. In the earth science classes, freedom from district-wide testing, familiarity with the subject matter and curriculum, and relatively small classes worked well with the maturity of the upperclassmen to provide conditions that enabled Mauro to enact pedagogy informed by his preservice learning (such as problem-posing

practices and experiential activities). Mauro was also able to build relationships with his upperclassmen that facilitated their cooperation with the student-centered instructional practices he brought to teaching from his preservice program. In contrast, the tested nature of environmental science, Mauro's lack of familiarity with the curriculum, and larger class sizes, combined with the ninth grade students' tendencies, created a classroom environment often characterized by student opposition and tense teacher–student interactions. Lacking the same level of student cooperation afforded by his upperclassmen, Mauro made his teaching more rigid and teacher-led, echoing the patterns of traditional, transmission-based instruction his preservice program sought to disrupt.

Mauro's different teaching-assemblages, and the ways the various sets of elements worked together to produce different results, provide insight into the complex, non-linear process of enacting practices learned in teacher preparation programs. Notably, this case provides evidence that pedagogical theory, knowledge, and skills are not discrete objects that teachers assimilate whole and "transfer" into classroom settings completely intact (Korthagen & Kessels, 1999, p. 5). Instead, the data analyzed here suggest that enacting teaching strategies learned in preservice preparation in the first year of teaching is a complex undertaking shaped by the ways in which elements in a "teaching-assemblage" come together.

From a rhizomatic perspective, the teacher herself is already an assemblage—that is, she brings to teaching a combination of specific beliefs, knowledge, experiences, intentions, and other elements. When she assumes a teaching position, she becomes part of a larger constellation of elements present in that setting. Thus, what she learned from her preservice program is only one piece of her own assemblage, which in turn is only one element in the larger amalgam of teacher–students–context. Within her new setting, the teacher must continue to make sense of her pre-professional learning as she engages in ongoing interactions with students and navigates numerous contextual elements—all of which shape the practices enacted. This idea is illustrated by the ways in which the elements in Mauro's earth science and environmental science assemblages combined differently to produce different practices. As the teacher moves into her first year of teaching and "comes into composition" (Deleuze & Guattari, 1987) with different configurations of students and components of context, she continues to negotiate meaning of her preservice learning together with those elements.

From the two main ideas articulated above—(a) preservice learning is only one of many influences on the eventual teaching product, and (b) teachers continue to negotiate meaning as they move into their new settings—I draw two important implications for teacher preparation practice and policy. First, the pedagogical principles learned in a pre-professional program will most likely be enacted in modified form. Thus, the "application" of knowledge, or the transfer of ideas intact, from preservice learning into classroom instructional practice, is

highly unlikely (Korthagen & Kessels, 1999; Zeichner, 2010b). Instead, "translating" may be a more fruitful construct in discussing the movement of preservice learning into classroom teaching practice. Although the term "translating" has been used in various works with respect to the theory–practice or learning–practice relationship (e.g., Lieberman, 1995; V. Richardson, 1997), this construct has not been significantly used in the teacher education literature with respect to pre-professional learning, nor has the actual translation process been studied thoroughly in this context. In "translating," as highlighted by Mauro's case, teachers take their learning and make sense of it within a specific setting and set of circumstances, which may mean the product of that joint sense-making may look substantially different from one context to the next. However, it does not necessarily mean that the preservice learning was completely abandoned by the first-year teacher or that the effect of her preservice preparation was washed out in the transition from university to school. Instead, her learning was transformed as it came into contact with multiple contextual elements.

Second, the collaborative negotiations occurring between teachers, their students, and their contexts, and the teaching practices emerging from those collective negotiations, suggest that no straight line can be drawn between the experiences of learning to teach in a preservice program and the enacting of that learning in a classroom. While Mauro's preservice learning was certainly an influence on his teaching practices, that knowledge was only one of many factors shaping his first-year teaching. The findings I presented here add to a small but growing body of research (e.g., Cochran-Smith, 2013; Davis & Sumara, 1997; Opfer & Pedder, 2011; Starkey, 2010) that attests to the complex, non-linear nature of teacher learning and practice. If no linear relationship exists between preservice learning and inservice practice, it follows, then, that linking a pre-professional program and the "outcomes" of its graduates is a vague connection at best. This insight challenges current policies that seek to evaluate teacher preparation programs using the "value-added" scores of their graduates, as determined by student test scores (Cochran-Smith et al., 2013), raising questions about their validity as a measure of program quality.

Conclusion

In our current climate of reforms driven by market logic and a privileging of transactional, linear views of teaching, undertaking research that allows for the investigation of teacher learning and practice as complex phenomena is crucial (Cochran-Smith et al., 2014). Non-linear conceptual and methodological frameworks, such as those featured in this study and beginning to be used by other educational researchers (e.g., Fenwick, Edwards, & Sawchuk, 2011), move the focus from "outcomes" to the actual ontology of practice. That is, these new lenses and tools turn our attention to the processes through which outcomes are produced. For example, in

this study, I used the concept of assemblage to highlight the multiple, collectively produced nature of teaching. Ideas such as this can assist the research community to push beyond linear, simplistic ways of studying teaching practice, and instead advocate for a shift toward conceptualizing teacher learning and the enactment of instruction in more complex ways, a movement which a number of researchers have promoted in the past two decades (e.g., Borke & Putnam, 1997; Cochran-Smith, 2003; Florio-Ruane, 2002; Lampert et al., 2013).

Situational analysis and other non-linear methodological frameworks, such as cultural-historical activity theory (e.g., Anderson & Stillman, 2013; Engeström, 1999) and actor-network theory (e.g., Fenwick, 2010; Latour, 2005), offer promise for the type of inquiry these researchers call for, one that attends to the relationships among components of a teaching-assemblage and how these interactions jointly shape the teaching practices produced. Conducting rich, qualitative studies of classroom activity within these complex perspectives can help provide a counter-balance to dominant technical views of the connection between preservice preparation and classroom teaching. By turning a spotlight to the ontology of teaching—that is, by attending to the “how” of teaching activity—we can investigate and document the fundamentally relational, non-linear nature of teaching and refute the reductionist conceptions that undergird current educational policy and reforms. To do so, however, researchers must advocate for an *ontological turn* (Lather & St. Pierre, 2013) in teacher education research that focuses on the process(es) of teaching, rather than the outcomes alone.

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