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**Discursive Productions of Teaching and Learning Through Inquiry: Novice Teachers
Reflect on Becoming a Teacher and Secondary Mathematics Teacher Education**

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Abstract

Reconceptualizing mathematics teacher education means studying the complex processes of being and becoming a teacher from multiple perspectives. This chapter reports on research tracing novice teachers' constructions of identity and agency through an understanding of their first few years 'becoming' a mathematics teacher and the role of secondary mathematics teacher education in this process. In particular, the theme of this chapter is the role played by the discursive drive for teaching and learning through inquiry (TLTI) in the process of becoming a teacher. Using discourse analysis informed by Bourdieu's social field theory, four threads of normativity are teased out of participants' experiences of teaching and learning through inquiry. In this chapter it is proposed that the four threads create a tightly woven network of discursive relations that structure the social space(s) of mathematics classrooms, producing normative notions of the good mathematics teacher as well as the processes for being and becoming one.

Research indicates that many students enter a teacher education program with already well-conceived notions of the kinds of teachers they want to become and the roles teacher educators should play in getting them there (Britzman, 2003; Phelan & Sumsion, 2008; Ritchie & Wilson, 2000). Emerging professional identities are closely tied to prospective and novice teachers' previous experiences as students, including their epistemological images of mathematics content knowledge (Cooney & Shealy, 1997; Manouchehri, 1998; Muis, 2004), their pedagogical images of "the good teacher" (McWilliam, 2008; Moore, 2004; Walls, 2010; Weber & Mitchell, 1995), and their stance on conformity with institutional structures and school regulations (Brown & McNamara, 2005, 2011; Nolan, 2010; Sumara, Davis & Iftody, 2008). Further, research suggests that prospective and novice mathematics teachers are embedded within an 'if it ain't broke, don't fix it' ideology as a response to new pedagogical approaches and techniques (Appelbaum, 2008; Lerman, 2001; Nolan, 2008).

Entering teacher education programs with these already well-established notions of what it means to be a teacher makes one wonder when, where, and how the processes of 'becoming' (a teacher) are best studied. It is suggested that being and becoming a teacher should be studied from multiple perspectives; that is, from the perspective of those who aspire to be admitted into a teacher education program; those who are currently enrolled in a teacher education program (prospective teachers in university courses and school field experiences), and recent graduates of a teacher education program (novice teachers in their first few years of teaching). Young & Erikson (2011) write about these perspectives as "stories of *imagining* ourselves as teachers, *becoming* teachers, and *being* teachers" (p. 122). Reflecting on such stories as three distinct phases, however, could paint a misleading picture that the process of becoming has definitive

beginning and ending points. The research discussed in this chapter confirms instead that the process of becoming a teacher is indeed an extended and complex process.

Danielewicz (2001) “regards ‘becoming a teacher’ as an identity forming process whereby individuals define themselves and are viewed by others as teachers” (p. 3). Similarly, daPonte & Chapman (2008) conceptualize prospective and novice mathematics teachers’ identity as “not only about what it means for one to do, know, learn, and teach mathematics but what it means to view oneself as a professional teacher and how one sees one’s ongoing development as a teacher of mathematics” (p. 242). Embracing the complexity and volatility of the concepts of identity and agency means understanding that teachers “are not unitary, rational and autonomous individuals freely able to choose new ways of viewing and doing [and teaching] mathematics at whim” (Klein, 1999, p. 86). School discursive practices produce and reproduce acceptable (often normalized) notions of the good mathematics teacher, thereby influencing the processes of being and becoming a mathematics teacher.

In short, becoming a teacher can be a slippery concept to trace. When novice teachers in this research study were asked if they were “still becoming a teacher,” one participant in her fourth year as a teacher responded:

I think so. Yeah, like I think I’m getting better each year. I think I’m learning more. This is the third time I’ve done [this topic] and each time I think they’re hopefully understanding it more and I’m trying to... yeah, do more inquiry, do deeper questions, less close-ended, more open-ended. Like I think I’m getting there, yeah. [Christy, interview #1, p. 17]

The discussion that follows in this chapter reports on research that traces novice teachers’ constructions of identity and agency through an understanding of their first few years ‘becoming’ a mathematics teacher and the role of secondary mathematics teacher education in this process.

Context of Research Study

The research data and analysis for this chapter is drawn from a larger research program¹ which seeks to reconceptualize mathematics teacher education by embracing the belief that there are more difficult questions to ask in teacher education than those which can be readily answered through a collection of teaching techniques. The significance of the research program does not rest on coming to a consensus on recommended techniques for ‘improving’ mathematics teacher education theory and practice. Its task “is not to seek truth or find a final resolution, but rather to ask how the discursive formulations have taken the shape that they have” (Brown and England, 2005, p. 449). In other words, the research program asks how poststructuralist concepts of identity and agency can open spaces for imagining multiple ways of being and becoming teacher, learner, inquirer.

The larger research program has a diversified focus on three key interacting dimensions, or perspectives, of mathematics teacher education—that of prospective teachers, novice teachers, and teacher educators. This chapter is limited in scope by focusing on the novice teacher perspective, or what is referred to as the retrospective dimension of this mathematics teacher education research program. The retrospective dimension primarily asks the question of how novice teachers experience and live out their sense of agency and identity formation when immersed in the powerful discourses of school mathematics.

¹ The research program, entitled *Reconceptualizing secondary mathematics teacher education: Critical and reflexive perspectives*, is supported by a 3-year Social Sciences and Humanities Research Council (SSHRC) Insight Grant.

Theoretical Framework

Reconceptualizing mathematics teacher education means rethinking the dominant conceptual framework for questions of how, why, and what could be in teacher education. To this end, the research challenges and disrupts traditional discourses of teacher education programs and associated field experience, tracing the intersections of identity, agency and reflexivity in mathematics teacher education using Bourdieu's sociological theory (Bourdieu, 1977, 1990; Bourdieu & Passeron, 1977). The key concepts of Bourdieu's social field theory (such as habitus, field, capital, and doxa) confirm the complexities of becoming a teacher by focusing on the dynamic relationships between structure and agency within a social practice, pointing to the promise and possibility of social change through critical reflexivity. Such an approach highlights the network of relations and discursive practices that support (and (re)produce) traditional practices in the teaching of mathematics, acknowledging the normalized practices and dispositions of schooling as strong forces in shaping teacher identity and agency (Nolan, 2012).

Research Design and Methods

The research design for the study informing this paper involved working with several novice teachers (with 1-7 years teaching experience), who are graduates of the University of Regina's secondary mathematics teacher education program. Specifically, the novice teachers selected for the study had been students in the researcher's curriculum courses when they were in university. Data was collected through an online survey, 2 semi-structured interviews with each of ten (10) participants and three focus group discussions with small groups of participants. Research questions focussed on teachers' experiences in the first few years of teaching, their

beliefs on teaching and learning mathematics (including especially inquiry-based approaches), their perceptions of mathematics curriculum renewal, and their views on the role of teacher education programs in becoming a mathematics teacher. Examples of research questions are:

- ◆ If you were to be enrolled in your teacher education program all over again, describe what experiences/activities/theories you would want to be available and/or emphasized throughout that program. Were these available and/or emphasized when you were a student at the University of Regina?
- ◆ How ‘empowered’ do you feel to map out your own way of being/becoming a (good) teacher? Can you describe any particular structures or routines (of school, subject, etc.) that provide boundaries around (or limitations to) this ‘becoming’ process?
- ◆ What have been the major challenges for you in this reformed curriculum with a focus on inquiry? What do *you* mean by ‘inquiry’ or ‘teaching through inquiry’ (or ‘inquiry-based learning’)?
- ◆ Can you comment on how (or if) personal and professional discourses intersect in forming your teacher space (teacher identity)?
- ◆ Describe the role of ‘others’ (other teachers, mathematics consultants, curriculum policy documents, textbooks, administrators, etc.) in your decision-making processes as a teacher.

In essence, the questions focus attention on novice teachers' perceptions of the many powerful discourses of school mathematics, including discursive productions (and reproductions) of teaching and learning through inquiry. In this chapter, it is useful to view discourse "as the ways that an issue or topic is 'spoken of', through, for example, speech, texts, writing and practice" (Carabine, 2001, p. 268). Or, according to MacLure (2003), discourses can be thought of as "practices for producing meaning, forming subjects and regulating conduct within particular

societies and institutions, at particular historical times" (p. 175). As it happens, the production of one normative discourse in/of learning mathematics (for example, learning key mathematics procedures and rules) can construct a particular 'truth' that works to invalidate (even erase) other discourses in/of learning mathematics (for example, learning mathematics through inquiry-based approaches).

Critically analyzing the discourses 'spoken of' in novice teacher survey, interview, and focus group data provides insights into the ideologies and power relations involved in the discursive practices of schools and teacher education. In this research program, critical discourse analysis is shaped and informed by Bourdieu's social field theory (specifically, the concepts of capital and doxa) to analyze the shifting network of relations between social practices and social fields, with an eye to understanding relationships between structures and teacher identity/agency (Bourdieu, 1977) in becoming a teacher.

Discussion of Data

This paper focuses on one particular theme woven throughout the data as threads identified in the interviews with the research participants. The theme is that of the role played by the discursive drive for teaching and learning through inquiry (TLTI) in the process of becoming a teacher; the threads are those of the patterns or relations expressed by participants as they shared their experiences on teaching and learning through inquiry.

It is worth elaborating on the genesis of this particular research theme and threads of my data, which are visibly apparent in my research questions and also signify my discursive space as a teacher educator. For several years, I have worked closely with secondary mathematics interns as their faculty advisor, while simultaneously conducting self-study research into my practice—

in particular, the role of university courses and internship on the theory-practice transitions of prospective teachers. By design, that research has been studying the role of inquiry teaching and learning in prospective teachers' internship classrooms in their processes of becoming a teacher. Identified as a pattern in my research with prospective teachers over the years, interns would respond that their internship classroom was not their own; it belonged to the cooperating teacher and thus her/his style of teaching had to be honoured. As one intern noted, "... she's been teaching for a long time and she knows the best way to do it. I just don't think I can go against that right now" (Nolan, 2008, p. 169). This (apparent) voluntary relinquishing of individual agency in the internship classroom made me acutely aware of the limitations on prospective teachers in their processes of 'becoming' while in internship. Bullock and Russell (2010) argue that the field experience is "an inherently problematic construct that is unlikely to encourage teacher candidates to develop pedagogies that promote more productive learning for students" (p. 91) and that, as teacher educators, we need to "accept field experience for what it is and what it cannot be" (p. 98). My interns often assured me that things would be different once they got their own classrooms. Part of the impetus, then, for this research was to follow these prospective teachers into their own classrooms as teachers; to study how/if teacher agency featured prominently in becoming a teacher in the first few years with "one's own classroom". What I have come to realize is that teaching through inquiry represents a significant disruption (rupture?) in the normative practices of mathematics classrooms. Inquiry, featured as it is in secondary mathematics curriculum renewal in the province of Saskatchewan and throughout Canada, can no longer be viewed through the lens of "just another classroom tool". Teaching and learning through inquiry has become a defining philosophical direction of reform movements as well as a coordinate system through which 'good' teaching is mapped.

The pervasiveness and drive for teaching and learning through inquiry (TLTI) through the eyes and ears of public discourse is a controversial pedagogical paradigm, partly because it is positioned in stark contrast to that of direct teaching, or what Skovsmose (2008) refers to as the “exercise paradigm”:

First, the teacher presents a new topic, which may include a careful exposition of some details... Second, the students are asked to solve particular exercises... Third, a part of the lesson is reserved for the teacher to control the students’ possible learning and understanding. Exercises are often then checked and worked out at the blackboard. (p. 167)

Regrettably, the exercise paradigm is normalized in mathematics classrooms as the approach that is most effective at covering maximum curriculum content in a minimum period of time (Nolan, 2012). According to Boaler (2008), traditional teaching leads to passive learning: “Students taught through passive approaches follow and memorize methods instead of learning to inquire, ask questions, and solve problems” (p. 40). The paradigm shift to inquiry-based classrooms demands a tolerance for ambiguity, uncertainty, and negotiation—skills not generally acquired through years of traditional school mathematics experiences. Thus, in the context of mathematics teacher education and beyond, there are numerous challenges and complexities involved in inspiring prospective and novice teachers to embrace inquiry-based pedagogies while also seeking to deconstruct what are perceived as firmly entrenched stereotypes and ideas about teaching (Weber & Mitchell, 1995).

While the notion of an inquiry-based classroom (what it looks and feels like) is interpreted in diverse ways across a variety of contexts, there are a few distinguishing features common to most. In general, inquiry-based pedagogy is an alternative view of teaching and learning based primarily on theories of constructivism and characterized by classrooms where the focus is on

constructing mathematical understanding through student investigation, collaboration, and communication (Cheeseman, 2008; Leikin & Rota, 2006).

In relation to my research study, teaching and learning through inquiry (TLTI) has become a fitting thread to weave into my research conversations since it reflects a philosophical shift in what it means to teach and learn mathematics. As well, it focuses attention on a parallel social-constructivist thread of teacher education programs where prospective teachers are themselves encouraged to 'become' (teachers) through inquiry; that is, "to become lifelong learners, constantly inquiring into their beliefs and practices with respect to teaching and learning" (Beck & Kosnik, 2006, p. 53).

With the deliberate teasing out of inquiry threads from the fabric of novice teachers' mathematics classrooms as a focus for this chapter, it is worthwhile sharing what novice teachers in this study mean by TLTI. Responding to how they define inquiry or what it means to teach through inquiry, participants shared the following:

Posing a question and having students come up with a process to find it without giving the process, without saying step one, step two. Yeah, it's posing a question. [Christy, interview #1, p. 9]

Well, for me just to teach through inquiry-, like... would be to give them the tools that they need, but then not assist them in the way-, I could be there as a guide, but they would have to come up with the process on their own, using what they already know. [Toni, interview #1, p. 19]

For me it's trying to help them figure things out instead of me just telling them what the answers are, not giving them entirely structured, I guess, processes of where they're going. Just kind of giving them materials or some basic instructions and then see what they can find out. [Tina, interview #1, p. 3]

To me, inquiry is making them think about what they're doing and be able to explain what they're doing. And having questions that... are more open-ended so, what can you tell me about this? Tell me everything you know instead of what are the X intercepts, what are the Y intercepts, whatever, something that's straightforward. [Nadine, interview #2, p. 11]

The novice teachers may have experienced some difficulty articulating exactly what inquiry in mathematics classrooms *is*, but most were quite clear on exactly what it is *not*— it cannot be confused with the exercise paradigm currently dominating classroom pedagogy. In fact, my research suggests that there have been no significant ruptures in the exercise paradigm and the data points to several reasons why this is the case. In this chapter, each of these reasons is discussed separately in terms of how the data offers this interpretation. Connections are then made to Bourdieu's social field theory to make sense of the network of relations and interpretations. Instead of referring to these interpretations of data as 'reasons', I use the term 'threads of normativity' (and later, doxic threads) to capture the normalizing or regulating effect of the discourses. The four key threads of normativity are: (1) teacher education programs have been described as an environment replete with a 'do as I say, not as I do' undercurrent, thus perpetuating pedagogies already quite familiar to prospective and novice teachers (i.e., teaching

as one was taught), (2) prospective teachers (and indeed novice teachers reflecting back on their teacher education program) desire a recipe-based form of teaching and learning through inquiry, (3) novice teachers fear that the TLTI paradigm will not only take far too much time to design and implement, but that it will also require the act of “selling” its indiscernible benefits to parents, administrators, and even students, and (4) TLTI is generally viewed as “extra” and a “time-filler,” apparently because it has not been successfully and evidently linked closely enough to curriculum outcomes and key mathematical ‘content’ learnings.

Disrupting and unraveling these threads of normativity in mathematics classrooms hold promise for the TLTI paradigm in mathematics classrooms. Together, however, the four threads of normativity currently form a network of discursive relations that structure the social space(s) of mathematics classrooms and provide familiarity and comfort to many teachers, students, and others involved.

‘Do as I say, not as I do’.

Many of the novice teacher research participants saw *how they were taught* within the teacher education program as different from *how they were told to teach*. Several participants described it as ‘do as I say, not as I do’ teacher education. They perceived that the emphasis was on product learning rather than acquiring an understanding of the process of learning. Some participants observed that the manner in which mathematics is taught at the high school level is congruent with how they were taught within teacher education mathematics classes – through direct instruction involving lecture and the assignment of mathematical exercises. There was recognition by several participants that the school experiences they were expected to facilitate for their students differed greatly from those they had experienced themselves, commenting

“what I’m teaching is very different from how I was taught”. When asked about her teacher education experience of inquiry as a pedagogical focus, one participant stated:

... because that’s what was being pushed on us in most of our courses, to some extent, I kind of expected that every once in a while I should be getting a lesson like that, but I never did, for the most part, you know. [Karen, interview #2, p. 23]

The *doing* of teaching, as *told* about in teacher education, was different from what they had experienced in both high school and university, so participant teachers felt challenged in constructing an interpretation of their role according to the heightened level of content expectations and the perceived escalated demands of teaching through inquiry.

Recipe-based TLTI.

Many novice teachers described their experience of learning within the teacher education program as a *procedure of acquisition* rather than gaining insight into a creative learning process. They described their own efforts as prospective teachers as being focused on subject area lessons, with the goal of producing a series of lessons that would be usable in the field later when they were employed. One participant talked about the construction of a “nice fat binder, ready to go”. Whether it was a nice fat binder or a linear progression through the textbook, they found comfort and safety in a recipe-based approach to being a teacher—a sort of teacher ‘technician’, which involved adhering to accepted norms of direct instruction using a textbook. Not only did the direct approach mean less time required for preparation but it was what several participants described as the norm in their schools. Seeing other teachers on their staff who “do notes and assignments” arriving at school “twenty minutes before the bell”, knowing the exact page in the text where they will be continuing that day, and completing their teaching work day shortly after

the final bell at the end of the school day, was disheartening for novice teachers and served as a draw toward this normative approach. The message received through the research interviews was that the novice teachers might be willing to relinquish their grasp on the fat binder or the textbook if, and only if, teacher educators and education programs could provide similar time-saving and error-free recipes for being an *inquiry* teacher. When asked to share their learning about inquiry in teacher education, two participants stated:

I didn't have as many practical experiences as I would have liked... we're kind of on our own I find a lot in university. It was like, 'Oh, here, make a lesson plan and critique it', but we didn't really get shown how to do these things, how to make your plans exactly what we should be looking for. [Tina, interview #1, p. 2]

I just want something more concrete, but I just feel like... it's still such an abstract idea that this is what I think inquiry learning is but I don't know if I'm really on the right track with what I'm doing, so... I didn't have a lot of concrete examples from university. You know, I had a few things that I tried, but yeah not a lot to go from so I think that I would have liked to see more of that really concrete, this is how you could teach a lesson for this unit, for this course that would be inquiry learning. And this is how you could do something that's really, really specific and concrete, and even if I have to adapt it so that it works for me at least it's a starting point. Cause yeah I felt like especially my first couple years I really defaulted to direct instruction, and it wasn't the best I think but.... [Nadine, interview #2, p. 12]

‘Selling’ benefits of TLTI.

Novice teacher participants spoke about resistance to teaching and learning through inquiry from a variety of stakeholders who directly influence them as (becoming) teachers – school division personnel, school principals, teacher colleagues, parents, and students. Participants shared their personal awareness of how the expectations of other teachers, the school division personnel, or their principal(s) exerted a role in how they saw themselves as a professional. A few participants specifically highlighted their school division strategic direction and the need for students to achieve. The necessity for students to demonstrate proficiency with curricular content was described as promoting a return to the known instructional strategies related to textbook and direct instruction. One participant expressed the regulatory effect on her practice by her school division: “... our division has asked us all to try and be on the same page at the same time with the Math 9 and give the same exams and so it’s like, uh, it’s just awful” [Sandra, interview #1, p.7].

Another participant noted that within the school division there was an understanding of the importance of *staying away* from innovative ideas or trying something new. Such allegiance to established, approved instructional behavior was valued and was known as “not starting brush fires”.

Several participants who did incorporate an inquiry-based approach to teaching felt overt or covert disapproval by colleagues within the school. The effect of power differentials within schools was identified by participants who described how colleagues had the effect of shaping expectations of “how to do” teaching.

I think that you... you do you feel like you just want to do a good job and not get into trouble, and so yeah you default to what you know works, or what other people in the

building are doing, which for the most part is direct instruction. [Nadine, interview #2, p. 14]

It was also expressed that more experienced teachers exerted their authority regarding 'how things were done,' with the effect that the teacher participants felt a lack of personal power in how they approached facilitating learning with their students. They spoke of the opposition other teachers had to the use of inquiry learning, describing it as "not the best way to teach mathematics" and "not the best for students".

Another influential stakeholder the novice teachers spoke about was their students' parents. Parents' expectations of how mathematics should be taught were based in how they had experienced schooling themselves. Since most parents lacked experience in inquiry-based activities, they were unable to assist their own children and were anxious that their children learn "the content" in a manner similar to the way they had learned it. Some participants described this challenge as one of past experience interfering with, or influencing, current practice. As parents' concerns were focused on making certain their child attained what was needed for post-secondary, the use of an inquiry learning approach was perceived as a diversion from the real task of teaching and learning.

Some participants reported that even their students were reluctant to participate in inquiry-based learning activities; that students themselves found the transition to inquiry-based learning difficult. Having had a surplus of school experience focused on direct instruction content strategies, students found it difficult to be asked to pursue more learner-centred, problem-focused mathematics. Patterns of how the students had been taught limited them in not only how they learned but also in how they *wanted* to learn. One participant, Toni, described her students as "just wanting me to open their brain and insert the answers," finding teaching such students

difficult. “It’s like pulling teeth trying to get them to figure things out; they’re not used to doing it” [Toni, interview #1, p. 8].

No “filling time” outcome.

The use of inquiry learning in the teaching of mathematics was understood by several novice teachers in the study to be an alternative teaching strategy that *could* be used; however, it was perceived to require a significant amount of time, to not achieve readily discernible outcomes in the same manner that direct instruction did, and while it was seen to engage most students, it was ‘messy,’ making it hard to know if content had been covered and skills had been attained.

Time was perceived by many of the participants to impose restrictions and influence their instructional decisions. With such pressures, the participants felt they were not able to engage in inquiry learning, which they spoke about as instructional experimentation. They emphasized that the need to “cover the curriculum” preempted the use of inquiry learning and caused them to defer instead to direct teaching strategies.

For several participants, inquiry-based learning was used as a “time-filler” – something fun and interesting for the students to do, but not considered an effective approach to student learning.

And so that was one of the projects that I did. And it’s a nice time filler and it gives me a break. So when I give that it’s when I start to get stressed; it’s like 'okay, we’re going to do this project now'. Because it kinda takes the stress off me. [Karen, interview #1, p. 3]

In fact, one participant spoke of projects being used with students who were unable to understand the level of content that the course demanded, suggesting that projects represent a 'remedial'

course of action, rather than an approach which actually encourages students to engage with mathematics concepts at a deeper level.

The novice teacher participants did not perceive a clear relationship among inquiry-based learning, the promotion of problem-solving skills, student-directed learning and student achievement. Being aware that inquiry-based learning is a focus of new curriculum initiatives, all the participants indicated that they “should be doing more of it” but that they simply could not since student needs and content coverage were of primary importance. Time, students’ functional academic levels, and access to resources were cited as further limiting the use of inquiry-based learning.

In noting how inquiry is a much nicer fit for elementary school mathematics classrooms, one participant commented on how the emphasis in high school needs to shift to the acquisition of content, and with that shift comes a perceived need to teach students in a more traditional manner:

Math can be inquiry-based and it can be fun and it can be open-ended questions and all the little buzzwords, or whatever, that are awesome in education right now. At the end of the day though, math is something that is right or wrong and that is a concrete skill, and we have to teach kids how to learn concrete skills. [Judy, interview #1, p. 8]

Introduction to Bourdieuan Analysis

For years now, research has directed reform efforts in mathematics teaching and learning toward more student-centred questioning and active engagement with mathematics. However, Zeichner (2009) points out: “More often than not, knowledge presented to teachers generated through academic educational research is presented in a reified form, which does not invite

teachers to engage with it intellectually” (p. 109). This research acknowledges that teacher educators are “ask[ing] new teachers to engage in practices that are compatible with innovative curriculum orientations but which generally are not the established school approach” (da Ponte & Chapman, 2008, p. 256). The question of how (or if) these established school approaches can be disrupted in/through teacher education is an enduring one, but one that I believe Bourdieu’s social field theory can partially unpack.

In other research (Nolan, 2012), I present and analyze a number of circulating discourses articulated by prospective teachers during their internship (field experience). While the study described in this chapter focuses on novice teachers, and in particular on the theme of teaching and learning through inquiry (TLTI), the threads of normativity identified are strikingly parallel to those discourses. In that previous research, I conceptualize the discourses as dispositions to reflect the Bourdieuan claim that a person’s habitus, or set of dispositions, in a social practice field (that is, a socially instituted and structured domain or space, such as mathematics classrooms) is tightly bound up in and by the network of practices and discourses within that field. Even though habitus and field are dynamic—always evolving, always partial and never a perfect match for each other—a person will be most comfortable in a field where her habitus is a good fit with the logic and operation of the field. The traditional (legitimate and sanctioned) discourses of the field ‘persuade’ prospective and novice teachers toward a comfortable, non-conflicting habitus-field fit in their classrooms and schools. In other words, “fields provide something like magnetic attraction for agents who are disposed to engage in a given field (if their habitus is aligned to the field)” (Rawolle & Lingard, 2008, p. 732). Each of the agents participating in the social practice of a given field is seen to bring particular resources and/or strategies, referred to as capital, to the domain, where (generally) “[p]articipation implies a

shared commitment to the value of the activities of the field and of field-specific capital” (Warde, 2004, p. 12).

In this chapter, due to its limited scope, my Bourdieuan analysis focusses primarily on two specific concepts to help interpret the threads of normativity; the concepts are that of capital and doxa². In Bourdieu’s social field theory, capital plays an important role in the relationship between field and habitus in any/every social practice. Bourdieu describes three forms of capital (cultural, social, and symbolic) but for the purposes of this paper and its focus on mathematics classrooms, cultural capital is most relevant. According to Grenfell (2008), cultural capital is basically a synonym for status (or position) and refers to the resources that one brings to (and/or has access to in) the field. Cultural capital “is a credit, it is the power granted to those who have obtained sufficient recognition to be in a position to impose recognition” (Bourdieu, 1990, p. 138). Dika & Singh (2002) refer to three states of cultural capital: “embodied (dispositions of mind and body), objectified (cultural goods), and institutionalized (educational qualifications)” (p. 33).

In short, cultural capital includes all the things that help people gain access to, and position themselves strategically within, fields. According to Rawolle & Lingard (2008), “each social field provides a way of accumulating and distributing field specific forms of capital” (p. 732). It needs to be said, however, that while access to such valued forms of “field specific” capital can improve one’s position and status in the field, it is also one’s (privileged) position and status in the field that determines access to capital. In other words, capital ensures the protection and reproduction of existing power relations and social class distinctions.

² For a more detailed introduction to, and overview of, the key concepts of Bourdieu’s social field theory, it is suggested that the reader refer to Nolan (2012) and/or Nolan and Walshaw (2012).

The second concept, doxa, is conceptualized as a type of disposition, or “way of thinking and speaking the natural and social world” (Bourdieu, 1977, p. 169). Doxa refers to that which is learned, valued, and fundamental — the set of core values and discourses guiding the arrangements and actions of a social practice field. What makes particular (but certainly not all) dispositions ‘doxic’ is in how they come to be viewed as natural, normal, and inherently necessary, while actually being quite arbitrary and contingent. The meaning of doxa, or the *doxic experience*, lies in understanding that “[m]ost people, most of the time, take themselves and their social world somewhat for granted: they do not think about it because they do not have to” (Jenkins, 1992, p. 70). In other words, educational reproduction occurs because particular doxa tends to legitimize the natural order of things and the place of agents/structures within it, which generally leads to privileging and reproducing the current dominant paradigm. In this research, the currently privileged dominant paradigm is being depicted by the threads of normativity running through the theme of teaching and learning through inquiry— in other words, the threads are doxic.

Discussion and Interpretations

The four threads of normativity, or doxic threads, presented in this chapter—all related to the classroom social practice of teaching mathematics through inquiry—draw attention to how tightly woven together the network of relations within a field are. If one ignores, for a moment, the teasing apart of these threads (which I have done for the purposes of making sense of the research participants’ connections to inquiry in their becoming (a teacher) process) it can be seen that the threads mirror the core of established and taken-for-granted social practices of schools (school doxa). Naively, I had expected to see more diverse forms of, along with increased access to, the cultural capital available and valued when prospective teachers transitioned from being

interns to becoming teachers; that is, from internship to "one's own classroom." What has been confirmed instead is just how entrenched particular privileged forms of capital are in the network of normalized relations. The data from this study confirms the status of several normalized forms of cultural capital and doxic dispositions: access to a nice, fat binder of 'ready-to-use' lesson plans; establishing (and achieving) clear, unambiguous lesson plan outcomes; not being seen to 'waste' or fill time when content must be covered; falling in line with others' expectations for what it means to know and learn mathematics; a clear and unambiguous structure (recipe) for inquiry teaching, such that it is bestowed with legitimacy and credibility.

The habitus of many novice mathematics teachers finds a comfortable home in a field where these forms of cultural capital are most valued and have even reached doxic status; that is, when the discourse on/around them remains inhibited and heavily regulated. Furthermore, as evidenced in the data, if novice teachers exercise agency by introducing 'new rules for the old game,' institutional structures and pressures will most certainly return them to their original form of embodied cultural capital (their pre-disposed dispositions of mind and body). Unfortunately, the threads of normativity are easily maintained and reproduced as long as agents (particularly those who benefit from them) carry on as if this is 'just the way things are done,' thus drawing attention away from the (arbitrary) origins or roots and the promises of alternative discourses. As Bourdieu (1977) states, "[t]he truth of doxa is only ever fully revealed when negatively constituted by the constitution of a *field of opinion*, the locus of the confrontation of competing discourses" (p. 168).

According to Bourdieu & Passeron (1990), the essential function of an educational system (ES) is cultural and social reproduction, and thus "an ES must produce a habitus conforming as closely as possible to the principles of the cultural arbitrary which it is mandated to reproduce"

(p. 57). Planning and teaching a lesson that closely reflects the structures of curriculum, textbook, and a traditional content-focused ‘exercise paradigm’ (all constituting the cultural arbitrary being reproduced) represents considerable cultural capital for the novice teacher within the field of secondary mathematics classrooms. These field-specific forms of cultural capital reproduce a network of relations governing novice teachers’ pedagogic actions in the field. Teachers “very quickly learn what particular pedagogic modes are legitimated... and the types of classroom arrangements that are privileged and said to be conducive to knowledge facilitation” (Walshaw, 2010, p. 122). Viewing these threads of normativity (or doxic threads) through the lens of Bourdieu’s theory is a reminder of how “reproduction is achieved because social members internalise the ‘rules of the game’ and so adopt practices that ensure their ‘unconscious’ replication” (Nash, 2002, p. 272).

I guess I just feel like, you know, you need to learn more but there is, when you actually get into your classroom and you have to start planning stuff, and putting stuff together, and you do kind of default back to how you were taught either when you did your internship or when you were in high school. And because... the cooperating teacher or teachers I had in high school were from that generation of direct teaching that’s what I defaulted to...
[Nadine, #2, p. 12]

Bourdieu’s social field theory helps view the competing and conflicting demands on novice teachers and their process of becoming in a new light, understanding that the passive act of *wanting* to disrupt one’s habitus is easier said than done when the school playing field remains intact. A study such as this one, however, carries the voices of novice teachers into the field of teacher education and curriculum classes, where the threads of normativity can be used to initiate reflexive analysis of school doxa/orthodoxy before entering their practicum field and ultimately

their careers as teachers. The belief is that the threads are so inextricably linked to, and implicated in, each other that it is challenging to disrupt or unravel them. However, through reflexivity, one can target underlying themes such as compliance and regulation sustaining these dispositions. By taking a reflexive stance in teacher education, and revealing the habits shaping action in/of the field, prospective teachers and teacher educators can trouble the discursive network of relations— represented in this chapter through the four threads of normativity— of mathematics classrooms.

This brief analysis of novice teachers becoming teachers may best be viewed as an opening— an opportunity to consider drawing on Bourdieu’s social field theory to more carefully unpack the dispositions and tendencies surfacing in the disruptions and tensions of becoming a teacher. As stated previously, BSFT has been drawn on extensively elsewhere in similar mathematics research contexts (Nolan, 2012; Nolan & Walshaw, 2012).

Final Reflections

To date, novice teacher participants have contributed thought-provoking and intriguing responses to questions relating to becoming a teacher and the role of university teacher education programs. This chapter presents insights to inform one key research question; that is, how novice teachers experience and live out their sense of agency and identity formation when immersed in the powerful discourses of school mathematics. It has done so by examining the discursive drive toward teaching and learning through inquiry, out of which four threads of normativity attempt to ground the question in a particular context/example.

To teach and learn through inquiry is to shift from closed, one-answer mathematics toward embracing more openness and ambiguity, dispositions of discomfort for many novice teachers.

The traditional structures of the field, along with the forms of cultural capital that are currently believed to hold value in the field, persuade teachers away from the dramatic shift in habitus that is demanded of inquiry teaching. Learning to teach through inquiry is itself an inquiry process, fraught with ambiguity, uncertainty and significant investment of time. Clive & Kosnick (2006) discuss how prospective teachers “would like us just to tell them what to teach at each grade level and which activities to use, believing this would be more efficient and would prepare them better” (p. 10). Such a simplistic and technical view of what teacher education programs should be and do is not uncommon. However, becoming and being an *inquiring teacher* who values learning *through inquiry* demands that teacher education programs strive for a more informed understanding by all (students, teachers, parents, administrators) of just how complex teaching (mathematics) is. In other words, teacher educators must emphasize how TLTI is itself an inquiry process, and thus cannot be packaged with fixed recipes and shelved for purchase by the consumer teacher.

Teaching, as Phelan (2005) has argued, is “a complex and uncertain enterprise that demands ongoing, thoughtful inquiry and discernment” (p. 340). In the context of such complexity and uncertainty, reflections on the research analysis presented in this chapter means disrupting the threads of normativity and working to reveal their arbitrary and contingent nature. Adopting a reflexive stance in teacher education would aim to expose the socially conditioned and subconscious structures that underlay the reproductive nature of the doxic threads. Such a reflexive stance could begin by drawing on Bourdieu's social field theory (specifically, the concepts of habitus, field, capital and doxa) in teacher education to expose the discursive productions of these threads, along with the normalized forms of cultural capital and doxic dispositions discussed in this chapter.

In reflecting on her process of becoming a (mathematics) teacher, Sandra shares:

I'm still becoming a teacher; I still kind of feel like I'm growing into it. Like, I don't, some days... you know, I don't feel like a real teacher even though I am. So it's kind of going to be a weird transition-y sort of year from... you know, I sit at the big desk and it's almost weird sometimes. [Sandra, interview #1, p. 17]

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