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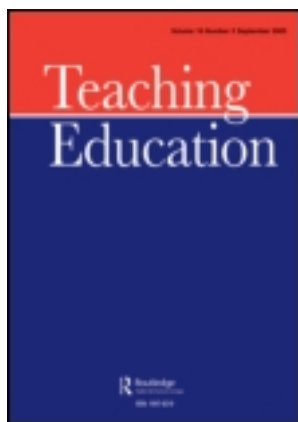
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Kathleen Nolan^a & Margaret Walshaw^b

^a Faculty of Education, University of Regina, Regina, Canada

^b Centre of Excellence for Research in Mathematics Education, College of Education, Massey University, Palmerston North, New Zealand

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Playing the game: a Bourdieuan perspective of pre-service inquiry teaching

Kathleen Nolan^{a*} and Margaret Walshaw^b

^aFaculty of Education, University of Regina, Regina, Canada; ^bCentre of Excellence for Research in Mathematics Education, College of Education, Massey University, Palmerston North, New Zealand

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At the heart of contemporary teaching reform initiatives is a pedagogy based around inquiry. In this paper, we explore inquiry through the efforts of one pre-service teacher, Toni, during her practicum experience in a secondary mathematics classroom. We look at the ways in which she negotiates her practice amid intersecting stories of traditional and reform movements. Drawing on aspects of Bourdieu's social field theory, we highlight not only the tensions between two different "fields," but also within Toni herself in her efforts to identify and become proficient with inquiry pedagogy.

Keywords: teacher education; pre-service teachers; mathematics field experience; secondary school; Bourdieu's social field theory; inquiry pedagogy

Introduction

Contemporary thinking about teaching mathematics is centered round the notion that making a difference in schools rests with the ways in which teachers operationalize the core dimensions of reform initiatives (Rand Report, 2003). Curriculum reform initiatives in many countries (see, e.g. Department for Education and Employment [DfEE], 1999; National Council of Teachers of Mathematics [NCTM], 2000; New South Wales Department of Education & Training, 2007; New Zealand Ministry of Education, 2006; Western and Northern Canadian Protocol [WNCP], 2008) promote inquiry pedagogy whose core dimensions involve the construction of mathematical understanding through student investigation, collaboration, and communication (Chapman & Heater, 2010; Leikin & Rota, 2006; Ma & Singer-Gabella, 2011). In these initiatives, the classroom environment is refocused away from learning rules for manipulating symbols toward one that values, respects, and addresses "all students' experiences and ways of thinking, so that students are comfortable taking intellectual risks, asking questions and posing conjectures" (WNCP, 2008, p. 2). In effect, student critical inquiry becomes a defining feature of reform movements as well as a coordinate system through which "good" teaching is mapped. With this in mind, we wondered how inquiry pedagogy becomes meaningful to teachers. Specifically, how do certain versions of effective mathematics

*Corresponding author. Email: kathy.nolan@uregina.ca

teaching, and not others, come to be intelligible to pre-service teachers in the context of their mathematics practicum experience in schools?

Arguably, inquiry initiatives have drawn attention to the social and cultural aspects of mathematical development, but, in doing so, they also draw attention to the sheer complexity of the teacher's work within the classroom. In teacher education, many pre-service teachers struggle to embrace inquiry pedagogies, while simultaneously seeking to deconstruct firmly entrenched ideas about what good teaching looks like (Brodie, 2011; Cuban, 2009; Moore, 2004; Pozuelos, Travé, & Cañal, 2010; Weber & Mitchell, 1995). [Pereira \(2005\)](#) has argued that unless teachers directly experience inquiry learning for themselves, it is unlikely that they will be able to implement it in their classrooms. We put that suggestion to the test by exploring the teaching practice of one pre-service teacher, Toni, who experienced an inquiry pedagogy in a university undergraduate secondary teacher education program. While there has been valuable research to date on the way in which pre-service teachers become classroom teachers (e.g. Brown, 2008; Darling-Hammond & Bransford, 2005; Garcia, Sanchez, Escudero, & [Llinares, 2006](#); [Tatto & Senk, 2011](#)), including the role of practicum, or field, experiences (Armaline & Hoover, 1989; Moore, 2003), what makes this account unique is its focus on the complexity of the implementation of an inquiry practice. In seeking to understand the pedagogical and paradoxical possibilities of an outwardly contradictory practice, we look at the ways in which past and present experiences of teaching weave through Toni's pedagogy and how her teaching is produced through negotiations within competing "fields."

In investigating how Toni negotiates her teacher practice around traditional and reform movements, we attempt to explain why the inquiry pedagogy given enthusiastic expression by Toni did not correspond to her classroom practice. While others have provided evidence of this same phenomenon (e.g. Herbel-Eisenmann, Lubieniski, & Id-Deen, 2006; Lampert & Ball, 1998), we argue that the conceptual framework of Bourdieu's social field theory provides rich ground for the analysis. There are arguments in Bourdieu's work that are helpful in advancing our understanding of a pedagogy that both intersects and is at odds with the kind of pedagogical practice mandated by inquiry initiatives. Drawing on aspects of Bourdieu's work, we explore pedagogical reproduction/repositioning empirically and, in doing that, we highlight not only the tensions between two different "fields," but also within Toni herself in her efforts to identify and become proficient with inquiry pedagogy.

What the literature clarifies

[Phelan \(2005\)](#) explains that "the inquiry-based model promotes ongoing exploration of the concrete particulars of practice in specific situations as the route to wise decisions about how to act" (p. 341). Teachers are urged to "encourage students to explore, gather information, plan, analyze, interpret, synthesize, problem solve, take risks, create, conclude, document, reflect on learning, and develop new questions for further inquiry" (WNCP, 2008, p. 24). There are, however, huge pedagogical demands placed on teachers in developing these kinds of practices (see [Brodie, 2010](#); [Sullivan, 2010](#)). Typically, what is at stake for the teacher is a shift from the comfortable and familiar tradition of "show and tell" to the facilitation of student understanding (Ball, Lubieniski, & Mewborn, 2001; Shulman & Shulman, 2004). Where once she dealt unilaterally with students' misunderstandings and errors by demonstrating and modeling the "right" and effi-

cient method or procedure, by leading students through the correct algorithm, and by ensuring their fidelity to these procedures, in the inquiry classroom the teacher's moves are less predictable and controllable. Rather than positioned as intellectual authority, as in conventional classrooms, the inquiry teacher becomes listener, noticer, facilitator, and scaffolder of mathematical practices in her inclusive classroom.

Tom (1985) suggests that “[p]erhaps the best we can do is to acknowledge that the parameters for what counts as inquiry teacher education are fuzzy” (p. 36). Nolan (2010a) showed how her inquiry pedagogy within her undergraduate teacher education program met with strong initial resistance from pre-service teachers. Equipped with an understanding of middle years teaching based on their own experience as students in schools, the pre-service teachers did not readily accept that teaching might encourage ambiguity, uncertainty, and negotiation. Other factors also come into play. There are problems associated with the pressure of time and the requirement to “get through” the curriculum. One teacher in Allen’s (2009) study put it like this: “You set yourself up. Alright this is what I think is going to work, this is what I’ve been taught. And then within three weeks going nah, scrap it all, start again” (p. 651). Burton (2004, p. 372) explained the difficulties in this way:

... it is not easy to organise a classroom where the mathematics is not prescribed but is generated through the activities of the students and where it is the responsibility of the teacher to help the students to interrogate the many different forms of it which they offer, and expect students involvement in the process of questioning, challenging and reflecting.

Since gaining better access to inquiry practice demands a complex coordination of elements, it is “highly likely that teachers attempting to work with reforms may resort to traditional practices that they are comfortable with, more or less deliberately” (Brodie, 2011, p. 176). Pre-service teachers attempt to enact reforms during the practicum experience, which is often “fraught with ambiguous and sometimes painful negotiations” (Walshaw, 2004, p. 78), as pre-service teachers attempt the delicate work of educating others while still being educated themselves (see also Britzman, 2003). As with some of the teachers in Nguyen’s (2009) study, Walshaw found that a number of the pre-service teachers in her study felt compelled to abandon their efforts toward developing a pedagogy informed by inquiry.

Towers (2010) has shown that despite a lack of understanding of inquiry-based practice or even opposition to it from teaching colleagues, it is possible for beginning teachers to enact inquiry pedagogy in schools. She described how one Grade 1/2 teacher, “caught between a vision for teaching through inquiry ... and a system populated by veterans who value[d] straight talking, ready and familiar answers, and tried and tested methodologies” (p. 257), was able to maintain his inquiry practice, albeit at the expense of developing productive collegial collaborations at the school. Similarly, Potari and Georgiadou-Kabouridis (2009) showed that with ongoing support from colleagues at the practicum school and from the researchers, pre-service teachers are able to implement, to some degree, the inquiry teaching approaches developed at the university.

Theoretical framework of the study: Introduction to Bourdieu's social field theory

In Bourdieu's understanding, perfect fits between the vision and the enactment of practices – in relation to our paper, between the ideal/imagined teaching of inquiry and the realities of practicum teaching – are impossible. In accounting for such imperfect fits, we, along with a number of others working in education (e.g. Albright & Luke, 2008; Harker, 1990; Mutch, 2006; Nash, 2002; Noyes, 2004; Reay, 2002; Zevenbergen, 2000), have found Bourdieu's work immensely helpful in offering a way to account for the complex interplay between the individual and the dynamics of the social. As we describe in this paper, the key concepts of Bourdieu's social field theory can help reveal the ways in which inquiry pedagogy is enacted through ambiguous and sometimes contradictory negotiations.

Specifically, Bourdieu's work offers a number of concepts and terms, namely practice, field, habitus, capital, doxa, and misrecognition, that allow us to understand pre-service teachers' shifts toward inquiry teaching. The term practice refers to domains or systems of activities or performances, each with their own logics based in the strategic and/or habitual (Bourdieu, 1990b; Warde, 2004). According to Rawolle and Lingard (2008, p. 730), "Bourdieu never offered simplistic definitions of practice, instead constituting the concept as a rich but open category for activities that have a social character and meaning, the specific details, structure and effects of which emerge in research." Field and habitus are central to understanding social practice since the two concepts are produced and reproduced in a dialectical relation to each other through social practice. According to Bourdieu, everyday decisions shape, and are shaped by, a set of dispositions (habitus) that includes attitudes, beliefs, perceptions, and practices, all formed through the embodiment of one's life history.

The word *disposition* seems particularly suited to express what is covered by the concept of habitus (defined as a system of dispositions). It expresses first the *result of an organizing action*, with a meaning close to that of words such as structure; it also designates a *way of being*, a *habitual state* (especially of the body) and, in particular, a *pre disposition, tendency, propensity, or inclination*. (Bourdieu, 1977, p. 214)

Habitus operates at various levels – in one's thoughts, actions, use of language, and in how one embodies experiences of structures and relations. The social arena or context in which a network of these structures and relations is found is referred to as a field (Grenfell, 2008). Bourdieu (1990a) posits the existence of many possible fields, all "historically constituted areas of activity with their specific institutions and their own laws of functioning" (p. 87). Bourdieu refers to fields, or these areas of activity, as "quite peculiar social worlds where the universal is engendered" (Bourdieu, 1998, p. 71). Within these peculiar worlds of social positions and power relations, habitus and field are viewed as mutually constituting and complicit in each other. In fact, Bourdieu describes a field as:

a *space of play* which exists as such only to the extent that players enter into it who believe in and actively pursue the prizes it offers ... [c]onversely, the theory of habitus is incomplete without a notion of structure that makes room for the organized improvisation of agents. (Bourdieu & Wacquant, 1992, p. 19)

A third key concept, and one that plays an important role in the relationship between field and habitus, is capital. Bourdieu describes two main forms of capital (economic and symbolic), but for the purposes of this paper and its focus on mathematics classrooms and teacher education, cultural capital (a form of symbolic capital) is most relevant. According to Grenfell (2008), cultural capital is 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, 1990a, p. 138). When discussed in the context of teacher education, cultural capital can include “commodities” such as one’s level of education, classroom experiences, research knowledge, grades/marks, classroom management skills, comfort with the script or logic of the field (i.e. a good habitus–field match), and so forth. In short, cultural capital includes all the things that help people gain access to, and position themselves strategically within, fields.

Dimitriadis and Kamberelis (2006, p. 67) express the dynamic relationship between these three concepts of Bourdieu’s social field theory in stating:

A field is thus defined primarily in terms of the kinds of practices that are common within it and the kinds of capital that may accrue to individuals who engage in those practices, and secondarily as the kinds of social relations that develop as people work to acquire and maintain the kinds of capital with the most purchase in the field.

By understanding the dynamic roles of the three key concepts – field, habitus, and capital – and their complex interactions within practice, social field theory can help illuminate issues of domination and reproduction in education. Indeed, according to one interpretation of Bourdieu’s theory and social reproduction, “the role of schools is to make students believe that the existing social relations are just and natural and in their interests” (Webb, Schirato, & Danaher, 2002, p. 113).

Doxa and misrecognition are two further concepts useful to our analysis. Doxa is the set of core values and discourses of a social practice field that have come to be viewed as natural, normal, and inherently necessary, thus working to ensure that the arbitrary and contingent nature of these discourses are not questioned nor even recognized. 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). This unquestioned acceptance of what constitutes normal, natural, and necessary is what Bourdieu refers to as misrecognition (Bourdieu, 1990a; Webb et al., 2002). According to Deer (2008, p. 121), “*doxa* allows the socially arbitrary nature of power relations ... that have produced the *doxa* itself to continue to be misrecognized and as such to be reproduced in a self-reinforcing manner.”

Using Bourdieu’s theoretical constructs, we reflect in this paper on the social practice journey of pre-service mathematics teachers as involving two key fields of practice (see Nolan, 2010a): the field of education in elementary and secondary schools, particularly in mathematics classrooms (*F1*), and the field of university teacher education, particularly in mathematics curriculum courses (*F2*). Pre-service teachers, like Toni, have a social practice journey through the social positions and power relations of *F1* as a student, *F2* as a pre-service teacher, and eventually *F1* as a teacher. We propose that, in both of these two fields, specific (but quite different) forms of habitus and cultural capital are valued and (re)produced. In our study,

F2 represents a field that promotes inquiry approaches in the teaching and learning of secondary school mathematics, whereas *F1* is dominated by traditional teacher-directed approaches. While it seems feasible to view *F1* and *F2* as sub-fields of the larger field of education, we propose that the logics characteristic, and constitutive, of these fields have distinct differences that warrant a teasing out in our analysis of Toni's practices related to inquiry and traditional pedagogies.

We wish to state at the outset that the two pedagogical approaches characterized as "traditional" and "inquiry" are not being dichotomized by field (*F1* and *F2*) to suggest that they cannot (and do not) coexist in fields; on the contrary, we are fully aware that teacher education programs propose inquiry pedagogy as one approach among a full repertoire of approaches and that, with regard to *F1*, inquiry pedagogy does thrive to a certain degree in many classrooms and schools. However, studies repeatedly show (Lerman, 2001; Nolan, 2008; Towers, 2010) that schools are still dominated primarily with/by traditional approaches as the centerpiece pedagogy, with the occasional inquiry-focused activity introduced. In this paper, we seek to understand the part that both fields played in framing the practice of one pre-service teacher; how both *F1* and *F2* function as sites of production and regulation of Toni's habitus. We also wanted to understand the negotiations that take place within and between these two distinctively unique fields of practice.

Methodology and data sources

The data are drawn from a larger ongoing research initiative conducted by one of the authors in an undergraduate teacher education program at a Canadian university (see, e.g. Badali & Nolan, 2010; Nolan, 2010b). The study described in this paper is a case study of Toni, one secondary mathematics pre-service teacher, during her practicum experience of teaching in a grade 10 (15–16 years old) classroom. We select one pre-service teacher because we are confident that we can learn some very important things from this one case even though, "[o]n representational grounds, the epistemological opportunity seems small" (Stake, 1998, p. 101). In bringing to life one case – the case of Toni – we highlight a research approach that "is process-oriented, flexible and adaptable to changing circumstances and a dynamic context" (Anderson, 1998, p. 152).

Toni was selected for this study for a number of reasons, including her demonstrated passion for teaching mathematics and her expressed desire and intention to explore teaching through inquiry in her internship. In our desire, as researchers, to study pre-service teachers' negotiations of their field experience amid conflicting pedagogical discourses, we felt that Toni's enthusiastic and responsive disposition toward inquiry would be a constructive starting point. A "best case scenario" pre-service teacher, such as Toni, would enable us to focus on the fragility of the transitions and negotiations that take place even within inquiry pedagogy enthusiasts. Thus, data from Toni's practicum experience lend themselves aptly to this particular study of understanding the double script lived by pre-service teachers as they negotiate teaching practice amid the intersecting stories of traditional and reform (inquiry) movements.

Specifically, in terms of data sources, the research required Toni: (1) to participate in both "virtual" and "real" aspects of the professional development process – this included the university's mandated school visits by the faculty advisor (the first author) plus additional virtual meetings with the faculty advisor through the use of

synchronous video conferencing tools (*Adobe Connect*, *Skype*), asynchronous video reflective tools (flip video camera), and a course management system for email and chat/discussions (*Moodle*); (2) to videotape (and conference on) several mathematics lessons (or parts thereof) planned and taught during the practicum; (3) to meet online with the faculty advisor for reflective conversations on the process of becoming a teacher and teaching through inquiry; and (4) to keep a journal/blog reflecting on the practicum experience and the personal journey of becoming a mathematics teacher. The videos of classroom mathematics lessons planned and taught by Toni, as well as pre- and post-lesson conferences between Toni and the faculty advisor, were recorded and later transcribed. This paper focuses on an analysis of two specific lessons (one on order of operations and the other on scale factor) planned and taught by Toni; on the pre- and post-lesson conferences for both of these lessons; and on an in-depth interview with Toni at the conclusion of her practicum. While the curriculum area for the research is domain-specific, the issues that the analysis raises have wider application. The issues raised apply to curriculum reform enactment, in general, and to pre-service teachers' efforts to negotiate practice and to become proficient with inquiry pedagogy, in particular, across curriculum domains.

Pedagogy as enacted by Toni

Practices in keeping with inquiry

In many respects, Toni's teaching exemplified the hallmarks of an inquiry practice, as mapped out in the pre-service university course. As a "privileged teaching repertoire" (Ensor, 2001, p. 399), the course framed Toni's engagement with the official curriculum statement and its representation of inquiry. In addition, prevailing discourses at the practicum school, which promoted (at least officially) inquiry and problem solving in the classroom, made it easier for Toni to express her commitment to inquiry. As her cooperating teacher volunteered: "I have had an excellent experience with [Toni] ... I have enjoyed sharing my students and classroom with her and will sincerely miss her, when our term is done."

Toni's order of operations (BEDMAS: brackets, exponents, division, multiplication, addition, subtraction) and scale factor lessons established a supportive learning environment. She introduced her lessons by articulating the content and indicating how that content might be operationalized:

- *Today we're working on 6.3 ... drawing similar polygons. I made each table a shape. None of them are the same and all of them are all irregular. So, what I want you to do ... I'll give each table a shape ... this is your polygon that you guys are getting ... So, what I want you to do ... with your shape, use a scale factor of zero decimal five to one and redraw the shape in your notebook. [scale factor lesson]*
- *Let's start with the heading, 2.3 Order of Operations with Powers. [BEDMAS lesson]*
- *[later] So let's write what BEDMAS stands for.*

Toni's instructional strategies honored students' thinking and validated their contributions, using those contributions to shape instruction and to occasion particular mathematical understanding in the classroom.

- *Ok, I'm going to ask Dusty what he did first ... what was the first thing you did in question 1, Dusty?*
- *And how did you know to do the exponents next? You remembered BEDMAS?*

In Toni's classroom, student talk was actively encouraged. Supporting a large body of empirical evidence of teaching that emphasizes the importance of student participation in mathematical dialog within the classroom (e.g. Kazemi & Franke, 2004), Toni encouraged students to express their ideas and to make their mathematical reasoning visible and open for reflection. The expression of their ideas informed Toni about what students already knew and what they needed to learn. During whole class discussion, Toni widened students' exploration in their search for a solution:

- *How come the exponent out here was the very last thing we did?*
- *Does everyone see what a small little thing ... gives him a very different answer?*
- [to two students at their table] *So, you have the original lengths of everything, so how are you going to find the new drawing? Why are you dividing by two?*

Toni exposed students to a wide range of ideas, strategies, and solution pathways. In whole class discussions in inquiry classrooms, the more academically able students provide richer cognitive potential to the class as a whole than would be possible in a traditional setting (see Walshaw & Anthony, 2008). Moreover, during class discussion Toni was able to draw connections between different solution pathways:

- *Let's do it the way you did it ... you got the same answer right? You did all the exponents right through ... so all of her exponents are taken care of ... and then you got that big number? And you got the exact same answer? [some surprise in voice] Why is she right as well? [a student mumbles something in response] It didn't affect anything, right ... so, it was ok to do the exponent first ... does everybody see how she is still right?*

She invited students to look for patterns and interrelationships:

- *Why do you think Dusty thinks that exponents are next?*
- *BEDMAS, yes, but what is the reasoning behind it?*
- *What will happen with the angle measurements when it's enlarged?*

She encouraged multiple representations of ideas:

- *So what can you tell me about 1.5?*
- *Don't worry about getting the right answer, just try and do what you know ... what you think is right.*

Her organizational practices fostered the sharing of student ideas with a peer. In Toni's classroom, peers served as an important resource for finding out about the nature of task demands and how those demands could be met (see Doyle, 1983).

Her own primary responsibility during peer discussions was focused on providing support for students to actively participate in the discussions. Specifically, she actively monitored their engagement and ensured that they understood the problem and, where necessary, adapted the level of difficulty for them.

- [to two students at their table] *So, how are you guys finding your scale factor?* [One student responds] *And how ... what was the first thing you guys did?*

The university course and the curriculum documents, like other current reform documents, both promoted the use of hands-on materials to motivate and guide student engagement “in investigations that lead to disciplinary and transdisciplinary understanding” (WNCP, 2008, p. 23). Toni’s scale factor lesson built on students’ “sense of curiosity and wonder” (WNCP, 2008, p. 23) and was centered on their engagement with, and investigation of, varying shaped polygons that she had assembled and distributed to the students.

- *Is this shape very similar to your last shape?* [S: no, one more side]
- *So does that make it more difficult or it’ll be ok?*
- *What happens to the angle measurements?* [S responds incorrectly that they’ll change so Toni continues prompting and asking him to show how]

The students’ investigations appeared to take the form of a cyclical process in which students’ questions, discoveries, and insights of scale factor were revisited to form the basis of new knowledge. Thus, an overall surface reading of Toni’s pedagogy might characterize it as inquiry practice.

Practices at odds with inquiry

Toni sought to implement an inquiry pedagogy. Arguably, she created a supportive learning environment and demonstrated a keen desire for talk to occur in the classroom. There is evidence to suggest, however, that Toni’s inquiry pedagogy operated merely at an emergent level. For example, Toni’s focus on monitoring engagement during peer work in the scale factor lesson put boundaries around the opportunities for pairs of students to make a joint conceptual shift. While students in Toni’s classroom were encouraged to exchange ideas, they were not provided with opportunities to test those ideas critically. Nor did they learn to make conjectures or familiarize themselves with the processes of mathematical argumentation and validation.

The inclusive relationships established in Toni’s classroom did not always involve reciprocity and a pedagogical attention that moved students toward independence. Like the teachers in a study undertaken by Knight (2003), most verbal responses took the form of an expression of encouragement or praise, offering directive rather than responsive support. Toni herself noted: *I find that I am talking a lot* [scale factor post-lesson conference]. It might be claimed that Toni’s instructional explanations appeared meaningful to students, yet in keeping with the novice teachers in a study by Inoue (2009), Toni’s explanations did not necessarily enhance students’ mathematical capabilities; nor did they assist in the development of their perception of the mathematical world.

Leinhardt (2010) has argued that teacher explanations are crucial in any classroom. An inquiry pedagogy uses explanations and questioning to assist students “to grasp the important disciplinary or transdisciplinary ideas that are situated at the core of a particular curricular focus or context” (WNCP, 2008, p. 25). In Toni’s classroom, questions did not link to a wider purpose or context. Her often leading questions tended not to “move students’ inquiry towards deeper understanding” (WNCP, 2008, p. 25). Arguably, recall, recitation, or funneling questions are important since they can serve a number of useful purposes during a discussion. However, in Toni’s lesson such types of questions narrowed the topic under discussion. Rather than “focusing” and directing students toward important mathematics (Franke et al., 2010; Herbel-Eisenmann & Breyfogle, 2005), Toni’s questions had the effect of discouraging student initiative and signaling to students a lesser responsibility for discovering and defining the problem. The questions were also, at times, ambiguous:

- *And what’s happening to the sides of the lines? What’s happening to the sides of the lines ... the side lengths of your triangle?*
- *How many people knew that we needed to do the exponents first, er, the exponents after the brackets?*
- *And the last thing we had to do was ... ? Square it? And what did you get for an answer?*
- *Is this shape very similar to your last shape?*
- *Does it always have to be enlarged or reduced by a whole number or can it be enlarged or reduced by a decimal?*

Such questions tended to close down risk-taking. Toni’s questioning might be interpreted as being more concerned with teacher exposition than with opening up the discussion with each interaction. However, this was not how Toni interpreted her questioning. In the post-lesson conference with the faculty advisor, after viewing the video of her lesson, she noted:

I still was asking questions and still posing open-ended questions. I don’t think there were too, too many “yes” or “no” questions. Most of them required an answer.

Irrespective of interpretation, Toni’s instructional explanations pinpointed a lack of understanding of the conventions of mathematical language:

- *The original is always going to be up front. What does it tell you about... if the scale factor is 0.5 to one, what is the original worth, like how big is our original? [S: one] One. How big is our new measurement [S: 0.5] Which is? [S: half smaller]. Half of the original.*
- *We’re going to switch our polygons. And this time I want you to use a scale factor of 3 to 1. What do we know right away?*
- *Our scale factor was 3.*
- *Use a scale factor of zero decimal five to one.*
- *What will happen with the angle measurements when it’s enlarged? And what’s happening to the sides of the lines? What’s happening to the sides of the lines ... the side lengths of your triangle?*

Contrary to the evidence presented, Toni believed that she “modeled good language and [that she] noticed that the students really model that language back” [scale factor post-lesson conference]. However, in the scale factor lesson, Toni did not always provide students with opportunities to speak the language of mathematicians. For example, her terminology “sides of the lines” was not the kind of language that would be deemed mathematical. Her pedagogy tended to structure learning by organizing student behavior rather than setting up an environment in which conventional mathematical language migrated from her to the students. Her tendency to structure learning through the organization of students’ behavior can be explored more closely by looking at her lesson plans.

In each of the lesson plans Toni constructed, specific components were always present and ordered similarly. For example, Toni began each class with “bell work” – a few warm-up problems that were not usually connected to the topic of the day, but functioned to draw students’ attention to mathematics. The introductory bell work activity was followed by the “development” section of the lesson plan, which involved providing notes (usually closely aligned with pages from the textbook) and a few illustrative examples for students to copy into their notebooks. Finally, the lesson plan included an assignment for students to complete.

In pre- and post-lesson conferences with Toni, the faculty advisor endeavored to disrupt this traditional lock-step lesson plan structure by indicating that a rigid format and timeframe made the realization of inquiry approaches extremely challenging. Overall, the faculty advisor made a number of suggestions concerning how Toni could turn her highly structured, textbook-oriented lesson plan into something more open and emergent to better reflect the characteristics of inquiry. For example, in reviewing Toni’s lesson plan prior to teaching the order of operations lesson, the faculty advisor suggested that Toni try not to focus so much on isolated rules of BEDMAS, but instead to “make the connection to things that students might do in everyday life with order of operations.” The faculty advisor made the suggestion that Toni create approximately five questions (with the brackets and operations positioned differently in the questions) and that she distribute one or two of these questions to each pair of students as they enter the classroom. As she clarified:

... maybe in one case put multiplication before the addition and in another case, put the addition before the multiplication and see what happens. And then basically if you have those five questions on the board or on the overhead or whatever you’re using, then you could say, all right, how many people had this question? And does someone want to volunteer how they did it? So you could get them talking about their own strategies before, or instead of, giving them the rules.

In fact, for a specific connection to everyday life, the faculty advisor recommended that Toni try to locate a few contest entry forms that included skill-testing questions and distributes these questions to the students. As evident from the *Skype* video, Toni was extremely receptive to the ideas throughout the pre-lesson conference, actively nodding, taking notes, and asking clarifying questions. Toward the end of the conference she stated: “I like the ideas that you have given me so far” and then proceeded to summarize the changes she would make to her plan before teaching the lesson, which included the contest entry form concept.

Toni’s lesson was recorded on three brief videos, which were uploaded for the faculty advisor to access and view, prior to holding a post-lesson conference. As

the following excerpt from the first video illustrates, Toni experienced considerable difficulty effecting her desire to transition from traditional to inquiry practice. In other words, she was just not able to enact a more open, less structured approach to student problem solving.

The first video began by focusing on two questions written on the whiteboard:

$$(-3 \times 6) + 4^2 \qquad 6 \times (3 + 2) - 10 \div 2^2$$

The screen shot following showed Toni saying:

I want you guys to ... at your tables, you need to talk about what's going on and I want you guys to try and solve these questions. [Pause for a few seconds]. This isn't bell work, this is going to be in your notes. [Toni moves over to the SmartBoard to write notes]. Let's start it with the heading ... 2.3 Order of Operations with Powers [Toni states each word slowly while printing these words that are taken directly from Section 2.3 of the textbook on the SmartBoard; after completing the printing, she goes back to underline the heading, glancing twice over her shoulder at a few students talking]. Ok, so underneath that heading, I want you guys to try and solve these questions.

Crucially, Toni was not able to diverge from the typical structure of the lesson plan. She paused after assigning the questions, clarifying how these two questions “fitted” into the overall lesson. She made a decision that she would not call this bell work (possibly because it was so closely linked to the topic of the lesson) and chose instead to ask her students to write the textbook heading and then try the questions “underneath that heading.” Toni was demonstrating a need to have this introductory activity appropriately labeled and positioned within the notes that students were taking and also within her own lesson presentation discourse.

In the post-lesson conference, Toni was asked about this structural decision, as well as her decision to start the lesson with two questions that were not reflective of the kinds of questions that the faculty advisor and she herself had agreed upon during the pre-lesson conference. Toni seemed confused over the question and asked: “did I upload the video for you where I had two different students each have a different answer?” When reminded again that the approach did not reflect what was discussed prior to teaching her lesson, Toni volunteered only an “okay” and made gestures toward writing notes on this point. When asked if she had viewed the videos herself after the lesson had concluded, Toni indicated that yes, she “went through them a couple of times.” She reflected:

It was kind of boring. Just because I find that I am talking a lot. But there's not a lot of room to experiment with that. I felt it went good, other than the boringness of it.

Why was Toni negotiating her practice in this way?

Explaining practice through the lens of Bourdieu's social field theory

Toni brings to the classroom her notion of mathematics teaching constructed from her experiences in the university mathematics curriculum course. She also brought her familiarity with the pedagogical relation as a former student in schools, noting

in early research conversations its very traditional nature. The field of teacher education and the university course, *F2*, on the one hand, imposed specific categories of being, acting, and thinking that promoted inquiry pedagogy. Toni's past experience in school (the field of *F1*) as a student of mathematics, on the other hand, invested as it was in discursive codes of traditional mathematics pedagogy, established a different set of practices and social relations for the teacher and learner in the classroom. In particular, the image of an organized teacher with a well-structured lesson plan produced a network of structures and relations governing Toni's pedagogic actions in the field of the secondary mathematics classroom. Her highly structured lesson plan, her textbook dependence, and her questioning techniques, informed by ideological constructions of a mathematics teacher advanced in her previous schooling, contrasted with those constructions promoted by the university course and the new curriculum. However, both "implicitly furnish[ed] a model of the 'right' mode of intellectual activity" (Bourdieu, 1971, p. 201).

According to Bourdieu and 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). As far back as early childhood "the habitus is inculcated as much, if not more, by experience as by explicit teaching" (Jenkins, 1992, p. 76). A habitus that orients one toward the familiar organized and well-managed classroom, with few unpredictables to disrupt flow, is a comfortable fit for pre-service teachers. Nash (2002) reminds us that when the subtext of a practice is "that's how it's done" (p. 279), then that practice "bounded as such, strongly marked by rituals or rules, and given a name, has a special status" (p. 279). Planning and teaching a lesson which reflects the structures of the textbook, the curriculum, and the other aspects of the traditional mathematics pedagogy (the cultural arbitrary being reproduced) constitutes considerable cultural capital for the pre-service teacher in the field of the secondary mathematics classroom.

We can explain Toni's reproduction of the cultural arbitrary as both involved in and emanating from her knowledge of "what works" in the field and is most valued in the classroom. What works, [Watson \(2002\)](#) has argued, "often involves simplification of the mathematics until it becomes a sequence of small smooth steps which can be easily traversed" (p. 462). Frequently the teacher will take the student through the chain of reasoning and the student merely fills in the gaps with the arithmetical answer, or low-level recall of facts. For pre-service teachers like Toni, such a habitus-field fit accrues valued cultural capital in the field and ensures that they misrecognize the objective truth of their pedagogic actions. Through misrecognition, particular structures of a field come to attain doxic status, thereby functioning to reproduce (yet, at the same time, conceal) power-relational inequities associated with possessing particular (privileged) dispositions and forms of cultural capital.

Unsurprisingly, the shift to an inquiry approach is severely bounded by the network of legitimate structures and practices in the field, including those forms of cultural capital that have the most purchase power. However, one should not read a lack of agency in this picture framed with a Bourdieuan vocabulary; in fact, "Bourdieu does not deny that agents face options, exert initiative, and make decisions. What he disputes is that they do so in [a] conscious, systematic, and intentional (in short, *intellectualist*) manner" (Bourdieu & Wacquant, 1992, p. 24). 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. In Toni's practice, this was evident in her use of highly structured lesson plans, her tendency toward explanations and "talking a lot," and drawing on forms of questioning that closed down risk-taking. Traditional teaching operated as a form of "hidden persuasion," "exerted, quite simply, by the order of things." (Bourdieu & Wacquant, 1992, p. 168). The reference to the order of things calls to mind the metaphor of "playing the game," used by Bourdieu (and others) to ground his social field theories in a familiar context.

Bourdieu's view is that adjustment to the demands of a field requires a certain "feel for the game" (Bourdieu, 1990b, p. 66). Similar to games, social fields are constructed with specific structures and rules, and the relative smoothness of the game/field often depends upon the players unquestioningly accepting and following these rules, regardless of how arbitrary they might seem. In the case of Toni, the structures and rules of the social field of her practicum school (*F1*) seem natural and unquestionable to her (due to her extensive experience in this field), resulting in a "feel for the game." This game, however, can be seen to contrast sharply with the game in teacher education (*F2*), resulting in cross-field tensions as she attempts to negotiate both sets of game rules. Her negotiations highlight how social fields (like games) are competitive, with the players continually strategizing to acquire better positions and more refined skills in the game.

In Bourdieu's model for strategizing game playing, there is a "mixture of freedom and constraint which characterises social interaction" (Jenkins, 1992, p. 72). This notion of strategizing is key to forging a link between Bourdieu's concepts of habitus, field, and social practice since strategies are "the ongoing result of the interaction between the dispositions of the habitus and the constraints and possibilities which are the reality of any given social field" (Jenkins, 1992, p. 83).

The strategies of agents depend on their position in the field, that is, in the distribution of the specific capital, and on the perception that they have of the field depending on the point of view they take *on* the field as a view taken from a point *in* the field. (Bourdieu & Wacquant, 1992, p. 101)

In relation to pre-service teaching, it is possible that because Toni had learned how to play school well, she had an investment in perpetuating and reproducing the logic and operations of the field of teaching as she had experienced it. As Bourdieu notes, "there is a probability, inscribed in the social destiny associated with definite social conditions, that experiences will confirm habitus, because most people are statistically bound to encounter circumstances that tend to agree with those that originally fashioned their habitus" (Bourdieu & Wacquant, 1992, p. 133).

For Toni, the shift to inquiry pedagogy can be conceptualized as a new game, and not one with which she necessarily felt comfortable or competent playing. The traditional game had become doxic or "second nature" to Toni. Her habitus in this game seems a natural, universal way of being. Bourdieu writes that "when habitus encounters a social world of which it is the product, it finds itself as 'a fish in water': it does not feel the weight of the world and it takes the world about it for granted" (Bourdieu & Wacquant, 1992, p. 127). When the rules of the game change to inquiry pedagogy, new forms of habitus and cultural capital become more highly valued. Toni's efforts to "play the (inquiry) game" in secondary mathematics

classrooms might be understood in terms of ‘skimming the surface,’ rather than swimming in the water, and of both striving and struggling to play the new game.

Although the inquiry game introduced in teacher education curriculum courses (*F2*) is enticing and desirable, Toni’s dispositions (shaped through her own school experiences as a student in *F1*) are not a perfect fit with the course. Furthermore, it becomes especially difficult to import the new game into another field with its own established structures and practices. Pre-service teachers, like Toni, vow to generate meaningful mathematics experiences through inquiry-based tasks and questioning that value student ideas and voice. This is, by no means, a trivial task however, given that Toni is faced with the challenge of reconciling conflicting demands amid the pull of normative discourses. Such normative discourses often succeed in marginalizing and misrecognizing the promises of alternative discourses.

Given that the dispositions and rules of the game in *F1* are familiar and comfortable for Toni (even to the point of suggesting that these dispositions and rules may have constituted the desirable conditions for selecting teacher education in the first place), she may see little benefit in forming new dispositions in *F2* that will not be well matched for the rules of the game in *F1* as a teacher. Even though habitus and field are dynamic – always evolving, always partial, and never a perfect match for each other – Toni will be most comfortable in a field where her habitus is a good fit with the logic and operation of the field. For her, *F2* is a brief detour between the social positions and the power relations of *F1* as a student and *F1* as a teacher. Instead of recognizing the possibilities in/for reshaping her habitus, and in turn using that new habitus to reshape the field of *F1*, the mutually constitutive nature of habitus and field is lost in the transition. In teacher education, the challenge lies in working to reveal the social positions and power relations perpetuated and reproduced by the privileged players (Nolan, 2012).

Concluding thoughts

Teaching, as Phelan (2005) has argued, is “a complex and uncertain enterprise that demands ongoing, thoughtful inquiry and discernment” (p. 340). That complexity is particularly apparent in the shift from a traditional practice to a teaching practice centered on inquiry approaches. Such a practice places huge pedagogical demands on pre-service teachers and is unlikely to produce a perfect fit between the vision and the enactment of inquiry practices. Cuban (2009) argues that “hybrid pedagogies” (p. 185) may be the norm as teachers shift from traditional teaching toward reform-oriented classrooms. Zeichner (2010) argues that such hybrid pedagogies are able to “bring together school and university-based teacher educators and practitioner and academic knowledge in new ways to enhance the learning of prospective teachers” (p. 92). In exploring one teacher’s (Toni’s) hybrid pedagogies that assist her in negotiating these shifts, we have drawn on Bourdieu’s work to explain the enactment of inquiry approaches as bound up in a set of dispositions and tendencies, constituting her habitus, that lead her more toward reproducing traditional practice rather than reconstructing and repositioning her classroom practice as inquiry. For Toni, of course, there are, in Bourdieu’s understanding, certain tangible benefits in reproducing convention.

Bourdieu’s social field theory addresses the longstanding issue of the structure/agency divide and allows us to view the competing and conflicting demands on Toni in a new light. It shows us how inquiry and traditional practices intertwine in

convoluted and contradictory ways to fashion teacher change in a way that is more complex than any stereotypical representation. Toni's reading of classroom practice during the practicum was informed by a complex grid of educational discourses and practices. Steeped in the as-yet-still-developing habitus as inquiry teacher, she tapped into both fields that, operating to some extent below her conscious awareness, vied for position to constitute her as a teacher of mathematics. Thus, we can conceptualize Toni's practice as both reproducing the modes of traditional teaching and enacting the wider influences of reform discourses which, at least rhetorically, gave primacy to inquiry and problem solving in the classroom.

Bourdieu's theory enables us to understand that the passive act of *wanting* to change one's habitus is easier said than done when the rules of the field continue to appear unaltered to any significant degree. What needs to be emphasized, however, is that habitus–field reshaping is not a project without hope since “social agents can experience change in fields when there is a disjunction between their *habitus* and the current conditions within the field” (Thomson, 2008, p. 79). Bourdieu himself tells us that while habitus is durable, it is not eternal and that one should see habitus as “an open system of dispositions” (Bourdieu & Wacquant, 1992, p. 133).

In teacher education, conditions are being created for pre-service teachers, like Toni, to experience such disjunctions in their current comfortable habitus–field fit so that they may reshape their habitus (see Nolan, 2012; Walshaw, 2011). The challenge lies in persuading pre-service teachers to take risks and consider trying an uncomfortable habitus on for size. Perhaps such risks will eventually transpire when teachers, pre-service teachers, and teacher educators all recognize that “the game that is played in fields has no ultimate winner, it is an unending game, and this always implies the potential for change at any time” (Thomson, 2008, p. 79).

References

- Albright, J., & Luke, A. (Eds.). (2008). *Pierre Bourdieu and literacy education*. New York, NY: Routledge.
- Allen, J.M. (2009). Valuing practice over theory: How beginning teachers re-orient their practice in the transition from the university to the workplace. *Teaching and Teacher Education*, 25, 647–654.
- Anderson, G. (1998). *Fundamentals of educational research*. London: Taylor & Francis.
- Armaline, W., & Hoover, R. (1989). Field experience as a vehicle for transformation: Ideology, education, and reflective practice. *Journal of Teacher Education*, 40, 42–48.
- Badali, S., & Nolan, K. (2010). Virtual faculty advisors: A self-study of two teacher educators' practices. In L. Erickson, J. Young, & S. Pinnegar (Eds.), *Navigating the public and private: Negotiating the diverse landscape of teacher education* (pp. 25–28). Provo, UT: Brigham Young University.
- Ball, D.L., Lubienski, S.T., & Mewborn, D.S. (2001). Research on teaching mathematics: The unsolved problem of teachers' mathematical knowledge. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed., pp. 433–456). Washington, DC: American Educational Research Association.
- Bourdieu, P. (1971). Systems of education and systems of thought. In M.F.D. Young (Ed.), *Knowledge and control* (pp. 189–207). London: Macmillan.
- Bourdieu, P. (1977). Outline of a theory of practice (R. Nice, Trans.). Cambridge: Cambridge University Press.
- Bourdieu, P. (1990a). In other words: Essays toward a reflexive sociology (M. Adamson, Trans.). Cambridge: Polity Press.
- Bourdieu, P. (1990b). The logic of practice (R. Nice, Trans.). Cambridge: Polity Press.
- Bourdieu, P. (1998). *Practical reason: On the theory of action*. Stanford, CA: Stanford University Press.

- Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in education, society and culture* (2nd ed.). (R. Nice, Trans.). London: Sage.
- Bourdieu, P., & Wacquant, L. (1992). *An invitation to reflexive sociology*. Chicago, IL: The University of Chicago Press.
- Britzman, D. (2003). *Practice makes practice: A critical study of learning to teach* (Rev. ed.). New York, NY: State University of New York Press.
- Brodie, K. (2010). Pressing dilemmas: Meaning making and justification in mathematics teaching. *Journal of Curriculum Studies*, 42(1), 27–50.
- Brodie, K. (2011). Working with learners' mathematical thinking: Towards a language of description for changing pedagogy. *Teaching and Teacher Education*, 27, 174–186.
- Brown, T. (2008). Comforting narratives of compliance: Psychoanalytic perspectives on new teacher responses to mathematics policy reform. In E. de Freitas & K. Nolan (Eds.), *Opening the research text: Critical insights and in(ter)ventions into mathematics education* (pp. 97–109). New York, NY: Springer.
- Burton, L. (2004). "Confidence is everything" – Perspectives of teachers and students on learning mathematics. *Journal of Mathematics Teacher Education*, 7, 357–381.
- Chapman, O., & Heater, B. (2010). Understanding change through a high school mathematics teacher's journey to inquiry-based teaching. *Journal of Mathematics Teacher Education*, 13, 445–458.
- Cuban, L. (2009). *Hugging the middle: How teachers teach in an era of testing and accountability*. New York, NY: Teachers' College Press.
- Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world: What teachers should learn and be able to do*. San Francisco, CA: Wiley.
- Deer, C. (2008). Doxa. In M. Grenfell (Ed.), *Pierre Bourdieu: Key concepts* (pp. 119–130). Stocksfield: Acumen.
- Department for Education and Employment (DfEE). (1999). *The national numeracy strategy: Framework for teaching mathematics from reception to Year 6*. London: Department for Education and Employment.
- Dimitriadis, G., & Kamberelis, G. (2006). *Theory for education*. New York, NY: Routledge.
- Doyle, W. (1983). Academic work. *Review of Educational Research*, 53(2), 159–199.
- Ensor, P. (2001). Taking the 'form' rather than the 'substance': Initial mathematics teacher education and beginning teaching. In M. Van den Heuvel-Panhuizen (Ed.), *Proceedings of the 25th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 393–400). Utrecht: Freudenthal Institute, Utrecht University.
- Franke, M., Webb, N., Chan, A., Ing, M., Freund, D., & Battey, D. (2010). Teacher questioning to elicit students' mathematical thinking in elementary school classrooms. *Journal of Teacher Education*, 60, 380–392.
- Garcia, M., Sanchez, V., Escudero, I., & Llinares, S. (2006). The dialectic relationship between research and practice in mathematics teacher education. *Journal of Mathematics Teacher Education*, 9, 109–128.
- Grenfell, M. (Ed.). (2008). *Pierre Bourdieu: Key concepts*. Stocksfield: Acumen.
- Harker, R. (1990). Bourdieu – education and reproduction. In R. Harker, C. Mahar, & C. Wilkes (Eds.), *An introduction to the work of Pierre Bourdieu* (pp. 86–108). London: MacMillan.
- Herbel-Eisenmann, B.A., & Breyfogle, M.L. (2005). Questioning our patterns of questions. *Mathematics Teaching in the Middle School*, 10(9), 484–489.
- Herbel-Eisenmann, B.A., Lubienski, S.T., & Id-Deen, L. (2006). Reconsidering the study of mathematics instructional practices: The importance of curricular context in understanding local and global teacher change. *Journal of Mathematics Teacher Education*, 9(4), 313–345.
- Inoue, N. (2009). Rehearsing to teach: Content-specific deconstruction of explanations in pre-service teacher training. *Journal of Education for Teaching*, 35(1), 47–60.
- Jenkins, R. (1992). *Pierre Bourdieu*. London: Routledge.
- Kazemi, E., & Franke, M. (2004). Teacher learning in mathematics: Using student work to promote collective inquiry. *Journal of Mathematics Teacher Education*, 7, 203–235.
- Knight, N. (2003). Teacher feedback to students in numeracy lessons: Are students getting good value? *SET: Research Information for Teachers*, 3, 40–45.

- Lampert, M., & Ball, D.L. (1998). *Teaching, multimedia, and mathematics. Investigations of real practice*. New York, NY: Teachers' College Press.
- Leikin, R., & Rota, S. (2006). Learning through teaching: A case study on the development of a mathematics teacher's proficiency in managing an inquiry-based classroom. *Mathematics Education Research Journal*, 18(3), 44–68.
- Leinhardt, G. (2010). Introduction: Explaining instructional explanations. In M.K. Stein & L. Kucan (Eds.), *Instructional explanations in the disciplines* (pp. 1–5). New York, NY: Springer.
- Lerman, S. (2001). A review of research perspectives on mathematics teacher education. In F.-L. Lin & T.J. Cooney (Eds.), *Making sense of mathematics teacher education* (pp. 33–52). Dordrecht: Kluwer Academic.
- Ma, J.Y., & Singer-Gabella, M. (2011). Learning to teach in the figured world of reform mathematics: Negotiating new models of identity. *Journal of Teacher Education*, 62(1), 8–22.
- Moore, R. (2003). Reexamining the field experiences of preservice teachers. *Journal of Teacher Education*, 54, 31–42.
- Moore, A. (2004). *The good teacher: Dominant discourses in teaching and teacher education*. London: RoutledgeFalmer.
- Mutch, C. (2006). Adapting Bourdieu's field theory to explain decision-making processes in educational policy. In V. Anfar & N. Mertz (Eds.), *Theoretical frameworks in educational research* (pp. 155–174). Thousand Oaks, CA: Sage.
- Nash, R. (2002). A realist framework for the sociology of education: Thinking with Bourdieu. *Educational Philosophy and Theory*, 34(3), 273–288.
- National Council of Teachers of Mathematics (NCTM). (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- New South Wales Department of Education and Training. (2007). *Count me in too: Professional development package*. Sydney: New South Wales Department of Education and Training.
- New Zealand Ministry of Education. (2006). *Numeracy development projects*. Wellington: Learning Media.
- Nguyen, H.T. (2009). An inquiry-based practicum model: What knowledge, practices, and relationships typify empowering teaching and learning experiences for student teachers, cooperating teachers and college supervisors? *Teaching and Teacher Education*, 25, 655–662.
- Nolan, K. (2008). Imagine there's no haven: Exploring the desires and dilemmas of a mathematics education researcher. In T. Brown (Ed.), *The psychology of mathematics education: A psychoanalytic displacement* (pp. 159–181). Rotterdam: Sense.
- Nolan, K. (2010a). Playing the field(s) of mathematics education: A teacher educator's journey into pedagogical and paradoxical possibilities. In M. Walshaw (Ed.), *Unpacking pedagogy: New perspectives for mathematics classrooms* (pp. 153–173). Charlotte, NC: Information Age.
- Nolan, K. (2010b). Virtually there: Introducing the internship e-advisor in mathematics teacher education. In U. Gellert, E. Jablonka, & C. Morgan (Eds.), *Proceedings of the Sixth International Mathematics Education and Society Conference* (Vol. 1, pp. 102–105). Berlin: Freie Universität Berlin.
- Nolan, K. (2012). Dispositions in the field: Viewing mathematics teacher education through the lens of Bourdieu's social field theory. *Educational Studies in Mathematics*, 80(1–2), 201–215.
- Noyes, A. (2004). (Re)producing mathematics educators: A sociological perspective. *Teaching Education*, 15(3), 243–256.
- Pereira, P. (2005). Becoming a teacher of mathematics. *Studying Teacher Education*, 1(1), 69–83.
- Phelan, A. (2005). A fall from (someone else's) certainty: Recovering practical wisdom in teacher education. *Canadian Journal of Education*, 28(3), 339–358.
- Potari, D., & Georgiadou-Kabouridis, B. (2009). A primary teacher's mathematics teaching: The development of beliefs and practice in different "supportive" contexts. *Journal of Mathematics Teacher Education*, 12, 7–25.

- Pozuelos, F., Travé, G., & Cañal, P. (2010). Inquiry-based teaching: Teachers' conceptions, impediments, and support. *Teaching Education, 21*(2), 131–142.
- RAND Report. (2003). *Mathematical proficiency for all students: Towards a strategic research and development program in mathematics education*. Pittsburgh, PA: RAND Education Institute.
- Rawolle, S., & Lingard, B. (2008). The sociology of Pierre Bourdieu and researching education policy. *Journal of Education Policy, 23*(6), 729–741.
- Reay, D. (2002). Shaun's story: Troubling discourses of white working-class masculinities. *Gender and Education, 14*(3), 221–234.
- Shulman, L., & Shulman, J. (2004). How and what teachers learn: A shifting perspective. *Journal of Curriculum Studies, 36*, 257–271.
- Stake, R. (1998). Case studies. In N.K. Denzin & Y.S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 86–109). Thousand Oaks, CA: Sage.
- Sullivan, P. (2010). The challenge in developing in mathematics teachers an inquiry stance to teaching. *Journal of Mathematics Teacher Education, 13*, 197–199.
- Tatto, M., & Senk, S. (2011). The mathematics education of future primary and secondary teachers: Methods and findings from the Teacher Education and Development Study in Mathematics. *Journal of Teacher Education, 62*, 121–137.
- Thomson, P. (2008). Field. In M. Grenfell (Ed.), *Pierre Bourdieu: Key concepts* (pp. 67–81). Stocksfield: Acumen.
- Tom, A. (1985). Inquiring into inquiry-oriented teacher education. *Journal of Teacher Education, 36*, 35–44.
- Towers, J. (2010). Learning to teach mathematics through inquiry: A focus on the relationship between describing and enacting inquiry-oriented teaching. *Journal of Mathematics Teacher Education, 13*, 243–263.
- Walshaw, M. (2004). Pre-service teaching in the context of schools: An exploration into the constitution of identity. *Journal of Mathematics Teacher Education, 7*(1), 63–86.
- Walshaw, M. (2011). Working with teachers to enable both student and teacher learning. *Journal of Mathematics Teacher Education, 14*(1), 1–4.
- Walshaw, M., & Anthony, G. (2008). The teacher's role in classroom discourse: A review of recent research into mathematics classrooms. *Review of Educational Research, 78*(3), 516–551.
- Watson, A. (2002). Instances of mathematical thinking among low attaining students in an ordinary secondary classroom. *Journal of Mathematical Behavior, 20*, 461–475.
- Warde, A. (2004). *Practice and field: Revising Bourdieusian concepts*. CRIC Discussion Paper 65, Manchester: The University of Manchester.
- Webb, J., Schirato, T., & Danaher, G. (2002). *Understanding Bourdieu*. London: Sage.
- Weber, S., & Mitchell, C. (1995). *That's funny, you don't look like a teacher! Interrogating images and identity in popular culture*. London: The Falmer Press.
- Western and Northern Canadian Protocol (WNCP). (2008). *The common curriculum framework for grades 10–12 mathematics: Western and Northern Canadian protocol*. (January 2008). Retrieved from <http://www.wncp.ca/math/math10to12.pdf>
- Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college – and university-based teacher education. *Journal of Teacher Education, 61*, 89–99.
- Zevenbergen, R. (2000). “Cracking the code” of mathematics classrooms: School success as a function of linguistic, social, and cultural background. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 201–223). Westport, CT: Ablex.