

Theorising Disruptive Pedagogy in Teacher Education: Mathematics Teacher Educators and Practice-theory Challenges in the Post-field Context

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An extensive body of research has examined theory-practice transitions in mathematics teacher education, where prospective teachers (PTs) move from university (theory) to field experience (practice). In contrast, the reverse transition—from practice back to theory—is underexplored. Acknowledging mathematics teacher educators' (MTEs') key role in teaching PTs to reflect critically on their field experiences and create spaces for disruption and disruptive pedagogies, this article focuses on the often-overlooked practice-theory transition. Drawing on interviews with 21 MTEs from Canada and Norway, we examine how MTEs navigate PTs' return to university following their field placement in schools. While and disruptive pedagogy literature suggests that teacher educators should challenge or shift away from certain pedagogies and practices, our findings reveal that MTEs may choose *not* to challenge specific beliefs/practices in the post-field context of mathematics teacher education. Reasons include PTs' limited familiarity with theoretical discourse, MTEs' desire to reduce the pressure on PTs, and an intention to avoid reinforcing the dominant time discourse. Additionally, some MTEs are unaware that pre- and post-field practices might need to differ. We offer specific suggestions for critical reflective questions and actions that could be initiated in a post-field "third space" to promote deliberate and disruptive pedagogical actions.

Keywords • mathematics teacher education research • disruptive pedagogy • teacher educator
• post-field context • analytical framework

Introduction

Regardless of the institutions at which they study, prospective teachers (PTs) tend to report on the experiences gained in school placements as being the most valuable part of teacher education (Allen, 2009). In that respect, there is a desire on the part of PTs to increase the time spent in placement (at the cost of time spent at campus) during teacher education (Resch & Schrittmesser, 2021). This "turn towards practice" (Zeichner & Bier, 2013) or "practicum turn in teacher education" (Mattson et al., 2012; Reid, 2011), drives teacher educators (TEs) and researchers to seek balance between the theoretical input from universities and the practice experienced in schools.

In mathematics teacher education, there is an extensive body of research examining the theory practice transition (Britzman, 2003; Gainsburg, 2012), focusing primarily on transitions from university (theory) to field experience (practice). Another key transition in teacher education programs is from field experience (practice) back to university (theory), addressing those programs where PTs return to the university for additional lessons/courses following the completion of a period of field placement. This is the transition focused on here, recognising that it is by far the least researched transition in teacher education research, especially with respect to the roles of teacher educators (TEs) "back" at the university after PTs complete a field experience in schools. As noted by Eriksen and Bjerke (2019), "[l]ittle is known about the way in which teacher educators integrate prospective teachers' actual experiences when they return to university after fieldwork" (p. 9). In this article, and in other publications (e.g., Bjerke & Nolan, 2023; Nolan & Bjerke, 2024), we claimed that a deliberate unpacking of field-back-to-university transitions is relevant in its potential to make fieldwork the object of more critical attention and



disruption in teacher education programs, as called for in the literature (Resch & Schrittester, 2021; Siuty, 2019). This call, in turn, places great demand on mathematics teacher educators (MTEs), since there is no recipe for how to unpack practice in post-field university courses through approaches that aim to disrupt and challenge taken-for-granted practices currently preserving status quo. While it is no easy task for MTEs to practice pedagogies which disrupt and challenge, Beighton (2017) reminded us, “teacher educators need to understand that learning, with all its difficulties and complexities, is not a problem to be fixed or a weakness to be confessed, but an ongoing process of engagement with what is becoming” (p. 120).

In this article, we present one aspect of our ongoing research into practice-theory transitions in mathematics teacher education—the specific beliefs/practices that MTEs are choosing *not* to challenge in the post-field context. To situate our data and analysis we first provide the theoretical context for our research and for this article, highlighting the work we have already published related to *disruptive pedagogies*. We describe our understandings of disruptive pedagogy and present the disruptive pedagogy analytical framework that we have developed through our broader research study, which explored practice-theory transition and reflected on the merit of viewing post-field teacher education practices through a lens of disruptive pedagogy. Following this, we present a review of current literature to establish what research has been conducted already. After presenting details pertaining to our research methods and approach to data analysis, we then offer our key findings in the form of four themes. Our discussion and concluding remarks then take the reader beyond the specific focus on beliefs/practices that MTEs are choosing not to challenge in the post-field context by offering key recommendations and implications emerging from our use of the full disruptive pedagogy analytical framework in our study, as we aimed to understand the role of MTEs in unpacking the post-field context of teacher education programs through a lens of disruptive pedagogy.

Theoretical Context for the Research

As we have discussed elsewhere (Bjerke & Nolan, 2022; Nolan & Bjerke, 2021), disruptive actions and practices on the part of TEs are those that work to dismantle and replace dominant paradigms that currently support status quo practices; they unpack “the culture of resistance for pedagogical change embedded in K–12 schools” (Vratulis et al., 2011, p. 1181). Prior to reviewing the literature on how/if TEs—and MTEs in particular—are disrupting and challenging aspects of their teacher education programs, we offer a brief overview of our intentions and meanings behind disruptive pedagogy.

We consider a pedagogy to be disruptive if it “requires students to challenge or change their epistemologies and participation in their learning” (Anderson & Justice, 2015, p. 400). Mills (1997) proposed that a disruptive pedagogy challenges “the legitimacy of school processes which produce and reproduce oppressive relations of power” (pp. 35–36) and calls for a pedagogy that moves beyond “valuing” diversity and a culture of tolerance “to a critical understanding of difference that ... recognises micro and macro power relations and problematises knowledge about ‘community’” (p. 75). In this regard, Beighton (2017) offered the idea that “teacher educators can examine how non-diversified practices at the local [micro] level constitute barriers to meaningful student participation and undermine teachers’ responses to issues of equity and social justice” (p. 113).

With these definitions of disruptive pedagogy in mind, and shifting to the context of mathematics teacher education, we claim that disruptive pedagogy is happening when MTEs encourage PTs to challenge the belief systems and learning experiences that prevent them from considering alternative discourses for what it means to know, learn and teach mathematics. In other words, MTEs are engaging in disruptive pedagogy when they create the conditions for PTs to interrogate dominant discourses of mathematics based on, for example, assessment practices that continue to rank and grade mathematics learners or instrumentalist technique-oriented teaching and learning approaches (what Skovsmose [2001] referred to as the “exercise paradigm”). In this regard, Gore et al. (2004) argued that field experiences often promote such technicist view, training teachers to “replicate a formula for successful teaching” (p. 377) and to focus on the practice of techniques “with relatively little concern for what is being taught and the quality of learning produced” (p. 385). Beyond the subject matter itself, disruptive



pedagogy also calls for MTEs to disrupt asymmetric relations and structural inequalities that continue to colonise the learner toward deficit views with respect to who can succeed at mathematics, including misrecognising the power of mathematics and its uses in schools and in society more generally (Andersson & Nolan, 2021).

Equipped with this understanding of disruptive pedagogy, our collaborative work as MTE researchers began as a dialogue between us reflecting on how it is to be an MTE in the post-field context of mathematics teacher education (Nolan & Bjerke, 2021). This dialogue prompted us to design a research project to explore the experiences of our MTE colleagues working in teacher education institutions across Norway and Canada. Drawing on a review and synthesis of the disruptive pedagogy literature, we found two main directions: first, a suggestion that teacher educators should challenge or shift away from certain pedagogies and practices (e.g., pedagogies and practices based in traditional and technical-rational approaches); and second, a suggestion that teacher educators promote or shift towards certain other pedagogies and practices (e.g., pedagogies and practices shaped by equity and social justice aims). Hence, informed by our review of disruptive pedagogies, we conducted an analysis of our study's data through this language of challenge, and advocate for the use of four data-driven questions that constitute our disruptive pedagogy analytical framework:

Q1: *What do MTEs see as challenges (i.e., what are MTEs challenged by) in the post-field context?*

Q2: *What are MTEs doing to challenge specific beliefs/practices in the post-field context?*

Q3: *What are MTEs doing to promote specific beliefs/practices in the post-field context?*

Q4: *Why/how do MTEs choose not to challenge specific beliefs/practices in the post-field context?*

This framework facilitates a better understanding of the roles and practices of MTEs in post-field contexts and to re-conceptualise post-field possibilities in teacher education (Nolan & Bjerke, 2024). Moreover, it establishes that MTEs have a crucial role to play in unpacking PTs' field experiences. In utilising the framework, in Bjerke and Nolan (2023), we first addressed Q1 of our framework above and found that MTEs face challenges related to organisational structures, and to PTs' superficial placement insights and their uncritical notions of "good mathematics teaching." In addition, PTs' reliance on mentor teachers, often sceptical of reform teaching, further undermines university-based instruction. MTEs reported encountering PTs' scepticism and resistance, along with feelings of resignation stemming from these persistent challenges. Our analysis suggested that some MTEs ultimately adopt a pragmatic approach to post-field instruction while some even step down from their role (Bjerke & Nolan, 2023). We followed our analysis of Q1 by addressing Q2 and Q3 of our framework, which is reported in Nolan and Bjerke (2024). We found that MTEs act *to challenge* certain beliefs and practices and *promote* other/alternative beliefs and practices in relation to four key themes identified in the data: theory-practice relationships, reflection on field placement, what it means to learn mathematics, and what mathematics is (Nolan & Bjerke, 2024).

In this article, we present our findings from focusing on Q4 of our analytical framework; that is, why/how do MTEs choose *not* to challenge specific beliefs/ practices in the post-field context. Hence, this article reports on what MTEs shared about why they do not act on the challenges that they notice in practice-theory transitions and how they choose to act instead. We suggest that there are important lessons to be learned from investigating MTEs' accounts of why, in the post-field context, they avoid drawing on and challenging aspects of placement experiences.

Literature Review

We present here a review of the literature on what other scholars have proposed as the key roles and knowledge that MTEs require for their work in teacher education as well as the literature that highlights how MTEs, and TE in general, seek to disrupt status quo practices in teacher education courses and in teaching practices in the field.

The Roles and Knowledge of Mathematics Teacher Educators

Lunenberg et al.'s (2014) comprehensive qualitative analysis of 137 articles on TEs and their professions, distinguished six roles of TEs: teacher of teachers; researcher; coach; curriculum developer; gatekeeper; broker (Lunenberg et al., 2014, pp. 19–21), unveiling some of the complexities involved in, and critical features of, TEs' professional behaviour. Others, Hökkä et al. (2012) for instance, discussed the high standards and responsibilities placed on TEs, setting forth how TEs "are considered to be academic professionals who are responsible for conducting academic research themselves, keeping up active societal relations, and providing research-based teacher education" (p. 84). These are only two examples of important research into the roles and knowledge of TEs, a steadily growing field of research.

Research on the roles of MTEs focuses less on their changing nature in the different stages of teacher education programs (i.e., pre-field or post-field) than it does on the role of specific theoretical tools or stances adopted in MTE practices and on how MTEs learn and develop their knowledge and expertise. For instance, considering the role of theory, an extensive body of research reported on the challenges of implementing theory in preservice courses (see e.g., Eriksen & Bjerke, 2019) and the tensions MTEs experience when introducing theory to teachers during professional development sessions (Lin et al., 2018), where teachers express "the view that theory is not useful for teaching" (p. 201). Further, considering how MTEs learn and develop their knowledge, a recent review on the issue identified three strands of focus in the research: self-studies conducted to highlight the nature of the knowledge used when teaching teachers; studies that use research on teacher knowledge to conceptualise what MTE knowledge entails; and studies that use "the lens of MTEs' instructional goals and design decisions to understand the knowledge they draw on when teaching teachers" (Castro Superfine et al., 2024, p. 1).

Considering the first strand, and the substantial share of literature featuring the voices of MTEs that mostly emerge from self-studies (see a review of this literature in Nolan & Bjerke [2024]), a recent study by Keazer and Nolan (2024) proposed a self-study framework to support MTEs in growing their culturally responsive pedagogies. In their framework, the authors identified four components of MTE practice (mathematical and curricular knowledge, pedagogical knowledge and modeling, research/theory/scholarship, and critical reflection/praxis) that MTEs are encouraged to reflect on as they seek to grow different dimensions of culturally responsive pedagogies.

The second strand covers literature that draws on the conspicuous connection between earlier work on mathematics teacher knowledge and MTEs' knowledge (Beswick & Goos, 2018). This is visible in how some researchers have conceptualised MTE knowledge (e.g., Masingila et al., 2018) by building on well-established conceptualisations from the mathematics teacher knowledge literature (e.g., Ball et al., 2008; Shulman, 1987), where certain subdomains of MTE knowledge are seen "as being 'meta' forms of analogous teacher knowledge subdomains" since "MTEs need knowledge of these subdomains in ways that are specific to teaching PTs" (Castro Superfine et al., 2024, p. 17). Others bring to the fore subdomains that are unique to MTEs, such as sensitivity to (prospective) mathematics teachers (Zaslavsky & Leikin, 2004) and MTEs' knowledge of mathematics education research (Chauvot, 2009).

The third strand of focus in the research identified by Castro Superfine et al. is of special interest to us, considering its "move towards considering affective constructs in relation to MTEs" (Beswick & Goos, 2018, p. 419). For instance, Li and Castro Superfine (2018) identified four goals of MTEs, two of them concerned with MTEs' desire to "ensure preservice teachers have a positive experience with mathematics" and to "create collaborative and safe learning environments" (p. 189). As we see it, these affective constructs, where MTEs are concerned with creating positive, safe, and collaborative environments, could unfortunately be standing in the way of MTEs engaging in critical work toward noticing and disrupting status quo and inequitable practices.

In the next section of this review, we discuss in greater detail how other research points to the role of TEs, and more specifically MTEs, as exercising greater agency in dismantling and disrupting non-critical desires, what Bissonnette (2016) referred to as "the culture of niceness." In claiming that "teacher education classrooms are powerful spaces, and teacher educators are capable of working as agents of



change" (p. 18), Bissonnette (2016) "offer[ed] teacher educators culturally responsive pedagogical possibilities that resist and reject educative niceness" (p. 11).

What are Mathematics Teacher Educators Doing to Disrupt?

Given this review of the research regarding the roles and knowledge of MTEs, it is clear that becoming and being a TE are complex processes that are not characterised by any clear set of motivations or outcomes; instead, living one's life as a TE relies to a great extent on the individual personal and professional goals and experiences of the TE (Malm, 2020). In this section of the review, we explore further the question of what TEs (including MTEs) are presently doing to disrupt status quo/dominant practices in the education of new teachers.

In the research reviewed, we found that some TEs (from non-mathematics disciplinary areas), including physical education, geography, and literacy education, are working to disrupt and challenge dominant ways of thinking, acting, and becoming a teacher/TE through a focus on, for instance, critical race theory (Andrews et al., 2021; Aronson et al., 2020), critical pedagogy (Kitts, 2022; Philpot, 2016), critical language consciousness (Stillman & Palmer, 2024), critical, social justice-oriented pedagogies (Conklin, 2015), culturally responsive/relevant pedagogy (Allen et al., 2017; Roberts, 2020; Tondreau et al., 2024), and decolonising and Indigenising approaches to education (King et al., 2024; Martin & Pirbhai-Illich, 2016; Reilly, 2022). Moreover, in mathematics teacher education, some MTEs also seek to disrupt dominant mathematical discourses through similar lenses and theories; for example, through critical race theory (Jett et al., 2022; Maldonado Rodríguez et al., 2022), anti-racist teaching (Madkins & Morton, 2021), culturally responsive/relevant pedagogy (Keazer & Nolan, 2024; Nicol & Korteweg, 2010; Nolan & Keazer, 2021), and decolonising and Indigenising approaches to working with prospective mathematics teachers (Brown, 2024; Garcia-Olp et al., 2022; Nicol et al., 2020; Owens, 2023).

It is worth noting at this point that, in the design of our research study and interviews, we did not ask MTE participants to draw on any specific theory (such as critical race theory) or pedagogy (such as culturally responsive pedagogy) to discuss how or what they considered to be disruptive about their practice; instead, we simply provided MTEs with a basic definition of disruptive pedagogy that they could use as a reference and tool for thinking when reporting on their practice. As reported in Bjerke and Nolan (2023), this approach led us to advocate for a disruptive view of learning through the creation of a third space "that invites awareness and action toward disrupting and challenging dominant discourses in mathematics classrooms" (p. 11). This third space—which we refer to as a post-field third space—is one "positioned in the transition from practice to theory, and one that invites the voices, narratives, and knowledge of mentor teachers, PTs and MTEs" (p. 11). We further elaborate on the potential of this third space in this article's discussion section, where we use the findings of the research to propose critically reflective questions and actions that could be initiated in such a third space.

While our research aims to focus on MTEs in the post-field context, we have learned that a sole focus on this context is not always possible, since the same TEs/MTEs are often involved with PTs during all three stages. In this review, therefore, we acknowledge the blurring of the lines between these stages when it comes to the critical research that does exist, and that aligns with our own search for disruptive pedagogy in the post-field context. A number of these studies are critical self-studies on becoming, being, or improving as TEs/MTEs (e.g., Livers & Willey, 2023; Maestranzi et al., 2022; Roofe et al., 2023). Livers and Willey (2023), for instance, conducted a critical self-study into their own practices to explore how/if they are preparing PTs to teach mathematics equitably. These authors noted, "one part of scrutinising the efforts of MTEs is to examine what it is that we attend to in teachers' formal preparation in becoming a mathematics teacher, namely, the mathematics methods coursework and corresponding fieldwork" (p. 290). They advocated for more critical self-studies, "where white MTEs engage in deconstructing their pedagogical practices for the seemingly hidden racist structures that maintain inequitable and unjust power relationships" (p. 310).

One approach to critical self-studies being conducted by both TEs and PTs are critical incidents studies (Brandenburg & McDonough, 2017; Goodell, 2006). In Brandenburg and McDonough (2017), a critical incidents study with TEs provided opportunities for identifying and reflecting on frequently



involved tensions that TEs experience around conflicting personal, professional, and institutional goals. Moreover, Goodell (2006), who described a critical incidents study with PTs, reported how “the use of the critical incident discussions can open up a dialogue between the teacher educator and the pre-service teacher that may not exist otherwise” (p. 243).

Loughran and Menter (2019) offered that “the teacher educator needs to be expert at creating pedagogical opportunities that extend understandings of teaching from being solely technical in order to offer insights and experiences of the dynamic, problematic, complex and sophisticated nature of practice” (p. 222). These authors contended that TEs must challenge the status quo and that the capacity to do so hinges on “teacher educators’ ability to actively create learning about teaching situations that can disrupt existing views of teaching and foster a search for pedagogical equilibrium” (p. 222). In the education of mathematics teachers, we contend that MTEs are called upon to act on the challenges they identify and to make deliberate pedagogical choices toward “the disruption of practices which contribute to the reproduction of educational inequalities” (Beighton, 2017, p. 113). As we report in this article, however, our research points to the reality that many MTEs choose not to challenge or disrupt but, instead, to resign themselves to status quo practices in mathematics teaching and teacher education. Following the presentation of our findings, we pose critically reflective questions around what, we believe, leads MTEs toward this resignation and inaction, and what could be done about it.

Methods

Based on the findings reported in Bjerke and Nolan (2023) and Nolan and Bjerke (2024)—where we identified what the pedagogies that challenge certain beliefs and practice while promoting others might look like in the context of MTE post-field practices—our attention in this article is drawn towards the MTEs’ accounts of why/how they do *not* act on the challenges that arise.

The Context

We use the term post-field context to refer to that stage in a university teacher education program where PTs return to the university for additional lessons/courses following the completion of a period of field placement (also known as school placement, field experience, practicum, internship, or simply school practice). For the sake of describing the two research contexts of the study referred to in this article, we provide brief portrayals of how teacher education programs are structured and organised in the two countries of Norway and Canada. Regardless of nuances associated with the teacher education programs in each country, and across different regions/provinces of each country, all programs include post-field teacher education work; our interest lies in unpacking the actions of MTEs in these post-field contexts.

Norway’s teacher education institutions follow a set of national guidelines (UHR Universities Norway, 2018) that guides each university and university college in preparing their own five-year long teacher education programs. While these guidelines give each teacher education institution the agency to make its own institutional curricular decisions, national regulations require for each program to facilitate a minimum of 80 days in the field for each PT during years 1–3 and a minimum of 30 days during years 4–5. These days in the field are typically evenly distributed across the program, especially in years 1–4, leaving approximately 15 days in the field in each of the first eight semesters. Hence, in Norwegian teacher education, the post-field context refers to the mathematics teaching sessions taking place after a period in the field and before the end of a semester.

Unlike Norway, education in Canada is provincially mandated, which means that the 10 provinces and 3 territories all exercise control over their local curricula. As such, teacher education programs existing across the different provinces and territories tend to be structured in ways that respond to local needs around teaching, learning, and assessment. Across the country, there are more than 60 institutions offering a teacher education program, with programs varying from 1-year post-graduate to 4- (or 5-) year undergraduate degrees. The design and duration of field placement, or school practicum, associated with these programs are also considerably diverse across the institutions. Some institutions



with a 4-year undergraduate teacher education program (2nd author university, for example) offer a developmental approach to field placement, beginning with one day per week in year 1 and increasing to a final 13-week intensive field placement in year four. During this intensive field placement, courses are not taken at the university. Instead, post-field courses are enrolled in by PTs after this lengthy field placement in schools. This situation is not the same, however, across all teacher education programs in Canada. In fact, one participant (CMTE7) discussed the post-field context as evening classes taking place at the university after PTs had been in schools all day.

Research Participants and Interviews

We draw on semi-structured interviews with 21 MTEs, all typically lasting approximately 45 minutes. The first author conducted the interviews of participants in Norway, and the second author conducted the interviews of participants in Canada. The 10 Norwegian MTEs selected worked at seven of the 11 governmental institutions accredited to provide teacher education. In Canada, the second author distributed a call to MTEs at 15 universities. Since teacher programs differed across the country, participants were selected from across several provinces. Table 1 outlines the number of participants, identification codes, their experience as MTEs, as well as the number of institutions drawn upon and program levels represented across both countries where the study was conducted.

Table 1

Presentation of Participants

Context	Number of participants	Participant Identification Codes	Experience as MTE	Number of Institutions	Programs
Norway	10	NMTE1-NMTE10	2–25 years	7 universities & university colleges	Grades 1–7 & Grades 5–10
Canada	11	CMTE1-CMTE11	1–18 years	11 universities across 6 provinces	Grades K–8 (elem), Grades 6–12 (sec), & Grades K–12 (elem/sec)

Each interview comprised of three parts. We opened with a general “icebreaker” question where we asked the participants to share details about their university position, their teacher education program, and thoughts on theory-practice and/or practice/theory transitions. In part two, we presented a list of challenges associated with theory-practice (university to field) transitions that we had identified across a review of the research, including PTs in the role of visitors in the mentors’ classrooms; tensions associated with the different roles of the involved parties; the divide or gap between university and school expectations; and the demands of teaching through reform-based approaches (Nolan & Bjerke, 2021). With this as a backdrop, we moved into the third part of the interview where we posed questions regarding challenges in their work with PTs upon their return from a field experience; the pedagogical strategies they draw on in post-field courses; and the theoretical tools used to “unpack” the field. We also asked how and whether they, in the context of the post-field courses, strive to disrupt field practices, principles, and beliefs. As an introduction to the third part of the interview, we provided our participant MTEs with a definition of disruptive pedagogy from Anderson and Justice (2015), who described a pedagogy as disruptive if it “requires students to challenge or change their epistemologies and participation in their learning” (p. 400). In addition, we offered how Mills (1997) refers to disruptive pedagogy as “teaching practices which promote change in the existing relations of power within schools” (p. 39). We asked MTE participants to keep these ideas in mind as they reflected on to what extent they describe their post-field pedagogy as disruptive, and whether they had any concerns or reservations about viewing teacher education practices through a disruptive pedagogy lens. We concluded the interviews by asking participants what they saw as their primary role(s) as an MTE in the post-field context.



The Analysis

Given that MTEs clearly noticed many challenges in the post-field context (as reported in Bjerke & Nolan, 2023), some of which they were trying to address (see Nolan & Bjerke, 2024), we sought to uncover MTEs' reasoning for not acting on other challenges.

The 21 semi-structured research interviews were transcribed verbatim, 10 in Norwegian and 11 in English. After becoming familiar with the data, a process that included extensive discussions between the authors (especially considering our different languages), we started identifying themes. Recalling that that we did not ask MTE participants to draw on any specific theory or discourse to discuss how or what they considered to be disruptive about their practice, initial codes with reference to what MTEs reported as challenges that they, for some reason, chose not to act upon in the post-field context were generated manually, individually and separately by each researcher. This step resulted in a collection of text extracts reflecting all forms of challenges (i.e., their accounts of what they avoided doing). These extracts were used to discuss our reflexive reading of the data while considering our understanding of disruptive pedagogy in the context of mathematics teacher education (for instance, when many (most) MTEs talked about avoiding being explicit about theories, we saw them as being challenged by PTs preferring a "practical-level" language). In conducting reflexive thematic analysis, we acknowledged that meaning making is iterative and that themes are not determined by frequency but by analytic significance (Braun & Clarke, 2019). Hence, our generated themes were not measured by prevalence but by their ability to capture something important about the data in relation to the posed research question.

Once a common understanding of our reflexive reading of the data was reached, we began generating themes (Braun & Clarke, 2019). We were able to identify four distinct themes to describe MTEs' reasoning for not acting upon disruptive pedagogy-inspired challenges that they noticed. These themes were unpacked with an aim of "identifying the "story" that each theme tells" (Braun & Clarke, 2006, p. 92). In presenting our analysis, each theme's story includes relevant data extracts that demonstrate the prevalence of the generated theme. These extracts were chosen if they were illustrative of ideas that were typical for that theme's story, regardless of context/country affiliation. As it turned out, it became apparent during the analysis process that data from both countries were represented in each theme, providing further support for us combining instead of comparing data from Norway and Canada. We assert that combining the data from two geographically distanced countries with different cultural contexts is considered a strength to our study in how it makes our findings pertinent and recognisable for a larger group of researchers and MTEs across more contexts/countries. At the same time, however, we remain aware that differences in the timing and duration of post-field contexts across the countries and contexts could be viewed as a constraint of our study's analysis and findings.

Findings

The data revealed how the 21 participating MTEs struggled to challenge specific beliefs/practices in the post-field context, while also (to some extent) deliberately avoiding doing so. While most MTEs were aware of how the theory-practice divide also applies to the post-field courses they teach, their reasoning or justification for deciding not to challenge or disrupt differed in nature. Four main "categories of justification" for their avoidance emerged, presented here as four themes: MTEs arguing that theory is not PTs' preferred language; they want to reduce the pressure on PTs; fear of reinforcing the time discourse; and they were not aware that pre- and post-field practices "should" be different. Below, we present the story of each theme.

Theory is not Prospective Teachers' Preferred Language

While being conscious about the important role of theory—even in post-field courses when students bring back stories from field placement that "are often kind of 'green', more like 'it was fun'" [NMTE7]—MTEs avoided being explicit with PTs about the theories they draw on. Instead, they spoke about 'being

informed by' theories in their interactions with PTs. For example, CMTE7, who clearly saw himself as "the Vygotskian", was not explicit about it because "it's just not a language that they speak ... They speak practice, not theory." [CMTE7] Instead, he chose to be "Vygotskian" rather than "talk about Vygotsky":

I think that a lot of my practices adhere to the first peoples' principles of learning. But I don't necessarily label my practice that way. So, I do a lot less labelling of theory. I have never found [theory] to be particularly useful or interesting to the student teachers. (CMTE7)

In the same manner, CMTE3 chose to support a "practical-level" language that she knows will raise student engagement. While being clear about how she is informed by theory in her chosen approaches, CMTE3 chose to draw on "real" people at the cost of being explicit about theories:

I tend to disguise the learning theories by bringing in like Dan Meyer [TED speaker] talking about, you know, math class needs a makeover. Yeah, there's a lot of theory in that, but we don't unpack it to that point, we leave it at the kind of practical level because I find I get better buy in and I get better student engagement in those kinds of pieces because they can see actual teachers, actual people who are doing this stuff, I'm not just making it up. So, I do draw on Peter Liljedahl's [mathematics education textbook author] thinking classroom kinds of concepts. You know, the culturally responsive teaching pedagogy, the theories around that, Rochelle Gutierrez in re humanising mathematics. ... I use it in the classroom, but we don't talk about it. [CMTE3]

This became the final position of CMTE10 as well: "In the past, I know I've been more explicit about who and where I'm drawing from [theoretically]. I've found that to be less effective for me, with most students." [CMTE10]

The MTEs seemingly agreed that using theories as a tool in the post-field context is discouraged by the PTs' focus. CMTE11 wished she did use theory as a tool, instead of what seems to be an inexhaustible need for hands-on advice about, for example, strategies for teaching addition of fractions. "They really don't want to learn about theories about teaching." She continued:

I suppose I mention constructivism [before they go out] ... But when they come back, I generally wouldn't draw on a theory like that. That's not what they want to do. And when I've done that before ... I get poor SOTs, student opinion of teaching surveys, because [they say] "all she does is talk about theory (...) she wants us to read these articles that are hard, you know, I just want a practitioner's book." That's what they want. So anyway, over the years, I've had to learn how to change how I deliver the math program... So yeah, so I have given up on theory. So that's absolutely truth. [CMTE11]

Although an experienced MTE, CMTE11 had, over the years, stopped naming theories in her teaching, partly due to poor feedback from students. In the same manner, other MTEs reported that they had tried to be explicit about theories, but remember it as not being particularly successful:

I don't mention [enactivist theory]. I can remember, early, one of the first or second years, I mentioned it in class, and it came back on a student's reflection that I had said anarchism or anarchy or something like that. And I thought, I think it's too much. I think it comes out in what I say and do. And the way I talk about our readings with them. But it's not something that I put out there. [CMTE1]

When the explicit use of theory in post-field courses came up during interviews, often revealing different reasonings for not being explicit about theories, other MTEs suggested this was due to a lack of experience. For instance, as a newer scholar, CMTE9 was only coming to learn theories herself and was therefore more confident in trying to practice her own stance as a "social constructivist believer". She left it to the PTs to see what lies behind her approach, like a 'hidden message':

I'm not sure I do a really good job of that [introducing theory] explicitly with the students. I've really just started to come to learn mine (...) I truly am a social constructivist believer. This is what I believe in (...) and what I've been trying to do is then make links back to what I'm doing to my theory and belief about learning. And I don't know if I do that really specifically, like using specific names of theory, like, theorists or theories. They just kind of exist within the things that I do. Not as explicitly as I'd like to. [CMTE9]

This last quotation could be seen as contributing to reducing pressure on PTs, which led us to the following theme and category of justification.

Want to Reduce the Pressure on Prospective Teachers

When speaking about PTs returning from school placement, MTEs reflected on both the complexity of the transition and the struggle that MTEs face in supporting it meaningfully. In the words of NMTE8: "I don't usually ... I continue as before, continue the semester plan where we stopped [before placement]." By this, NMTE8 was suggesting a default response, more out of habit than of intention. This initial impression, however, quickly gave way to deeper introspection. NMTE8 had, in fact, wrestled with the idea of doing things differently—of using the PTs' fresh experiences as a springboard:

I tried to think about what I do when they [the PTs] get back from placement. I thought, I'm really doing nothing. I just say: "Oh yes. You're back from placement. Yes. Did it go well?" I don't do anything (...) I mean, (...) they have 20, 30, 40 different experiences. Which should I pick? [NMTE8]

Her dilemma appears to stem from the overwhelming diversity and breadth of student experiences with too many stories and too little time to discuss them fully. This leads MTEs toward navigating among a desire to engage with those experiences, the practical limitations of curriculum and class time, and the high expectations placed on PTs in the wake of educational reforms:

We do place high demands on our students: Not only shall they fix their placement or fix their teaching—but in addition they shall teach better than their mentor does. We do not ask for little. [NMTE8]

CMTE11's reflections on this issue revealed how she felt it is more important for MTEs to support PTs in their meeting with different mentors' teaching, rather than acting as "a bull in a China shop":

I'm trying to, again, offer insight as opposed to give in and try to understand, you know, even though I might not understand either, why someone's doing something or teaching a topic a certain way (...) I think teachers who teach, you know, the Pythagorean theorem by saying, "here it is $c^2 = a^2 + b^2$, use a right-angle triangle, and off you go." I think it's because they don't know themselves how to explore, what an inquiry task looks like. So, it's having a little bit of empathy. You know, math was probably hard for them (...) So, I think it's that understanding so that our pre-service teachers don't come in like a bull in a China shop, and start going like, "well, this is the way we should be doing math. And because this is what [CMTE11] told us at the university, and this is the way we should do it." So, it's not letting them loose like that. It's more so again, trying to give them some insight into the problem. [CMTE11]

This concern of demanding too much of PTs is echoed by NMTE2, who emphasised the formative, exploratory nature of teacher education: "They are sort of on an 'identity hunting' [journey] during their study." Her metaphor of identity hunting captures the developmental uncertainty that defines much of the PT experience—a search for personal coherence amidst institutional expectations and diverse school realities. In this regard, CMTE6 asked herself: "Am I doing everything I can to set them up for what I hope they would like to be?" She continued:

It's one thing if they leave my room, my class, saying 'oh, yeah, these are all these ideas, and maybe I'll do it and maybe it's not the right time now. And, as [CMTE6] said, the first couple years, it's gonna be really tough, so don't be too hard on yourself if you're just trying to stay afloat and take it one day at a time', things like that. But then if they never end up pulling these [tools] back out of the toolbox, then I think in some way, I failed there too, right? So, I'd like to learn more about ... am I effective in what I'm doing, not just when they leave my class, but once they're teachers? And then if I'm not, how do I change? Or what do I change to be a little bit more effective? [CMTE6]

Taken together, the reflections in this section point to a broader narrative—one in which MTEs must constantly negotiate between supporting professional growth and respecting the messy, nonlinear process of becoming a teacher. Rather than pushing PTs to immediately challenge established school practices, MTEs such as NMTE8, NMTE2 and CMTE11 suggested a need for patience, empathy, and space for identity work. In suggesting this, they raise an important pedagogical question for teacher education regarding how to support PTs in bridging the gap between placement and university, without overwhelming them—or MTEs—in the process.



Fear of Reinforcing the Time Discourse

Time discourse refers to the ways in which MTEs construct and negotiate the meaning, value, and use of time within teacher education. Aware of the pervasive influence of the time discourse in school settings, MTEs' stories revealed multiple layers of tension between personal teaching history, institutional realities, and pedagogical intentions. NMTE9, for instance, admitted that "I have not paid enough attention (...) I am most concerned with fulfilling the course." Due to time constraints, he had to focus on covering the curriculum. CMTE1 grounded her concerns about reinforcing the time discourse in her lived experience:

Because certainly my own experience as a middle years teacher teaching some years, four subjects, sometimes seven subjects, in a class with students with a variety of needs (...) There, there isn't enough time. And reflecting on what we were talking about before, this question of where students get that idea, I think it's already also reinforced in their other courses. They're being told for other subjects there isn't enough time. But you take it out far enough, there isn't enough time for anything. There isn't enough time for life. We've got to make choices. We've got to set boundaries. That's just the way things are. So, I know sometimes when I'm teaching or running an activity, you know, I look at the clock and go, "Oh, okay, we've got to move on". So, I wonder if I'm reaffirming that way. [CMTE1]

CMTE1 was aware that the time discourse does not stop at the school door—it follows PTs into university classrooms. Raising a critical concern that teacher education may be reaffirming rather than challenging the time pressure PTs will face in practice, she does not position herself as outside the problem, but inside it—as someone trying to navigate the contradiction between wanting to resist a problematic norm and being constrained by the structures that sustain it.

Not Aware that Pre- and Post-field Practices Should or Could be Different

During interviews, we repeatedly came back to how the MTEs planned their teaching after placement. While one MTE (NMTE1) explained, "I don't think I plan my teaching differently after their placement than before" another MTE (NMTE7), when asked about the pedagogical strategies used after placement responded:

The boring answer is that I think I want to say no. I don't think I have any good approaches ... I focus too little on this (...) Actually, I think that we are not very good at utilising the placement periods optimally. [NMTE1]

When CMTE8 was asked specifically about post-field approaches that were disruptive, she reflected on the question more deeply, and rephrased it for herself multiple times: "How a disruptive approach will be different before the field experience and after?" She concluded that she was not aware that pre- and post-field practices "should" be different:

So, how it is different in terms of my practice and how it should be different, or if there are some discussions that should be more emphasised after the field experience or before. So, I have never thought about those things (...) I was thinking, okay, I need to read your research once you're done. I was kind of okay; I don't know if what I'm doing is good for my students, if it could be improved or not, thinking in terms of that. [CMTE8]

The MTEs interviewed were generally unaware that they should, or could, use different teaching practices before and after school placements. Several admitted to not actively adapting their approaches or reflecting on how field experiences could inform their teaching. Some did not even see a point in trying to make post-field practices different and disruptive, a view that was grounded in PTs' volatile relationship with practice where PTs see themselves as visitors (Nolan & Bjerke, 2021). NMTE1 commented on the issue: "If they [the PTs] see themselves as visitors (...) then they are sort of done with practice when they come back to the theory [at campus]." And moreover, even if this was not the case, NMTE6 found it hard to know how to draw on placement experiences in post-field courses: "I think it is hard to get a hold on [what to do] (...) The truth is, there is no point in trying." [NMTE6]



Discussion and Concluding Remarks

In exploring why or how MTEs choose not to challenge certain beliefs or practices in the post-field context, we find that they often adopt a caring and empathetic approach that reinforces what Bissonnette (2016) describes as “the culture of niceness” in teacher education programs. We find that MTEs avoid exerting excessive pressure on PTs, opting instead to “speak their language.” The downplaying of theoretical perspectives in response to student preferences has led MTEs to focus more on practical, hands-on approaches and instead of being explicit about it, they “practice theory” through their teaching—as a kind of “hidden message.”

There is an overlap with this downplaying of theory and MTEs wanting to reduce the pressure on PTs. MTEs’ recognition that becoming a teacher is a messy, individual process makes them mindful of the intense demands placed on PTs after school placements and, as a result, they strive to reduce this pressure by offering support that is empathetic and developmentally appropriate. Meanwhile, MTEs do not want to add stress to PTs or to reinforce the time discourse perpetuated in schools. This awareness leads some MTEs to avoid disruptive approaches that they believe might further stress PTs, thus unintentionally reinforcing the existing time pressures rather than challenging them. When trying to adapt to pressure and practical constraints, faced with the high pressure on PTs and the complexity of integrating diverse field experiences into coursework, MTEs often default to either continuing pre-field teaching methods in the post-field or focusing post-field discussions on “placement stories” from the field (Bjerke & Nolan, 2023). This avoidance is partly due to the overwhelming nature of trying to address numerous different experiences, in meaningful ways, within limited time. These findings illustrate how the challenges and constraints faced by MTEs can lead to a tendency to avoid trying to disrupt or challenge certain beliefs and practices in the post-field context, while also admitting to not differentiating their teaching practices before and after field placements. Consequently, they avoid attempting new approaches that might better utilise, unpack, and disrupt field experiences.

We acknowledge that, through our larger research study, we have learned that some challenging and disrupting is taking place on the part of MTEs (Nolan & Bjerke, 2024). In that article, we mapped our findings and participant voices onto a *disruptive pedagogy continuum*, designed to illustrate how, according to our data, MTE actions ranged from highly disruptive to non-disruptive. Unfortunately, as we noted, further growth and shifts are called for toward more explicitly disruptive practices.

The themes presented in this article do not tell an entirely new story about what happens (and does not happen) in teacher education programs. Others have noted the resistance and/or apathy when well-established discourses of how and what to teach are challenged or disrupted in teacher education programs (e.g., Bissonnette, 2016; Nolan, 2015). While we agree with Bissonnette (2016) in claiming that “teacher education classrooms are powerful spaces, and teacher educators are capable of working as agents of change” (p. 18), we have also learned from our study that MTEs working in isolation is not the way forward toward such changes. We propose that a community-based approach holds the most promise—an approach we have previously referred to as a post-field third space (Bjerke & Nolan, 2023). In this space, the goal would be to unpack the field placement toward “teaching practices which promote change in the existing relations of power within schools” (Mills, 1997, p. 39).

Our vision for the third space begins with suggesting that the space could be populated by MTEs, PTs, and mentor teachers and guided by critically reflective questions about schools and classrooms, specifically mathematics classrooms, as well as by specific actions. In particular, we suggest that the third space offers pedagogical possibilities that “resist and reject educative niceness” (Bissonnette, 2016, p. 11) and recognise that “students and teachers who fully engage in transformative, radical educational acts are required to constantly reposition, redefine, and rethink their roles and to deconstruct and redesign their objects of study” (Bastos, 2009, p. 5). We found in our research that some MTEs admitted to not fully comprehending what it means to be disruptive. Take CMTE6, for example:

And I think disruptive, even though I know what the word means, obviously, but I think I've just never used it or thought of the work that I do as disruptive, even though I'm sure there are things that I do that are disruptive, I guess I just never labelled it with that term. So, in terms of your original question of like “Do I have any reservations or hesitations?” I think my answer— which I'd like to think isn't a cop

out answer—but I think my answer is that I don't know because I think for me, personally, I'm still trying to make sense of what it means to disrupt.

Saultz et al. (2021) offered several implications for teacher educators who seek to disrupt, noting the importance of helping their students to acknowledge that "neutrality is actually an action in and of itself, [and this] could be one way that we begin to disrupt continuing to follow the status quo" (p. 26). Like the goals of Saultz et al. (2021) in their study of prospective teachers' views on education and issues of social justice, one aim of our proposed third space would be for PTs:

... to be informed of the sociopolitical and historical contexts that influence educational policy and thus schooling experiences. This should result in the ability both to leverage their personal experiences in schools and to see how power and privilege disproportionately impact those individuals and groups with marginalized social identities across race, class, gender, orientation, ability, and so on. (Saultz et al., 2021, p. 10)

To close this discussion and move forward toward envisioning a post-field third space, we offer specific suggestions for the forms of critical reflective questions and actions that could be initiated in this third space by its "participants"—MTEs, PTs, and mentor teachers (see Table 1).

Table 1
Reflections and Actions in a Third Space

Reflections
What do third-space participants expect/hope to see if mathematics classrooms are equitable and just spaces?
What barriers currently stand in the way of realising these spaces and how can such barriers be challenged/disrupted?
How can we learn from and strengthen the role of theory in mathematics teacher education, including disrupting "the view that theory is not useful for teaching" (Lin et al., 2018, p. 201)?
How might we envision following up on the recommendations of promoting more meaningful ways to learn mathematics and promoting a different vision/reality for the subject of mathematics (Nolan & Bjerke, 2024)?
How can we "ensure preservice teachers have a positive experience with mathematics" and "create collaborative and safe learning environments" (Li & Castro Superfine, 2018, p. 189), while simultaneously not backing down from challenging and disrupting the practices which presently sustain inequitable and unjust mathematics classrooms?
How might reflection on each of Keazer and Nolan's (2024) components of MTE practice (mathematical and curricular knowledge, pedagogical knowledge and modeling, research/theory/scholarship, and critical reflection/praxis) help to grow different dimensions of culturally responsive pedagogies and other social justice and equity-based pedagogies?
What issues/situations lead the third space participants toward resignation and inaction, and acceptance of "things as they have always been"? What could be done about these issues/situations?
In what ways might I, as a third space participant, be "reconfirming what I want to disrupt?" (Bjerke & Nolan, 2023, p. 12)



Table 1 Cont.
Reflections and Actions in a Third Space

Actions
Third space community participants could collaborate to craft a "transformative curriculum" (Bissonnette, 2016). Participants could design a plan to "experiment with pedagogical approaches learned in their teacher education programs ... [even] if they are not evident in schools and may not be supported by sponsor teachers on practicum" (Vratulis et al., 2011, p. 1181). To envision paths toward disrupting current beliefs and practices, participants could read and discuss published research focused on critical race theory, anti-racist teaching, culturally responsive pedagogy, and so forth. Participants could engage in critical incidents reflections (Goodell, 2006) to peel away the layers of field placement stories that currently serve to sustain (even glorify) status quo school practices. The third space participants could direct attention toward "ways to design or reorganize programs to ensure that teacher candidates explore the origins of their personal, cultural, and racial beliefs and how these beliefs influence their relational and pedagogical practices with the students they teach" (Roberts, 2020, p. 229).

We claim that these specific suggestions align with the focus of our disruptive analytical framework (Nolan & Bjerke, 2024) and the goals of our study. First, the third space could be a space of reflecting on and identifying the challenges of practice-theory transitions. Second, discussions in the space could work toward actions that challenge certain beliefs/practices and promote others. Finally, specific to this article, the third space could encourage the unpacking of certain beliefs or practices that MTEs are presently choosing not to challenge in the post-field context of teacher education.

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Ethical approval

Ethical approval for the research was granted by the Behavioral Research Ethics Review Committee at the University of Regina, Canada, and by Sikt (Norwegian Agency for Shared Services in Education and Research) at Oslo Metropolitan University, Norway. The participants provided written informed consent to participate in this study.

Competing interests

The authors declare there are no competing interests.



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