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The return to university after fieldwork: toward disrupting practice-theory challenges identified by mathematics teacher educators

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In this paper, we present on a research study that was framed in disruptive pedagogy (DP) to examine the post-field context of mathematics teacher educators' (MTEs') practices. We open by referring to common challenges discussed in the literature related to theory-practice transitions of prospective teachers (PTs) as they move from university courses to their field placement. After reviewing these challenges, we then shift our focus toward understanding what MTEs see as challenges in the post-field context of teacher education programs; that is, what practice-theory challenges are identified by MTEs as PTs make the transition from field back to university. Briefly, our thematic analysis suggests that, in the post-field context of teacher education programs, MTEs are challenged by organizational issues and institutional structures; by PTs' return to the university armed with superficial placement stories and unexamined indicators of "good mathematics teaching"; and by the significant emphasis PTs place on mentor voices and ways of teaching, often including unfavorable views on the value of reform teaching. Simply put, MTEs expressed being challenged by PTs' skepticism, resistance, and lack of conviction toward the role of the university. Additionally, MTEs reported being challenged by their own feelings of resignation that our analysis suggests stems from a growing list of challenges which can result in some MTEs stepping down and settling on a pragmatic approach to their post-field mathematics teaching. To close, implications for MTEs are discussed by pointing specifically to the potential of DP for unpacking practice-theory transitions and considering the creation of a post-field third space.

KEYWORDS

mathematics teacher educator, challenges, post-field university context, disruptive pedagogy, practice-theory transitions

1. Introduction

Often, research examining theory-practice transition in mathematics teacher education focuses on transitions from university (theory) to field placement (practice). Yet, such a focus leaves the under-researched transition from field placement back to university "unpacked": "Little is known about the way in which teacher educators integrate prospective teachers' actual experiences when they return to university after fieldwork" (Eriksen and Bjerke, 2019, p. 9). This

"unpacking" of field-back-to-university transitions is relevant in its potential to give the field placement a more prominent role in teacher education, as requested in the literature (Resch and Schrittesser, 2021). However, this more prominent role is threatened by how the individual stories of field experiences that prospective teachers (PTs) bring back from field placement remain unpacked, preventing the teacher education community from moving beyond reflection and toward 'disruption' (Anderson and Justice, 2015) of current practices. In response to these shortcomings, the research we describe in this paper extends the existing focus on theory-practice transitions in mathematics teacher education by highlighting practice-theory challenges. We do this by examining the post-field context of mathematics teacher educators' (MTEs') practices through a research study that was framed in disruptive pedagogy (DP).

To clarify, by disruptive pedagogy we are referring to "pedagogical practices which disrupt normalizing discourse" (Mills, 1997, pp. 35–36) and which serve to disrupt reproduction of status quo, inequitable practices (Weis and Fine, 2001). Disrupting normalizing discourses can open a critical space where "challenges [can] be made to the legitimacy of school processes which produce and reproduce oppressive relations of power" (Mills, 1997, p. 36). Further, Mills (1997) offers:

> Disruptive pedagogies are teaching practices which disrupt marginalizing processes by encouraging students to identify and to challenge the assumptions inherent in, and the effects created by, discourses constructing categories of dominance and subservice within contemporary society. These teaching practices which promote change in the existing relations of power within schools are not limited to classrooms, but appear throughout the routines of life within the school. (p. 39)

Elsewhere, we suggest that MTEs have a crucial role in unpacking PTs' field experiences, both in terms of challenging, or *shifting away from*, certain current pedagogies and practices, and also promoting, or *shifting toward*, other pedagogies and practices (Bjerke and Nolan, 2022). In this paper, to set the stage for later analyzing what MTEs choose to challenge and promote in the post-field context, we first ask the question of what do MTEs identify *as* challenges in the post-field context. This question guided us in conducting a thematic analysis of 21 semi-structured interviews with MTEs across Canada and Norway. Given the critical nature of the research study, we claim that this paper makes a strong contribution in how it looks critically at MTE practices with an aim of disruption in the field of mathematics teacher education. This contribution is particularly important given that, in some countries, there is a move afoot to initiate a dramatic shift away from theory in teacher education and toward, for example, "a theory-independent perspective, where the importance of personal, practical, and contextual experience is acknowledged" (Österling, 2022, p. 530) or even, in the case of the UK, "a vocational employment-based model of training located primarily in schools" (Brown, 2021, p. 52). This is not, however, a view endorsed in this research study, where instead we actually seek to understand how theory can gain a stronger foothold in teacher education. We do this by identifying the challenges that MTEs face in the post-field context and then situating these challenges within a hybrid third space where the disruptive work can begin.

2. Literature review

Our research not only inverts the teacher education transition typically studied (instead of theory-practice, we focus on practice-theory), it also features the voices of MTEs, which is a significant departure from existing research commonly featuring the voices of PTs. Theory informing the study comes from three main areas in the research literature: the role(s) of MTEs; theory-practice transitions in mathematics teacher education; and practice-theory transitions in mathematics teacher education. We acknowledge that the use of theory and practice to describe transitions between university teacher education courses and school-based field placements creates a false binary and hierarchy (Zeichner, 2010; Österling, 2022). Perpetuating the idea of a theory-practice 'gap' has been shown to be a non-productive discourse in preparing teachers, when instead the goal should be, for example, for PTs to reinvent theories in the form of 'theory-enriched practical knowledge' (Oonk et al., 2015, p. 561). Although we draw here on theory-practice (and practice-theory) language, in reality our broader interests are positioned within a hybrid space of research where we study the role of MTEs in disrupting and reimagining knowledge constructed in the crucial movement from university to field and back to university. Within this movement, it is the post-field context of teacher education that we focus our attention.

2.1. The role(s) of mathematics teacher educators

Teacher educators have many roles, and hold significant responsibilities, as studied by Lunenberg et al. (2014) who describe "six professional roles of teacher educators" (p. 2): Teacher of teachers; researcher; coach; curriculum developer; gatekeeper; broker. Discussing the high standards and responsibilities placed on teacher educators, Hökkä et al. (2012) offer that teacher educators "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).

Outlining the specifics roles of MTEs is a growing area of scholarship. In a recent collection edited by Goos and Beswick (2021), chapter authors introduce the complexities involved in describing the kinds of work MTEs do, including how they learn and develop their knowledge and expertise. The collection establishes the importance of MTE knowledge (mathematical, curricular, and pedagogical), as well as the ability to utilize that knowledge for modeling teaching practice. Goos and Beswick (2021) offer that "MTEs require a kind of meta-knowledge which could be described as knowledge for teaching knowledge for teaching mathematics" (p. 3). Contributors to this collection reflect deeply on the contexts in which MTEs learn, including support for MTEs engaging in critical reflection on their practice (praxis) and staying engaged in research, theory, and scholarship.

It seems, however, that research which considers the roles of MTEs is, for the most part, non-specific to a particular stage of the teacher education program (i.e., pre-field or post-field). Instead, much of the research sets out to understand the role of particular tools or stances adopted in MTE practice. For instance, Lin et al. (2018) study MTEs' perspectives on the use of theory with prospective and

practicing teachers toward facilitating their growth. This study by Lin et al. (2018) also investigated the tensions that MTEs experience when introducing theory to teachers during professional development sessions. These tensions included teachers expressing "the view that theory is not useful for teaching" and that often they choose to attend "workshops to learn something new that they could directly apply in their classroom" (p. 201). These expressed tensions around the use and value of theory are also relevant to our study, as will be discussed when we present results of our analysis of MTE challenges in the post-field context. In fact, our analysis reveals a number of tensions that MTEs see as challenges in the post-field context and our goal in this paper is to share those challenges through the voices of MTEs. We believe that MTEs' reflections on their practices can help other MTEs to become aware of situations where their fundamental beliefs may not be as evident in their practices as they hope, and thus to consider the possibilities that more disruptive pedagogies hold. That is, the premise of this research is that the spaces of transition between university and field placement are where MTEs' voices and critical perspectives are most needed in the education of new mathematics teachers; yet, there is inadequate understanding across the research about how to make these spaces, especially the practice-theory (or post-field) space, more productive and disruptive.

2.2. Theory-practice transitions in mathematics teacher education

Research on theory-practice transitions in teacher education programs has been extensive (Britzman, 2003; Gainsburg, 2012; Allen and Wright, 2014), including transitions from university (theory) to field/practicum experience (practice), as well as transitions from the process of becoming a teacher (university) to the first few years of being a teacher in schools (Nolan, 2014). In fact, mathematics teacher education research points to the continuing need to study theory-practice transitions, suggesting that there is a prevalent disconnect between "theory" (university courses) and "practice" (school-based practicum) (Malderez et al., 2007; Bergsten and Grevholm, 2008). To address perceived theory-practice disconnects in teacher education, research proposes ways to bridge the transitions based in, for example, close university-school collaborative partnership models (Reynolds et al., 2013; Erbilgin, 2014; Bradbury and Acquaro, 2022), professional learning communities (Beck and Kosnik, 2006; Nolan, 2015, 2018), use of hybrid educators (Risan, 2020), third spaces (Zeichner, 2010; Garrett, 2012; Williams, 2014), and a third culture (Cochran-Smith and Lytle, 1999), just to name a few. In an example of a third space, Österling (2022) calls for a "space, where knowledge from both university and school may integrate" (p. 521), where university tasks are completed during practicum. In a similar manner, Nolan (2018) reports on a space which lies in the theory-practice nexus of teacher education which is its own distinct Bourdieuian field. She claims that her research-based "internship learning community constitutes a distinct field (F3), or "third space", in which transitions between the field of university teacher education classrooms (F2) and the field of schools (F1) can be problematized and deconstructed" (Nolan, 2018, pp. 131–132). A comparable space is proposed by Rust (2019), who calls for teacher educators and teacher education programs to "be situated at the nexus between universities and schools—the place where theory and practice can come together" (p. 524). Perhaps as an

example of the latter, from the UK context, one such collaborative model, founded as the Oxford internship model (McIntyre and Hagger, 1992), favors a dialectical approach to theory and practice where university teachers and school mentors contribute in equally meaningful ways to initial teacher education (Smith et al., 2006).

Continuing experimentation with models for field placement and university courses to address theory-practice disconnects is important, since the models serve to influence how MTEs work with/for PTs "to provoke change through a greater understanding of the theory-practice nexus" (Anthony et al., 2016, p. 319). However, as noted by Anthony et al. (2016), while it is significant to understand how PTs negotiate theory-practice transitions, it is also highly significant to explore and understand the practices of MTEs with regard to these transitions. After all, as Schulz (2005) reminds us, "[i]f teacher educators want to change prevailing practices… they must provide frameworks that encourage different ways of thinking about teaching and learning about teaching" (pp. 149–150). Since the practices of teacher educators are positioned at the nexus of theory-practice transitions, such a focus is critical. Yet, our survey of the research literature suggests that a focus on the roles of MTEs is not all that common in research studies focusing on these transitions.

2.3. Practice-theory transitions in mathematics teacher education

The key transition in teacher education programs which has captured our interest in our research is the under-researched transition from field placement back to university which, as we alluded to earlier, is in need of further "unpacking". This "unpacking" of field-back-to-university (practice-theory) transitions is relevant to the community of teacher educators since teacher education programs, and corresponding field placements, are frequently critiqued for being steeped in technical-rational approaches (Nolan and Tupper, 2020). MTEs in particular struggle with the tensions implicit in these transitions, as they seek to disrupt dominant 'technique-oriented' discourses of school mathematics and becoming a teacher.

While limited research focuses explicitly on the challenges of practice-theory transitions, there is a noticeable focus in the literature on the role of theory more generally. In seeking to understand how theory can gain a stronger foothold in teacher education, we focus this paper on the practice-theory challenges identified by MTEs. Hence, informed by this literature review, we claim that the research described in this paper adds to the field of mathematics teacher education through its focus on the under-researched field to university (practice-theory) transition, while featuring the voices and perspectives of MTEs themselves as we respond to the DP-inspired question: *What do MTEs see as challenges (i.e., what are MTEs challenged by) in the post-field context of teacher education?*

3. Materials and methods

We situate our research across two countries, Norway and Canada. Elsewhere (Nolan and Bjerke, 2021), we discuss the origins of our research study, including how it began as a dialog between the two of us, made possible through our own self-study reflections on the issues and challenges we encounter in the post-field context of mathematics

teacher education. Through this dialog, we became motivated to move beyond our own experiences as MTEs (which together adds to more than four decades) to explore the experience of our MTE colleagues working in teacher education institutions across both countries.

Regardless of institutional decisions on how field placement is organized within and across Norway and Canada, here, we use the term post-field context to refer to the lessons/courses taking place at a given university/university college after a shorter or longer period of field placement (also known as, in various contexts, school placement, field experience, practicum, internship, or simply school practice). For the sake of describing the two research contexts, however, we next provide brief portrayals of how teacher education programs are structured and organized in these two countries. While there are important nuances associated with the teacher education programs in each country, and even across different regions/provinces of each country, we want to emphasize that our interest here lies in unpacking the actions of MTEs in their post-field contexts; regardless of these nuances, all programs include post-field teacher education work.

Norway's teacher education institutions follow a set of national guidelines (UHR Universities Norway, 2018) that guides the universities and university colleges in preparing their own five-year long teacher education programs for grades 1–7 (ages 6–13) and grades 5–10 (ages 10–16). While these guidelines give each teacher education institution the agency to make its own institutional curricular decisions, the timing and number of days in the field/school placement are given by Regulations on the plan for primary school teacher education, grades 1–7 (2016) and Regulations on the plan for primary school teacher education, grades 5–10 (2016). Each program shall facilitate a minimum of 80 days in the field for each PT during years 1–3 and minimum 30 days during years 4–5. These days in the field are typically evenly distributed, especially in years 1–4 (year 5 is devoted to the master thesis), leaving approximately 15 days in the field in each of the first eight semesters. Hence, in Norway, the post-field context refers to the mathematics teaching sessions taking place after approximately 15 days in the field and before the end of a semester.

Unlike Norway, education in Canada is provincially mandated, with 10 provinces and 3 territories all exercising control over their own local curricula. As such, teacher education programs existing across the different provinces and contexts are structured around efforts to respond to local needs, while also remaining informed about program enrolment trends and competition at other universities across the country. There are more than 60 institutions across the country offering a teacher education program, with programs varying from 1-year post-graduate to 4- (or even 5-) year undergraduate degrees. The design and duration of field placement, or school placement, associated with these programs also reveals considerable diversity across the institutions. For instance, at the University of Regina (author 2's primary institution), field placement in a 4-year undergraduate degree program is introduced in year two of the program through a one-day-per-week classroom observation time, and then building to a final 13-week intensive field placement (an internship) in year four where the PTs spend every day in the field placement school with their mentor teacher (also referred to in Canada as a cooperating teacher). Courses are not taken at the university while engaged in this field placement. This means that, at author 2's university, post-field courses are enrolled in by PTs after a lengthy time devoted to being and teaching in schools; this is not the

case, however, across all teacher education programs in Canada. In fact, one participant (CMTE7) discussed the post-field context as evening classes at the university after PTs had been in schools all day.

In what follows, we introduce our research participants and the interview guide before giving a detailed account of the process for analyzing our data.

3.1. Research participants and interviews

In this inductive exploratory study, we draw on 21 semi-structured interviews conducted via Zoom, 10 from Norway (NMTE1–NMTE10) and 11 from Canada (CMTE1–CMTE11).[1] The 10 Norwegian MTEs, three identifying as male and seven as female, work at seven of the 11 governmental institutions accredited to provide teacher education for grades 1–7 and 5–10 in Norway. All 10 participants are experienced MTEs, with two having 5–10 years' experience, and eight having worked in teacher education for more than 10, and as long as 25 years. The 11 Canadian MTEs, eight identifying as female and three as male, work at 11 different universities across six provinces, with most of the universities offering both elementary (K-8) and secondary (9–12) teacher education programs. All presently work as MTEs in their roles as assistant, associate or full professors, with experience ranging from one to 18 years. Unlike the Norwegian MTEs, all Canadian MTEs have experience as school teachers prior to their MTE position. The interviews typically lasted between 45 and 60 min.

We opened each research interview with a general "ice-breaker" question asking about the participant's university position, the design of their teacher education program, and any initial thoughts they have on theory-practice and/or practice-theory transitions. In conceptualizing our research study–specifically, for this paper, to understand what MTEs view as challenges in the field-back-to-university (practice-theory) transitions–the next step in our research interviews was to present participants with a list of challenges associated with theory-practice (university to field) transitions as identified across the research and reported on in Nolan and Bjerke (2021):

> *Prospective Teachers (PTs) as visitors*: The visitor 'stamp' prevents PTs from trying out new ideas, focusing on unquestioning alignment with existing norms and plans, deferring to the mentor teachers' accountability for their pupils' progress.
>
> *The different roles of the involved parties*: A lack of understanding of the roles of mentor teacher, PT, and MTE.
>
> *The theory–practice divide*: A reported disconnect between university and school methods/theories, often resulting in PTs favoring school placement and expressing a need to be armed with

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1 While the intention in Canada was to interview 10 MTEs, the same as in Norway, the circumstance of a late reply from one MTE meant that the researcher made the decision to add one more interview and research participant.

a "toolbox" to be aligned more closely with the school and performing the role of teacher.

The demands of reform teaching: Reform, or inquiry, approaches not taken up by PTs during field placement, for several reasons: Inadequate modeling by MTEs; lack of "recipes" for implementing inquiry; inquiry-based lessons reported as taking too much time to plan and implement; PTs' lack of conviction.

This list of theory-practice challenges was presented to the participants to gain their perspectives and to provide a starting point for discussing the roles and practices of MTEs in the practice-theory transition (from field placement back to university). Further interview questions asked MTEs to share their own professional challenges with respect to practice-theory transitions, the pedagogical strategies and theoretical tools they draw on to challenge and/or disrupt these transitions in working with PTs in post-field courses, and what they view as their primary role(s) in the post-field context of mathematics teacher education. In addition, we explicitly asked questions about their practice in relation to the ways of defining disruptive pedagogy, as synthesized from across the literature. We provided our participant MTEs with a definition for DP from Anderson and Justice (2015), who describe a pedagogy as disruptive if it "requires students to challenge or change their epistemologies and participation in their learning" (p. 400). In addition, we mentioned how, for instance, Mills (1997) refers to DP as "teaching practices which promote change" (p. 39). With these ideas introduced, we then asked participants to what extent they would describe their *own* post-field pedagogy as disruptive; that is, we asked if they strive to disrupt practices, principles and beliefs from the field and, if so, to describe their successes and failures in these efforts. And finally, we asked participants if they had any concerns or reservations about viewing teacher education practices through this DP lens.

3.2. Data analysis

We conducted a "theoretical" thematic analysis of the interview data through the following six-step process adapted from Braun and Clarke (2006, p. 84).

First, we fully familiarized ourselves with the 21 semi-structured research interviews that were transcribed verbatim, 10 in Norwegian and 11 in English. While the first author is fluent in both languages, the Norwegian transcripts were run through Google Translate to give the second author an overview of the Norwegian data. This enabled both authors, through "repeated reading" of the data, to search for meanings and patterns across the data corpus (as suggested by Braun and Clarke, 2006), before continuing to the second step where we manually generated initial codes with references to challenges. This step was conducted individually and separately (the Norwegian-speaking author analyzed the Norwegian interviews, and the English-speaking author the Canadian interviews) and resulted in a collection of text extracts/quotes. At this point the Norwegian data were translated (manually) into English, making sure the original meaning was captured. These extracts were used to discuss our reflexive reading of the data. Once a common understanding was reached, in step three, we began generating themes that capture "something important about the data in relation to the research question, and represents some level

of patterned response or meaning within the data set" (Braun and Clarke, 2006, p. 82). Once we had devised "a set of candidate themes" (Braun and Clarke, 2006, p. 91), in step four, our refinement of this set resulted in a total of six themes that we determined aptly summarized the issues MTEs see as challenges in the post-field context. Next, in step five, we wrote a detailed analysis for each of the six themes, with a view to "identifying the 'story' that each theme tells" (Braun and Clarke, 2006, p. 92). To do this, we selected a number of quotes/extracts which served as strong illustrations of that theme and the ideas within. We resisted applying a heavy hand of interpretation by allowing MTEs to speak for themselves through the selected quotes within the themes we had identified. This foregrounding of MTEs' voices was important for both ethical and theoretical reasons: As authors of this paper, we are experienced MTEs ourselves, and so we set out to ensure that it was there, and not our, rendering that formed the themes. Moreover, we see this focus on practice-theory challenges as a new contribution to the research and, as such, we do not want to make assumptions about how they are (or are not) similar to theory-practice challenges. In light of this, we have chosen to provide ample space for the voices of MTEs to speak for themselves as they elaborate on what they see as challenges. We made sure that the themes did not intersect and/or overlap in any significant manner, while at the same time we examined how they relate to (and draw upon) each other. This can be noticed in our presentation of each theme. Finally, in our last step before writing up all the themes, we ensured that we could identify sufficient evidence (in the form of relevant data extracts) to demonstrate the prevalence of the generated themes (Braun and Clarke, 2019).

In presenting our analysis, extracts were chosen if they were illustrative of ideas that were typical across the data material, while making an effort to include quotes from both countries. In fact, it became apparent during the analysis process that we found no themes unique to only one context/country (i.e., not present in the other data set). We maintain that this situation provided further support for the appropriateness of combining (instead of comparing) data from both countries for our analysis. We are aware of the limitations of this study, which are mainly connected to how post-field contexts are defined, when they occur and their duration.

4. Results

In what follows, we present our themes, six in total, for the challenges identified by MTEs in the post-field context. First, we elaborate on how MTEs are challenged by their teacher education program's core structure (Organizational issues and institutional structures). Next, we focus on how MTEs are challenged by what happens (or does not happen) during field placement (What happens during field placement), and also by what ideas the PTs bring back from placement (their collection of placement stories) (PTs' collection of stories from field placement). In PTs' skepticism and resistance to university input, we hear how MTEs are challenged by PTs' resistance to university input (PTs' skepticism and resistance to university input) and to the demands of reform teaching (The demands of reform teaching). The final theme is concerned with a looming feeling of resignation that challenges many MTEs (A feeling of resignation). As MTEs ourselves, we make a deliberate effort within

our theme sub-sections to present illustrative quotes in ways that grant spaces for MTE voices to be heard.

4.1. Organisational issues and institutional structures

A central theme featured in MTEs' accounts is how they are challenged by organizational frames that affect the placement (in terms of when it is, and its content) and how structures are organized on campus (e.g., group size and assessment). For example, when PTs are sent out in the field in the middle of a mathematics pedagogy course, MTEs emphasized that this placement needs to be with a mentor teacher who teaches mathematics:

> I think it is very challenging, how the placement is organized (…) I repeatedly experience that first-year students don't engage with mathematics during placement because they have a mentor that doesn't teach mathematics. (NMTE1)

Such organizational flaws "exclude some of the teacher students" (NMTE1) from post-field activities. This also applies to the timing of the placements. NMTE10 referred to a recent experience where "… the placement came really late," limiting what could be done in post-field sessions: "We have only a few teaching sessions after placement [before the year is over], that is a limiting factor" (NMTE10). CMTE10 provided a more detailed account of what PTs miss out on due to organizational challenges:

> … there's the other challenge that some come back very excited and wanting a lot more than you're able to provide with any core structure (…) they're ready to do a lot more and learn a lot more. But the course structure might constrain how much we're able to do within that time (…) it's a challenge to figure out how to get it to work, or if it's sort of just pointing to resources and ideas without doing the much deeper work.

MTEs also reported being challenged by how the groups are organized at universities, in relation to how the large groups make it hard to model what MTEs want their students to accomplish ("I have felt inhibited by how we are organized–it is hard to demonstrate good teaching," NMTE9), but also in how it makes them less flexible:

> I think it is hard to make it work well because we have such large cohorts of students. This makes us have to follow a pre-decided plan telling when to teach what. (NMTE7)

It can be seen that these constraints challenge the unspoken goal of "practicing what we preach" as MTEs, which becomes even more evident in the account of NMTE3:

> It is obvious that the dilemma is reinforced now with the national exams and commitments (…) we are deeper and deeper in this exercise paradigm way of thinking.

CMTE8 also offered that the focus on assessment reinforces the theory-practice divide:

> … the university still uses assessment practices that I discourage my students to use in class. So how come I tell them, 'Oh, you shouldn't be doing that,' but then *I'm* doing that. So, this is one of the things that bothers me a lot. And actually, I'm deeply thinking about some new ways of doing this (…) like ungrading strategies and things that will value more students' learning instead of the grades that they get out of those assessments.

The 'deeply thinking' proposed by CMTE8 is promising in that it could lead to disruptive practices such as "ungrading." Yet, as CMTE10 expressed, the system is strong and perceived as resistant to change, and perhaps not even open to disruption at all:

> So, the disruption, it doesn't take place elsewhere, right? The [disruptive] pedagogy is only directed toward the students in the course, and not directed to the system, and system administrators as well (…) right now it's only directed toward the students, for disrupting their way of thinking and doing and perceiving. But the other way (…) that system is *very* strong, in terms of resistance to change.

This last utterance is important to keep in mind when we later delve into MTEs' feelings of resignation that can result in some MTEs stepping down and settling on a pragmatic approach to their post-field mathematics teaching in Section 4.6.

4.2. What happens during field placement

While MTEs found some aspects of the organizational side of the placement challenging, a more detailed picture of challenges connected to placements were drawn out in the MTEs' accounts of PTs' superficial indicators of 'good mathematics teaching', the mentor teachers' ways of teaching, and the value placed on mentor teacher voices.

NMTE1 was challenged by the idea that the level of reflection *after* placement mirrors the level that was set *during* placement. For example, NMTE1 described how, during a placement visit, she was asked to give PTs feedback on whether they managed to see all raised hands in the classroom:

> You don't need to have a PhD in mathematics education to sit in the back of a classroom and observe if those students raising their hands get to speak or not.

NMTE1 asserted that such tasks were given to her because the PTs do not feel academically strong enough – they do not want you to "dig in too deep" (NMTE1) and so instead MTEs were assigned to tasks that made the post-lesson feedback session "safe". This appeared to relate to a reoccurring theme across interviews regarding how PTs struggle with mathematics ("I wish they knew mathematics well enough," NMTE1; "some students easily complain when they think that the mathematics is too tough," NMTE10), which made it challenging for MTEs to keep a focus on how to *teach* mathematics. CMTE10 shared that PTs frequently comment on their discomfort with mathematics content:

… not actually knowing how to teach particular concepts well, and I think that goes back to their own mathematical knowledge for teaching, and their mathematical knowledge.

One of the NMTEs gave a more thorough account of why PTs come up with these superficial indicators as a way to avoid "the horror of the difficult questions" (NMTE6) that make them favor placement over university teaching:

…when you say that they favor practice, I think that it sometimes is a matter of them being afraid to go into what is difficult, to teach mathematics at grades 1-7, or 1-4, it is academically demanding (…) all the difficult questions, in some sense, they belong to the theory part. But, when in placement, it is all about surviving from day to day, from hour to hour. This makes them use indicators such as "the student was active", "it looked like they were enjoying themselves", "they worked well". In a way, that is what that determines how successful the session was, "he was so engaged", "she was so eager", while if I dig into the content or the way things are done or something like that, then it immediately becomes difficult … (NMTE6)

NMTE5 stressed that such indicators of good mathematics teaching have unfortunate consequences. As NTME5 noted, it is not easy to criticize those things that, previously, PTs were praised for by their mentor teachers:

… PTs come back [to university] with a very good feeling; 'I received very good feedback', and then I am supposed to meet them with critique (…) that is quite challenging.

It is hard to reach consensus when "whole teams of university teachers and mentors do not seem to agree on what good mathematics teaching is" (NMTE5), some of which may relate to different views on their need for knowledge:

…how can we who are located at the university and those in the field of practice together hold the same requirements for what one needs to know in mathematics? (NMTE7)

There was a tendency to notice that, while MTEs push the mathematics, mentor teachers stress the reality:

I feel that some of what has been challenging is the collaboration with the mentors (…) I become this annoying professional that comes in, who does not understand what they actually have to deal with. (NMTE6)

This differing focus is problematic, even beyond the list of indicators for good mathematics teaching: MTEs reported being challenged by the different philosophies of mentor teachers that make it "very hard [for PTs] to implement the innovative ideas that they think they have learned from the teacher education program" (CMTE5). CMTE5 had the impression that PTs' awareness of being assessed while in their field placement prevents them from bringing university input to life:

…in that context, where they are being assessed by school advisor, being assessed by faculty advisor, it makes it very challenging to be very innovative, to be very inquiry driven, to try new ideas that they've learned about. (…) from what they've shared with me, they feel inadequately prepared to engage in that inquiry.

CMTE5 spoke on behalf of their students, as did CMTE11 when imitating PTs as a way of questioning how to deal with the different input they get:

… you know, [PTs saying] 'I taught it this way, but they [mentor teacher] want it taught another way'. And how do we address the differences in pedagogical styles or approaches to teaching (…) here [at university] they've experienced different ways to think about, you know, how to multiply or whatever the task is. And it's helping them, giving them the tools, I think, to navigate through that difficult area (…) and they don't want to come in and say, 'well, this is the way we learned how to do it at the university.' So, they're very timid about bringing in a new style, or a new approach, or a different way to think about whatever it is that they're teaching.

This situation is very unfortunate, especially when PTs often experience "a practice that is too traditional" (NMTE1) in combination with PTs' feelings of being visitors ("I think it's a very particular situation, because it is not their class," CMTE8). This does, however, differ between mentor teachers, as proposed by CMTE8:

… some mentors will be really good in terms of giving some freedom to teacher candidates, but other mentors will kind of have them following a very strict structure. So sometimes I am afraid that the field experience might decrease that eagerness to change, because they feel that 'Oh, it won't be that easy'.

This differing mentoring style challenged the MTEs in their post field courses. CMTE10 suggested that perhaps one should consider "differentiating the course, structure, and content for students who have had differential experiences in their practicum" (CMTE10) because, for some PTs, the lack of opportunities to try out university input was leaving this input as theory in the minds of PTs:

A lot of the great things and the ideas and the issues I've been trying to push with them, they feel like they haven't had a chance to try it or see it in practice. So, it stays theory to them, when they don't get to see it in practice. So, there's frustration, they want to try these things, and they don't feel they're allowed to, or they haven't seen it. They don't really understand what it is I'm trying to tell them. Or some of their [mentor teachers] teachers will flat out tell them that what I'm teaching them is just absolute hooey and it doesn't work. And the only way to teach math is to drill and to tell kids how to do it, give them problems, they practice it and repeat. And that's it. Like that's the only way teaching math works. So, it becomes a tension between what I'm trying to tell them and show them and what they're experiencing in the class and realizing it works for me. I want to share this with students. But they're not being given the opportunity. (CMTE3)

The voices of mentor teachers stayed strong in PTs' minds, even after placement. Many MTEs expressed being challenged by how mentor teachers seemingly tended to support the PTs in their critiques about university input:

> I think that maybe the mentor lacks an understanding of his [the mentor's] role, that is my experience. That they often tend to agree with the PTs when they express frustration about "we haven't learned this at the university" (…) "there is only theory at the university". This is a little kick to the mentors from my side. (NMTE9)

In this regard, some of what challenged the MTEs was the lack of opportunity to elicit from the mentor a confirmation (or rejection) of the PTs' placement stories: "now it would have been very interesting to have the mentor here to hear what he has to say on the issue" (NMTE1). Taken together – what happened during field placement, or rather, what PTs perceive to be happening during placement, appeared to limit what could be done in post-field mathematics courses.

4.3. PTs' collection of stories from field placement

In the theme presented above, we shared how MTEs questioned some of the placement stories. This went beyond the stories' truth gestalt—MTEs seem challenged by the stories PTs bring back to university from placement, most often because they are too superficial, leaving them just as that—a collection of stories for which it is hard to "do any justice". When asked about the most striking challenge after placement, NMTE7 waited for 10 s before he answered:

> Yes, what is it? We usually ask them to talk about an interesting mathematics experience from placement. Their answers are often kind of "green", more like "it was fun that the students could talk about mathematics". I can't make them verbalize, observe, bring back interesting math-related problems, didactical problems. I wish they came back saying "I met a kid that really couldn't deal with the standard algorithm in multiplication. So, we tried to do x and y, but we didn't make it. What could have been done?"

NMTE7 asserted that this would have been a good starting point for a productive post-field conversation. Unfortunately, such conversations are rare. NMTE4 offered that when one tries to bring in an experience from field placement, "it sort of becomes isolated [from placement], and it is no longer about placement, it is all about an activity that takes place at campus". This change from a "placement case" to a "campus activity" perhaps has to do with how the cases are presented by the PTs:

> When they come back from school placement with an experience, having tried out different things (…) a special challenge is to use that knowledge, that is, research and theory to try to understand [their experiences] (…) then theory is explanatory, when they come back, the theory must work (…) but the question is – do they have enough information for this to work? (…) An important point with doing a master in teacher education is that teachers

shall learn more systematic ways to develop their practice, so they may need help to "collect data", not for research, but to collect enough information to sit down and process it. It needs to be more than a story of an experience. (NMTE4)

Even when MTEs attempted to steer the post-field discussions toward more productive matters, the tasks ended up being imprecise and too wide and nothing more than a collection of stories; "it [the discussion] often ends up being something else than what we had anticipated" (NMTE8). When giving an account of an interdisciplinary post-field reflection day that a group of teacher educators tried to arrange a few years back, NMTE8 reflected:

> I don't know. I guess it is ok for the students to talk about their experiences, but professionally I must say that it was not very useful. It was all about experiences, and at the best there were some general considerations about students and solicitations.

In some sense, these MTE voices resonate with CMTE10's statement in the previous theme on how PTs, when in placement, seldom get to try out or see ideas and issues "pushed" onto them from university when in placement, which eventually results in university input "staying theory to them". Here we see that, if not connected to theory, the placement stories stay stories to them.

4.4. PTs' skepticism and resistance to university input

When (or if) theory stays theory, and placement stories stay stories (as discussed in PTs' collection of stories from field placement), PTs' personally experienced stories tend to "win"; that is, in post-field courses, MTEs are challenged by PTs' lack of conviction toward university input. MTEs' views are that PTs often experience a disconnect:

> Sometimes they come back with experiences in the field where math is taught very traditionally and now they're wondering what the connection is with what we've been doing in class (…) an experience I can think of, in a course for secondary teacher students, when they've come back from their final practicum, or field experience and the course is about debriefing. And (…) I was doing activities with them about how groups work in mathematics and what the latest research is (…) I can just remember this one experience where the student kept saying, "Oh, no, that would never have worked for the class I just had for my field experience". Anything I said, she insisted, "No, that wouldn't work. You can't do that." (CMTE1)

The critical PT voices have made an impression on CMTE1. The same goes for CMTE9 who imitated her PTs, saying things like "…'well, my teacher did not do that, my teacher did not try that', you know" (CMTE9) to justify why they spent their placement copying their mentor teachers' textbook-inspired practice with "a lot of 60-question sheets to get the students to practice the skill, which is really frustrating" (CMTE9). Moreover, CMTE9 brought in the voices of the mentor teachers that downplay university input:

They [say] "no, no, no, in the real world (…)", like I've heard that language as somebody that is orienting students and teachers to the practicum that's just about to happen. "No, don't worry about what all those professors told you, we'll show you how it really works."

CMTE3 claimed that such clear messages feed PTs' skepticism and resistance to university input, and

… it reinforces this idea that "this is the only way to teach, it works for me, it should work for everybody. If it didn't work for them [the students], then somebody just didn't explain it slow enough". So for [PTs], I find that that lack of conviction does tend to be a problem.

This problem re-occured throughout MTEs' accounts, much because they saw that "the experiences they get [from placement] are very prominent (…) they generalize a lot based on little time in placement" (NMTE2), even if PTs do spend most of their time in teacher education at university. CMTE6 suggested that PTs really "want to see practical examples of what we have talked about [at university] because they still kind of buy into it, but because they have not seen it, they are just sometimes skeptical" (CMTE6). For CMTE7, it was important for the PTs to recognize what they have engaged in at university and not let that drown in "the trivialities of teaching". In other words, CMTE7 was challenged by making the thinking PTs engaged in clear to them:

So, they're engaged in that really deep sort of philosophical [discussion] about the idealization of what teaching can be and what it should be, and what it means to be a learner and a teacher and all of that. And then they get out there in the practicum, and they meet a teacher who really cares a lot about whether or not you can do a bulletin board or not, right? So, it's *that* sort of thing. But they're actually quite well equipped to think deeply about things, they just haven't had a lot of experience with the trivialities of teaching.

In this way, CMTE7 saw 'the trivialities of teaching' as something that takes over, that prevents the PTs from using what they have learned at university and with which they can reflect on a deeper level.

4.5. The demands of reform teaching

Reform, or inquiry-inspired approaches to teaching are seldom taken up by PTs during placement. MTEs offered one main reason for this: PTs find reform teaching demanding and time-consuming, an idea that MTEs deny any part in perpetuating. In the accounts of MTEs, PTs tend to draw on their experiences from placement when justifying a narrow view on what mathematics teaching is and ought to be. CMTE8 ironically portrayed teachers in school, and hence mentor teachers, as those who are partly responsible for the resistance to change:

… secondary teachers, I guess they are more stuck with the old traditional ways of doing and learning math. And some of them, I really think that they just have this idea, that's what math is

about. "No, we don't need to use manipulatives in class, we don't need those different strategies. Let's just go with exercises and repeat a hundred times the same thing, and the students will get there," just as *they* did.

MTEs were eager to leave this old-fashioned way of teaching behind. For instance, NMTE9 referred to embarrassing experiences from visiting PTs in placement and finding them teaching like "my father did in the 70ies":

Yes, several times we have been a bit embarrassed. They state that exploring mathematics lessons are too time-consuming to plan and implement. I totally disagree. It is really all about…just doing it, it isn't hard.

This being said, reform teaching is not straight forward, especially for those novice PTs who "… come in with an image of what teaching is; they often think they already know how to teach, right? And that first year is about interrupting them for a little bit" (CMTE4). Also, this image tends to be traditional, according to what NMTE3 offered:

We have some hidden agendas (…) we want these PTs to change how they perceive, how they think about what teaching mathematics can be (…) they have a very traditional view on what mathematics teaching is, even if I think they have different experiences, it is clear that it is it [the traditional] that they hold on to.

As illustrated in the following quote, even when CMTE3 was very clear on how inquiry might look, the tradition of direct teaching is very challenging to disrupt because many teachers believe that you must first teach (content) then do (problems), not the other way around. To inquire into a problem before the teacher presents all the mathematics needed in the problem runs counter to traditional ideas of how students learn mathematics:

I'm very intentional; it's not just any lesson plan that I want them to do. It's one where it is very inquiry-based, it's more reform, where they're going to give the students an experience in mathematics. And then at the end, then they might unpack some of the mathematics (…) So any direct and instruction pieces would happen in the consolidation, where they're trying to attach the math to it, which is a really difficult thing for them to wrap their head around (…) I really want to push them to do something different. And I will get some students who will write in the lesson plan: 'I know you told us we're not allowed to do this upfront, but I don't believe students can do any math until I tell them how to do it'. So, it seems to be reinforcing that I have this pie-in-the-sky ideal that doesn't actually work in classrooms. (CMTE3)

Hence, it takes time to fully understand that mathematics teaching is multi-dimensional, and "to interrupt the belief that [PTs] sometimes have after the first year or after the practicum, that there's basically two types of tasks, problem solving and routine, or worksheets" (CMTE10). MTEs want and need to get to the point where PTs realize that "we have lots of other intentions and purposes in our teaching" (CMTE10). But this takes time, primarily due to how there are aspects to the inquiry approach that may be too demanding for novices:

… I don't think it's so much lack of steps or recipes, but in inquiry type activities and problem-solving type activities (…) beginning teachers feel very vulnerable if they're not able to anticipate more than one way that students might solve this problem, because we value and privilege that as instructors, and they're rushed to develop perceived expertise in mathematics teaching. (CMTE10)

Perhaps, then, the challenge is partly due to PTs not feeling well prepared:

… it's a challenge for them to bring out their uniqueness, to test certain ideas, right? So, timewise, and also they feel somehow inadequately prepared, and they lack confidence in engaging in inquiry work with their students, and they constantly question their own practice, which is also a form of inquiry too. (CMTE5)

In sum, what challenged the MTEs is not the demands of reform teaching as such (they even expressed understanding why PTs find it demanding, especially as novices), but it is rather how the demands of reform teaching become an 'excuse' for not even attempting the approach. Resistance to engage in reform teaching has, to some extent, become a 'circulating discourse' among PTs:

… the demand of reformed teaching, I actually hear about that a lot from the students who have not gone out in the field at all yet. And it's interesting to think about why they think this already, that there isn't enough time and there isn't enough resources and you just can't do this. (CMTE1)

If CMTE1 was suggesting here that reform teaching has a poor reputation among PTs at university— even those who have not yet experienced teaching in a classroom— this challenge is perhaps bigger than anticipated.

4.6. A feeling of resignation

Taken together, we see how this list of challenges can cause some MTEs to step down and settle on a more pragmatic approach to their post-placement mathematics teaching. They were challenged by finding out not only *what* to do to disrupt, but *when* and *how* to do it. For instance, when working to understand why she was not feeling successful in reaching her PTs with theory-inspired ideas, NMTE8 shared that, in her experience, when in-service teachers participate in professional development activities, they do often experience a connection between university input and what they do in their teaching practice; this made her wonder:

…I think, I feel that in some sense this is about them [the PTs] being young and that very much is new. And our input is rather low on their list of priorities of what needs to be fixed to survive.

This, in turn, made *us* wonder if one should wait for PTs to have more experience first. CMTE10 was not so sure. When PTs are more experienced upon their return from the practicum "… they are now more focused on getting a job. So, their attentions have shifted from learning to teach to learning how to secure a position" (CMTE10). A feeling of resignation grows; that is, our analysis suggests that a

growing list of challenges can result in some MTEs stepping down and settling on a pragmatic approach to their post-field mathematics teaching. In the post-field context, MTEs shared how it was tempting for them to continue as if nothing had happened, and just say: "Welcome back, hope you had a nice stay, but now the exam is getting closer…" (NMTE3). This approach is perhaps not as unusual as NMTE3 thought: NMTE9 revealed how they after the spring placement "… jump right back to summing up the course and prepare for the exam" (NMTE9). Hence, at times, MTEs shared how nothing is done in the post-field context:

… when they [the PTs] come back [from placement] (…) the task of connecting practice with theory is left to the students (…) The fact that we [as MTEs] don't do anything, that is the biggest challenge. Things do not properly connect, but when nothing is done, this is what is problematic. Then everything continues as before … (NMTE4)

Adding to this feeling of resignation, is how some MTEs suspect that a similar feeling grows inside their PTs as well:

I think that the challenges relate to (…) one of the things that I try to foster in my students is this idea of changing the way that mathematics is taught at the school level, right? So, this is one of the things, it's like (…) there is a big rock and I'm trying to break it little by little, and it's hard, right? (…) So, some students, they will enter the program, very eager to change the experiences that they had as a student, and they want to make that change happen. And sometimes after their field experiences, I think that some of them might get discouraged because it's almost like they see the system and how it works. And they feel 'Oh, that's not going to be that easy' (…) And there are some students, they don't really see the *need* for that change, right? They think "No, I'm okay, that's always been like that and that's what I will continue doing." So those students, they are harder for me to plant that seed of change. And I think that with the field experience, they might say, "Oh, see, that's what is happening, it's still the same". (CMTE8)

The recognition that it has 'always been like that and that is what I will continue doing' not only perpetuates traditional practices such as direct teaching and exercise paradigm approaches in the teaching and learning of mathematics, but it fails to acknowledge inequitable practices that serve to exclude some students from participating in mathematical discourse (Nolan and Graham, 2015). Resigning oneself to take the easy, well-traversed path— as either an MTE or a PT— has appeal, especially in light of how efforts to disrupt traditional practices can be met with resistance, "backlash" even, as forewarned by CMTE5:

…if we engage in disruptive pedagogies, I also anticipate that backlash from the public. For example, my students will sometimes, some of them will tell me, "hey [CMTE5], I tried a social justice problem in class", and one parent wrote to him, saying that, "hey, I don't want my son or daughter to talk about anything about racism." And I think culturally responsive teaching and critical pedagogies are themselves "disruptive", right? They are disruptive in trying to challenge the status quo, they strive to move us to think beyond what we already know. And parents, many of them, not all but some of them, will show

> that backlash, will come out forcibly (…) And also, even some institutions, what I anticipate is that— or what I will not be surprised to see— some institutions actually being against it, being against anything about talking about racism, talking about using any disruptive pedagogy that kind of challenges the hierarchy or challenges issues of power, and so on. Because those who are already in power are beneficiaries, right? They benefit from the system, right? So, challenging that system means you are trying to undermine the authority (…) So, I think disruptive pedagogies are great. But as educators, I will say we should be prepared for the backlash.

While only one of our 21 interviewed MTEs ventured explicitly into this direction of discussing possible backlash associated with disruptive pedagogy as a challenge, we can surmise from our conversations with other MTEs that a number of issues similar to these contribute to feeling discouraged and resigned to the challenges at hand.

5. Discussion and concluding remarks

As alluded to earlier in this paper, there is, across the teacher education research, a fascination with theory-practice transitions— conceptualizing them, addressing them, and resolving them. Here, we add to the less researched practice-theory transition by coming to know what MTEs are challenged by in the post-field context of teacher education. Through our analysis, we determined that MTEs are challenged by how teacher education is organized and institutionalized, by what happens during field placement, and by what experiences/stories PTs bring back from field placement. Also, they are challenged by PTs' resistance and skepticism to university input, and how reform teaching is considered too demanding, situations that eventually led to some MTEs being challenged by their own feeling of resignation. Acknowledging these challenges, in the myriad of proposed models to bridge the transitions (see, e.g., Beck and Kosnik, 2006; Reynolds et al., 2013; Nolan, 2018), we suggest that one of the most promising ideas of late for doing this and for meeting the challenges that come with them, is through the creation of a hybrid, or third space in initial teacher education (Zeichner, 2010; Garrett, 2012; Wood and Turner, 2015; Beck, 2020)—one that resembles the internship model (McIntyre and Hagger, 1992) that has inspired many collaborative initiatives in UK universities (Smith et al., 2006). As noted by Daza et al. (2021), "scholars and practitioners worldwide have adopted the third space as a model that can potentially blur boundaries and even out hierarchies in school-university partnerships (…) to establish partnerships that collaboratively integrate theory and practice" (p. 3). Daza et al. (2021) state, however, that this more recent use of third space, in the context of teacher education programs, reflects "distortions" (p. 3) of Bhabba's originally intended conceptualisation of the term, which was grounded in a "critical and liberatory theory of identity" (p. 3) that sought to challenge and decenter dominant discourses. In this regard, Pereira (2019) offers that "the biggest challenge to teacher education today is being able to contribute to the training of professionals ethically committed to a more democratic and just public school system" (p. 87). We agree with Pereira (2019), whose account aligns well with our disruptive pedagogy goals, yet it does not appear to align with the current teacher education research

where the focus is on distorted versions of hybrid or third spaces. In other words, one of the key messages resonating for us in the data and in the six themes of our analysis is the need for a different kind of third space—one that invites awareness and action toward disrupting and challenging dominant discourses in mathematics classrooms.

> I think disruptive pedagogies are particularly important in this era, where advocacy for equity, advocacy for social justice, advocacy for trying to dismantle issues of racism and so on in our education programs and even in our classroom context. So, for me this disruptive pedagogy has come in perfectly at this particular time or particular moment (…) how do we use our teaching and learning to talk about issues of equity, to talk about issues of diversity, to talk about issues of access. So, for me, this is the right time. (CMTE5)

Hence, having identified the six themes above on what MTEs are challenged by in the post-field context of teacher education, we propose a different kind of third space—a post-field third space— which is positioned in the transition from practice to theory, and one that invites the voices, narratives, and knowledge of mentor teachers, PTs and MTEs. An explicit focus in this space would be the goal of unpacking the field placement toward "teaching practices which promote change in the existing relations of power within schools" (Mills, 1997, p. 39) and recognizing that "[s]tudents 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 propose that the themes in this paper represent reasonable starting points for these repositioning and redefining of roles. For example, the post-field third space could serve as a space to unpack discussions on the need for critical perspectives on what 'good mathematics teaching' is: MTEs are challenged by PTs' superficial indicators of 'good mathematics teaching' and the way they tend to return to post-field university sessions with superficial placement stories. MTEs also reported being challenged by mentor teachers' ways of teaching, including the significant emphasis PTs placed on mentor teacher voices and views. This challenge of mentor teacher influence was often discussed in combination with how PTs struggled with the demands of reform teaching, preferring instead to comply with narrow views on what mathematics teaching is. Simply put, MTEs expressed being challenged by PTs' skepticism, resistance, and lack of conviction to the role of the university. However, we acknowledge the struggles and tensions PTs experience when balancing the expectations of the university MTEs and the school mentor teachers at the same time while in field placement (Bullock and Russell, 2010). We suggest that more research is needed to include the voices of mentor teachers and PTs as they join MTEs in this post-field third space.

While we have proposed here the rise of a post-field third space, we also want to draw the reader's attention back to our initial intention in this research: to highlight practice-theory challenges as identified by MTEs. Having now identified what MTEs see as challenges in the post-field context, we feel more confident in our understanding of what needs to be disrupted. In other words, we see the next critical step in our research as identifying what MTEs *do* with these challenges; that is, what disruptive and transformative practices, if any, are initiated by MTEs in the post-field teacher education context. As noted earlier in this paper, in our review of

research texts focusing on DP (Bjerke and Nolan, 2022), we found that a key aim of DP in teacher education is to mentor/support PTs to reposition, redefine and rethink their roles (Bastos, 2009). Through careful study and synthesis of ideas across those research texts on DP, it became clear how the literature suggested the existence of certain current pedagogies and practices teacher educators want to challenge, or *shift away from*, and also pedagogies and practices they want to promote, or *shifts toward*. We now propose moving forward in our research study and analysis through an explicit focus on these two DP shifts: what do MTEs want to shift away from (challenge) and shift toward (promote). This is not, however, a task that we take up here in this paper.

Instead, to close this paper, we raise two queries that we think MTEs, like ourselves, might benefit from reflecting on: *Am I reconfirming what I want to disrupt? Have I resigned my practice to give in to the challenges at hand?* A reconfirmation of what MTEs identify as challenges appears to follow from the way school placements are organized (e.g., PTs come back from placement very excited, but there is no time to dig deep), and from what PTs (do not) experience in placement that makes university input stay theory to them (as worded by CMTE3 in Section "What happens during field placement"). Eventually, this reconfirms what we/MTEs want to move away from: a mathematics classroom heavily influenced by the exercise paradigm (Skovsmose, 2001) where reform teaching is downplayed by time constraints and PTs' lack of knowledge, resulting in a space that resists the introduction of pedagogies which will dismantle and replace dominant paradigms (Vratulis et al., 2011). Hence, based on the findings we report on in this paper, we find it timely for MTEs to ask: *Am I reconfirming what I want to disrupt?* This, together with how our analysis suggests that a growing list of challenges causes some MTEs to step down and settle on a pragmatic approach to their post-field mathematics teaching, it is equally important to ask: *Have I resigned my practice to give in to the challenges at hand?* Many MTEs reported being challenged by their own resignation and/or their beliefs about the purpose of the field. For some, this resignation grows from when they realize:

> … there is a dilemma which I always feel is difficult; we can change their [the PTs] beliefs, perceptions, but it is something entirely different to change their practice because then we need to help them to get experiences with the kind of practice we're talking about (…) It is too big a gap for them to go from a perception – an idea and a dream – to actually perform such a practice. (NMTE3)

Through its focus on the under-researched field to university (practice-theory) transition, this paper has featured the voices and perspectives of MTEs themselves as they 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). In its focus on disrupting and reimagining knowledge constructed in the movement from university to field and back to university, our research study is important ongoing work, both for those MTEs involved in our study (as a reflective self-study exercise) and for those reading about and relating to what we report. We realize that the themes we have uncovered add to the already high standards and responsibilities placed on teacher educators (Hökkä et al., 2012; Lunenberg et al., 2014), which makes the road ahead rough. "[I]t can be difficult to determine how to continue and sustain moves toward such 'disruptive pedagogies'" (Sidebottom, 2019, p. 233), but we suggest that it is a worthwhile field trip to take.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Behavioral Research Ethics Review Committee at the University of Regina, Canada. NSD–Norwegian Centre for research data. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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