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Negotiating the complexity of teaching: a rhizomatic consideration of pre-service teachers' school placement experiences

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ABSTRACT

Background and purpose: Acknowledging that it is critical that researchers design and implement studies that examine teaching as a complex phenomenon (Strom and Martin [2017]. *Becoming-teacher: A Rhizomatic Look at First-year Teaching*. Rotterdam: Sense Publishers), the objective of this study was to examine pre-service teachers' (PSTs') experience of teaching a specific content (i.e. Sport Education) in various school contexts (i.e. diverse PSTs, contexts, students, and the SE model). Using the rhizomatic (Deleuze and Guattari [1987]. *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press) concept of assemblage, this study was guided by the question, 'How do PSTs negotiate their Sport Education physical education teacher education learning experience during school placement?'

Research setting and participants: Grounded in post-qualitative methodology, this study involved twenty-one PSTs undertaking their school placement as part of a three-year physical education teacher education (PETE) programme in Norway. School placement was composed of two three-week periods in upper secondary school in which the PSTs taught SE to the same class each week. The PSTs participated in a university SE-PETE unit prior to school placement.

Data collection and analysis: Three focus group interviews were conducted with three PST groups: (i) end of the SE-PETE unit and prior to school placement; (ii) between school placement blocks; and, (iii) end of school placement. Also, PST coursework was collected on completion of the PETE unit (completed in groups) and on completion of school placement (individual coursework). The nonlinear analysis process included data walking, rhizomatic mapping, situational analysis, and memo writing.

Findings and discussion: This study highlighted how particular characteristics of various human and non-human elements (that is, the PSTs themselves, their contexts, their students, the features of SE) influenced and shaped PSTs' teaching and learning. Recognizing that it is not possible to be true to the myriad of elements influencing each PST, we provide a detailed consideration of two selected PSTs and show how interactions between human and non-human elements created two different teaching practices and learning experiences. We discuss the concept of assemblage in relation to the findings and introduce the notion of 'translating'. In 'translating', as highlighted by the PSTs in this study, PSTs make sense of

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their PETE learning within a specific setting and a set of circumstances.

Conclusion: We contend that non-linear conceptual and methodologic frameworks, such as those featured in this study, can assist the PETE community to push beyond linear and simple ways of studying practice and instead encourage more complex conceptualizations of teaching and learning. Hence, we advocate for an ontological turn (Lather and St. Pierre [2013], "Post-qualitative Research." *International Journal of Qualitative Studies in Education* 26 (6): 629–633) in PETE research that focuses on the processes of teaching and learning rather than the outcomes alone.

Introduction

There is a growing body of research (Davis and Sumara 1997; Britzman 2003; Opfer and Pedder 2011; Strom 2015) that attests to the complex, non-linear nature of pre-service teachers (PSTs) and teachers learning and practice. Strom and Martin (2016) asserted that PST learning does not directly transfer into classroom practices and suggest that multiple enabling and constraining elements influence the pedagogical decision-making and the enactment of teaching practices. Such ideas can assist researchers to push beyond linear, simplistic ways of studying teaching, and instead advocate for a shift toward conceptualizing PST learning and the enactment of instructional practice in more complex ways (Strom 2015).

A complex conceptualization of teaching encourages researchers to focus on the process(es) of teaching and learning rather than the outcomes alone (Strom 2015). In this study, we used 'rhizomatics' (Deleuze and Guattari 1987) to investigate the complex and non-linear processes of PSTs' school placement experiences. Rhizomatics is a theoretical lens that emphasizes interrelationships among a multitude of interacting variables in a given social situation. Specifically, this encouraged us to investigate PSTs' teaching as co-constructed by interrelated elements in the classroom and school setting.

The specific content PSTs were to teach during school placement was the Sport Education model (SE) (Siedentop, Hastie, and van der Mars 2011). Teachers, and in particular PSTs and beginning teachers, have encountered a range of challenges when teaching SE (e.g. McCaughtry et al. 2004; McMahon and MacPhail 2007; Deenihan and MacPhail 2017). Consequently, while researchers (Curtner-Smith, Hastie, and Kinchin 2008) have encouraged PSTs to teach SE aligned with the guidelines (i.e. 'full version') provided by Siedentop (1994) and his colleagues (Siedentop, Hastie, and van der Mars 2011), it seems initially unreasonable to expect PSTs to teach SE aligned with all recommendations (Deenihan and MacPhail 2017). Researchers are therefore encouraged to conduct studies that explore the realities, not ideals, of teaching the model (Deenihan and MacPhail 2013, 2017).

Acknowledging the complex, non-linear and interrelated nature of teaching, and the complexity of SE itself (Hordvik, MacPhail, and Ronglan 2017a), the objective of this study was to examine PSTs' experience of teaching a specific content (i.e. Sport Education) in various school contexts (i.e. diverse PSTs, contexts, students, and the SE model).

This study can be envisaged as contributing to the 'chain of evidence' (Cochran-Smith 2005) concerned with empirical evidence demonstrating the link (or lack of link) between teacher education programmes, PSTs' learning and their subsequent teaching during school placement. We work on the premise that enacting a specific content (i.e. Sport Education) experienced in teacher education is a complex undertaking shaped by the ways the elements in the school setting work together. Our contribution advocates for a shift towards a more complex and relational conceptualization of teaching and learning. We particularly hope to contribute to the debate about the normative practice surrounding SE and the wider notion of models-based practice (Landi, Fitzpatrick, and McGlashan 2016).

Specifically, we argue that this study represents an original and significant contribution to the physical education and sport pedagogy community. Using a novel theoretical framework, we examine teaching as a complex process. This allows us to recognize the multitude of elements that co-construct teaching, conveying how teaching is a collectively negotiating process. Furthermore, investigating the how and why of teaching, we highlight that a specific content (i.e. Sport Education) experienced in teacher education most likely will be taught in modified and different forms in school placement. This encourages us to convey how PSTs translate (as opposed to transfer) their teacher education experiences into school placement practice.

Conceptual framework

Rhizomatics is an extension of the work by Deleuze and Guattari, who use the concept of a rhizome to express a non-linear, multiplistic, relational way of thinking, of ontology, and of human experience (Deleuze and Guattari 1987). Rhizomatics is deemed a helpful tool for explaining the complexities of enacting pedagogical change at the micro-level of the teacher and classroom (Strom 2015). Affiliating with other postmodern, non-linear theoretical perspectives such as cultural-historical activity theory (Engeström 1999) and actor-network theory (Latour 2005), rhizomatics attends to the relationships among components within the classroom and how these interactions jointly shape the teaching practices produced. In this way, rhizomatics seeks to advance an alternative (rather than an opposite) way of thinking about teaching and the complexities of teaching on a day-to-day basis.

The ‘rhizome’ is central to rhizomatics, and Deleuze and Guattari (1987) contrasted the rhizome with the Western thought that they termed the ‘tree logic’. While the rigid tree is stable, hierarchical and affirms linear thinking, the rhizome is a bulb (can also be imagined as a ginger) that grows unpredictably in all directions and constantly evolves. Any point of a rhizome is connected by lines to other heterogenic points. Ruptures may occur within the rhizome, but new lines will always be generated. Rhizomes are considered maps rather than tracings, meaning that they are always open and can be entered at any point, constantly changing its structure (Deleuze and Guattari 1987).

In this way, with a focus on interactional processes between a multitude of elements rather than products, rhizomatics is particularly well suited to the research of teaching as complex and contextually situated phenomena (Roy 2003; de Freitas 2012; Strom and Martin 2017). While we acknowledge the difficulty of considering one rhizomatic concept without considering others (St. Pierre 2016), for the purpose and scope of this paper, our main focus is on the concept of ‘assemblage’.

Assemblage

‘Assemblage’ is one of the numerous rhizomatic concepts that can be used as analytic tools to think differently about social activity (Strom and Martin 2017). An assemblage is an ‘aggregate of elements, both human and non-human, that function collectively in a contextual unique manner to produce something (e.g. teaching practice, a situated identity)’ (Strom and Martin 2017, 7). A classroom can be conceptualized as an assemblage, composed of PSTs (their knowledge, experiences, and beliefs), students (their knowledge, experiences, beliefs, and investments), physical space (the sport hall, equipment, the room environment), and discourses (the PST’s expectations about the students and vice-versa) (de Freitas 2012).

Considering teaching as assemblage means considering the various components of the classroom – the PSTs, the students, the content, the classroom, and so on – as ‘working collectively to shape teaching practices, rather than viewing them as discrete variables that are independent of one another’ (Strom 2015, 322). As such, we contend that assemblage provides a pertinent concept with which we can think differently about teaching. Rather than thinking of the various components of the classroom as separate, discrete, and neutral, we can consider them as working together in a

collective agency to carry out a particular function or activity (e.g. teaching and learning) (de Freitas 2012).

By adopting rhizomatics as a conceptual framework, and particularly the concept of assemblage, we hope to extend the ideas articulated by previous work on PSTs' school placement teaching by considering the PST as working collectively in a classroom-assemblage composed of various heterogeneous elements (i.e. forces, affects, bodies, ideas, and objects) to negotiate and construct practice. Furthermore, rather than discussing learning and practice as an object, something the PSTs take (or are expected to take) from the university and implement in their classrooms, the concept of the classroom-assemblage can further assist our complex thinking about the process of practice (Strom and Martin 2017). In this way, we aim to illuminate the 'why' and 'how' of processes of PSTs' school placement practice, which can in turn inform PETE and its continuing support of PSTs and teachers.

Elements influencing PSTs' school placement teaching

Various conditions or elements related to the PST (e.g. the classroom, the school, the district, and the larger policy contexts) influence the experiences and practices of PSTs. Because this study revolves around PSTs' teaching of SE, our focus in this section is related to the considerable amount of research on PSTs' SE teaching experiences. We discuss the ways in which the multiple conditions and elements combine and interact, and influence PSTs' experiences and practices in varying, and sometimes unpredictable, ways.

The Sport Education model

The various teaching and learning features of SE (e.g. season, teams, roles, competition) have the potential to shape PSTs' experience and teaching the model. PSTs have reported that teaching SE increased the planning and workload requirements (McCaughtry et al. 2004; Deenihan and MacPhail 2013, 2017; Braga and Liversedge 2017). While the detail of SE has made PSTs feel overwhelmed (McCaughtry et al. 2004), others have reported that the model structure (particularly the use of teams, roles and competition) aided the effective teaching of SE (Stran, Sinelnikov, and Woodruff 2012; Braga and Liversedge 2017). It has been suggested that SE has the potential to challenge PSTs' traditional teaching approach (Curtner-Smith and Sofo 2004; Stran and Curtner-Smith 2009a) and provide an effective medium through which PSTs can explore and consider different perspectives (Stran and Curtner-Smith 2009b).

While utilization of SE appears to facilitate a more autonomy-supportive social context in teaching practices (Perlman 2012), it has also been suggested that SE's aim of providing authentic sporting experiences creates an ego-involving climate (Parker and Curtner-Smith 2014). SE features have also been proposed to challenge a conservative school culture whereby the teacher acts more as a facilitator than a teacher-led instructor in the learning environment (McMahon and MacPhail 2007).

The pre-service teacher

The PST brings to teaching personal knowledge and experiences that shape their teaching of SE. PSTs' occupational socialization influences practice (Curtner-Smith, Hastie, and Kinchin 2008; Stran and Curtner-Smith 2009a) and consequently PSTs teach differing versions of SE. PSTs' knowledge influences their SE teaching (Stran and Curtner-Smith 2010), with PSTs gradually developing their knowledge and understanding about teaching and learning SE (Glotova and Hastie 2014; Hordvik, MacPhail, and Ronglan 2017b).

While researchers have reported PSTs' enjoyment of teaching SE (Deenihan and MacPhail 2013), PSTs tend to experience multiple struggles and misunderstandings with SE. They have struggled with tactical instruction (McCaughtry et al. 2004), expressed organization concerns (Curtner-Smith and Sofo 2004) and conveyed an unwillingness to move away from a reliance on teacher-led instruction

(Stran, Sinelnikov, and Woodruff 2012). PSTs have misunderstood and underestimated both the complexity of skill development (e.g. used repetitive drills that focused on isolated skills) (McCaughy et al. 2004), and the teaching of roles and responsibilities (McMahon and MacPhail 2007).

PSTs have been reported to reinforce traditional gender roles and expectations while teaching SE (Parker and Curtner-Smith 2012). Others have been able to combat masculine bias and sexism due to their liberal views about sport, willingness to confront the prevailing sporting culture, and the fact that they were teaching elementary aged children (Chen and Curtner-Smith 2015). It has been suggested that an overemphasis from the PSTs on the competitive elements of SE created an ego-involving climate (Parker and Curtner-Smith 2014).

The classroom environment

While PSTs have noted student enjoyment through their teaching of SE (Curtner-Smith and Sofo 2004), they have experienced student challenges that have constrained their teaching of SE. The culture (e.g. teacher using exercise as punishment, students showing up late to class) of the class has been suggested to constrain PSTs' SE teaching (Stran, Sinelnikov, and Woodruff 2012). There is evidence that PSTs have experienced student resistance towards roles and responsibility and other features (such as record keeping, statistics and match reports) because students were not familiar with these ways of engaging in learning (Curtner-Smith and Sofo 2004; McMahon and MacPhail 2007; Stran, Sinelnikov, and Woodruff 2012). More generic issues related to teaching such as low student attendance (Stran, Sinelnikov, and Woodruff 2012), range of student skill level (Braga and Liversedge 2017) and students not bringing the correct attire to participate in physical education (Deenihan and MacPhail 2013), have all been noted as further challenges to the effective teaching of SE.

The PETE and school context

The quality of physical education teacher education (PETE) programmes influences PSTs' teaching of SE (Curtner-Smith, Hastie, and Kinchin 2008; Stran and Curtner-Smith 2010). While PSTs' PETE experiences can facilitate their teaching of SE (Deenihan and MacPhail 2013; Braga and Liversedge 2017), being assessed on their teaching while undertaking school placement can lead to a concern from PSTs on 'experimenting' with SE (Deenihan and MacPhail 2017). PSTs who were teaching in a custodial school environment were inhibited in their teaching of SE (Deenihan and MacPhail 2017), while supportive structures in the physical education department and in the wider school community worked towards facilitating the teaching of SE (Deenihan and MacPhail 2013). The cooperating teacher also influences PSTs' teaching of SE. While some cooperating teachers encouraged and supported PSTs to teach SE while undertaking school placement, others encouraged PSTs not to teach SE (Deenihan and MacPhail 2013, 2017). This latter point may well be associated with cooperating teachers being unfamiliar with SE (Deenihan and MacPhail 2017).

In this paper, rather than trying to add to the list of elements influencing PSTs' school placement experiences (i.e. the outcomes of teaching) we aim to show the way these various conditions and elements interact and shape PSTs' experiences and practices (i.e. the process of teaching).

Aim and purpose

We acknowledge the complex, non-linear and interrelated nature of teaching, and that it is critical that researchers design and implement studies that examine teaching as a complex phenomenon (Strom and Martin 2017). Consequently, the objective of this study was to examine PSTs' experience of teaching a specific content (i.e. Sport Education) in various school contexts (i.e. diverse PSTs, contexts, students, and the SE model).

Given that seminal rhizomatic questions are fundamentally concerned with practicality, process, and context ('Does it work, and how does it work? How does it work for you?' – Deleuze 1995, 7), our

aim is to illuminate the ‘why’ and ‘how’ of processes of PSTs teaching SE. Considering the term ‘negotiation’ to entail a process between two or more elements (each with its own aims, needs, and beliefs) seeking to discover and achieve something together or solve a conflict, the study was guided by the question, ‘How do PSTs negotiate their SE physical education teacher education learning experience during school placement?’

Method

This study was grounded in post-qualitative methodology. Subsequently, we insist that all knowing is partial and that research is inherently value and perspective-based (St. Pierre 2000), seeking to highlight non-linear, multiplicitous ways of researching complex phenomena such as teaching (Strom and Martin 2016). In this way, our post-qualitative research position is consistent with rhizomatics (Deleuze and Guattari 1987) as we aim to disrupt and express a break from (and not a rejection of) traditional methodologies (Ellingson 2009).

Within this larger methodological perspective, we used case study (Yin 2013) as the study design. Case studies allow for in-depth investigation into the complicated set of ‘institutional, political, developmental and personal factors that shape actions in schools and classrooms (Stake, 1995), helping the researcher to gain a deeper and more holistic understanding of complex phenomena, like teaching, that involve multiple interacting variables (Merriam, 1998)’ (Strom and Martin 2016, 256–257).

We acknowledge that our post-qualitative position informed and shaped the study and its story in specific ways (Barad 2007). We did not focus on the extent to which PSTs followed a SE model protocol. Rather than focusing on the outcomes of how PSTs learn to teach SE, we constructed a story about how multiple interacting elements influence PSTs’ teaching experience. Furthermore, acknowledging that we provide a contextualized description of a phenomenon that may or may not be replicable across different contexts, our aim is not to add variables to the complexity of teaching but rather to tell a story that exemplifies the complexity of teaching. We hope this will allow the physical education and sport pedagogy community to appreciate that PSTs (and other practitioners) are only one of multiple elements shaping their practice and learning experience.

Participants and setting

This study involved 21 PSTs (6 females, 15 males) who were in their final year of a three-year undergraduate PETE programme in a university in Norway. While the PSTs were aged between 20 and 29 years old, 16 of them entered the PETE programme one or two years after completing their post-primary education. In Norway, SE or the wider notion of models-based practice is not part of the physical education and teacher education curriculum. The PSTs had therefore not experienced SE as school students. The goals of the established module had previously focused on learning the content of games. PSTs were now learning about SE in the same module. Also, the school placement was not specifically directed towards encouraging the use of SE.

SE-PETE experience

All PSTs experienced a SE practical games unit prior to school placement. Six of the PSTs had previously experienced a SE practical team handball unit the year before (Hordvik, MacPhail, and Ronglan 2017a) while three PSTs also had taught SE in a consecutive school placement (i.e. one school placement following the SE team handball unit). During the SE games unit, PSTs experienced a SE season as if they were a school student. They selected and affiliated to teams, adopted roles and experienced formal competition and culminating events. They were required to reflect and discuss the ‘how’ and ‘why’ of teaching SE. The unit consisted of two connected mini seasons of touch rugby (lessons 1–7) and team handball (lessons 8–13). The PSTs were formally assessed in week 13 on the

basis of a group coursework assignment that they were to complete in their SE teams, producing a SE season design that would inform their teaching of SE during school placement.

School placement

The school placement was composed of two three-week periods in upper secondary school. PSTs were divided into pairs, assigned an urban or suburban upper secondary school, and were appointed a school cooperating teacher. Each week the PSTs were required to teach and actively observe their peer a minimum of eight hours, with an additional six hours shared supervision with their cooperating teachers. This study focuses specifically on the one class each week where PSTs taught SE. However, due to unpredicted school events some PSTs never got to teach the maximum six-week complement of lessons.

Regarding expectations towards PSTs model implementation. They were encouraged to apply the SE season design developed in the SE-PETE unit, while modifying their teaching considering the context and personal confidence of teaching through SE.

Data collection

Ethical approval for the study was granted from the Norwegian Social Science Data Services and each PST signed a study consent form. Data collection employed nine focus groups in addition to PST group and individual coursework. We conducted three focus groups with each of the three PST groups: (i) end of the SE-PETE unit and prior to school placement; (ii) between school placement blocks; and, (iii) end of school placement. The interactional and dynamic nature of the focus groups both facilitated the PSTs' construction of, and allowed insight into, various school placement expectations and experiences (Kitzinger 1994).

We collected PST group and individual coursework to generate further understanding of the school placement expectations, practices and experiences. A template (van der Mars and Tannehill 2015) was used to facilitate the comprehensive group coursework. We collected the group coursework (each ranging between 45 and 65 pages in total) on completion of the SE-PETE unit. Through weekly submissions and subsequent feedback (focusing on aspects specifically emphasized in the SE-PETE unit) PSTs developed a SE season design.

The individual coursework (each ranging between 29 and 64 pages in total) comprised of two submissions. The first submission was before school placement and required PSTs to write their biography and teaching philosophy that they subsequently used in a reflection on SE and their expectations of teaching the model on school placement. The second submission was finalized on completion of school placement. This involved a description of the school context, intended unit and lesson plans, after class reflection (i.e. What went well? What was challenging? Possible solutions?) and end of each period reflection (i.e. What went well/not well for me? Why? What kind of changes are needed? What went well/not well for the students? Why? Other reactions or comments from students? New ideas or modifications?).

Together, the focus groups and coursework allowed us to map PSTs' expectations, experiences and perceptions of multiple elements (e.g. SE, school contexts, students) influencing their school placement teaching practices, while providing an understanding of how such elements interacted and shaped the teaching and learning experience.

Data analysis

Drawing on the analytic work of Strom (2014, 2015), we analysed the data employing traditional qualitative analytic conventions (such as coding) with rhizomatic mapping (a methodology based on the properties of the rhizome) (Deleuze and Guattari 1987) and situational analysis (a

postmodern form of grounded theory) (Clarke 2003). The non-linear analysis process included data walking, rhizomatic mapping, situational analysis, and memo writing.

The first level involved a strategy of 'data walking' (Waterhouse 2011; Strom 2014), an inductive approach to exploring the data. This process involved reading the focus groups and coursework multiple times, while highlighting sections of interest and noting connections between the data and the theoretical literature, the empirical literature, and other data sources. Our focus in walking through the data was on connections, interactions and processes rather than categories.

In the second level, we used the data software 'Inspiration' to create rhizomatic maps that are flexible and show multidirectional relationships among elements (Strom 2015). We entered the main ideas from the initial coding process into the map, creating expandable 'bubbles' to capture each idea. We then began clustering these data bubbles together in ways that related to the facets of constructing SE teaching practice, such as 'negotiating with SE', 'constraining conditions', 'enabling conditions', and 'negotiating with students'. Rather than reducing the data to a category word or phrase, this method kept us immersed in the detail and complexity of the data (MacLure 2013).

In the third level, we used situational analysis to create organized situational charts which named 'who and what' matter in school placement, including the major human and non-human elements present (Clarke 2003). We then theorized the lines we had drawn or the connections made within the rhizomatic map. We considered these as the social negotiations in school placement. That is, the relations and interactions between important elements that shaped PSTs' ongoing teaching practices.

In the final level, we employed a process of analytic memoing (Charmaz 2006). Appreciating the nature of each PSTs' school placement teaching, this involved constructing individual narratives from a few selected PSTs that we considered represented the diversity of experiences and contexts. The rhizomatic map and situational analysis assisted us in developing the main ideas in more detail and creating lengthier descriptions of events to re-situate the data. We believe narratives constructed from multiple qualitative data sources (focus group transcripts, documents or other data) 'enable the reader to think with and feel with a story, rather than only analysing its meaning ... narratives enable qualitative researchers to show rather than tell' (Ellingson 2009, 65). As such, these narratives helped us make sense of the multiple elements in the classroom and school setting, as well as the ways the resulting linkages shaped PSTs' experiences and teaching practices.

Findings

The findings of this study show that PSTs' experiences and described practices were strikingly different. Some PSTs were able to successfully enact the key ideas from SE and their corresponding template. This included allocating students to stable teams, providing students with roles and an appreciation of responsibility for own learning, and carrying out a festive culminating event. In contrast, other PSTs struggled to engage students in taking responsibility for their learning, allocate students to stable teams and refrained from introducing defined roles.

We contend that key differences between the PSTs themselves, their contexts, their students, the features of SE and the ways the unique set of elements comprising each class interacted, help explain the different PSTs' experiences and described practices. Our analysis convey that the nature and diversity of these elements included: (i) the PSTs themselves – that is, teaching and learning experiences with SE, expectations of teaching SE, beliefs about learning and if SE is suitable or not for students; (ii) their contexts – that is, size of sports hall, equipment, number of SE lessons, changing between sports halls, different grades and/or educational programmes coming together for physical education, various degree of support from cooperating teachers; (iii) their students – that is, unfamiliarity with SE or other student-centred approaches, challenges of speaking Norwegian, sport skill level, student absenteeism, lack of relationship with students due to PSTs being teacher substitutes, different response and engagement to the SE features; and (iv) the features of SE – that is, comprehensiveness of the model and PSTs' degree of modification.

While an elaboration of the above elements (the PSTs, the context, the students, the SE model) could provide new insights into the diversity of PSTs' experiences, or the outcomes of school placement, our aim in this study is to illuminate the processes of practice and the way elements interact, and together shape teaching and learning. Consequently, following Mooney, Moncrieff, and Hickey (2018), recognizing that it is not possible to be true to the myriad of elements influencing each PST experience, we attempt to provide a 'thick description' (Creswell 2007) of two selected PSTs. We selected Mary and Calvin because they represent the diversity of PST experiences, while also sharing some commonalities in background, beliefs and school placement contexts. As such, instead of selecting PSTs with different backgrounds, beliefs and contexts, we find the similarities between the two PSTs to both emphasize and exemplify our aim in this study, i.e. to illuminate the 'why' and 'how' of processes of PSTs' SE teaching.

The 'why' and 'how' of two PST classroom-assemblages

Mary and Calvin (both 20 years old) had a similar background, espoused philosophy and belief about SE (e.g. how suitable it was in school) and school placement facilities. Although they came from different parts of Norway, they both grew up in two relatively small cities (50–80k). They participated in two of the largest organized sports in Norway, with Mary playing team handball and Calvin soccer. Physical education was their favourite subject at school. In upper secondary school, they selected the educational programme 'Sports and Physical Education' before starting their undergraduate PETE. Both participated in a SE unit the year before (Hordvik, MacPhail, and Ronglan 2017a), while Calvin also taught three lessons with SE in the subsequent school placement.

Mary and Calvin acknowledged that their sport background and SE-PETE experiences made them feel competent, looking forward to teaching SE while on school placement. Although they were used to, and therefore most comfortable with a teacher-centred approach, both aimed to develop a student-centred teaching approach with physical education being a high activity 'learning subject' where students experienced affiliation and enjoyment. Prior to starting school placement, both reported that they considered SE to be aligned with their own teaching philosophy and a teaching practice that they aimed to develop.

Finally, the two school contexts had similar characteristics. Calvin was appointed a 1. grade general education class with 25 students (13 girls and 12 boys, age between 16 and 17) for his SE teaching, while Mary was appointed a 2. grade general education class with 24 students (8 girls and 16 boys, age between 17 and 18). Both taught six 70-minute SE lessons and had a large sport hall (40 × 20 metres) and necessary equipment (vests, goals, cones, balls) at their disposal.

Despite such commonalities in sport and education background, espoused philosophy and beliefs, and facilities, Mary and Calvin shared widely different SE school placement experiences and teaching practices. In developing insights into the 'why' and 'how' of the differences, we present each of the contributing elements in turn before exploring the way Mary and Calvin negotiated these elements in their practice. As such, we argue that the relationships and interactions between elements, or the assemblage in total, influenced and shaped their experiences and practices.

Calvin's classroom-assemblage

Several elements contributed to Calvin having a positive SE teaching experience, allowing him to follow the pre-planned SE design and subsequently enact his espoused teaching philosophy.

Calvin's first-grade students enacted characteristics that created conditions where he experienced being able to engage students in his SE teaching. He described students as: 'Not that skilled, but they did what they were asked to do and never questioned my (SE) approach'. Importantly, Calvin experienced that students enjoyed being part of, and worked well in, teams while undertaking their role responsibilities. He emphasized how such characteristics contributed to the successfulness of his

teaching: 'It has worked well because of positive students ... Everyone has taken their role seriously and they have listened to each other and cooperated well'.

The cooperating teacher also contributed to Calvin's continuous enactment of SE. Calvin reported the cooperating teacher to be positive towards the way SE encouraged student responsibility and engagement, while he was 'not particularly concerned about having a high level of physical activity' in physical education. Importantly, this allowed Calvin to use sufficient time introducing multiple SE features and teach roles. The cooperating teacher also helped Calvin divide the class into three heterogeneous teams before the first lesson (mostly based on skills). Furthermore, Calvin conveyed specific characteristics that appeared to encourage his ongoing enactment of SE. The data suggest that he was not specifically concerned with the fidelity of the model, exhibiting a rather relaxed, yet accountable, approach to teaching.

Each of these elements enabled Calvin and the students to engage in meaningful teaching and learning experiences where Calvin was able to use several strategies to successfully encourage students to actively participate and take responsibility for their own learning. For example, he spent a considerable amount of time describing SE to students and developing team affiliation. For example, Calvin shared that he had an introductory lesson beginning with a short explanation of SE. Then he divided students into teams, provided them a home court and gave them a task card to facilitate student role selection and creation of team names and chants. The introduction ended with a 'thorough explanation' of routines for starting class and warm-up. In this way, the SE curriculum and instructional features (i.e. teams and roles, and instructional strategies) worked to positively influence Calvin's teaching with him progressively shifting from a teacher-led to teacher-facilitated student-led environment:

I didn't experience this (get more time for the individual student) in the beginning because I needed to follow up and make sure that students took the responsibility they got and mastered it. However, as the season progressed, when I was confident that they were able to take the role responsibility, I was able to retreat (take a step back) and utilizing time for feedback.

The interaction between elements created a practice where Calvin experienced that students learning was aligned with his aim for their learning (i.e. learning, mastery and enjoyment). This allowed Calvin to negotiate with his previously established teacher-centred approach by constructively reflecting on, and adjusting his teaching with the aim to develop a student-centred teaching approach. For example, after the first three lessons, Calvin shared that he was dissatisfied with his teaching of the head coach role:

I have been too active, ended up controlling more than I wanted ... stopping and changing the activity to get a better flow. The reason for this is that I have been so focused on having a good flow and a lot of activity during lessons. Also, I'm used to having control and sole responsibility for keeping the activity going.

Reflecting on such experiences, Calvin explained how he adjusted his teaching of roles in the last three lessons. Instead of taking control of the instruction, he aimed to promote students' responsibility by posing questions as a way to promote student reflections. Calvin shared how this influenced his teaching:

It was important for me that the students got to try to judge and adjust the drills by themselves and keep statistics without my monitoring and making sure they did it correct. When I gave them more responsibility, I also had more time to observe and give individual feedback.

Mary's classroom-assemlage

Several elements contributed to Mary having a more challenging SE teaching experience, not allowing her to follow the pre-planned SE design. Given that she was unable to both engage students in SE and teach in line with her espoused teaching philosophy, Mary considered not enforcing all SE features.

Mary's students enacted characteristics that created conditions where she was unable to engage students in her SE teaching. She described the class as 'un-concentrated' and 'impatient', with students 'just wandering around doing nothing'. For example, Mary experienced that students 'didn't want to be in their team, and rather joined the two other teams'. She also reported that she experienced specific problems with one student in the class who was bullying his classmates. Mary also experienced that the high absenteeism in the class (with different students being absent in each lesson) constrained her SE teaching.

The cooperating teacher also contributed to Mary's ongoing struggles and challenging experiences. While noting that the cooperating teacher was positive to some aspects of SE, Mary shared that he was sceptical about the level of physical activity in the SE lessons and the use of duty responsibilities. Also, contrary to Calvin's experience, Mary's cooperating teacher had not divided students into teams before the first lesson. Mary explained how this, together with student absenteeism, influenced her teaching:

I needed to depend on the class list (when creating student teams) ... The cooperating teacher explained which students were skilled and who never showed up. Hence, creating teams I expected around 20 students. However, only 11 students showed up (in the first lesson). In the next lesson, 15 students showed up and seven of them weren't there the first lesson. It was not possible to divide students into the new teams I had prepared because of huge irregularity in the number of students on each team.

Furthermore, Mary conveyed specific characteristics that appeared to result in her being challenged in teaching SE. The data suggests that she was overly concerned with the fidelity of the model, striving to teach all the SE model features across the six lessons.

Each of these elements produced conditions where the SE features of teams and roles constrained Mary's teaching. For example, the unpredictable student absenteeism did not allow her to maintain stable teams or roles, and consequently did not allow ample time for teaching students about the role responsibilities. She shared that this made her feel like an 'activity leader (and not as a teacher). As a result, I don't feel being provided time to give individual feedback, which should be one of the benefits of SE'.

The different elements contributed to an unpredictable teaching practice. Mary struggled to engage students when attempting to actively involve them in their learning experience. As a way to 'motivate or frighten them to give a bit more effort' and encourage students to take responsibility for their own learning, Mary started to use external rewards (e.g. points for attendance). Reflecting on the first two 'devastating' lessons, Mary decided to assess each student on effort. She shared the positive experience of such a practice,

Then students engaged and asked what grade they got on effort. The student I had particular problems with, he was like, 'Was it good today? Did I get a five?' and I said, 'You know what? You got a five plus'. He was in heaven. After that lesson, students came to me and said that, 'I'm looking forward to the next lesson'.

Mary stated that her 'vision is to develop self-regulated students that experience enjoyment and who love physical education'. Consequently, it was devastating for her to experience not being able to engage students, 'I was really tired after the [fourth] lesson. It was so much buzz and so little engagement, which unfortunately affected me'. Mary tried following her original pre-planned SE design. However, in an attempt to develop a student-centred teaching approach, the continuing challenging experiences, together with the cooperating teacher's reservation about the physical activity levels of students involved in SE, resulted in Mary losing 'all belief that SE can work for the class' and started to move away from the pre-planned SE schedule.

For example, in lesson five, Mary started with a teacher-instructed whole-class dance warm-up before each team was to create a dance. Turning to the pre-planned SE schedule in the latter part of the lesson, the lesson turned into chaos: 'Students with duty roles played football on the side, the referee doesn't judge, many players don't play as much as they should, and I'm standing here trying to assess. Where do I start?'. Losing all confidence in providing students any responsibility, while reflecting on the relationship between her vision for student experience and the current SE

teaching and learning experience, Mary turned to favouring direct instruction in the last SE lesson. Encouraged by the cooperating teacher to stop teaching SE, Mary carefully considered whether to continue following her SE plan or do something completely different:

I decided a middle way. I used teams and made a huge event with prizes and a good atmosphere ... [I] developed a competition day consisting of cooperating games. The competition started quite well, students seemed to enjoy themselves and were motivated to score points. However, students trying to cheat on points and not follow the rules unfortunately characterized the lesson.

Discussion

The findings of this study support the claim that there are a multitude of challenges that PSTs are expected to meet when teaching (e.g. SE – Deenihan and MacPhail 2017) and suggest a more complex analysis of teaching and learning. We argue for examining the conflux of elements present in the settings where PSTs teach and to analyse the ways those elements work together to shape experiences and practices (that is, by conceptualizing and analysing teaching as assemblage). In this way, PETE researchers may help advance the teacher education field's understanding of PSTs' teaching as continually transforming in relation to the PSTs' own experiences, their students, the classroom and school context (Strom 2015). This, in turn, will help the PETE community better grasp the complex relationship between PST learning and how that learning is enacted in classrooms.

Assemblages are collectives of elements that work together to produce something (e.g. teaching and learning) (Strom and Martin 2017). Extending this concept to the PSTs' school placement, the conflux of elements in PSTs' classes can be considered classroom-assemblages, each of which operated to construct particular teaching experiences and practices. As such, while previous studies have highlighted the multitude of challenges PSTs meet in school placement, we have shown 'how' and 'why' these elements influence and shape PSTs' teaching and learning. This highlights that rather than viewing each element as separate elements – that is, the PSTs (e.g. their socialization), or students (e.g. their maturity-level), or cooperating teachers (e.g. supportive or not), or a specific content (e.g. SE's comprehensiveness) – it is the way in which these elements interact that shapes the teaching and learning experience.

In this study, for example, the way Mary (her eagerness in teaching in line with the SE requirements and promoting student responsibility) interacted with the apparently disinterested students (not used to or willing to being responsible for their learning), the cooperating teacher (predominantly invested in providing a high level of physical activity in lessons), and SE's teaching and learning features (stable heterogenic teams, roles, culminating event), created a chaotic and not particularly meaningful SE teaching and learning experience.

Contrary to this, the way Calvin (his relaxed approach) interacted with more engaged students (appreciating responsibility and cooperation), the cooperating teacher (supporting Calvin in the necessary time given to explaining SE and related roles), and SE teaching and learning features (stable heterogenic teams, roles, task cards), created a meaningful teaching and learning experience that enabled Calvin to maintain the development of a student-centred teaching approach.

Importantly, Mary's and Calvin's classroom-assemblages represent two extremes on a continuum of PST school placement experiences and were purposefully chosen as a way to illustrate the complexity. We suggest that by presenting two contradictory stories as empirical evidence might be substantiated as a pedagogical way to illustrate collectively produced outcomes. Rather than presenting discrete categories that merely assert that teaching is complex, the two stories provide a glimpse into the complexity and the interactive processes that contribute to the production of teaching.

Implications for teacher education practice

Considering each of the PSTs' classes as their own classroom-assemblages (in other words, as mixtures of PST, students, classroom, school, and programme elements) allows for a more complex

discussion of teaching and learning. Such a discussion recognizes experiences and practice as co-constructed by a multitude of influences rather than a set of actions fully controlled by the PST (Strom and Martin 2017). This conceptualization recognizes that PSTs and their university PETE learning is only one of many elements influencing their teaching in which PSTs continuously negotiate their teaching and learning. We argue that such a complex and interrelated conceptualization creates important implications for teacher education and the way we consider PSTs teaching and learning.

Specifically, this study highlights that the teaching and learning features of SE will most likely be taught in modified and different forms during school placement. Thus, the normative labelling of teachers' and PSTs' *delivery* of the 'full version' of SE (Curtner-Smith, Hastie, and Kinchin 2008), or the *transfer* of the spirit of Siedentop and colleagues (Siedentop, Hastie, and van der Mars 2011) and all the model features from a university PETE programme into classroom *application*, seems highly unlikely (Deenihan and MacPhail 2017). Instead, 'translating' may be a more productive concept in discussing teachers' and PSTs' teaching (of SE) in schools. Although the concept of 'translating' has been used with respect to the theory–practice or learning–practice relationship (e.g. Lieberman 1995; Richardson 1997) and also recently in the teacher education literature with respect to pre-professional learning (Strom 2015; Strom and Martin 2016, 2017), we suggest that this concept can be used in PETE with respect to teaching and learning a specific content such as SE and models-based practice.

In 'translating', as highlighted by the PSTs in this study, teachers and PSTs make sense of their PETE learning in a specific setting and a set of circumstances. This may mean that teaching in school, that is produced by a joint sense-making, may look substantially different from one context to the next. This does not mean that the PSTs (their background, beliefs, PETE learning) possess no influence on the teaching practice. Rather, their teaching and learning are continuously transformed as it 'comes into composition' with multiple contextual elements and conditions (Strom 2015).

If teaching is a collectively negotiating process within which PSTs and teachers need to translate their PETE learning into classroom teaching, the PETE community need to acknowledge this complexity and the relational aspects of teaching and learning. Hence, teacher educators should give attention to, and discuss, (i) the collective of elements that influence teaching and allow for activities that highlight the agency of students, cooperating teachers and other actors in the setting, (ii) the power of history and culture of the context, and (iii) the role of material elements such as the SE model and school equipment.

For example, teacher educators can engage PSTs in an advocated inquiry cycle (Klein et al. 2016) where PSTs co-construct new understandings about a specific content (i.e. SE) with their peers and teacher educator(s), enact that learning in school placement, and return to their class to discuss, reflect, and problematize their school experiences as well as their own learning about theory–practice. As a way to facilitate such a recursive cycle of theorizing, practicing, and reflecting, teacher educators can connect PST coursework to the learning process. PSTs can develop a block plan (e.g. SE season design) in the PETE course and during school placement PSTs modify and translate the block plan and their PETE learning into the classroom. After lessons or at the end of school placement, PSTs could engage in reflection to identify all elements (both human and nonhuman) that influenced their teaching, the way they negotiated them and how these elements influenced their intended practice. In the second period of the PETE course, PSTs and the teacher educator could engage in reflection and discussion about the multiple forces that influenced the practice, and the ways they negotiated and were required to modify their teaching.

Limitations and further research

Through the enactment of a novel theoretical framework, we argue that this study provides new insights into PSTs' school placement teaching and learning experiences. However, while we generated data that allowed a consideration of the processes of practice for a relatively large group of PSTs, we acknowledge the study limitations. First, the school placement was relatively short (6 weeks) and

PSTs were only required to teach SE in one class each week. The short period was also reported by the PSTs, noting that it influenced the way they were able to enact the SE features (e.g. not able to use considerable time teaching roles). Second, while we conducted focus groups with PSTs before, during and on completion of school placement and collected two comprehensive pieces of coursework, other data sources would have provided deeper insights into the connection and interaction between elements in PSTs' practice. For example, interviews with cooperating teachers or school students would have provided valuable knowledge about the extent to which both population perceived they contributed to PSTs' teaching and learning experience. Moreover, observation data of PSTs' teaching practice would have provided in situ understanding about their 'actual' teaching practice.

Consequently, we encourage researchers to conduct rich qualitative studies (e.g. longitudinal studies, interviews with various actors, observation of multiple practices) that account for the complexity of classroom teaching and learning. Such studies can provide deeper insights into how multiple elements of different teaching-assemblages influence and shapes teaching and learning. For example, extended periods of structured and comprehensive school placement experiences will enhance understanding about the involvement of different elements and how such change influences teaching and learning. Moreover, this emphasizes a focus on understanding PSTs' and teachers' translating process as they aim to make meaning of their initial or on-going teacher education.

Conclusion

We contend that a multitude of elements influences PSTs' teaching on school placement. As a way to account for the relational and complex nature of teaching and learning in physical education (teacher education), non-linear conceptual and methodologic frameworks, such as those featured in this study, can move the focus from outcomes to the processes of teaching. In this study, we used the concept of assemblage to highlight the relational and collectively produced nature of PSTs' SE experiences and practices. We suggest that such ideas and concepts can assist the PETE community to push beyond linear ways of studying practice and instead encourage more complex conceptualizations of teaching (SE). Following the encouragement of Strom (2015) regarding teacher education in general, we advocate for an *ontological turn* (Lather and St. Pierre 2013) in PETE research that focuses on the process(es) of teaching and learning rather than the outcomes alone. By focusing on the 'how' and 'why' of teaching, we can examine the non-linear nature of teaching and learning.

Disclosure statement

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