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Exploring collective action in becoming a teacher in physical education: Understanding the development and use of signature pedagogies across teacher education contexts

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Abstract

Researchers have highlighted the urgent need for large-scale international collaborative research projects between teacher education and school physical education (PE) to develop practices and understandings that address the grand challenges facing the field (MacPhail and Lawson, 2021). In response, this article outlines and illustrates the design and methodology of an international project built on collaboration among PE teacher educators, in-service teachers, and pre-service teachers (PSTs). This collaborative work aimed to explore the development and use of signature pedagogies as collective action across diverse PE teacher education contexts, including both initial teacher education and continuous professional development in five European countries. This article serves two purposes. First, it presents a design for international collaborative research between school PE and teacher education, with a specific focus on signature pedagogies in PE teacher education. Second, it illustrates the methodological approach, detailing the research methods used to explore signature pedagogies across varied international contexts. In so doing, the article contributes to the field by offering a framework for designing international research that engages with collective action and pedagogical innovation. We advocate for research designs that employ robust methodologies, clearly defined analytical frameworks, and transparent procedures. Such designs are essential for conducting large-scale international collective action projects involving teacher educators, in-service teachers, and PSTs from diverse PE teacher

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education contexts. We argue that these elements are critical for scaling up research in the field and for supporting the development, adaptation, and use of signature pedagogies across educational settings.

Keywords
Physical education teacher education, initial teacher education, continuous professional development, pedagogy, teacher educator, communities of practice

Introduction

Physical education (PE) is widely recognized as a field that is ripe with potential. For instance, PE has the potential to enhance the quality of students' lives (Lawson, 2018), to foster lifelong joy of movement (Kretchmar, 2008), to "facilitate self-directed and self-inspired learning" (Penney and Chandler, 2000: 73), and to foster "interaction, communication, responsibility, decision-making, goal setting [and] leadership" (Ward et al., 2021: 51). However, scholars have long been sounding the alarm around issues threatening the future of PE (e.g. Kirk, 2009; Quennerstedt, 2019), with many of these concerns being reiterated to date. A notable issue is, for example, the splintering of PE into fragmented, disconnected "camps," leading to a siloed approach to finding solutions to the challenges facing PE, thereby inhibiting the mature growth and development of the field (Tinning, 2015).

Teacher education in PE includes both the preparation of pre-service teachers (PSTs) and teacher educators, and the continuous professional development (CPD) of in-service teachers and teacher educators (Fletcher et al., 2020). It serves as a crucial context for ongoing efforts to reimagine and improve both school PE and teacher education. However, concerns about fragmentation in teacher education in PE across international contexts have also been raised. This includes the initial teacher education of PSTs (Calderón and MacPhail, 2023), the CPD of in-service teachers (Tannehill et al., 2021), and the preparation and CPD of teacher educators (Czerniawski et al., 2024).

The siloed and fragmented nature of school PE and teacher education have led MacPhail and Lawson (2021) to identify a series of "grand challenges"—issues that presumably manifest in some form and to some extent in PE and teacher education across international contexts. One such challenge involves articulating clear, consistent aims and outcomes for PE, which hold important implications for justifying and advocating for PE, determining what and how students should learn, and fostering equitable, inclusive learning experiences. Another grand challenge facing the field is the lack of coherence and alignment between school PE and teacher education. Often, there is a disconnect between, for example, PE content taught in schools and that which is advocated for within teacher education programs (Harris et al., 2021).

Such fragmentation and the resulting grand challenges have hindered progress in the field, leading scholars to call for a collaborative redesign between school PE and teacher education (Beddoes and Jones, 2022; MacPhail and Lawson, 2021). On the largest scale, such a redesign should, according to MacPhail and Lawson (2021), involve cross-national collaborations that allow for international comparative analyses and facilitate the development of innovative approaches and professional learning. Simultaneously, there is a need to acknowledge contextual and systemic differences, understanding that there are no one-size-fits-all solutions (MacPhail and Lawson, 2021). Thus, the challenge lies in identifying solutions which are both broadly

applicable and locally adaptable (Lawson et al., 2021). In addition to international collaboration, there is a need for national collaboration, which brings together local key stakeholders in the field (Lawson et al., 2022). Hence, scholars have argued that a promising future for PE hinges upon national and international collaborations uniting PSTs, in-service teachers, teacher educators, and policymakers (Beddoes and Jones, 2022; MacPhail and Lawson, 2021). For example, Scanlon and MacPhail (2024) have advocated for collaboration both within and across national and international school PE and teacher education. This collaboration involves teacher educators and in-service teachers jointly working and learning with the aim of bridging the significant existing gap between recommended policy and practices, and the actual realities of schools and teacher education (MacPhail, 2021).

Consequently, there is an urgent need for national and international collaborative research projects between teacher education and school PE, aiming to construct practices and understanding that address the grand challenges within the field. However, to better understand these collaborations, robust research designs moving beyond fragmented and siloed approaches also need to be developed to explore what happens when uniting PSTs, in-service teachers, and teacher educators around joint matters of interest.

In order to take on these challenges, this article outlines and illustrates the design and methodology of an international PE teacher education project built upon collaboration between school PE and teacher education, incorporating an international comparative perspective. Spanning seven countries over three years, the project sought to bring together in-service teachers, teacher educators, and PSTs across international contexts. The primary objective was to promote sustainable national and international collaboration between school PE and teacher education, focusing on developing signature pedagogies of teacher education in PE. These pedagogies refer to characteristic forms of teaching that are used across teacher education contexts in PE (Hordvik and Beni, 2024; Parker et al., 2016; Shulman, 2005).

The article serves dual purposes. Firstly, we outline a design for national and international collaborative research between school PE and teacher education, specifically focusing on understanding the development and use of signature pedagogies across international teacher education contexts. Secondly, we illustrate this methodological approach, detailing the methods used to explore signature pedagogies across teacher education contexts. In this way, we contribute knowledge to the field regarding the design of international studies exploring collective action as well as a way to explore signature pedagogies across contexts. Before outlining and illustrating the methodological approach, we explore the literature on collective approaches aimed at addressing the grand challenges in PE, as well as the design and methodologies used to explore the signature pedagogies of teacher education in PE.

Background

Collective action to address the grand challenges in PE and teacher education

In identifying the grand challenges facing the field of PE, MacPhail and Lawson (2021) call for a bold redesign of PE in both schools and teacher education programs, advocating for strategic innovation through collective action projects. Collective action agendas hold the potential to foster "strengths-based, solution-focused, culturally competent, responsive conversations among cross-sector stakeholders that aim to consider all aspects of the challenge and to gain consensus for a plan of action" (Lawson et al., 2021: 7). While collective action initiatives may vary in terms of

size, scope, and purpose, it is imperative that they begin with a timely agenda around a common purpose and include people, organizations, and cross-sector partnerships (Beddoes and Jones, 2022; Lawson et al., 2021). MacPhail and Lawson (2021) highlight three key strategies for collective action to support the redesign of PE, including the need for: (a) international-comparative analyses to facilitate cross-border knowledge generation, innovation, professional learning, and continuous improvement; (b) solid, dynamic partnerships, between exemplary teacher education and school PE programs; and (c) knowledge-generating teams of exemplary teachers and teacher educators.

While engaging in these types of collaborations can facilitate professional learning, they are not without their challenges. In addition to the difficulties of navigating busy schedules, tight budgets and incentive structures which often do not prioritize collaborative agendas (Lawson et al., 2021), national and international collective action also requires participants to acknowledge and appreciate the complementarity of their varying roles, responsibilities, and areas of expertise and to be committed to negotiating a partnership built on an understanding that no one party "owns" all of the knowledge (MacPhail, 2021). Furthermore, contextual misunderstandings—such as assumptions about others' educational systems and limited understanding of local teaching practices—can generate unintended power dynamics and hierarchies between teacher educators and in-service teachers, particularly as core concepts, such as signature pedagogies in this project, are interpreted differently across societal and educational contexts (Gerdin et al., 2019). Challenges also include structural and bureaucratic barriers within organizations, as well as misalignments in academic traditions, research cultures, expectations, and intentions among partners (Rizvi and Nadarajah, 2019). Additionally, plurilingualism has been shown to both facilitate and hinder international collaboration (Hordvik et al., accepted). Despite the challenges, scholars have argued that collective action is essential for reimagining the future of PE (MacPhail and Lawson, 2021), "and the future is now" (Lawson et al., 2021: 7).

In the international project presented in this article, collective action in becoming a teacher in PE was explored through the development and use of signature pedagogies across PE teacher education. Signature pedagogies were used in both initial teacher education and CPD to address the grand challenge of creating coherence and alignment within and between school PE and teacher education.

Exploring signature pedagogies of teacher education in PE

Signature pedagogies are defined as characteristic forms of teaching by which practitioners are prepared for their future professions and supported in their continued professional learning (Hordvik and Beni, 2024; Shulman, 2005), and recently, the value of articulating signature pedagogies specific to teacher education in PE has been highlighted (Hordvik and Beni, 2024; O'Sullivan, 2018). Shulman (2005) conceptualizes signature pedagogies as consisting of three distinct but interconnected structures: surface, deep, and implicit. The surface structure refers to the concrete, observable elements of pedagogical practice—what is visibly enacted in the classroom. The deep structure concerns the underlying assumptions about how the pedagogy supports learning. The implicit structure encompasses the values, attitudes, and dispositions that are communicated through pedagogical practice, often without being explicitly articulated. Together, signature pedagogies and their structures provide a foundational knowledge base and shared language that enable teacher educators to make judgments about pedagogies to best support specific teacher education outcomes (Parker et al., 2016).

To initiate this development, Hordvik and Beni (2024) conducted a scoping review of teacher education pedagogies in PE—including both initial teacher education and CPD—and proposed a shared language of signature pedagogies for the field. They constructed three overarching categories of signature pedagogies and identified several examples within each, including: (i) (auto)biographical pedagogies where teachers learn through engaging with and reflecting on stories and experiences (e.g. narratives, vision, and vignettes); (ii) experiential pedagogies which allow teachers to engage in bodily and lived teaching-learning experiences in authentic settings (e.g. school placement, living the curriculum, and peer teaching); and (iii) pedagogies of professional learning which support collaboration in a group with a shared vision and goal. These include forms of practitioner research (e.g. action research) and communities of learners (e.g. communities of practice (CoPs)). While signature pedagogies specific to PE teacher education, as well as the broader concept of signature pedagogies, imply a shared language and a certain pervasiveness across contexts, they do not prescribe specific practices. Instead, they require adaptation to the local context in which they are enacted. In an international project, this entails developing a shared language and understanding of the structure of these pedagogies, while allowing teacher educators to adapt them to their specific contexts, from class to class and lesson to lesson.

Previous studies of pedagogies and signature pedagogies in the context of teacher education have often involved individual practitioners or small groups of practitioners in a local context, including, for instance, methodologies such as case studies or self-studies of the exploration of signature pedagogies within a single course (e.g. Tan, 2019) or within a small group of teacher educators' individual courses (e.g. Hordvik et al., 2021a). In these studies, methods used included, for example, reflective journaling, observations, audio of meetings, individual planning and reflection documents, and critical friend responses. The intentional use of CoPs has also been shown to support teacher educators' professional learning concerning their pedagogical practice, including both local communities and digital international communities involving small groups of teacher educators across contexts (e.g. Patton and Parker, 2017).

While these small-scale, context-specific studies offer essential and nuanced insights into the development and use of signature pedagogies in PE teacher education, their narrow scope highlights the need to complement this work with larger-scale research. Advancing the field requires more robust research designs, clearly defined methodological frameworks, and transparent analytical procedures capable of supporting scaled-up inquiry. Rather than replacing case studies, these approaches can build on their strengths to enable cross-contextual comparisons and support meta-level understanding. In this light, large-scale international collective action projects involving teacher educators, in-service teachers, and PSTs across diverse PE teacher education contexts are essential. Such projects can address shared challenges—such as understanding the development and use of signature pedagogies—and contribute to a broader, more cohesive, yet contextually adaptable knowledge base for the field.

An illustration of collective action focused on signature pedagogies in PE teacher education

Positioning the collective action

The collective action approach, along with the related research design and methods detailed in this article, was developed within the context of an international European research and development project entitled "PhysEd-Academy." This project involved seven European nations (Norway,

Ireland, Sweden, Spain, Luxembourg, Turkey, and Slovenia) and was initiated with the vision of establishing a sustainable PE academy. The primary aim was to develop a shared language, practice, and understanding to support the preparation and CPD of teachers in the field of PE.

To achieve this, the project focused on gaining an understanding of the development and use of signature pedagogies as collective action across international PE teacher education contexts. Subsequently, while signature pedagogies served as the object of study in the project, in this article we foreground collective action. The primary research questions guiding the project were: (1) What are the processes and resulting outcomes of developing an international PE teacher academy? and (2) What are the processes and resulting outcomes of developing signature pedagogies across several international initial teacher education and CPD programs?

In line with the primary aim and research questions, the project adopted a relational ontological stance (Pinnegar and Hamilton, 2015; Slife, 2004). This stance suggests that what happens in practice cannot be understood in isolation from its interplay with other human, material, and cultural elements and conditions within the given context (Slife, 2004). Consequently, we did not aim for the establishment of universal and foundational claims about the most effective implementation of signature pedagogies. Instead, we assert that knowing is partial and co-created through the interplay of human and non-human elements throughout the teaching and research process. Thus, the knowledge and understanding we developed were co-created by the teachers-researchers involved in the project and also supported by the generated data and our analyses of them (Pinnegar and Hamilton, 2015).

Our ontological and epistemological stance guided us to theoretically ground the project's collective action approach in sociocultural learning theories, emphasizing the co-construction of knowledge and the significant role of social and cultural contexts in shaping processes and outcomes of teaching and learning. We specifically drew from Lave and Wenger's (1991) situated learning theory, and, in the following section, we detail how the project participants' professional learning was situated within the context of "legitimate peripheral participation" in CoPs (Lave and Wenger, 1991). To elaborate, we engaged project participants in meaningful, authentic tasks where their contributions were regarded as essential for the community's success (legitimate). The objective was to facilitate participants in progressing toward full participation in the community (peripheral), with knowledge being acquired through active interaction within the community (participation). Importantly, CoPs have been utilized extensively to support the CPD of PE in-service teachers and teacher educators (Patton and Parker, 2017).

Illustration of collective action design based on signature pedagogies of professional learning

The collective action approach in the project, as illustrated in Figure 1, was designed using signature pedagogies of professional learning (Hordvik and Beni, 2024), specifically through a combined approach of practitioner inquiry (Cochran-Smith and Lytle, 2009) and CoPs (Lave and Wenger, 1991; Wenger-Trayner and Wenger-Trayner, 2015). Practitioner inquiry, recognized as a powerful approach to conducting research into both teacher educators' and PSTs' practice and to support their ongoing professional development (Cochran-Smith and Lytle, 2009; Hordvik et al., 2021b), has been shown to support professional learning of teachers when combined with CoPs (Goodnough et al., 2020). Such integration of practitioner inquiry and CoPs was, therefore, fundamental in facilitating national and international collaboration, knowledge generation, innovation,

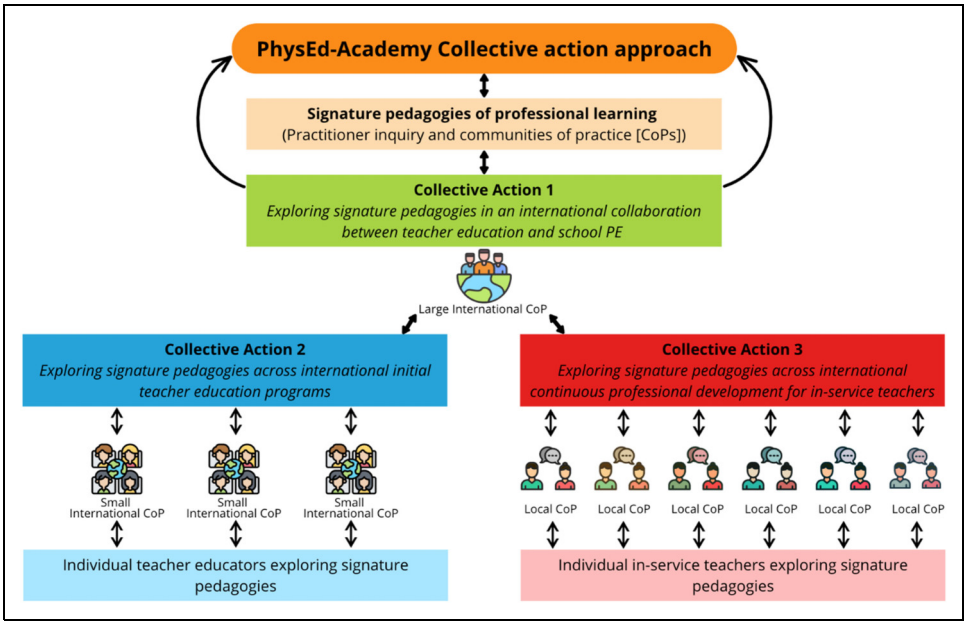

Figure 1. Illustration of the project's collective action approach.

professional learning, and continuous improvement between teacher education and school PE in the collective action (MacPhail and Lawson, 2021).

Subsequently, the collective action design was grounded in the common characteristics of various forms of practitioner inquiry identified by Cochran-Smith and Lytle (2009). These characteristics include: practitioner as researcher; assumptions of links between knowledge, knowers, and knowing; professional contexts as the site for study; community and collaboration; blurred boundaries between inquiry and practice; and systematicity in data collection and analysis. Moreover, Wenger-Trayner and Wenger-Trayner's (2015) conceptualization of CoPs was integrated into the collective action design. They emphasize that CoPs come in a variety of forms, ranging from small(er) to large(r), local to global, and online to in-person. In response to this, we established three different layers of CoPs, incorporating both public and private community spaces, and inviting varying levels of participation (see Figure 1). Consequently, this project distinguishes itself from others using CoPs to explore pedagogies of teacher education in PE, as it incorporates a layering of CoPs for collective action.

Figure 1 illustrates the collective action approach, highlighting the integration of practitioner inquiry and CoPs as design and signature pedagogies for this approach. Three initiatives were developed, each contributing to the "PhysEd-Academy" collective action approach. The first action involved the establishment of one large international CoP consisting of teacher educators, in-service teachers, and PSTs. The second incorporated three small international CoPs, consisting of teacher educators, while the third action involved six small local CoPs consisting of in-service teachers and teacher educators. Each of these initiatives embedded characteristics of practitioner inquiry into their respective layers, such as through the exploration of signature pedagogies in teacher educators' practice. Therefore, while all actions were collective, individual actions and

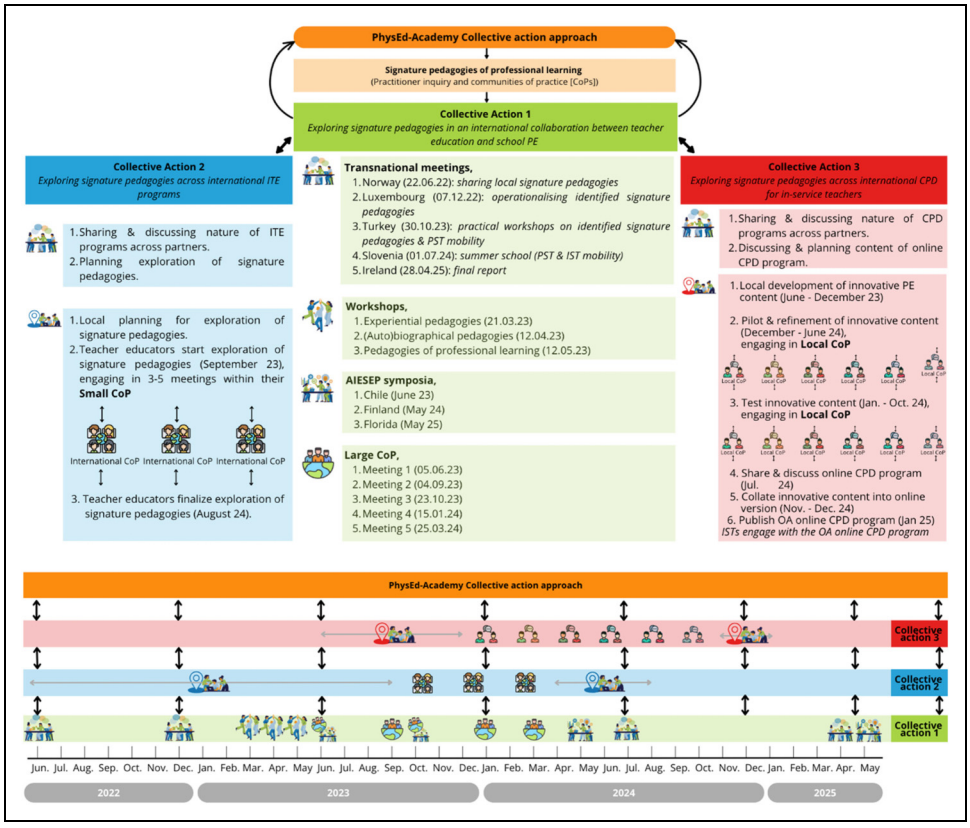

Figure 2. Illustration of the project timeline and overview of activities. ITE: initial teacher education.

practices were intertwined with and influenced all three layers of the collective action design. Consequently, each individual played a crucial role in shaping the overall "PhysEd-Academy" collective action.

The methodological steps of the three collective actions (see Figures 1 and 2) are detailed in the following sections, illustrating our methodological approach and detailing the methods used to explore signature pedagogies across international teacher education contexts.

Collective Action 1: exploring signature pedagogies in an international collaboration between school PE and teacher education

Purpose, research question(s), and practitioners. The purpose of this collective action (see Figure 1) was to explore signature pedagogies across various PE teacher education forms and contexts. This exploration was designed to foster sustainable international collaboration between school PE and teacher education, and to facilitate international knowledge generation, as well as professional learning and development for in-service teachers, teacher educators, and PSTs. The specific research question was: How do signature pedagogies function to facilitate collective action and support teacher educators', in-service teachers', and PSTs' professional learning? This action

involved a total of 43 in-service teachers, 35 teacher educators, and 17 PSTs from the seven project countries contributing to the project at some level and point in time during the project duration. Some participants were involved on a regular basis (e.g. partner in-service teachers and teacher educators) and also actively involved in the two actions described below. In contrast, others had a more peripheral role and were only occasionally involved. For example, some teacher educators participated only in digital meetings and workshops, while PSTs engaged in a five-day student mobility program and a five-day summer school, both organized as part of the project.

Inquiry, professional practice, and collaboration. Participants engaged in both online and in-person activities throughout the project's timeframe. The primary activities included five transnational physical meetings in different partner countries (Norway, Luxembourg, Turkey, Slovenia, and Ireland) as well as online meetings, both of which involved discussing and sharing insights on signature pedagogies, as well as workshops (practical, theoretical, and hybrid) where teachers learned about and experienced the pedagogies as both teachers and learners. The meetings in Turkey and Slovenia served dual purposes, as they respectively involved a combination of project meetings and PST mobility program and summer school for in-service teachers, PSTs, and teacher educators. In the meetings, we shared insights from Actions 2 and 3 and engaged in discussions on the development and use of signature pedagogies across international initial teacher education programs.

We generated data from these processes by collecting artifacts, audio-recording online and in-person meetings, non-participant observation of workshops, and carrying out focus groups. During the initial in-person project meeting in Norway, for example, we gathered artifacts such as partner PowerPoint presentations of their localized signature pedagogies. Additionally, we audio-recorded the online workshops on the three identified signature pedagogies. Non-participant observations were also carried out during the project meetings and PST mobility program in Turkey, where we observed how one teacher educator used experiential pedagogies (living the curriculum and peer teaching) to teach the teacher educators, in-service teachers, and PSTs how to teach innovative PE content. The observation protocol of this workshop (see Supplemental Material A) highlighted the ways it fostered shared bodily experiences of both the signature pedagogies and the innovative PE content. It also facilitated discussions and reflections on the teachers' (bodily) experiences with the pedagogies and the innovative PE content. Furthermore, we carried out focus group interviews in Turkey that focused on the experiences of the teacher educators, in-service teachers, and PSTs from the combined project meeting and PST mobility program, and their experiences of the entire project (see Supplemental Material B).

Collective Action 2: exploring signature pedagogies across international initial teacher education programs

Purpose, research question(s), and participants. The purpose of this action was to explore signature pedagogies across international initial teacher education programs in order to better understand the development and use of signature pedagogies for the learning of PSTs and the CPD of teacher educators. Specific research questions posed were: How do signature pedagogies function within different international initial teacher education programs, and what learning do they support for PSTs? This involved 14 teacher educators, their local critical friend(s), and the PSTs they taught.

Inquiry, professional practice, and collaboration. Two teacher educators from each of the seven partner nations explored one or more signature pedagogies in their practice in at least one module/course. Signature pedagogies were used to support the teaching of the regular module content (i.e. it was not necessary for teacher educators to adjust the content of the module, but rather their pedagogical approach). Data for this action was gathered from multiple sources including individual teacher educator reflective diaries, non-participant observations of teacher educators' practice, and focus group interviews with PSTs. This involved teacher educators using shared reflective prompts (see Supplemental Material C) to reflect upon their experience throughout the course duration and during meetings with their local critical friend(s). The local group also conducted non-participant observations during the course (see Supplemental Material A). Upon course completion, a focus group interview with PSTs was carried out about their experiences of the specific course and teacher educators' pedagogy and use of signature pedagogies (see Supplemental Material B).

In addition to their local exploration, teacher educators met regularly in small, online, international CoPs to discuss their experiences of exploring signature pedagogies in their practice and receive support from other teacher educators in the group. Group formulation was based on university affiliation and the corresponding teaching schedules of the members. Each group was encouraged to convene at least three times while exploring signature pedagogies. They were assigned a facilitator and were provided with a structured plan for meetings, encompassing a pre-teaching meeting, a minimum of one meeting during teaching, and a post-teaching meeting. To support reflection and dialog, discussion prompts were provided for each session, such as: In what ways (if any) is your intentional use of signature pedagogies changing your teaching practice? (see Supplemental Material D). All meetings were audio-recorded.

Collective Action 3: exploring signature pedagogies across international CPD for in-service teachers

Purpose, research question(s), and participants. The purpose of this collective action was to understand the development and use of signature pedagogies across international CPD programs, including both in-person and online formats. Specific research questions were: How do signature pedagogies function within both in-person and online CPD programs, and what learning do they support for in-service teachers? How does CPD guided by signature pedagogies influence students' experiences in PE? This involved a total of 37 in-service teachers, 14 teacher educators, and the school students the in-service teachers taught (850 students in total).

Inquiry, professional practice, and collaboration. This action involved the establishment of six local CoPs, each consisting of in-service teachers and teacher educators in each country (four to six members). The local CoPs were allocated two main tasks: (i) develop innovative PE content/pedagogy that in-service teachers can use to guide their PE teaching, and (ii) explore how in-service teachers use signature pedagogies to familiarize themselves with and teach based on the innovative content. Following this local development, the final task revolved around the creation of an online CPD program that included both innovative PE content and signature pedagogies to learn how the innovative content could guide teaching practices. These tasks unfolded in three main stages, which we detail below. While all partner countries were involved in all three main stages, the nature of each country's context influenced the inquiries and practices, leading to some variations from country to country. Here, we use the Norwegian study of signature pedagogies as an example.

First, local CoPs of in-service teachers and teacher educators used signature pedagogies to facilitate the creation and piloting of innovative PE content. In Norway, a team of two teacher educators and two in-service teachers engaged in a form of practitioner inquiry to pilot a pedagogical approach named "Slow Friluftsliv" (Abelsen and Leirhaug, 2024). This process involved the creation of a teaching resource that outlined the pedagogical approach. The two in-service teachers wrote reflective diaries during the piloting process (see Supplemental Material C), and artifacts such as lesson plans were collected. The two teacher educators functioned as critical friends, carrying out non-participant observations (see Supplemental Material A) and holding several meetings, which were audio-recorded, to discuss the pedagogical approach. In addition, upon completion of the unit, focus group interviews were conducted with students to gain a deeper understanding of how the pedagogical approach influenced their PE learning experiences (see Supplemental Material B).

Second, following the first phase, the two local teacher educators used signature pedagogies with a new group of local in-service teachers to facilitate their learning of the "Slow Friluftsliv" approach. This involved a physical workshop using experiential pedagogies, such as living the curriculum, and (auto)biographical pedagogies, such as vision and pedagogies of professional learning, including learning communities. Artifacts such as visions and lesson plans were gathered, while workshops and online meetings were audio-recorded. In addition, focus group interviews were carried out with school students on completion of the unit in order to learn more about how the pedagogical approach influenced the students' PE learning experiences (see Supplemental Material B).

Third, each country collated the learning from stages 1 and 2 into an open-access online resource (see https://www.physed-academy.com/). This resulted in an online CPD program consisting of suggestions for signature pedagogies to use to engage with and learn how to teach different innovative pedagogies in PE. In addition to the local development, the insights gathered from the development process were shared with the project team during a transnational meeting and used to refine each innovative pedagogical approach.

Data analysis

Data analysis processes have varied within the sub-projects that align with the three actions and specific research questions. Importantly, in each case, data analysis was guided by specific, theoretically-driven analytic questions derived from the research questions and sub-questions in each study. As an example, the diverse types of data in this project, generated across multiple layers, encourage us to pose various analytical questions aligned with Shulman's (2005) three structures of signature pedagogies, each referring to different aspects of teaching and learning. Using peer teaching as a pedagogical reference, relevant analytical questions might include the following: at the *surface structure* level: In what ways do teacher educators act to use peer teaching, and how do PSTs respond to this pedagogy? At the *deep structure* level: What do PSTs learn through peer teaching? At the *implicit structure* level: What norms and values about teaching can be identified in the ways peer teaching is experienced or enacted? Furthermore, in Collective Actions 2 and 3, where most data were collected in the original language, the sources were initially analyzed in that language. Selected excerpts were subsequently translated into English for group analysis and publication, using a bidirectional translation approach (Baumgartner, 2012). In this process, one team member translated the text into English, while another translated it back into the original language to ensure accuracy and consistency.

In this article, rather than providing an analysis of the project's processes and outcomes, we focus on illustrating the functioning of the collective actions, their connection to the individuals

involved, and how the data we have generated can inform our claims about signature pedagogies. As such, the positive aspects (e.g. developing a common purpose; Beddoes and Jones, 2022) and the challenging aspects (e.g. differing interpretations of concepts; Gerdin et al., 2019) of the previously described collective actions are not the focus here. However, we believe that both the description above and the illustrations that follow demonstrate how we worked to foster positive developments and minimize challenges encountered during the project. For example, in fostering a shared understanding and addressing the challenge of interpreting the concept of signature pedagogies, we engaged in multiple local and international meetings involving both small and large group discussions. In parallel, individuals pursued their own explorations to further deepen their understanding of the concept.

To enhance the reader's understanding and ensure coherence, we opt to spotlight one project member, Anders, a teacher educator from Sweden.[1] We detail his involvement in the collective action and explain how we generated insights about his use and development of signature pedagogies through multiple methods. In both illustrations, we have adopted a form of "memo writing" (Charmaz, 2014), combining our generated data with our experiences throughout this project to craft rich illustrations.

Illustration of the functioning and interplay of collective actions in PE teacher education

In this section, we illustrate the functioning of and interplay between the large and small CoPs, focusing on how Anders' individual exploration of signature pedagogies connected with and influenced conversations in the small CoP (i.e. Action 2). These conversations, in turn, shaped the content of and sparked further reflections and dialog in the large CoP (i.e. Action 1). This illustration shows that when CoPs are used as a signature pedagogy for teachers' professional learning, they can facilitate learning across all three structures of signature pedagogies: surface, deep, and implicit.

Anders, Carmen (Spanish teacher educator working in Ireland), Gregor (Slovenian teacher educator), Pablo (Spanish PhD student), and Mats (Norwegian teacher educator) collectively formed one of three international CoPs of teacher educators. They convened five times over six months, using the provided prompts to guide their reflections (see Supplemental Material D). For instance, during their teaching, they shared experiences of using signature pedagogies, addressing prompts such as: What has gone well? What has been challenging? What are the similarities and differences in experiences of using signature pedagogies? The following conversation is from their third small CoP meeting, where Anders began to share a reflection that had been on his mind since their previous meeting, a reflection to which Carmen and Mats could relate:

> Anders: […] last time we spoke, I talked about having the signature pedagogy living the curriculum in different costumes or suits. And I think I've realized what I meant: living the curriculum in initial teacher education is both that the PSTs get the embodied experience of the exercises and what we are doing. But also, since we always have the didactical glasses on, it's kind of a parallel process, living the curriculum, both as a pupil, but also as a teacher. […]
>
> Carmen: I have my signature pedagogy of living the curriculum, that I use to teach games, and I feel exactly the same. I feel that they need to explore the situation in which their students are going to be, but they also have to reflect on how to create these situations [as a teacher].

> Mats: I think that's an interesting reflection about what's living the curriculum. Is it only living the curriculum or do we need to do something related to that for the PSTs' learning? […] You also said something about providing insights into the uncertainty. Is it insight into the uncertainty that students in school will experience or is it uncertainty that you experience as a teacher [educator] or both maybe?
>
> Anders: I would say both because I think if I experience uncertainties within myself, I can use that experience. […]
>
> Mats: Yeah, I think that's important […] I think we're better at discussing the uncertainty that students will meet when they experience this kind of content, but maybe not so much, and I think that's part of living in the curriculum, the uncertainty and challenges we experience as teachers and what kind of challenges the PSTs will meet when they become teachers. […]
>
> Anders: It's as you say, Mats: it's parallel roles. So it's two dimensions, perhaps even three dimensions. Since we are always considering learning as well.
>
> Mats: Yeah, and this (dialog) makes me think about Loughran's work on developing a pedagogy of teacher education. He talks about learning about learning, learning about teaching, and learning about content.

In the large CoP (Action 1), the small CoPs were asked to share insights from their discussion. In one of the large CoP meetings, including 23 participants (five in-service teachers and 18 teacher educators), carried out approximately a month after their small CoP meeting, Anders shared the small CoPs conversation around the ways the signature pedagogy of living the curriculum comes in different costumes:

> Anders: […] When starting to teach and specifically starting to write the reflective diaries after each lesson, I became a bit frustrated by the kind of naming the different signature pedagogies that I've chosen to work with within the experiential pedagogies. Living the curriculum, peer teaching, what is that? We have kind of a definition, but sitting there and writing the reflections, I just felt, I don't know, it felt like the definition was, a bit narrow. So, in a reflection with the small CoP, I said that I feel like living the curriculum comes in different costumes.

Mats, organizing the large CoP, followed up on Anders' reflection and how this had sparked his reflection and what could be important for the large CoP to learn about and discuss:

> Mats: Thanks, Anders. And Anders' reflection [during our small CoP meeting] made me think about Loughran's work on developing a pedagogy of teacher education. So, I will, in a presentation afterwards, discuss signature pedagogies and Loughran's work.

The last two groups shared their small CoP insights before Mats held a presentation on the nature of Loughran's ideas about developing a pedagogy of teacher education (Loughran, 2006) and its relation to Shulman's concept of signature pedagogies. The final slide presented three prompts that four breakout groups were to reflect upon: (i) What do you see as the relationship between the ideas of signature pedagogies and developing a pedagogy of teacher education? (ii) In what way can they be used together to think about teacher education practice? (iii) In considering insights from the small

learning communities, what might be some similarities or differences across contexts? The following dialog between three teacher educators is from one of the four breakout rooms:

> Dan (American teacher educator working in Sweden): I think it was quite useful, this learning about [content, teaching, and learning], we have a course that we need to realign a bit [… and this] would be a good framework for us to align our course better […] quite good for overall course alignment. But signature pedagogies are more, they can align an entire course, or they can align specific content or parts of courses. It's kind of how I interpreted the two different concepts.
>
> Javier (Spanish teacher educator): I totally agree and connecting this to the [discussions we have had in my] small CoP, […] the PSTs, some just want to learn about activities. Others want to go a bit further and learn about how individuals learn. And then some also want to learn about teaching […], I think it also connects with the surface and deep [structures of signature pedagogies]. When you want to become, when you are a PE teacher, if you just are concerned about the content, then you're on the surface [structure]. But if you're concerned about your teaching or how students learn, then you get into the deep (structure). […]
>
> Dan: I think it's a good connection, because […], about the preferences of PE PSTs […] they value learning to be better at sport or learning more about sport, but to a much lesser extent how students learn and how to be a teacher. And I think in that way, it kind of profoundly connects with how Shulman, like you're saying, how Shulman reasons that a good or sound signature pedagogy goes beyond the surface. It has a deep [structure], and it's not compromised.

Following up on the breakout room conversations, one person from each breakout room made a summary to the large CoP about the key insights from their group's discussion. The following extract is from this summary in which Mikael (Swedish teacher educator) presents insight from their group while Antonio (Spanish teacher educator working in Ireland) follows up and connects his group conversation to that of Mikael:

> Mikael: We started in the theories but left them quite quickly, […] because we thought they're in a sense compatible but highlight different things. And we liked what you added, Mats, the why. But we thought, at least I thought, maybe it should be in the other order when we talk about signature pedagogies. Not start with the signature pedagogies, but start with the educational purposes, the purposes for teacher educators, in-service teachers or PSTs […] So it shouldn't be what, how, and why, it should be why, what, and how […] and maybe in plural too […] it probably is many whys, many whats, and many hows. […]
>
> Antonio: It's always a pleasure to hear people's thoughts and challenges to us. And I think I'm picking up on Mikael's point in relation to the plural piece […] because I think that was something that we've been discussing in relation to prompt number three and to what extent being part of different sociocultural and political contexts as we were in our breakout room, that is kind of affecting or shaping our own understanding and notion of what we mean by teaching about teaching or learning about teaching.

The illustrations show that when CoPs are used as a signature pedagogy for teachers' professional learning, they can lead to: (i) reflection and discussion among teachers about their signature pedagogies, along with the sharing of experiences, knowledge, beliefs, and practice (i.e. surface structure); (ii) the development of a shared understanding and language among teachers about signature pedagogies in PE (i.e. deep structure); (iii) encouragement for teachers to critically and vulnerably

reflect on their own and others' understanding and enactment of signature pedagogies (i.e. implicit structure).

An illustration of research methods for examining signature pedagogies in PE teacher education

The aim of this section is to illustrate how various research methods can be used together to offer different key insights into the use of signature pedagogies.

Observation: capturing the nature of teacher educator signature pedagogies and PSTs' response to the pedagogical approach(es). In the following example, the observer summarizes several pedagogical moments, all facilitated through Anders' living the curriculum approach. This approach not only engaged PSTs in experiences similar to what their future students will encounter in school, but also required them to reflect from both the perspectives of a teacher and a learner. The following observation was noted in the protocol regarding this relationship:

> Using living the curriculum, 'pedagogical moments' occurred when (i) the students were practicing movements within dance in a pedagogical build-up from 'easy' steps toward more complexity in movement, cooperation, and different tempos, (ii) when the teacher educator prompted reflections on his own pedagogies during the lesson, (iii) when the teacher educator prompted reflections on their future roles as teachers, and (iv) potentially when the PSTs write in their respective process reflective diaries using the end-of-the-lesson question.

Observing teacher (educator) pedagogy, including pre- and post-lesson discussions with the teacher educator, as well as the observer's post-lesson reflection (see Supplemental Material A), provides insights into the teacher educator's signature pedagogies, as well as the PSTs' responses to the pedagogical approach.

Reflective diary: capturing the personal experience of developing signature pedagogies. The extracts below, from Anders' reflective diary after lessons 3 and 9, exemplify how the reflective diary can provide deeper insights into the underlying reasoning and evolving understanding of the development and use of signature pedagogies:

> Lesson 3: One insight is also that (and I have reflected upon this before) living the curriculum is multi-layered since the students are both in practice as pupils (experiencing, and developing their own ability) as well as PSTs since the didactical perspective is always present since I 'always' give them the chance to reflect upon the Why and How in the content of the lesson, so having them 'think like teachers' […] so that we constantly can relate their own embodied experience (maybe also learning) with the didactical perspective in how to use the exercises we do in school and Why!

> Lesson 9: What also becomes clear (also came up in discussion afterward with the observing colleague) is that living the curriculum includes being in the assignments as 'students' but also as PSTs. That is, I always include and reflect on didactical choices and other pedagogical/methodological objectives that can come up.

Reflective diary entries by the teacher (educator) throughout the exploration of signature pedagogies thus offer insights into the personal beliefs and experiences of the practitioner. This layer

can enrich the observational data and lend a personal signature to the why, what, and how of the teacher educator's signature pedagogy.

Focus group interviews: capturing the learner experience of signature pedagogies. The following two extracts from a focus group interview with PSTs taught by Anders illustrate how the interview offers a learner perspective on the living the curriculum approach. One PST shares their embodied learner experience facilitated by this approach:

> PST: I'm thinking about this expressive part where we had lots of balloons and balls and you're supposed to keep the rhythm and so on, it didn't scream dance to me. […] In contrast to the cultural form where it was like, yes, this is polka, and you've heard about that. […] But that doesn't mean it [polka] was less relevant, more like, yes, this is some other kind of dance that I hadn't linked as being dance.

Later in the focus group interview, the PSTs deliberated on the role of reflection in the unit. Two PSTs shared their insights on how the reflective activities encouraged them to consider both their role as learners and teachers:

> PST: In order to then put it all together into a whole, and sometimes reflect on it at the moment, if it's something we've discussed or if we've thought about something with BRESS [the content PSTs were to learn about in the course] but often we usually end the lessons by reflecting on something we've done, either in a large group or if you should do it yourself or if you do it in smaller groups. But always, almost always in every lesson there has been some kind of reflection to anchor what we have done. […]

> PST: I think most discussions have been didactic because then it has been about, […] it has felt like a lot in our reflections has still been very much toward BRESS. And for me, I have linked BRESS more didactically than subject-knowledge-wise, so it depends on how one interprets it as well.

While the observations offer insights into the pedagogy and, to some extent, how the PSTs responded, and the reflective diary provides deeper insights into the teacher educators' beliefs and experiences, the focus groups offer the learner's perspective on the pedagogical approach(es). This perspective adds a crucial dimension to the interrelated relationship between teaching and learning (Loughran, 2006).

Returning to Shulman's (2005) three structures of signature pedagogies, the illustration of methods for examining signature pedagogies in initial teacher education shows that the different methods have allowed insights into different structures of signature pedagogies: (i) the lesson observations captured the tangible acts of Anders' signature pedagogies and the PSTs' responses (i.e. surface structure); (ii) the reflective diary entries captured Anders' experience of enacting the signature pedagogies (i.e. surface structure) and, to some extent, his aims for PSTs' learning (i.e. deep structure), as well as the professional attitudes, values, and dispositions he promoted through these pedagogies (i.e. implicit structure); (iii) the focus group interviews captured the PSTs' learning from Anders' signature pedagogies (i.e. deep structure) and, to some extent, their response to the operational aspects of Anders' pedagogies (i.e. surface structure).

Conclusion

In this article, we have advocated for and illustrated a design and methodology for conducting large-scale international collective action projects involving teacher educators, in-service teachers,

and PSTs across diverse PE teacher education contexts—including both initial teacher education and CPD for in-service teachers and teacher educators. Specifically, we outlined the structures of such a project and illustrated our research design through empirical examples. These examples show how the diverse types of data generated over time can deepen our understanding of the development and use of signature pedagogies in PE teacher education. By emphasizing the importance of robust research designs—grounded in clear methodologies, analytical frameworks, and transparent procedures—we argue that such approaches are essential for scaling up research in the field. Ultimately, we suggest that international collective action projects offer a valuable pathway for advancing both knowledge and practice related to signature pedagogies across teacher education contexts.

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Ethical approval and informed consent statements

This research did receive the necessary ethical approval and participants' signed informed consent.

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Supplemental material

Supplemental material for this article is available online.

Note

1. All names used in the article are the real first names of project members, used with their consent.

References

Abelsen K and Leirhaug PE (2024) Langsomt friluftsliv [Slow outdoor education]. In: Hordvik M, Bjørke L and Standal ØF (eds) *Modellbasert Praksis i Kroppsøving [Models-Based Practice in Physical Education]*. Oslo, Norway: Cappelen Damm Akademisk, 64–74.

Baumgartner I (2012) Handling interpretation and representation in multilingual research: A meta-study of pragmatic issues resulting from the use of multiple languages in a qualitative information systems research work. *The Qualitative Report* 17(42): 1–21.

Beddoes Z and Jones E (2022) Enhancing collective action in physical education teacher education: A three-pathways approach. *Quest (Grand Rapids, Mich)* 74(3): 251–265.

Calderón A and MacPhail A (2023) Seizing the opportunity to redesign physical education teacher education: Blending paradigms to create transformative experiences in teacher education. *Sport, Education and Society* 28(2): 159–172.

Charmaz K (ed) (2014) *Constructing Grounded Theory*. Thousand Oaks, CA: Sage.

Cochran-Smith M and Lytle SL (2009) Teacher research as stance. In: Somekh B and Noffke SE (eds) *The Sage Handbook of Educational Action Research*. London, UK: Sage, 39–49.

Czerniawski G, Guberman A, MacPhail A, et al. (2024) Identifying school-based teacher educators' professional learning needs: An international survey. *European Journal of Teacher Education* 47(5): 1–16. doi:10.1080/02619768.2023.2251658.

Fletcher T, Beckey A and Larsson H, et al. (2020) The research and development challenge: better aligning teachers' and teacher educators' needs, priorities and demands. In: MacPhail A and Lawson HA (eds) *School Physical Education and Teacher Education*. London, UK: Routledge, 116–127.

Gerdin G, Philpot R, Larsson L, et al. (2019) Researching social justice and health (in) equality across different school health and physical education contexts in Sweden, Norway and New Zealand. *European Physical Education Review* 25(1): 273–290.

Goodnough K, Arnold C, Azam S, et al. (2020) Cultivating a self-study community of practice: Reflections of faculty on issues of evolution and functioning. *Studying Teacher Education* 16(2): 145–163.

Harris J, Cloes M and Wilson K (2021) The alignment and coherence challenge: Developing university–school partnerships for the simultaneous improvement and redesign of school programmes and teacher education. In: MacPhail A and Lawson HA (eds) *School Physical Education and Teacher Education*. London, UK: Routledge, 34–45.

Hordvik M and Beni S (2024) Signature pedagogies of teacher education in physical education: A scoping review. *Physical Education and Sport Pedagogy*: 1–17. doi:10.1080/17408989.2024.2352829.

Hordvik M, Fletcher T, Haugen A, et al. (Accepted) Det er ikke alltid jeg får uttrykt hva jeg mener eller ønsker å si: What is gained and lost in a plurilingual collaborative self-study. In: Bullock SM and Bullock C (eds) *Plurilingual Approaches to Self-Study*.

Hordvik M, Fletcher T, Haugen AL, et al. (2021b) Using collaborative self-study and rhizomatics to explore the ongoing nature of becoming teacher educators. *Teaching and Teacher Education* 101: 1–11. doi:10.1016/j.tate.2021.103318.

Hordvik M, Haugen AL, Engebretsen B, et al. (2021a) A collaborative approach to teaching about teaching using models-based practice: developing coherence in one PETE module. *Physical Education and Sport Pedagogy* 26(5): 433–447.

Kirk D (ed.) (2009) *Physical Education Futures*. London, UK: Routledge.

Kretchmar RS (2008) The increasing utility of elementary school physical education: A mixed blessing and unique challenge. *The Elementary School Journal* 108(3): 161–170.

Lave J and Wenger E (eds) (1991) *Situated Learning: Legitimate Peripheral Participation in Communities of Practice*. Cambridge, UK: Cambridge University Press.

Lawson HA (ed.) (2018) *Redesigning Physical Education. An Equity Agenda in Which Every Child Matters*. London, UK: Routledge.

Lawson HA, Jones E, Beddoes Z, et al. (2021) Collective action for learning, improvement, and redesign. *Journal of Teaching in Physical Education* 40(3): 412–422.

Lawson HA, Jones E and Richards KA (2022) Prioritizing a physical education workforce research and development agenda. *Quest (Grand Rapids, Mich)* 74(4): 359–373.

Loughran J (ed.) (2006) *Developing a Pedagogy of Teacher Education: Understanding Teaching and Learning about Teaching*. London: Taylor and Francis.

MacPhail A (2021) Developing commitments and capacity to learn with and from each other. In: MacPhail A and Lawson HA (eds) *School Physical Education and Teacher Education*. London, UK: Routledge, 179–191.
MacPhail A and Lawson HA (eds) (2021) *School Physical Education and Teacher Education*. London: Routledge.
O'Sullivan M (2018) PETE academics as public intellectuals and activists in a global teacher education context. *Physical Education and Sport Pedagogy* 23(5): 536–543.
Parker M, Patton K and O'Sullivan M (2016) Signature pedagogies in support of teachers' professional learning. *Irish Educational Studies* 35(2): 137–153.
Patton K and Parker M (2017) Teacher education communities of practice: More than a culture of collaboration. *Teaching and Teacher Education* 67: 351–360.
Penney D and Chandler T (2000) Physical education: What future(s)? *Sport, Education and Society* 5(1): 71–87.
Pinnegar SE and Hamilton ML (eds.) (2015) *Knowing, Becoming, Doing as Teacher Educators: Identity, Intimate Scholarship, Inquiry*. Bingley, UK: Emerald.
Quennerstedt M (2019) Physical education and the art of teaching: Transformative learning and teaching in physical education and sports pedagogy. *Sport, Education and Society* 24(6): 611–623.
Rizvi F and Nadarajah G (2019) Developing and maintaining transnational research collaborations: A case study of Australian universities. In: Redding R, Drew A and Crump S (eds) *The Oxford Handbook of Higher Education Systems and University Management*. London, UK: Oxford University Press, 213–231.
Scanlon D and MacPhail A (2024) Interpreting, translating, and embedding school curriculum in physical education teacher education: The need for collective action within and across the teacher education continuum. *Irish Educational Studies*: 1–18.
Shulman LS (2005) Signature pedagogies in the professions. *Daedalus* 134(3): 52–59.
Slife BD (2004) Taking practice seriously: Toward a relational ontology. *Journal of Theoretical and Philosophical Psychology* 24(2): 157–178.
Tan C (2019) A signature pedagogy for initial teacher education in Singapore. *The New Educator* 15(3): 226–245.
Tannehill D, Demirhan G, Čaplová P, et al. (2021) Continuing professional development for physical education teachers in Europe. *European Physical Education Review* 27(1): 150–167.
Tinning R (2015) Commentary on research into learning in physical education: Towards a mature field of knowledge. *Sport, Education and Society* 20(5): 676–690.
Ward P, Parker M and Barnes N (2021) The innovation challenge: Maintaining programme standards and developing cohesion while developing and testing alternative designs in new kinds of schools. In: MacPhail A and Lawson HA (eds) *School Physical Education and Teacher Education*. London, UK: Routledge, 46–57.
Wenger-Trayner E and Wenger-Trayner B (2015) Introduction to communities of practice: A brief overview of the concept and its uses. Available at: https://www.wenger-trayner.com/introduction-to-communities-of-practice/ (accessed 11 June 2024).

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