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Exploring educators' professional development in teaching nature-based physical activity: Applying the Interconnected Model of Teacher Professional Growth

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Abstract

This study applied the Interconnected Model of Teacher Professional Growth to explore educators' professional development (pro-d) in teaching nature-based physical activity (NBPA) in their Physical and Health Education (PHE) courses. The aim was to explore if the teachers described professional growth in the personal domain or the domain of practice and if they experienced any salient outcomes in their students' learning. Six teachers participated in virtual open-ended interviews. Findings indicated that after learning about, sharing, discussing, and implementing NBPA, then reflecting on the process and enacting, participants reported changes in their professional vision, instructional practices, and student learning.

Keywords: schools-university partnership; community of practice; in-service teachers; physical and health education

Résumé

Cette étude a appliqué le modèle interconnecté de croissance professionnelle des enseignants pour explorer le développement professionnel des éducateurs (pro-d) dans l'enseignement de l'activité physique basée sur la nature (NBPA) dans leurs cours d'éducation physique et à la santé (PHE). L'objectif était de déterminer si les enseignants décrivaient une croissance professionnelle dans le domaine personnel ou dans le domaine de la pratique et s'ils avaient constaté des résultats marquants dans l'apprentissage de leurs élèves. Six enseignants ont participé à des entretiens virtuels ouverts. Les résultats ont indiqué qu'après avoir appris, partagé, discuté et mis en œuvre la NBPA, puis réfléchi au processus et l'avoir mise en œuvre, les participants ont signalé des changements dans leur vision professionnelle, leurs pratiques pédagogiques et l'apprentissage des étudiants.

Mots-clés: partenariat écoles-universités; communauté de pratique enseignants en service; éducation physique et santé

Introduction

To effectively support teachers' professional development (pro-d), it is essential to understand how they grow professionally and the conditions that foster this growth (Clarke & Hollingsworth, 2002). Pro-d is defined as a variety of educational experiences related to an individual's work, designed to improve practice and outcomes (Bartley & McKay, 2022). Pro-d is a ubiquitous and mandatory aspect of Canadian education systems, implemented across school districts to ensure teachers continually enhance their knowledge, skills, and instructional practices to meet the dynamic needs of students and curricula. While common pro-d approaches include school in-service days, structured workshops, conference attendance, and post-secondary courses, these tend to focus upon training at the level of the individual (Gast et al. 2017); other forms of pro-d can be interactive and social and based in community practice (Bartley & McKay, 2022). It has been argued that learning best occurs through social relationships with other people, suggesting that community-based approaches to pro-d can lead to more effective teaching practices (Wenger 1999). A common approach to facilitate social acquisition of skills amongst professionals is the formation of a community of practice. Cox (2005) describes a community of practice has been developed when educational organizations "recognise the value of this source of shop floor innovation and foster the informal networks which actually work out how to get the job done" (p. 529). As pro-d is an ongoing requirement for practicing teachers, ensuring that it is effective is vital. Hunzicker (2011) characterizes effective pro-d as a continuous process that goes beyond the one-off workshops and instead integrates into a teacher's daily routine and responds to their individual needs and goals. This study focuses on a form of ongoing pro-d that is a community of practice, the schools-university partnership (SUP).

Knowledge building within a SUP focuses on dialogue among participants regarding central features of learning activities and considering the participants' experiences. Thus, partnerships are more likely to contribute to teachers making sense of their practices and informing them of the newly built knowledge (Hennessy et al., 2011). Putting teachers' experiences at the center of the partnership's development allows the teachers to have their values, theories and pedagogies considered as a valid starting point for learning. This principle might seem evident when it comes to students' learning, but is often overlooked in teacher pro-d programs (Clarke & Hollingsworth, 2002). Moreover, the discussions held during meetings give the teachers and researchers the opportunity to learn from each other's experiences, in a co-learning environment (Baumfield & Butterworth, 2007).

There is strong evidence that pro-d is best when embedded in the teachers' specific subject area (Wei et al., 2009), so the partnership outlined in this study involves specialist middle and secondary school Physical and Health Education (PHE) teachers. These teachers were interested in implementing nature-based physical activity (NBPA) in their PHE classes. NBPAs are those activities that can be done in natural areas, require little specialized equipment, focus on a connection to nature, can be done by the majority of children, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021, 2024).

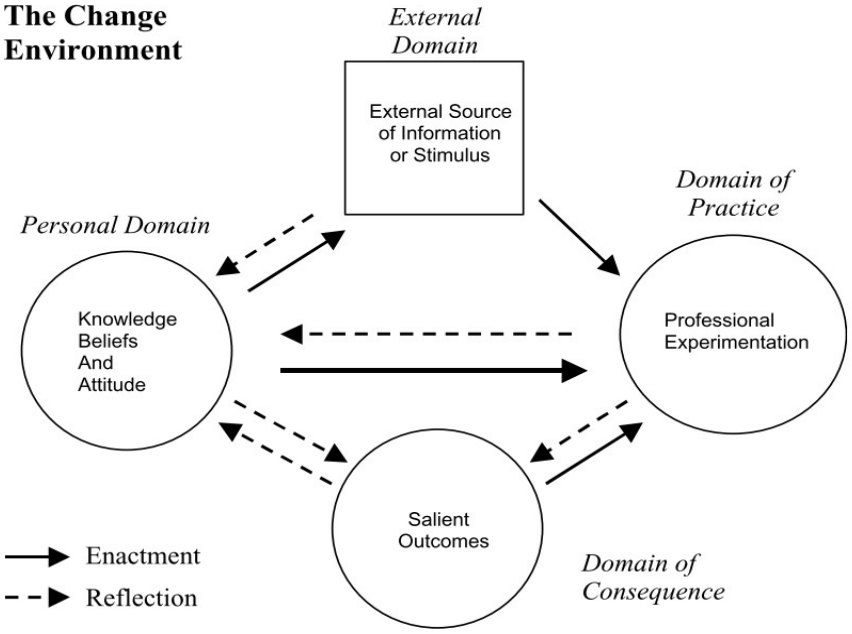
Interconnected Model of Teacher Professional Growth

One aim of this study was to explore professional growth as a possible result of the teachers' participation in the SUP. To do this, we adopted a model of teacher pro-d, the Interconnected Model of Teacher Professional Growth (see Figure 1). Guskey (1986) argued that teacher pro-d programs should start from changes in classroom practice. He stated that significant changes in beliefs and attitudes are likely to take place only after changes in student learning

outcomes are evident, that is, once teachers have 'field-tested' innovations in classrooms and experienced first-hand changes in student learning. Developing Guskey's idea further, Clarke and Hollingsworth (2002) revised the Interconnected Model of Teacher Professional Growth, that proposes four domains: the personal domain (teacher knowledge, attitudes and beliefs), the domain of practice (professional experience), the domain of consequence (students' learning outcomes) and the external domain (information, support, etc.). Change occurs through two mediating processes: reflection (active and careful consideration) and enactment (translation of a belief into action), which can link the four domains. Hence, multiple growth pathways are recognised between the domains and change can occur in any of them. The term 'enaction' was chosen to distinguish the translation of a belief or a pedagogical model into action from simply 'acting,' on the grounds that acting occurs in the domain of practice, and each action represents the enactment of something a teacher knows, believes or has experienced (Clarke & Hollingsworth, 2002).

Figure 1

Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002)



Clarke and Hollingsworth (2002) suggested that teacher growth is a much more useful and appropriate goal than teacher change. The Interconnected Model makes it clear that many change sequences are possible through teacher participation in pro-d programs. Not all such sequences lead to lasting teacher growth. This model recognizes the complexity of professional growth through the identification of multiple growth pathways between the domains. Its nonlinear structure recognises the situated and personal nature of both teacher practice and teacher growth. This, and the fact that it recognizes professional growth as an inevitable and continuing process of learning, distinguishes this model from others in the literature. Clarke et al. (2013) further clarified:

> If our [pro-d] programs are to recognize the individuality of every teacher's learning and practice, then we must employ a model of teacher growth that does not constrain teacher learning by characterizing it in a prescriptive, linear fashion, but anticipates the possibility of multiple change sequences and a variety of possible teacher growth networks (p. 99).

Clarke and Hollingsworth (2002) criticize what they call a 'deficit perspective' in teacher pro-d programs, which sees change as an event where teachers are generally passive. They claim for a shift of agency: moving away from programs looking to change teachers towards programs based on the conception of teachers as active and reflective participants in their pro-d. In this study, we propose the SUP as a pro-d program that prioritizes teacher agency.

Schools-University Partnerships

The disconnect between theory and practice in education is a well-documented issue. McIntyre (2005) attributed this gap to the differing, often incompatible types of knowledge between educators and university researchers. Educators' knowledge is crafted and context-bound, while researchers' knowledge tends to be abstract and decontextualized. He proposed collaboration to integrate these knowledge types, and a SUP is one approach to bridging this gap. Day et al. (2021b) defined a SUP as "an enterprise that is jointly created, developed and sustained in the midst of complex settings to advance educational practice, knowledge and understanding"(p. 24). These partnerships offer a locally driven, collaborative approach to educational innovations in which researchers and teachers pursue improvement goals they define together, drawing on the expertise of each partner (Coburn et al., 2021). Literature has focused on how partnerships can be exciting and empowering experiences for those involved, and how close collaborations between researchers and teachers bridge the cultural boundaries of learning and knowing, enhance professional thinking and practice, and contribute to capacity building in schools (Coburn & Penuel, 2016).

In this study we utilized the Interconnected Model of Teacher Professional Growth (Clarke & Hollingsworth, 2002) to look for evidence of professional changes within the four domains as well as aimed to involve the teachers in the partnership as active and reflective participants and gain their perceptions on the domains. The research questions are organized within each domain of the model:

1. *External domain:* How do the teachers perceive their participation in the SUP? What aspects most impact their practice?
2. *Personal domain:* Which changes – if any – did they report in the personal domain? Did their beliefs/attitudes/values shift during the SUP?
3. *Domain of practice:* How have their NBPA instructional and assessment strategies changed?
4. *Salient outcomes:* Have they noticed any changes in their students (in terms of learning, behaviour, engagement) since beginning participation in the SUP?
5. *Mediating processes:* Which evidence can be found within the teachers' discourse in relation to reflection and enaction processes?

Methods

This study explored the impact of participation in a SUP on teachers' professional growth regarding NBPA in PHE. In the last decade, several researchers have explored teachers' perceptions of pro-d by conducting qualitative analyses of their experiences (Brown & Weber, 2019; Leeder & Beaumont, 2021; Masuda et al., 2013), and this study builds on this research by applying a specific model of teacher growth. Ethical approval was obtained from the institutional review board.

Participants

The SUP involved in this study was formed in 2007 with a group of over 25 teachers from throughout (rural and urban) British Columbia, Canada to conduct formative and participatory-action research, as well as provide teachers with current, research-informed, pro-d opportunities. The second author formed the group by contacting past students as she has been a PHE teacher-educator for several years. Members of the partnership consisted of middle and secondary specialist PHE teachers, pre-service PHE teachers, and researchers in the field of PHE. The research conducted by this partnership was guided by the self-determination theory of motivation (Ryan & Deci, 2000) which suggests that motivation to engage in a particular behaviour, such as meaningful engagement in PHE, is influenced by an individual's need for autonomy, competence, and relatedness.

From 2007-2017, the teacher-members brainstormed and implemented innovations associated with autonomy, competence, and relatedness in their PHE classes. More recently, the focus narrowed to NBPA as a source of relatedness in PHE. The teachers brainstormed NBPAs they were already using and wanted to continue to use in the future, how NBPA can create a sense of relatedness for their students, and barriers to implementing NBPA in their schools. Some members of the partnership then committed to implementing NBPA actions to support relatedness for students in PHE (Gruno & Gibbons, 2021, 2024).

This SUP is characterised by research undertaken by individual teachers that is project based, confined to the school, and limited in time. However, these individual teachers also form a larger group with other teachers from across several schools and school districts who are researching the implementation of NBPA in PHE. The overall topic, NBPA, was selected by the researchers, while the individual teachers decide, usually in consultation with students and administration, on their specific focus. Although the impact of such activities on the schools involved is often restricted to the classroom experiences of the individual teachers and their students, the quality of the research itself is enriched by the range of knowledge and expertise shared amongst the group. Teachers are supported by the lead researchers, other professors, and graduate students, who take on the role of research experts and mentors.

Currently, the SUP includes 32 teachers and two university researchers, the authors of this paper. Members consist of middle and secondary specialist PHE teachers (n = 25), elementary generalist teachers (n = 5), and pre-service PHE teachers (n = 2) representing 21 different schools and seven different school districts. However, these numbers shift each year as current members invite new colleagues, teachers retire, and new pre-service teachers express interest in joining the partnership. Typically, as part of the partnership, teachers participate in a yearly in-person meeting with the morning dedicated to research and the afternoon dedicated to an experiential pro-d workshop. Then, throughout the school year, the members participate in projects generated during the meeting and discuss regularly via email with the other members and the researchers. We provide a thick description of the current context of the SUP to make the participants' experiences described below more meaningful to an outsider, this is to aid in the transferability of the study (Korstjens & Moser, 2018).

For this study, we employed purposeful sampling as a technique since it is widely used in qualitative research for the identification and selection of information-rich cases (Patton, 2015). All members of the partnership were invited to participate, and six teachers agreed to be interviewed. Phenomenology research seeks to explore and describe individuals' lived experiences of a phenomenon, focusing on the essence of those experiences as perceived by the participants (Creswell & Poth, 2018). This qualitative method typically involves fewer than 10 participants, as in-depth engagement with everyone is prioritized to capture rich, detailed accounts (Starks &

Trinidad, 2007). The six participants all identify as women and use she/her pronouns. See Table 1 for details on each participant's teaching and partnership details.

Table 1
Participants' Teaching and SUP Details

Participant Name (Pseudonym)	Number of years teaching	PHE grades most taught	Number of years as part of the SUP
Ava	17	8-10	6
Kyra	15	10-12	5
Alana	4	9-10	5
Elise	9	8-10	3
Keisha	15	9-10	7
Macey	12	10-12	4

Data Collection

Teachers' experiences of the partnership and subsequent changes in their growth domains were explored through semi-structured interviews (see Figure 2). The open-ended questions served to frame the topics related to the research questions. The interviews were conducted, recorded and transcribed via Zoom in May 2021, and were between 17 and 42 minutes in length. Teachers were interviewed individually by the lead author on their perceptions of learning, changes and reflections regarding their ongoing participation in the partnership in relation to the Interconnected Model.

Figure 2

Semi-Structured Interview Guide

1. How long have you been a part of the SUP?
2. What PHE grades do you mostly teach?
3. How long have you been teaching?
4. Describe your experiences as part of this pro-d group. What aspects most impacted your practice? (external domain)
5. Have your beliefs or attitudes or values associated with teaching NBPA changed due to your participation in this group? (personal domain)
6. Have your NBPA instructional and assessment strategies changed due to your participation in this group? If so, in what ways? (domain of practice)
7. Which NBPAs, if any, from the group have you implemented into your teaching? Why did you select these activities to incorporate? (domain of practice)
8. Have you noticed any changes in your students (in terms of learning, behaviour, engagement, motivation) because of your instructional changes since beginning participation in the group? (salient outcomes)
9. What, in terms of pro-d, could be done to further support teachers outside of this research group?
10. Please add any comments about teaching nature-based physical activities and/or pro-d that you have not had the opportunity to mention.

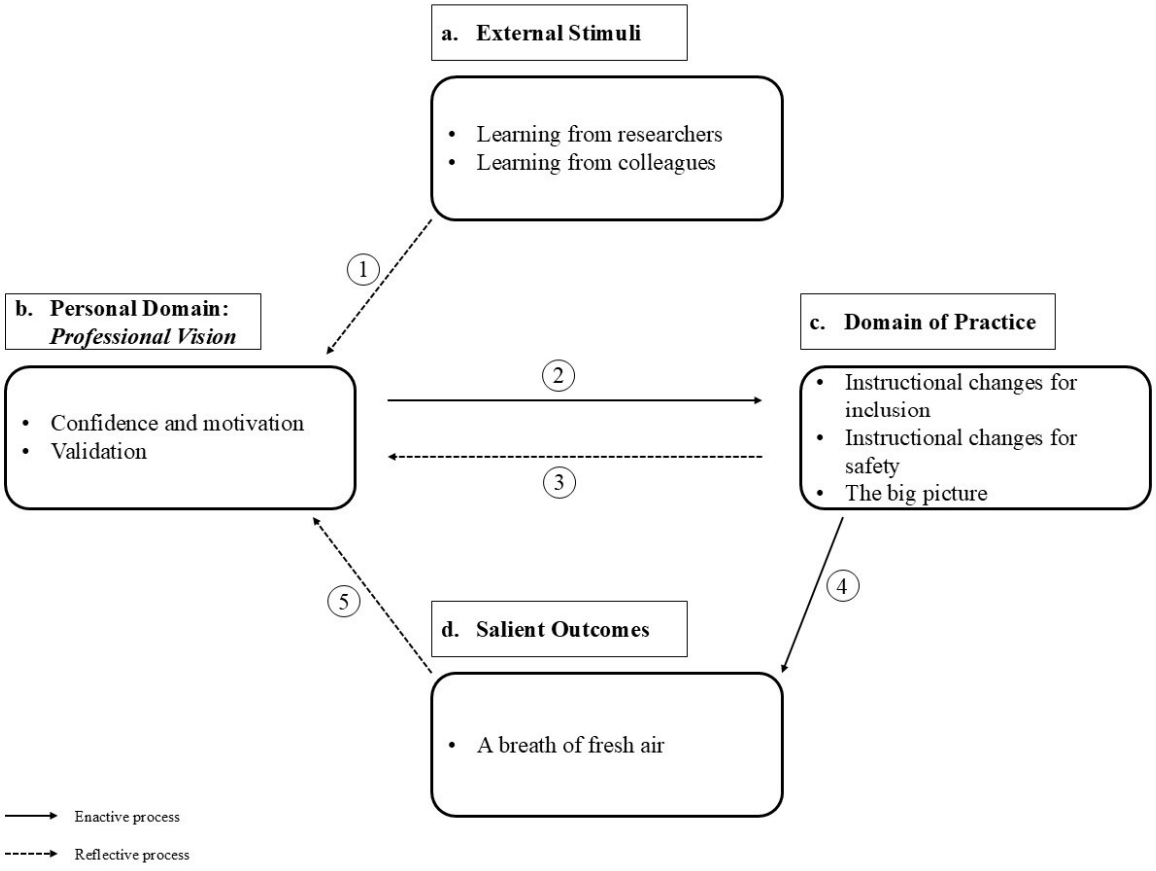
Data Analysis

Reflexive thematic analysis was selected as it is used to identify, analyze, and interpret patterns of meaning (themes) within a dataset. Reflexive thematic analysis emphasizes the active role of the researcher in generating themes, highlighting the importance of reflexivity, or the researcher's ongoing critical self-awareness of their influence on the research process (Braun & Clarke, 2021). As we are also the lead researchers in the SUP, and therefore, played 'insider roles' (Korstjens & Moser, 2018), it was critical that we were self aware of our biases during the analysis. We engaged in reflexively at all stages, critically considering how our perspectives, assumptions, and decisions shaped the analysis. A large portion of leading the partnership includes helping the teachers address challenges. Unlike structured approaches to thematic analysis, reflexive thematic analysis encourages a more iterative, organic process of theme development, emphasizing depth and richness over rigid procedural adherence (Braun & Clarke, 2021).

After initial interviews were transcribed, both authors and a research assistant compared the transcriptions to the audio recordings and corrected any inconsistencies. The edited transcripts were then sent to the participants to ensure that the written text reflected what they meant to say and their experiences. This member checking process was important for credibility (Korstjens & Moser, 2018). The first author then followed Braun and Clarke's (2021) six-step framework for thematic analysis to analyze the data. First, the researcher engaged in familiarization by immersing in the dataset, reading and re-reading the material while noting initial impressions. Next, coding was conducted, systematically tagging relevant features across the data. Codes were exemplified with quotes and the validity of the codes were checked by both authors to reinsure the fit between the codes and the data (Cohen et al., 2011). In the third step, the researcher generated themes by grouping codes to identify broader patterns or meanings. Using the Interconnected Model as a guide, we grouped the codes into relevant themes and used the model to organise the themes according to their fit into one of the four main domains: (a) external domain, (b) personal domain, (c) domain of practice, and (d) salient outcomes, and their connecting processes (reflection or enaction). Each comment from a participant which related to an outcome of the partnership was categorised into one of the four domains of change. For example, if a teacher described a new NBPA activity she tried in PHE that engaged the students, that was placed under the domain of practice. If a teacher stated her beliefs on the importance of nature in PHE had changed, that was placed under the personal domain. If a teacher felt her students were more active in the forest than in the gym that was placed under the domain of consequence. This was followed by having both authors and a research assistant review the themes, refining them to ensure they accurately represented the data and aligned with the research questions. In the fifth step, the research team defined and named the themes, developing clear and distinct descriptions for each theme. Finally, the lead author compiled the analysis, synthesizing the themes into a coherent narrative that connected the findings to the research context and questions. Our prolonged engagement in the partnership with the participants allowed us to invest sufficient time to become familiar with the setting and context, to test for misinformation, to build trust, and to get to know the data to get rich data, further ensuring credibility (Korstjens & Moser, 2018).

This analysis provided a qualitative snapshot of the impact of the partnership. The Interconnected Model was also used to trace change sequences (Clarke & Hollingsworth, 2002) describing the learning of the participants. We identified participants' reported learning from the partnership, located each outcome in the appropriate domain of change and then linked these changes together into pathways. Grouping the themes using the Interconnected Model allowed us to link specific references to participants' growth in a comprehensive scheme, linking changes across domains through relevant reflections or enactions (Figure 3).

Figure 3
Participants' Change Patterns (based on Clarke & Hollingsworth, 2002)



Findings and Discussion

The first process reported by the teachers shows how their participation in the SUP resulted in their learning from the researchers and their colleagues (external domain). This learning subsequently promoted relevant changes in their motivation and confidence and provided validation (personal domain), and these changes inspired the teachers to implement new teaching strategies as well as revise 'the big picture' in their PHE classes.

External Domain: External Source of Information or Stimulus

The SUP offered continuous pro-d, was highly regarded by the teachers, and it was shown to foster reflection regarding students' learning and the impact of their own teaching practice. The External Domain consisted of the SUP and its associated activities that were designed and implemented by the members and research team. Teachers reported that they valued the meetings because they allowed them to learn through interactions with peers and researchers. Within this domain, the participants identified two themes that impacted their practice: learning theory from the researchers and learning from the discussion with fellow members. Learning in these two areas impacted change as defined by Clarke and Hollingsworth's (2002) original description, in that they were both new stimuli for the participants and drivers of change in the other domains.

Learning from Researchers

Our key roles in the SUP are to provide a theoretical framework, mobilize knowledge with the participants, support members with projects at their schools and act as facilitators during the meetings. Alana described how, prior to being introduced to the research behind NBPA, she had a limited scope of what being active in nature could look like: "hearing the concept of [NBPA], immediately I thought, well I don't know the trees, and the leaves, and the flowers…and that was my super narrow scope of what I thought [NBPA] was." She explained, even the idea of [NBPA], "like that was not even on my radar, we were doing basketball, volleyball, soccer, and the sports, and that's the extent of it." Participating in the SUP provided her with a broader idea of what a PHE curriculum could encompass: "I'll never forget, one person [in the SUP] suggested doing yoga outside…like anyone can do that, right?"

As part of the facilitating and support role of the research team, we often ask our members to share their teaching ideas, we add our own based on the research, and then we bundle them into a resource for the group. Ava spoke of how valuable this process was in changing her teaching practice:

> I really appreciate all the resources that you share with us, by putting together things that people have brought and just all the things you've done on your own. [Another member] and I were talking the other day about that resource package that we left with and having that at our fingertips and how valuable it is.

She also commented that this is "a different way of sharing than what often happens in the school. I find that some people have these great things, but they don't like sharing them."

Differences in the professional and institutional *cultures* between the worlds of university researchers and those of school teachers can pose a particular challenge (Coburn et al., 2013). However, the members of this partnership found the theory-to-practice relationship valuable and the existing personal and practical knowledge of the school-based teachers and the research knowledge held by the university-based researchers were regarded as complementary in their contributions to the success of the partnership's purposes (Day et al., 2021a). Additionally, it has been stated that leaders of SUPs must ensure that the participants are: convinced of their merits; feel a sense of ownership through participation in decision-making processes; and are provided with the intellectual, affective and practical support throughout (Day et al., 2021b). It appears through the responses of the members that they felt these three components in their participation in the SUP.

Learning from Colleagues

All six participants spoke of the power of meeting with "like-minded" (Ava and Kyra) colleagues who "share [their] passions" (Kyra) and have "similar values" (Macey). Alana felt that the partnership "is made up of these people that want to learn and want to better themselves, and we all have the same information moving forward, so that's what I appreciate about it." Ava also spoke of the positive impact of learning from her colleagues:

> I find that it's a positive group…all too often it seems like when teachers get together there's a focus on negative roadblocks and the reasons why they're not doing things. I never get that from our group. It seems like [we] are always willing to think outside the box and find ways to make things better, regardless of the situations we come from.

The positive appraisal of the SUP's learning environment was crucial as time and space to reflect with colleagues was scarce at many of the teachers' individual schools. Indeed, some teachers

characterised their experience in the SUP as cathartic because they had the chance to release stress by sharing their professional challenges. Elise explained that "teaching is hard" and one often "feel[s] like a silo," but when she left the SUP meetings, she felt supported:

> …this is why I do it, I love it…Just the support and how we give to each other, you know, ideas and energy and share…it's like hey, do you want to try this because this worked for us…I love this group and I love the environment that you have created, it's so significant.

Kyra also felt that the SUP provided the collegiality that was missing in her own PHE department: "I don't get much of that [shared passion], within my own department. It's been nice to have this group available and share and learn new things that I can bring back to my own practice." Macey stated that the partnership removes her from her own "little bubble within [her] school." She felt that "just hearing other people's stories" was her "favourite part of the group." Such healthy mutual connections are found to act as important "social glue" (Goodwin, 2005, p. 615) in partnerships, helping to unblock "underlying patterns of isolation and immobilization" (Jordan, 2012, p. 74).

Kyra spoke about the adaptability of her learning from the partnership:

> …how it impacted my teaching is just by being able to take ideas…from everybody who shares…being able to implement them in my own way. I love how everybody can interpret different versions of the same activity or the same game and put their own spin on it.

She went on to describe a human anatomy activity that she had learned from another SUP member which she adapted and then texted the images and adaptations to the teacher who had originally shared the activity.

Alana, a younger member of the partnership, initially was intimidated by colleagues in the group; however, she soon felt accepted:

> Being a new teacher, [the SUP] was invaluable to me. I was intimidated; I'd heard all these amazing [teachers'] names, and now sitting amongst them and giving my opinions and feedback…I always felt comfortable since day one. And it's so nice to be able to bounce ideas off each other…I see what colleagues are doing…it's just been such an amazing experience to open my eyes to all these things.

For Keisha, learning from her colleagues provided important impetus to try new strategies with her PHE students:

> I think part of it is hearing what other people are doing on a regular basis pushes me to do better with what I'm doing. I do find that I, for the last few years, I've been teaching the same courses so it's easy to just fall into doing the same thing that works for me and then I hear somebody else's doing something: 'Oh that's a good idea I should try that too.' So, it encourages me to do better practice for sure.

The findings in the external domain support previous research in showing the critical role peers can play in partnerships. For example, Fullan (2008) argues that collective commitment in an organisation can be fostered "not because people fall in love with the hierarchy but because people fall in love with their peers" (p. 30). The existence of such social connections "affords group solidarity that makes achieving collective goals much more likely" (Bryk et al., 2010, p. 169). The dialogue between members in this partnership encouraged them to listen to each other and sow the seeds of trust, respect and collaboration in their search for a shared purpose and what Fullan (2008) calls "the we-we solution" (p. 49). Day et al. (2021b) stated that teacher learning and how it relates to organisational change is best when teachers are willing to participate,

collaborate and be centrally involved in the construction and shaping of new meanings and change of practice, which parallels our findings in the external domain.

Personal Domain: Teacher Knowledge, Beliefs and Attitudes

In Clarke's and Hollingsworth's (2002) model, the personal domain contains a complex set of attributes: a teacher's knowledge, beliefs, and attitudes. Two themes emerged from the data to explain the teachers' changes in their personal beliefs and attitudes regarding NBPA in PHE due to their participation in the partnership: Confidence and Motivation, and Validation.

Confidence and Motivation

Several teachers interviewed commented that their learning as part of the partnership provided them with increased confidence and motivation to continue implementing NBPA, or to try new NBPAs with their students. Ava described the SUP like a "security blanket" because, in her words, it "makes [her] more confident that [she] can carry out the things that we've talked about." She also stated, "[the SUP] makes me confident that I'm doing something meaningful" and similarly Elise felt, "it's been amazing…It's really helped me stay excited about teaching, you know, activities with the kids." Elise elaborated by stating, "[The SUP] just gives [me]…more confidence to think 'yeah I'm doing the right thing, getting the kids outside.' Some of the confidence and motivation to teach NBPA came from learning a thorough perspective of what NBPA is, as Alana explained:

> …money…I think that was a barrier for me…like 'I can't take my kids into nature because we can't afford to rent kayaks and paddleboards,' but there are so many things you can do that you don't need to get to the ocean for, like hike, go for a walk, teach these games and go do Manhunt in the forest, go do yoga outside. There's just so many options that I never considered or would have never thought about if it wasn't for this group.

Green and Eady (2024) describe how involvement in SUPs can offer strong motivation for innovation in education. It has been found that school administrators also agree that sustaining partnerships with schools and universities is crucial because they produce palpable increases in teacher and students' motivation (Hunter, 2024).

Validation

The participants in this study have all been members of the partnership for a minimum of three years, and, therefore, all had time and experience innovating with NBPA. All the participants, to some degree, agreed that the SUP did not necessarily change their beliefs or attitudes on NBPA as they already knew "the benefits of getting kids outside in nature" (Ava). Elise explained that her beliefs and attitudes did not change necessarily, but instead were "enhanced and encouraged" because "being with like-minded people" her beliefs were "validat[ed] a little bit, because I love being outside; I love sharing that." The SUP validated and strengthened her beliefs in the value of teaching NBPA in PHE:

> …the school that I'm at currently when I got here was only sport focused in [PHE], you know the traditional basketball, football, volleyball, and philosophically that's not who I am, and the kids don't always enjoy that. So being a part of this group and always having something tangible to take away and implement has been significant.

Previous research has found that the prevailing belief in PHE often stigmatises the 'others' in PHE, those who do not look fit and sporty. Thus, this commonly held belief that PHE is for those who

are athletically inclined does not challenge how power and social superiority or inferiority appear in the subject (Camacho & Fernández-Balboa, 2006; Dowling, 2006; Larsson et al., 2018). Contrary to this, Elise wanted to challenge the idea of athletic superiority in PHE and create an inclusive environment for all learners, often through the incorporation of NBPA.

Macey felt that being a part of the group "validates why [she] went into to study [PHE] in university"; she felt:

> …it can be so easy to be like okay I just got to do it the way everybody else is doing it, but then to come back to the core group and go oh no…there are other people who want to teach the way I do, and it validates that so I can come back and feel confident in my values.

Macey also felt her values had not changed, but that the partnership gave her "an opportunity to deepen them." Keisha, who already taught many PHE lessons outdoors, felt that conversations with others in the group made her further appreciate her approach to NBPA: "it's always interesting for me to hear about other people's challenges and it kind of puts in perspective how lucky I am to do these things."

Participation in the SUP (External Stimuli) led, through the collective reflective process (Arrow 1), to changes, or validation, in the teachers' Personal Domain (b). This validation can be portrayed as a development in the teachers' *professional vision*, as defined by van Es and Sherin (2008). Professional vision refers to "the ability to notice features of a practice that are valued by a particular social group" (p. 244), in this case, members of the SUP. These changes in the teachers' professional vision (Personal Domain) led to the implementation through *enaction* of professional experimentation (Arrow 2), generating new strategies in their PHE classes (c), which responded to the new or enhanced teaching perspectives.

Domain of Practice: Professional Experimentation

Day et al. (2021a) stated that the value of SUPs "lies in their potential to inspire, add momentum, or 'kick start' new ways of thinking, doing, and leading teaching and learning in schools" (p. 1). Previous research has found that teachers can attain new instructional skills and/or diversify instructional strategies through pro-d (Till et al., 2011) and numerous outcomes were revealed that were situated in the domain of practice. Day et al. (2021b) argued that "unless individuals' attitudes and dispositions are aligned and harnessed by those who lead them so that they become *collective* attitudes, *collective* capacities and *collective* commitments, partnership structures and mechanisms themselves are more likely to falter than succeed" (p. 30). Due to the individual teachers' dedication and motivation, and the collective professional vision of the SUP, the teachers reported changing instructional and assessment techniques for inclusion, safety, and the "big picture" of their PHE classes.

Instructional Changes for Inclusion

Alana found inspiration from a recent SUP meeting and planned to implement a new game shared by one of her colleagues entitled 'Marker Tag.'

> …that was one that really stood out to me…where you get kids to hide and give them [markers] and write down a letter, I thought that would be great…for the kids who don't like sports, like go out and find your friends in the woods…what a great idea.

Similarly, Keisha felt her instructional changes to incorporate further NBPA "kind of levels the playing field because there's not a lot of students that have a lot of experience [in it]." She explained that in NBPAs like forest games, "anyone can excel in different ways." She provided an example:

> … some of my students last quarter were very good at hiding…they were engaged in finding the best spot to hide…whereas I know that when we go into the gym and play badminton they'll stand in the corner and hit a birdie around but it's just not the same.

One instructional change Macey made was to "give [her students] voice" by having them fill out a survey on the first day of class about the activities that they wanted to participate in throughout the PHE course. The students often identified NBPAs.

Alana found that by adapting her assessment techniques during NBPA, she created a more inclusive learning environment:

> …it's tough to come in day in and day out and play these sports if you're not an athlete. So, assessment wise, [NBPA is] great for those kids who don't enjoy sports to get outside, and for me to give them a little check-in, like 'hey today was your first 5/5, great job, keep it going for the rest of the week.' So, my whole view of assessment has changed around that area.

Kyra felt that the learning environment in general when implementing NBPA provided the time and space for her to "visit and chat with [the students], but also really hear them and see them, and for them to enjoy visiting with each other. I don't think students get an opportunity to do that very often." She felt the very simplicity of NBPA provided inclusion:

> They're just walking and talking and there's so much value in that… [NBPAs] are for everybody. You can find ways to target both the competitive and non-competitive students and provide an environment for everybody to feel comfortable.

Hunter (2024) explained that working in a trusted initiative with a team of colleagues supported by a SUP can strengthen not only professional growth, but also prospects for refining and innovating practice as illustrated by the interviewed teachers.

Instructional Changes for Safety

Some of the instructional changes the teachers made, and the increased incorporation of NBPA were further motivated by COVID-19 as this study was conducted in 2021. Many found that NBPA fit into their PHE curriculum particularly well as learning outdoors was encouraged during the pandemic. Kyra found she explored new local areas: "this year's forced us to…branch out from what we're used to…there's only so many times you can walk to [the local beach] so that's when I started changing the route." Elise further explained the impact of the pandemic on her PHE courses:

> This year, particularly, we really haven't played those conventional [games and sports], we've done more [NBPA]…and the kids are really enjoying it. The feedback has been great from the parents…just encouraging going outside regardless and tying into the health concepts, and the significance it has on our daily lives.

The Big Picture

Along with new instructional and assessment strategies reported by teachers, another change in the Domain of Practice was that they claimed to be more aware of the "big picture" of their relevant teaching activities involving planning, executing and/or assessing a lesson. Many of the participants stated that they changed their practice regarding NBPA by placing nature as the focus. Ava explained:

> So instead of just going on a field trip to do some disc golf, turning it into more of a nature-based unit where we don't just play the game as a one off at the end of the year but looking at skills that can be developed and playing it around the school and then going somewhere for the culminating activity. So, making it bigger.

Similarly, Elise felt that the SUP gave her more "structure" to her NBPA lessons: "instead of just …like okay we're going for a walk…find connections…recently I had the students spend a week outside…[one] requirement was you just can't be on your phone…" She also changed her assessment for her weeklong NBPA unit: "the assessment piece was finding articles that support [NBPA] and understanding the correlation between what we did [and] the research and the positive aspects and so that helped tie it together."

Kyra began implementing cross-curricular learning in her NBPA PHE lessons. She started having her students create "nature art installations" once they had reached their destination – a beach or top of a mountain – after a hike. These installations also served the function of connecting students to their community because they were to create something for "other passersby to enjoy." She also connected this activity to a community that the students really understand: *X (formally Twitter)*:

> I take pictures and I post them and say whoever controls the most votes I'll bring a prize. So, it gets them interacting and gets their friends interacting. And I've had moms who follow that account.

Most of the participants provided specific examples of activities learned in the meetings that they implemented into their practice. Elise spoke highly of learning geocaching in the partnership as it was well received by her students:

> The geocaching was amazing, and I liked it because…we did it around our school first and then we took them to [a local mountain] … it was great. They were outside, there was a technology piece that we could incorporate a bit of map reading…

The identified changes in the Domain of Practice led to a set of reflective and enactment processes that enhanced teachers' initial changes in the Personal Domain. As Figure 3 shows, teachers reported having engaged in a reflective process after they implemented new strategies with their PHE classes (arrow 3). This process reinforced their initial change in the Personal Domain, hence strengthening their professional vision.

In most Western countries teaching has always been associated with contact time with students in classrooms, leaving teachers with limited time to systematically reflect upon their work (Day et al., 2021b). Typically, teachers are likely to spend much of their time in quick, reactive thinking in their classrooms, engaging primarily in reflection-in-action. This type of reflection allows teachers to draw upon or adjust existing practices to address immediate concerns, rather than to deeply explore the underlying purposes, practices, and influences that could support or hinder improvement (Day et al., 2021a). Despite the demands of teaching, the participants in this study actively engaged in reflection and maintaining a formal partnership within and between schools (Harris et al., 2017).

Domain of Consequence: Salient Outcomes

Teachers involved in a SUP with their peers and academic researchers, are likely to act as 'insider' researchers of their own practices. Their inquiries are usually small-scale, motivated by a desire to solve the puzzles within their teaching environments, and are often unconstrained by the

formal requirements of systematic academic research (Day et al., 2021b). Teachers in this study discovered their NBPA innovations resulted in changes in student behaviour. The changes in the Domain of Practice led through an enactive process (arrow 4), perceived by participants as Salient Outcomes (d) in terms of students' participation and engagement in the NBPA lessons. Walsh and Backe (2013) argued that the primary beneficiaries of SUPs should always be the students. The participants in this study spoke of the main outcome they noticed in their students because of their changes in practice: a breath of fresh air.

A Breath of Fresh Air

Ava noticed when she increased her use of NBPA that many of her PHE students "like being outside" and "they really enjoy the idea of being able to do something that doesn't involve competition necessarily; that isn't a team sport." Elise noticed a dramatic change in her students in response to implementing NBPA:

> The kids, they seem happier, they enjoy PHE more, and I've heard that from several students…and it was wonderful to hear from the parents: 'We love that you're doing something different, our son is so happy. It's such a good fit for him because you're doing non-traditional things, spending more time outside.' I remember when I told my grade nines this year the [NBPA] structure of what we were going to do, and I kid you not…they clapped.

She felt, for students who had been disenfranchised in the past in PHE that NBPA built their confidence, and it was "a safe place for them with this different type of class structure."

Keisha, who teaches senior elective PHE courses, had the chance to directly compare the participation of students in regular PHE with her NBPA-focused courses:

> I find that the students [who are in] regular [PHE] wouldn't participate very well. You get them outside playing tag in the forest and they're on and they're playing. I noticed that there are higher levels of engagement when we are outside. They seem to really thrive out there. I see more engagement in the students; if you're playing Foxes and Hounds in the woods someone is going to chase you, there's not really that option to sit out.

Keisha also noticed that her students show "a greater appreciation of where they live" after participating in NBPA, and this appreciation would transfer to NBPA outside of PHE:

> … [the students] can walk through this [forest] from their own house and see [what we] talked about…they're exposed repeatedly to going outside and realize 'oh this is fun'…this is kind of the purpose…to lead them down that path so they value being outside and active.

Change in the domain of consequence is firmly tied to the teacher's existing value system and to the inferences they draw from the practices of the classroom (Clarke & Hollingsworth, 2002). The occurrence of both new practices and outcomes contributed through teacher reflection to another change in the Personal Domain (arrow 5). Teachers reported changes in their attitudes towards their profession and their role as PHE educators. Elise reflected on the impact of NBPA on her students, and the meaning it brought to her perspective as an educator:

> …my job is to expose you to so much that you are active for your lifetime, not that you can shoot a layup… I want you to be like, 'oh I really like that, I want to continue that when I'm not in PHE class' or have the confidence to go to a mountain…I want to give them the confidence. I'm going to take you there and show you can do it…now maybe you take your family…like just exposing them, so they continue to be active in some way.

The teachers were able to identify important consequences of their new NBPA strategies in their personal domain (see Figure 3). Clarke and Hollingsworth (2002) proposed two types of teacher change that can be represented in the Interconnected Model. First, change sequences, where there is evidence that change in one domain causes changes in another in a momentary way, such as the introduction of an NBPA innovation, with no further impact. Second, in growth networks there is "explicit evidence of lasting change in practice or in teacher knowledge or beliefs" (p. 958–959). In this study, complex change sequences were identified, and links were suggested between the external, practice and outcome domains, and the personal domain of teachers' attitudes and beliefs. Hence, according to teachers' perceptions, these change sequences could correspond to a growth network.

Conclusions

The data presented in this study fits with the Interconnected Model of Teacher Professional Growth (Clarke & Hollingsworth, 2002). When the participating teachers described their processes of learning and change, they described interactions between the external domain, the personal domain, the domain of practice, and the salient outcomes. By approaching the SUP with a goal of growth, the teachers were able to grow professionally in their individual, non-linear ways.

Lessons from successful SUPs, such as the one described in this study, suggest that while common values provide an integral foundation, within this, flexibility, adaptability and relevance are vital attributes if they are to sustain their functionality, performance, and their impact on the quality of teaching and learning, and professional growth for teachers and students (Day et al., 2021b). Additionally, the analysis of the interviews shows that teachers adopted the main theoretical points of our SUP, namely the research on the benefits of NBPA. We consider that these elements constitute bridges between theory and practice, which is at the core of the development of SUPs (Baumfield & Butterworth, 2007; Hennessy et al., 2011).

Limitations

The study involved only six teachers, and although phenomenology does not seek to make findings generalizable, these six female teachers are not representative of all members of the SUP. Additionally, the teachers' perceptions of their own growth and changes in practice may not accurately reflect their actual experiences; they may have presented themselves positively or had difficulty recalling specific details. Although we attempted to mitigate it through reflexivity, being the leaders of the SUP may have introduced bias. Our pre-existing beliefs and relationships with participants could have influenced data collection, analysis, and interpretation. Finally, this study offers a snapshot of the SUP's perceived impact on the participants at a specific point in time. As Clarke and Hollingsworth (2002) argue, to find explicit evidence of lasting change, the current analysis should be placed in relation to further evidence of teachers' long term NBPA practices.

While it is important not to overstate the evidence on the effectiveness of SUPs, it is clear that they are a promising strategy for fostering educational improvement and transformation (Coburn et al., 2021). Coburn's and Penuel's (2016) review of available evidence of the outcomes of research-practice-partnerships in education found that although there was evidence of successful innovations developed within partnerships in other fields (e.g., health), the evidence of impact in education was sparse. They lamented that few studies had even attempted to investigate the value of the SUPs themselves. This study is one step towards evaluating the impact of a SUP on teachers' professional growth. As shown in the model and this study, when inspired by perceived improvements in student learning, teachers can grow in their professional vision, become more

motivated to teach NBPA, and feel validated in the fact that these instructional changes are what is best for their students in PHE.

References

Bartley, H., & McKay, C. (2022). Why informal professional development matters: Six tips to developing professionally in the physical education profession. *Strategies*, *35*(6), 20–24. https://doi.org/10.1080/08924562.2022.2120138

Baumfield, V., & Butterworth, M. (2007). Creating and translating knowledge about teaching and learning in collaborative school-university research partnerships: An analysis of what is exchanged across the partnerships, by whom and how. *Teachers and Teaching: Theory and Practice, 13*(4), 411–427. https://doi.org/10.1080/13540600701391960

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE Publications.

Brown, C. P., & Weber, N. B. (2019). Bringing being into professional development: A qualitative investigation into teachers' struggles moving beyond an epistemological framing of teaching and learning. *Early Child Development and Care, 189*(5), 763–776. https://doi.org/10.1080/03004430.2017.1343312

Bryk, A., Sebring, P., Allensworth, E., Luppescu, S., & Easton, J. (2010). *Organizing schools for improvement: Lessons from Chicago.* University of Chicago Press.

Camacho, A. S., & Fernández-Balboa, J. M. (2006). Ethics, politics and bio-pedagogy in physical education teacher education: Easing the tension between the self and the group. *Sport, Education and Society, 11*(1), 1–20. https://doi.org/10.1080/13573320500255023

Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education, 18*, 947–967.

Clarke, D., Hollingsworth, H., & Gorur, R. (2013). Facilitating reflection and action: The possible contribution of video to mathematics teacher education. *Sisyphus: Journal of Education, 1*(3), 94–121. https://doi.org/10.25749/sis.3708

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher, 45*(1), 48–54. https://doi.org/10.3102/0013189X16631750

Coburn, C. E., Penuel, W. R., & Farrell, C. C. (2021). Fostering educational improvement with research-practice partnerships. *Phi Delta Kappan, 102*(7), 14–19. https://doi.org/10.1177/00317217211007332

Coburn, C. E., Penuel, W. R., & Geil, K. E. (2013). *Research-practice partnerships: A strategy of leveraging research for education improvement in school districts.* William T. Grant Foundation.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education.* Routledge.

Cox, A. (2005). What are communities of practice? A comparative review of four seminal works. *Journal of Information Science, 31*(6), 527–540. https://doi.org/10.1177/0165551505057016

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Day, C., Gu, Q., Townsend, A., & Holdich, C. (2021a). *School-university partnerships in action: The promise of change* (C. Day & A. Lieberman (eds.)). Routledge: Taylor & Francis Group.

Day, C., Gu, Q., Townsend, A., & Holdich, C. (2021b). Successful partnerships: Opportunities and outcomes. In C. Day & A. Lieberman (Eds.), *School-university partnerships in action: The promise of change* (pp. 21–38). Routledge: Taylor & Francis Group.

Dowling, F. (2006). Physical education teacher educators' professional identities, continuing professional development and the issue of gender equality. *Physical Education & Sport Pedagogy, 11*(3), 247–263. https://doi.org/10.1080/17408980600986306

Fullan, M. (2008). *The six secrets of change.* John Wiley & Sons.

Gast, I., Schildkamp, K., & van der Veen, J. T. (2017). Team-based professional development interventions in higher education: A systematic review. *Review of Educational Research, 87*(4), 736–767. https://doi.org/10.3102/0034654317704306

Goodwin, R. (2005). Why I study... Relationships and culture. *The Psychologist, 18*(10), 18–33. https://doi.org/10.4135/9781071800973.n3

Green, C. A., & Eady, M. J. (2024). Creating, sustaining, and enhancing purposeful school-university partnerships: An introduction. In *Creating, sustaining, and enhancing purposeful school-university partnerships: Building connections across diverse educational systems* (pp. 3–15). Springer. https://doi.org/10.1007/978-981-99-8838-9_1

Gruno, J., & Gibbons, S. L. (2020). Incorporating nature-based physical activity in physical and health education. *Journal of Physical Education, Recreation and Dance, 91*(3), 26–34. https://doi.org/10.1080/07303084.2019.1705210

Gruno, J., & Gibbons, S. L. (2021). Using discussion to inform action: Formative research on nature-based physical activity as a means of fostering relatedness for girls in physical and health education. *European Physical Education Review, 27*(4), 743–760. https://doi.org/10.1177/1356336X21991181

Gruno, J., & Gibbons, S. L. (2024). Moving from discussion to action: A formative research process to implement nature-based physical activities and support relatedness in physical and health education. *PHENex Journal, 14*(1), 1–15.

Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher, 15*, 5–12. https://doi.org/10.3102/0013189X015005005

Harris, A., Jones, M., & Huffman, J. (2017). *Teachers leading educational reform: The power of professional learning communities.* Routledge.

Hennessy, S., Warwick, P., & Mercer, N. (2011). A dialogic inquiry approach to working with teachers in developing classroom dialogue. *Teachers College Record, 113*(9), 1906–1959.

Hunter, J. L. (2024). Invitations, impact, and involvement: Tales from successful school-university partnerships in STEM and STEAM in Australian schools. In *Creating, sustaining, and enhancing purposeful school-university partnerships: Building connections across diverse educational systems* (pp. 39–57). Springer. https://doi.org/10.1007/978-981-99-8838-9_3

Hunzicker, J. (2011). Effective professional development for teachers: A checklist. *Professional Development in Education, 37*(2), 177–179. https://doi.org/10.1080/19415257.2010.523955

Jordan, J. (2012). Relational resilience in girls. In S. Goldstein & R. B. Brooks (Eds.), *Handbook of resilience in children* (2nd ed., pp. 73–86). Springer.

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24*(1), 120–124. https://doi.org/10.1080/13814788.2017.1375092

Larsson, L., Linnér, S., & Schenker, K. (2018). The doxa of physical education teacher education – set in stone? *European Physical Education Review, 24*(1), 114–130. https://doi.org/10.1177/1356336X16668545

Leeder, T. M., & Beaumont, L. C. (2021). Lifestyle sports and physical education teachers' professional development in the United Kingdom: A qualitative survey analysis. *Education Sciences, 11*, 1–23. https://doi.org/10.3390/educsci11100642

Masuda, A. M., Ebersole, M. M., & Barrett, D. (2013). A qualitative inquiry: Teachers' attitudes and willingness to engage in professional development experiences at different career stages. *The Delta Kappa Gamma Bulletin, 79*, 6–14.

McIntyre, D. (2005). Bridging the gap between research and practice. *Cambridge Journal of Education, 35*(3), 357–382. https://doi.org/10.1080/03057640500319065

Patton, M. Q. (2015). *Qualitative research and evaluation methods: Integrating theory and practice* (4th ed.). SAGE Publications.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Starks, H., & Trinidad, S. B. (2007). Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory. *Qualitative Health Research, 17*(10), 1372-1380.

Till, J., Ferkins, L., & Handcock, P. (2011). Physical activity based professional development for teachers: The importance of whole school involvement. *Health Education Journal, 70*(2), 225–235. https://doi.org/10.1177/0017896910396218

van Es, E. A., & Sherin, M. G. (2008). Mathematics teachers' "learning to notice" in the context of a video club. *Teaching and Teacher Education, 24*(2), 244–276. https://doi.org/10.1016/j.tate.2006.11.005

Walsh, M. E., & Backe, S. (2013). School-university partnerships: Reflections and opportunities. *Peabody Journal of Education, 88*(5), 594–607. https://doi.org/10.1080/0161956X.2013.835158

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). Professional learning in the learning profession: A status report on teacher development in the United States and abroad. In National Staff Development Council. http://www.becker.k12.mn.us/sites/beckerschools/files/departments/2012/NSDCstudytechnicalreport2009_0.pdf%5Cnfiles/24/NSDCstudytechnicalreport2009-PD-use.pdf

Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity* (1st ed.). Cambridge University Press.