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Article

Using the Principles from Community of Practice: Developing Sustainable Professional Development Programmes in Physical Education

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Abstract: Continuing professional development is vital for enhancing teaching quality in Physical Education, but traditional approaches often lack effectiveness. This study explores the implementation of a Community of Practice framework integrated with motivational theory to develop and evaluate a Physical Education professional development programme in a Welsh secondary school, assessing its impact, benefits, challenges, and critical considerations. This 18-month longitudinal qualitative study involved eight staff members. Data were collected through interviews, focus groups, researcher reflections, collaborative discussions, and a WhatsApp group. Deductive thematic analysis was employed. Three main themes emerged: understanding effective continuing professional development and community of practice principles, establishing and maintaining professional development opportunities incorporating community of practice, and evaluating the professional development programme's impact. A boundary spanner (the principal investigator) played a pivotal role in bridging school and external expertise, by facilitating ongoing collaboration and knowledge exchange within the community of practice. The "boundary spanner" played a critical role in facilitating the use of WhatsApp, which enhanced engagement and sustainability. Teachers reported improved planning, increased collaboration, and enhanced understanding of motivational strategies. This study advances physical education professional development literature by demonstrating the effectiveness of integrating community of practice principles with theory-informed professional development programmes. It emphasises the importance of contextual understanding, theoretical grounding, and the 'boundary spanner' role. The findings underscore the need for research-informed, context-specific principles to enhance professional development programmes in PE, highlighting technology's potential in facilitating ongoing professional development.

Keywords: professional development; communities of practice; theory informed CPD; motivation

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1. Introduction

Continuing professional development (CPD) is not just important; it is critical for elevating the quality of Physical Education (PE) (K. M. Armour & Makopoulou, 2012; Parker & Patton, 2016). For teachers to thrive through effective pedagogical practices, they need ongoing opportunities for professional development (PD); (Kern & Patton, 2024). Yet, the current landscape of PE-CPD is fraught with challenges, particularly in establishing a connection between teacher learning and tangible student outcomes (Parker & Patton, 2016; Yoon & Armour, 2017). While professional development programmes (PDPs) in PE hold immense potential for enhancing content knowledge and teaching methodologies (Harris et al., 2012; Kern & Patton, 2024), there is a pressing need for focused direction and support (K. M. Armour & Makopoulou, 2012). Scattered, brief workshops often fail to provide the contextualisation necessary for meaningful impact, leading many PE teachers to question the efficacy of these programmes (Jess et al., 2017; Ko et al., 2006; Yoon & Armour, 2017).

Motivation is a pivotal factor that underpins effective teaching and learning in PE. Theoretically informed CPD programmes that foster adaptive motivational climates—environments structured to enhance autonomous motivation through supporting psychological needs for competence, autonomy, and relatedness—can significantly enhance teaching quality, student engagement, enjoyment, learning outcomes, skill development, social relationships, and well-being (Duda et al., 2014; Milton et al., 2018; Milton et al., 2025).

However, motivation is often neglected in traditional CPD approaches. This study leverages Duda's integrated framework for motivation (2013) and the Empowering PE programme to illustrate how theory-driven CPD can guide teachers in creating motivationally adaptive environments. This perspective positions teachers as facilitators of student motivation while equipping them with strategies for their professional growth. This study specifically adopts Duda's (2013; Duda & Appleton, 2016; Duda et al., 2024) integrated motivational framework because it uniquely synthesises key elements (i.e., features of the motivational climate) from both Achievement Goal Theory (AGT) and Self-Determination Theory (SDT), providing a more comprehensive approach than either theory alone. While the TARGET Model (Epstein, 1989) offers valuable dimensions for structuring more task-involving motivational climates (Tasks, Authority, Recognition, Grouping, Evaluation, and Time), Duda's framework more explicitly connects these environmental dimensions to the psychological mechanisms that influence motivation and in doing so, pulls from constructs/assumed processes embedded in AGT (e.g., goals) and SDT (e.g., basic psychological need satisfaction, basic psychological need frustration). Specifically, this integrated approach allows us to examine how 'empowering' climates (i.e., social psychological environments characterised by highly task-involving, autonomy-supportive, and socially supportive behaviours of the teacher) as well as 'disempowering' climates (i.e., social psychological environments characterised by highly ego-involving and controlling behaviours) influence teachers' engagement (their discussions, their understanding, and efforts to change behaviour) within professional development. This dual consideration of both empowering and disempowering elements provides a more nuanced approach in regard to working with teachers and having them better understand and aim to optimise their behaviours/strategies and the motivational dynamics at play in PE-CPD contexts. Furthermore, the motivational climate as conceptualised in this framework has been found to be predictive of differential student processes and outcomes in PE settings (e.g., Milton et al., 2018; Milton et al., 2025), making it particularly relevant for our investigation of sustainable professional development in PE.

The demand for a paradigm shift in PE-CPD cannot be overstated. Despite widespread criticism, traditional models still prevail (Yoon & Armour, 2017), emphasising

the urgent need for transformation. Parker and Patton (2016) and Parker et al., (2010) advocate for context-specific learning tasks that foster sustained, informal opportunities for teachers to collaborate and share knowledge. This approach not only recognises teachers as active learners but also prioritises collaboration—an essential mechanism for cultivating motivation among both teachers and students. Effective PE-CPD must enhance pedagogical, and content knowledge delivered with genuine care and attention (Leeder & Beaumont, 2021), while integrating motivational principles into practice. This requires a blend of informal and formal learning experiences, seamlessly connecting reflective practice with collaborative activities among educators. In contrast, outdated, didactic methods, such as one-time workshops lacking sustainability and collaboration, undermine the complex dynamics of PE teacher learning (Leeder & Beaumont, 2021).

1.1. Recent Developments in PE-CPD

Over the past 15 years, there has been a shift towards sustained CPD focusing on personal development and collaboration (Chambers et al., 2012; Lieberman & Miller, 2008; Yoon & Armour, 2017). Involving teachers in the design and implementation of their CPD is crucial (Lieberman & Miller, 2001; Lieberman & Miller, 2008; Little, 2012; Tannehill & MacPhail, 2017). PE Community of Practices (CoPs) are recognised as vital for enhancing teacher growth and learning (Yoon et al., 2024). Recent advancements highlight the complexity of impacting teacher development and student learning (Kern & Patton, 2024; Yoon & Armour, 2017; Yoon et al., 2024), with many PE-CPD programmes not adequately addressing these complexities (K. Armour et al., 2017). Researchers advocate for innovative approaches that bridge theory and practice, suggesting CoP principles in PDPs (K. Armour et al., 2017; Yoon & Armour, 2017). CoPs facilitate collaboration, sustained development, and practical innovation, promoting systemic improvements in PE teaching (Hu & Endozo, 2024). Edwards et al. (2019) outlined nine principles for effective PD in PE, emphasising collaboration, sustainability, and theory integration. Embracing CoP principles can transform traditional workshops into sustained, collaborative learning opportunities.

1.2. Communities of Practice and PE-CPD

The complexities of teacher learning and the challenges in developing effective PE-CPD through CoPs necessitate attention (Yoon & Armour, 2017). Active participation in educational communities is crucial for teacher growth (Sfard, 1998). While CoPs naturally exist, recent trends emphasise intentional cultivation for better learning support (Barab & Duffy, 2012; Hoadley, 2012). CoPs foster collaborative learning distinct from traditional PD (Lieberman et al., 2011; Yoon & Armour, 2017), and Wenger's framework advocates for engineered CoPs with facilitators for increased effectiveness (Wenger et al., 2002).

Key elements for developing CoPs include mutual engagement, joint enterprise, and shared repertoire (Goodyear et al., 2014; Yoon & Armour, 2017). Benefits of CoPs encompass contextualised learning and collaborative environments that promote pedagogical innovation (K. M. Armour & Yelling, 2004; K. Patton et al., 2013). However, challenges like time constraints, sustainability, varied participation, lack of institutional support, and power dynamics must be addressed (Goodyear & Casey, 2015; Hu & Endozo, 2024) to maximise their potential.

The effectiveness of CoPs varies by context, and assessing their impact is complex (Parker & Patton, 2016). Hu and Endozo (2024) point out that while CoPs provide both opportunities and challenges, empirical research combining a strong theoretical basis with CoP principles in PDP is limited. Establishing a theoretical grounding for CPD content can enhance its relevance and effectiveness, especially in motivating students (Makopoulou & Armour, 2014). Teachers are vital in fostering student motivation, yet their understanding of motivational theory is often insufficient (Duda et al., 2014). Thus,

exploring CoP-driven approaches in PD centred on motivation is essential (Haerens et al., 2015). This has led to the development of a theory-informed PE CPD programme focused on empowering teachers to create more adaptive motivational climates.

1.3. Strategies for Effective CPD and CoPs

Recommendations for building effective CPDs and CoPs have been applied in educational settings (K. Armour et al., 2017; De Carvalho-Filho et al., 2020; Edwards et al., 2019; Trust & Horrocks, 2019). These strategies, outlined in Table 1, offer valuable insights for designing PD and CoP initiatives.

Table 1. Recent recommendations and strategies used to build effective professional development and CoPs.

	Strategies for Implementing a CoP	Professional Development Programmes & Physical Literacy	Recommendations for Implementing CoP in Education
1	Gather a core group to launch the process	In depth needs assessment	Give members voice and choice in how they learn
2	Articulate the goals and values of the CoP	Create a supportive environment	Collaboratively develop a set of guiding principles with members that set the tone for the Community
3	Start with a specific task or project—make it problem orientated	Embed the content alongside the PE Departments current roles and find space to allow them to reflect on the learning process	Provide substantial support for the community
4	Make it worthwhile for members and the institution	Focus on teachers' growth and nurture them as learners and bridge the theory-practice gap	Create opportunities for social learning
5	Promote sustainability	Create a collaborative environment	Use technology to support and connect
6	Communicate success	Emphasis on sustainability and avoid one-off training opportunities	Build a sense of community
7	Evaluate the CoP	Do not rely on resource material as resource driven professional development programmes do not adequately provide teachers with in-depth knowledge	Co-develop the purpose of the community with the members

Notes: Adapted from (De Carvalho-Filho et al., 2020; Edwards et al., 2019; Trust & Horrocks, 2019).

These principles guided the development and implementation of the present PE-CPD programme, ensuring a tailored approach to the education context that aligns with the theoretical foundations of CoPs and practical considerations of the school context.

1.4. Connecting Communities of Practice to PE-CPD

To explore the potential of CoPs in PE-CPD, it is essential to apply these principles in practice. The boundary spanner plays a critical role in facilitating CoPs by bridging different groups, disseminating information, and fostering collaboration (Capel & Lawrence, 2019; Goodyear & Casey, 2015). A boundary spanner is an individual who works across organisational boundaries, connecting different groups, disseminating information, managing tensions, building trust, and facilitating collaborative learning (Capel & Lawrence, 2019; Goodyear & Casey, 2015).

Digital platforms have expanded opportunities for PE teachers to engage in informal learning through online CoPs, where resources and best practices can be shared (Hu & Endozo, 2024). Social media, particularly platforms like WhatsApp, supports ongoing communication and member engagement even without face-to-face interactions (De Carvalho-Filho et al., 2020). The effectiveness of CoPs is context-dependent; strategies that

work in one setting may not in another due to cultural and institutional differences (Parker & Patton, 2016). Therefore, tailoring CoP initiatives to specific school contexts is crucial, as shared understanding among teachers fosters collaboration to address common challenges (Hu & Endozo, 2024).

1.5. Purpose

This study aims to develop a PE CPD programme based on effective CoP principles (Trust & Horrocks, 2019) and assess its impact in a school setting. Objectives include (a) proposing a motivational theory-grounded PDP and (b) analysing the implementation challenges and benefits. The research highlights the importance of contextual understanding, theoretical grounding, and the boundary spanner's role in successful PD programmes. By addressing teacher learning complexities using CoPs, this research provides a comprehensive, theoretically grounded framework for PD, emphasising motivation (and how to create a more empowering motivational climate) and the long-term sustainability of these approaches. It aims to fill literature gaps by offering insights on leveraging CoPs for motivational strategy development and providing recommendations for future CPD initiatives.

2. Materials and Methods

2.1. Setting and Participants

This study was conducted in a secondary school PE department. The school was selected based on its participation in collaborative research networks, providing an authentic setting for exploring the complexities of PDPs using CoP principles. Institutional research ethics committee approval was obtained, and the school was purposively sampled from collaborative research groups (M. Q. Patton, 2002). Recruitment involved email contact with the headteacher, who opted into the study after discussion. Written informed consent was secured from the headteacher, senior leadership team (SLT), and PE department staff.

The targeted school was a co-educational comprehensive school with a diverse student body. It provided a rich context for examining the implementation and impact of a CoP-based PDP. Eight staff members participated in the study, including those from the PE department and members of the senior leadership team, bringing varied experience in teaching, leadership, and school contexts. Participants were assigned pseudonyms to maintain anonymity (Table 2).

Table 2. Participants within the project including their role and experience.

Participants	Role	Experience and Context
Stanley	Headteacher	5 years as head of the school
Trevor	Interim Headteacher	Trevor took over as headteacher Christmas 2019
Adele	SLT responsible for staff development	Recently appointed
Katie	SLT responsible for teaching and learning	3rd year in the role
Archie	Overall Head of PE	7th Year as head of department
Anthony	PE Teacher and YR 7 Year Tutor	5th year teaching
Sophie	Head of Girls PE	15 years teaching currently part-time
David	Researcher and Boundary Spanner	10 plus years teaching experience working in higher education

The principal investigator, possessing experience in teaching secondary school PE and currently serving as a Senior Lecturer in sports coaching and PE, offered expertise in motivational theory (Milton et al., 2018, 2025) and acted as a ‘boundary spanner’ to facilitate the CoP’s development and evolution. As per Goodyear and Casey (2015), the boundary spanner was tasked with disseminating, filtering, and facilitating information exchange across different organisations. This role was filled by the principal investigator from a separate professional organisation to inject new insights and sustain teacher inquiry. This study’s boundary spanner was pivotal in establishing and maintaining the CoP. Through regular interactions with the PE department, the boundary spanner facilitated discussions, shared resources, and encouraged collaborative problem-solving. The boundary spanner acted as a distributed leader (Goodyear & Casey, 2015), bridging school and external networks, facilitating knowledge transfer, and supporting the emergence of a collaborative culture. This role aligns with facilitation theory, emphasising the importance of relational trust, distributed expertise, and sustained engagement in CoP development.

This approach supported the development of a shared repertoire among teachers and fostered a sense of mutual engagement and joint enterprise, essential components of effective CoPs (Wenger et al., 2002). The diverse backgrounds and experiences of the participants enriched the study, allowing for a comprehensive exploration of the benefits, challenges, and critical considerations of implementing a CoP-based PDP in a secondary school PE department. These critical considerations included balancing institutional constraints with teacher autonomy, leveraging technology for sustained engagement and ensuring contextual relevance.

2.2. Research Design: Professional Development Programme

This longitudinal study assessed the benefits, challenges, and considerations of implementing a PDP. Data collection spanned eight months, from July 2019 to February 2020 (Table 3), involving five phases: (a) needs assessment (July 2019); (b) delivery of the theory-driven aspect of the PDP—the Empowering PE™ Workshop focusing on optimising the motivational climate in PE classes (September 2019); (c) establishment and continuation of a CoP-based PDP (October 2019–February 2020); (d) post-intervention interviews; and e) a one-year follow-up (February 2021). However, due to COVID-19, the one-year follow-up was disrupted, limiting face-to-face contact with pupils. Consequently, a brief follow-up was conducted solely with members of the PE Department.

Table 3. Initial timeline of study *.

	July 2019 Needs Assessment	September Workshop Delivery	October-January Principles of CoP	February 2020 Post Project Interviews
1	Interview Headteacher	Inset–Whole School	In person meetings every 3-4 weeks	Interview Headteacher
2	Interview Senior Leadership	Half Day Workshop 1 during Inset	Interactions with staff within the intervention via WhatsApp group	Interview Senior Leadership
3	Focus Group PE Staff (4)	Mid-September Workshop 2 and Review	Interviews, conversations and interactions with staff via individual and group meetings	Interview PE Staff
4		End of September Workshop 3 and Review	Include top- up workshop material	* ONE YEAR FOLLOW UP
5		Principles of CoP intervention established	New aims developed each cycle for individuals and department	Disrupted due to COVID-19 but WhatsApp interviews recorded

* The data were collected from July 2019 to February 2020. Due to COVID-19, the one-year-later follow-up interviews were limited and not completed face to face. This was due to the school being shut for large parts of the year due to the pandemic.

Building on insights from the literature, the study developed a PE-CPD program informed by CoP principles that aimed to promote teachers’ understanding and

application of motivational strategies. Drawing on previous research strategies (See Table 1), commonalities were identified across the recommended strategies and adapted to fit the study's context through rigorous discussion between the authors to support the implementation and sustainability of the CoP within this study (See Table 4). Three primary sources of literature informed the development of this PE CPD. These sources were selected because of the work they had already performed to inform the development of CPD and CoPs and their relationship to the context and situation. They were also the most recent empirical evidence within the field at the implementation time. In this study, WhatsApp was used to facilitate discussions, share resources, and support teachers, ensuring that the CoP remained active and relevant throughout the study period.

Table 4. Strategies of effective CPD and CoPs and application to this study.

Strategies Used		Application to This Study
A	In depth needs assessment	Qualitative needs assessment of the Headteacher, SLT, and PE Department
B	Gather a core group to launch the process	Staff members of the PE Department with whole school support
C	Start with a specific task or project embedded with theory and applied to practice:	Understanding and implementation of motivation and empowering motivational strategies
D	Co-develop the purpose of the community with the members, giving them voice and choice with how they learn	Create individual and departmental goals shared and created by the participants.
E	Create sustainable support structures, opportunities to collaborate and increase social learning	Establish 3–4-week touch points to review, reflect and shape the next cycle
F	Use technology to support and connect	Use the participants to come up with a way of online sharing that would engage and help sustain the group, i.e., WhatsApp
G	Make it worthwhile for members and the institution	Evidence the learning and development throughout, build and share strategies including success and failure. Work it into their schedule—make it work for them
H	Communicate success and evaluate the project	Post-intervention interviews to assess the impact of the approach and one year follow up to ensure sustained approach

2.3. Data Collection

Multiple qualitative data sources informed the study, as detailed in Table 5 (Parker et al., 2010). These included researcher reflections, semi-structured interviews (lasting between sixty to hundred and twenty minutes) with the Headteacher and Senior Leadership Team (SLT), focus groups, interviews, collaborative discussions, and an online WhatsApp group involving the boundary spanner and PE department members. The WhatsApp group facilitated over 130 interactions, primarily when the boundary spanner was not on-site, aiding CoP maintenance and idea sharing. Transcripts of WhatsApp messages were included in the analysis. Interviews with the headteacher, SLT, and PE department members were audio-recorded and transcribed for analysis.

Table 5. Data gathering tools.

Data Source (Codes)	Description	Purpose
1. Researcher Reflections/Boundary Spanner (BS)	Informal voice memos recorded by the researcher that took place during the time over the course of the project (Total Number 12)	To gather personal insights into how the project developed and the key learnings throughout the timeline.
2. Interviews: Headteacher and SLT (NAIHT and NAISLT)	Headteacher and SLT interviews establishing the context and current understanding of professional development and CoPs.	To understand the school and staffs' current understanding of professional development, CoPs and the theory/concepts behind the workshops.
3. Needs Assessment Focus Group: PE Department (NAFGPE)	PE Department Focus Group establishing the context and current professional development and CoPs.	
4. Workshops to establish CoP: PE Department (WCoP)	Within and towards the end of the Workshops a CoP was developed with boundaries organised by the group.	To gather information on the creation of the PDP with principles of CoP.
5. Social Media discussions via WhatsApp (SMWA)	Conversations, strategies, voice notes collected having used WhatsApp as a collaborative tool and discussion board throughout the period (Over 130 interactions)	To provide evidence on how the CoP was being sustained and developed and support the teachers
6. Professional Learning Meetings Interviews with PE Department (PLMI)	Each visit to the school the researcher interviewed the teachers involved in the CoP (Total number 6)	To provide evidence on how the CoP was being sustained and developed
7. Post Professional Development Programme Interviews: Headteacher and SLT (PPDPHT and PPDPSLT)	Post project interviews were conducted with the new acting headteacher and SLT on the impact of the CPD.	To understand the impact of the PDP and CoP from the SLT and Headteachers perspective
8. Post Professional Development Programme Interviews: PE Department (PPDPPE)	Post project interviews were conducted with the PE Department on the impact of the CPD.	To understand the impact of the PDP and CoP from the PE departments perspective
9. One-Year Follow-Up Interviews (OYFUI)	Interviews with all participants to see the sustainability of the project	To assess the sustainability and longer-term impact of the PDP

Phase 1 (July 2019): An initial needs assessment phase was conducted pre-intervention at the SLT level and within the PE Department (Edwards et al., 2019). Interviews with the headteacher (NAIHT) and SLT (NAISLT), along with a focus group with the PE Department (NAFGPE), identified views on motivation, strategies, formal training, and awareness of CoPs. The project was introduced to the entire school during a Staff Training Day in September 2019. This aimed to establish objectives, gain buy-in, share key findings from the needs assessment, and outline the project timeline.

Phase 2 (September 2019): Three evidence-based workshops, each lasting 2.5 h, were conducted following the Staff Training Day (Table 6). Designed to minimise disruption and maximise participation, the workshops were spread over a month, enhancing teachers' understanding of motivation and the 'why and how' regarding the creation of empowering climates in PE lessons. Workshop one (start of September 2019) introduced theoretical concepts underpinning the Empowering PE™ approach and prompted reflection on prior training. Workshop two (mid-September 2019) expanded on motivational theories and introduced empowering behaviours. Workshop three (end of September 2019) reviewed theoretical concepts, facilitated collaborative discussions, and utilised pupil questionnaire results to reinforce the need for improvement within the

school context. The principles of CoPs were introduced gradually, highlighting potential benefits and establishing the lead author's role as a boundary spanner (Trust & Horrocks, 2019). Teachers identified individual goals, discussed motivational theories, and explored practical strategies, including using social media like WhatsApp to sustain collaborative learning (De Carvalho-Filho et al., 2020). This approach empowered participants and integrated technology to support ongoing PD.

Table 6. Content of Workshops within Phase 2.

Workshop 1 (Early September 19)	Workshop 2 (Mid September 19)	Workshop 3 (End of September 19)
Introduction to the training	Introduce the ABC's	Recap the theoretical concepts within the workshop
Philosophy and setting of initial individual and departmental goals	Autonomy Belonging and Competence	Collaborative discussion on theory to practice
Understanding the quality and quantity of motivation	Introduce the CLIMATE Acronym	Introduce the concept of a PDP using principles of CoP outlining the potential benefits and creating the boundaries and placing the author as the 'boundary spanner'
Collaborative discussion using applied examples	Co-operative contribution	
	Learning emphasised	
	Intrinsic focus	
	Mastery orientated	
	Authority with autonomy	
	Taking other's perspectives	
	Evaluation	
Theoretical Underpinning—Duda's Integrated Framework (Duda, 2013)		
Integrates the motivation related dimensions of the motivational climate from Achievement Goal Theory (Ames, 1992) and Self Determination Theory (Deci & Ryan, 2000). Empowering climates are highly task involving (AGT), autonomy supportive and socially supportive (SDT). Disempowering climates are controlling (SDT) and marked by ego involving behaviours (AGT)		

Phase 3 (October 2019 to February 2020): Strategies from Table 1 continued to guide the PDP's development and sustainability. The boundary spanner (principal investigator) engaged regularly with the PE department, discussing recent lesson delivery, pedagogy, and social interaction (Trust & Horrocks, 2019). Participants shared empowering strategies, reflected on their implementation, and revisited departmental and individual goals. Professional learning meetings (PLMI) were supported by a WhatsApp group where theoretical content was shared weekly, fostering discussions and practical examples (Gon & Rawekar, 2017). The group facilitated the sharing of ideas, resources, and lesson plans related to motivational climates in PE (Edwards et al., 2019), while voice memos captured reflections throughout phases 2 and 3 (BS, Table 2).

Phase 4 (February 2020): A post-intervention interview (PII) phase occurred for two weeks to identify challenges in sustaining PD through effective CoPs, involving interviews with the headteacher (PIIHT), SLT (PIISLT), and PE department members (PIIPE) (See Table 5).

Phase 5 (May 2021): A one-year follow-up phase was disrupted by COVID-19. While interviews were planned to assess PDP impact, teachers participated in short voice recordings via WhatsApp to reflect on the PDP's effects using CoP principles (one-year follow-up interview, OYFUI; See Table 5).

2.4. Data Analysis

Deductive thematic analysis was completed using six phases of analysis proposed by Braun and Clarke (2006): 1. Familiarisation with the data, 2. Generating initial codes, 3. Searching for themes, 4. Reviewing themes, 5. Defining and naming themes, and 6. Producing the report. This approach was chosen as it allows for a systematic and rigorous examination of data guided by pre-existing theoretical frameworks and research questions, making it particularly suitable for exploring how CoPs can support PE-CPD

(Braun & Clarke, 2006, 2019). Deductive thematic analysis is justified as it provides a rigorous and theory-informed method for examining how CoPs can support PE-CPD while addressing the study's objectives of exploring benefits, challenges, and sustainability factors within this context. This approach was used to answer the objectives and build on the strategies identified for PD using the principles of effective CoP. The lead researcher repeatedly read the transcripts from various data sources to become familiar with the content and generate initial codes. The peer examination strategy was used throughout the analysis to member check and pass comments on how the higher-order themes led to codes; sub-categories were defined. Findings were developed (Goodyear & Casey, 2015).

We aimed to support triangulation by cross-referencing themes from interviews, WhatsApp exchanges, and researcher reflections. For example, teachers' reported increases in collaboration were corroborated by WhatsApp message analysis and reflective memos. Trustworthiness was addressed using the following criteria: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Strategies to support trustworthiness included the researcher keeping voice memos, personal reflections, questions and discussions with supervisors, theoretical propositions throughout the study (Parker et al., 2010) and member checks, where the information gathered was returned to participants for verification. Finally, triangulation was considered through multiple data sources (interviews, focus groups and researcher reflections) and discussions with the other investigators to exchange and confirm the findings (Merriam & Tisdell, 2015).

3. Results

Through the data analysis process, three themes were constructed that aligned with the objectives: (a) develop a PD opportunity using best practice ideas from the literature, and (b) analyse the critical benefits, challenges and considerations of this approach: Tables 7 and 8 outline core codes, sub-themes and higher-order themes established through the analysis. In Table 7, three key themes were identified. Firstly, the context of the school and the teacher's knowledge of CPD and CoP principles. Secondly, creating and sustaining effective CPD using the principles of CoP and thirdly, the impact of PD using the principles of CoP. Finally, the boundary spanner's role has been considered an important overarching theme throughout the findings and discussion (See Table 8). Pre-intervention, staff expressed scepticism about CPD effectiveness and limited understanding of CoP principles. Post intervention, participants reported greater agency in lesson planning, increased peer collaboration, and more frequent sharing of motivational strategies, as evidenced in both interviews and WhatsApp exchanges.

Table 7. Context, professional development, creating and sustaining a CoP and impact core codes, sub themes and higher order themes.

Core Codes	Subthemes	Higher Order Themes
Tick box Training needed Reflective Learning and engaging Specific Lack of Time	Current thoughts on professional development	Theme 1: Context and knowledge of effective CPD and CoP
Lack of knowledge No knowledge	Current knowledge of CoP	
Clear Boundaries Personalised/Voice Immediate	Establishing the professional development	Theme 2: Creating and sustaining a professional development using the principles of CoP

Flexible/Accessible Meaningful		
Sustained Increased Planning Generates Ideas Prompt timely and organised Impact	Theory informed	
Sharing strategies Cross gender Wider Impact Sharing knowledge	Accountable/Collaborative	
Flexible and Ease of information Bigger impact Immediate	Use of Technology	
Practice Increased understanding Effective/Improved Excitement and Passion Reflection Longevity Collaborative/Bouncing	Benefits	Theme 3: Impact of the professional development using the principles of CoP
Increased evidence Greater follow up/Wider Impact Manage change Dissemination event Culture of Research Increased time	Way Forward	
COVID-19 Well-Being Increased belonging Focus on theory	One Year On	

Table 8. Role of the Researcher/Boundary Spanner core codes, sub and higher order themes.

Core Codes	Subthemes	Higher Order Themes
Build relationships Self-awareness Alternative solutions Reflections Digitally capable	Challenges	Overarching theme: Role of the Boundary Spanner
Staff relationships Managing relationships Power Dynamic Staff context Individulised approach	Understanding context	

3.1. Theme 1: Context and Knowledge of Effective CPD and the Principles of CoP

3.1.1. Current Thoughts and Understanding of Professional Development (Pre-Intervention)

The needs assessment phase (Edwards et al., 2019) focused on understanding the school context, identifying barriers, and tailoring relevant content to establish the PDP

effectively. Adele from SLT highlighted time constraints as a barrier to staff development: 'There is an awful lot that we now need to do'. Similarly, Sophie from PE noted that teachers are often overwhelmed by multiple responsibilities: "We're expected to do so much... teaching, counselling, chasing that child".

SLT members criticised traditional CPD approaches as 'tick-box' exercises lacking specificity and reflection (NAHT, Stanley). They emphasised a need for CPD aligned with professional learning approaches in the new Curriculum for Wales. Stanley felt

"It would be that we give opportunities for staff to be reflective about motivation, so that can inform their planning, so that they can plan engaging lessons, where the students will be more motivated, understanding what the triggers for motivation are, so that then outcomes can improve, and the students can make more progress" (NAHT).

Understanding pupil motivation and effective building relationships as part of the school development plan and an area that had not been explicitly explored in previous CPD. The senior leaders supported this reinforcing the need for specificity, with Adele stating, "it is actually tailoring our training and making it more explicit" (NASLT). Kate, the SLT responsible for teaching and learning was adamant that the CPD should be interactive "because I don't want to stand a listen to someone for an hour—you know—because I'm not motivated. So, what do I want to do? I want to be hands-on; I want to learn something; I want to be engaged. The times goes quicker, you learn more" (NASLT, Kate). The PE staff within the needs assessment focus group recognised the need for training on motivation "I think as a staff we definitely need more training on that" (NAFGE, Archie). Following the needs assessment and early workshops, the focus turned to the sustained PDP and embedding some of the principles of CoP.

3.1.2. Knowledge of the Principles of CoP in Education

While there is increasing use of PD linked with the concept of CoPs within their design, there is still a lack of understanding and knowledge about their role within schools. For example, Stanley, the headteacher, had not heard of the term CoP or the potential benefits the principles a CoP could have in helping to sustain PD: "It was only when you came in the other day, and we talked about community of practice. That was the first time I heard that term, and as a learning organisation, I think yes, if we're expecting students to be learners and be motivated to do that, I think it's important that we broaden our horizons..." (NAHT, Stanley).

Both SLT and PE staff demonstrated limited understanding of CoP principles when initially introduced by researchers:

David: 'Have you ever heard of a community of practice?'

Adele: 'What do you mean by 'community of practice? Is that our research groups?'

Kate: 'No'

PE Sophie: 'No',

All: 'No'

(NASLT and NAFGPE)

These views hold implications to ensure that the boundary spanner understood the context of the environment to help create and sustain an effective PDP. With the knowledge of CoP being limited, introducing the concept and principles gave them the understanding of the benefits of this type of approach.

3.2. Theme 2: Creating and Sustaining Professional Development Opportunities Incorporating CoP Principles

There were some key sub themes that emerged regarding the creation and sustaining of the PDP including its establishment, the theoretical framework that was used and the planning behind the CoP. The key principles taken from the literature around the creation and sustainability of the PD (See Table 2) were linked to the findings which emerged.

3.2.1. Establishing the Professional Development

The boundary spanner prioritised personalisation by tailoring PDP goals for individual staff members while fostering departmental collaboration through shared frameworks. “I’ll be coming in—it can be weekly, bi-weekly—whatever suits you...you need a bit of time in between each visit... to try things out, teach...you’ve also got other administrative work” (WCoP David). This approach was taken throughout the stage of setting up the intervention where David continued to set boundaries, personalise the information and ask for the groups input into the framework:

“Next week, will be to (a) personalise it for you three as individuals, because you might have different goals within this professional learning; Archie yours might be more of a departmental focus, yours might be lesson-focused on multiple goals. Then we’ll start to think about setting up the CPD using principles of CoP—how do you three best works?” (WCoP Dave)

Sharing the questionnaire results during the establishment of the PDP personalised the content and increased staff buy-in. Insights into pupils’ views on the motivational climate in PE classes, their motivation, and associated outcomes reinforced the value of engagement with the PDP. This personalised approach continued throughout the intervention, with individual and departmental goals discussed in group sessions and individual interviews to balance personal comfort with group identity. Open questions encouraged teachers to identify target areas for development, as reflected in Dave’s query: “Anthony, is there anything you specifically want to think about over the next phase ... what do you want your goal to be?” (PLCI Dave). Personal goals were formalised and shared via WhatsApp, ensuring accessibility and collaboration. David, the boundary spanner, understood the need for individual goals but also wanted to give the teachers the time to embed the principles into their practice:

“I think giving them their two or three weeks of teaching now until the one-week holiday will give them that time and space to embed some of these principles, before we look at what’s next, and what’s right for them as individuals, but also as a department”.

Time and space, along with the key concepts from the theory allowed the teachers to explore and practice the principles. Such an approach further engaged the participants. In fact, it increased their motivation for continued participation in the CoP. The boundary spanner did, however, still express concerns about the level of engagement of the PE Department and how the PDP was being received by the group:

“I’ve just been to the first session to build the community of practice and I’m getting a little bit nervous of this, I’m not properly sure how the staff really view it yet, the timings, we’ve decided to go via WhatsApp. I’m worried will people post. What will be the level of engagement? How often do they want me to engage? We’ve established some guidelines—I’m mindful that this works for them, not seen as onerous, a chore, because as soon as it is, then I’ve lost them” (David).

What emerges from the reflection is the complex nature of establishing and the involvement of boundary spanners in PDPs. In this instance, the boundary spanner’s

reflection made it apparent that being comfortable with the ‘messy’ nature school-based research projects, understanding their own position and the context were all crucial for creating the most effective type of learning environment and address the associated challenges of doing so. Embedding theory within the PDP was also considered a key principle.

3.2.2. Theoretically Informed PDP

A theoretically informed PDP was an important part of creating and sustaining what hoped to be an effective CoP. At various points throughout the data collection, the participants emphasised the theoretical foundation of the PDP (i.e., Duda’s theoretically integrated model of the motivational climate and ensuing motivational processes and outcomes. The boundary spanner explored this in his personal reflection:

“I was nervous, but it’s given me confidence that these principles are worth reflecting on. The role of the teacher, as the more capable other, can have a significant impact on a young person’s environment and life. The interactions we have are vital, and it’s understanding that motivation isn’t a light switch—it works overtime. Being an empowering teacher in one lesson might light that candle later, transferring motivation to another moment” (David).

The theoretical foundation provided a framework for sustained PDPs by shaping planning practices and empowering and enhancing motivation among staff. The teachers referred to the theory content throughout the PDP and it allowed them something to shape their planning (consistently realising the theoretical principles), share and keep at the forefront of their practice. Anthony, as an example, constantly used the theoretical concepts and examples we discussed throughout: “how you speak to students...praising them...when they put effort in” (PLCI). Whereas for Archie, the theoretical foundation of the PDP gave him a focus to discuss progress with the rest of the department:

“I’ve been having weekly informal discussions with them individually about this motivational climate empowering PE concept. I can gauge if they’re embracing the theory and acknowledge that it’s going on” (PLCI).

Interestingly, the boundary spanner discussed how the theoretical concepts being used to enhance quality motivation for the pupils were also central to creating an effective CoP with the teachers “it reinforces this idea...it comes back to that motivational climate and that empowering environment that for this to fundamentally work, we have to live the theoretical principles ourselves...this idea of belonging and getting people to buy into these sorts of things, becomes really, really important” (David).

3.2.3. Accountable, Sustainable, and Collaborative

During the PDP, the teacher’s language focused on the level of accountability and sustainability. These were considered key concepts when discussing creating the boundaries and framework of the group. Anthony made this clear within the final workshop when he mentioned the importance of sustainability and longevity of the project:

“What we don’t want is for the work we’ve done in the last three workshops to become a snapshot or one of those short-lived interventions. As you often say, Archie, we do things that last for a few weeks and then suddenly disappear” (WCoP, Anthony).

This sustainability was considered vital and moving away from traditional forms of CPD. Archie, as head of the department, wanted there to be a level of accountability within the intervention “I’ve been thinking about this and it comes down to this accountability but my job as a leader of the department is to ensure that I’m upholding the staff accountability...weekly informal discussions about how it is working for them” (PLCI, Archie). In his role, accountability which is a prominent discourse in education

settings, was also critical. Archie also emphasised the longevity of the intervention effects “it’s collating evidence on what could potentially—what PE could look like in 18 months’ time” (PLCI, Archie).

The collaborative and meaningful approach was considered vital in the discussions on how to set up the dynamics of the group to ensure sharing of ideas and practice. Anthony mentioned about wanting to improve their daily practices by “having the tool in place which allows us to share those good things” and how the informal collaborative discussions were a significant part of improving practice “we have our best chats when we have 10 min, they’re playing and we bounce back—I did this, I did this. If I tried this... It would be good” (WCoP). This was reinforced by Archie:

“I think having an area where Anthony and I can share practices with Sophie and she can share practice with us, I don’t think we do share enough. I don’t transfer to you at times, the stuff that I’ve done with rugby or football...it just doesn’t happen, you know?” (WCoP, Archie).

Enabling a safe and collaborative space amongst participants was a fundamental element identified by the participants that would prove integral to the success of the PDP. Archie continued “In terms of advice, guidance, strategies, we would like that as a source, because we don’t find the time to go away and research new ideas—it’s...a challenge, so to have an area which is accessible for us would be great” (WCoP). This lack of time and space and ensuring a safe and collaborative environment to share practice is a common feature in research enquiry work within education and linked to the principles outlined in the introduction (i.e., Edwards et al., 2019).

During the PDP, it became apparent that the prolonged nature and sustained approach enhanced the learning and development for the staff. As such, the planning of the programme regarding how to sustain and enhance learning was integral. The comment below illustrates how information was shared, and the timing was important to help the teachers generate strategies for their lessons related to the theoretical concepts:

“The pictures you’ve been putting in are great. If it’s a picture, I’ll probably look at it on my way to work or even in bed. The infographics are quick to look at, and I can take what I need from them. The pictures are the best part, especially in the morning, because they make me think, ‘I’m going to try this today’ or reflect on it” (PLCI, Anthony).

Key themes emerged from the data around (a) the format (visuals/ideas) and timing of the messaging and (b) having the boundary spanner present to support, encourage questions and discussions and (c) the individualised approach needed for each participant. This was reinforced by Archie and Anthony who felt both the timing and nature of the support from the boundary spanner was very important to sustain the theoretically informed CoP. Archie suggested “what’s been good is that it’s been prompt—it’s not necessarily been ‘You should be thinking about this. It’s a resource or an image with cues on it that allow us to think how we’re going to teach our unit of work? With this theme...it’s certainly created thoughts about how I teach anyway” (PLCI). These comments during the initial cycle were reinforced by the boundary spanner who reflected:

“Anthony, for instance, is loving the infographics, and that gives him a little snapshot, have a quick reflection and then pull out a few of the ideas and use them in his practice. Then Sarah...thinks this term assessments over the last two weeks have had an impact...but given the chance to explain and provide that rationale gave her a boost in terms of knowing that she can post when she feels comfortable. She’s going to mirror some of the strategies applied by the boys last term and see the effect it has on the girls” (David).

Sophie did feel that the timing had not allowed her to engage with the project as much as she would have liked due to the end of term class assessments taking place during the first two weeks of the CoP. This led to feelings of guilt “No. I feel a bit guilty because I haven’t put a great deal in because I don’t really feel I’ve done a huge amount yet...the timing wasn’t ideal for me. But this term now I feel I’ll be able to contribute a bit more, because I’ll be able to try more” (PLCI Sophie). The comments made by Archie, David, and Sophie reinforce the need to understand the importance of planning such PDPs. Knowing their other commitments at any time in the school year, making the participants feel comfortable and understanding the individual contexts are vital. The boundary spanners reflections from one of the first meetings explicitly referred to this:

“Anthony loves the infographics, which give him a quick snapshot to reflect on and use in his practice. Sarah found assessments impactful and appreciated the rationale provided, boosting her confidence to post when comfortable. She plans to mirror strategies applied by the boys last term to see their effect on the girls” (David).

Understanding the amount of information, when the information is shared as well as the timing of the CoP will have a significant impact on the success of creating and sustaining these types of approaches. These results indicate some key considerations for both creating and sustaining PDPs using the principles of CoP.

3.3. Theme 3: Impact of the Professional Development Programme

There were several sub themes that developed related to the impact of the PDP. The sub themes that will be addressed within this section are the use of technology, the benefits of the PDP, the way forward, and finally the sustainability from the one-year follow-up interview.

3.3.1. Use of Technology

While there was an understanding that an online forum would be used to share practice, it became apparent that the traditional school-based systems like (email/OneDrive) were not fit for purpose. The department proposed the use of the social media application WhatsApp as a better way to communicate. As Archie mentions some of the perceived benefits were as follows:

“This concept of using social media, WhatsApp enabling ease of communication, the dashboard was brilliant, we can pick up our phone, we can see an image, we can highlight the research-, know that this concept is the journey and actually the pressure doesn’t sit with ‘Oh, I’ve got to do it this day, this lesson, this year group.’ It was nice having flexibility” (PLCI).

Archie continued with this theme outlining the ease of information and flexibility of sharing information in this way:

“Because it is in your phone which is so accessible, it’s on you most of the time, it’s just been there, so you’ve always felt the need. When it’s on email, you are so busy in school, you have a list of things to do, email becomes irrelevant, so I think when it’s on your phone, even if I’m walking in from the car park to the school, I have a look at what you’ve sent on a Sunday, it’s refocused me, and has had an impact. So I think it’s been really positive” (PPDPPE).

Sophie felt more comfortable in the format of the online WhatsApp group and felt being in the group increased her willingness to post and develop ideas “No, I feel comfortable posting with the PE department and you. I think in a way it’s quite good that it’s not one-to-one, because if someone else has posted it spurs you on to post and you can build on something that someone else has said” (PLCI). This informal online way of collaborating was considered vital in ensuring members of the department voices were

heard and embedding a flexible, easy way to engage in the PDP. Archie went on to confirm this point:

“There is a need for accessible tools, as current dashboards are clunky and require multiple clicks to implement ideas. WhatsApp allows individualised approaches, enabling staff to dip in and out as needed—whether during PPA time on a Friday or on a Sunday afternoon when they have headspace. The Community of Practice supports flexibility and adaptability for each member” (PPDPPE).

Undoubtedly, understanding the context of the environment and suiting the technology to suit the intervention is vital to implementing and sustaining PDPs.

3.3.2. Benefits of the PDP

Participants noted greater longevity and commitment compared to traditional one-off workshops due to collaborative discussions and goal setting within CoPs. Anthony reinforced the importance of reminders and goals “which we got through the community of practice, just to be on task. Not like a tick list, but maybe a mini goal, because we all had a goal for a couple of weeks” (PPDPIPE). Sophie felt the CoP approach was different to the more traditional workshop offerings and had more potential for sustained development:

“I found this has more longevity. About workshops, I’ve been to quite a few, the stuff is really good, but it just sorts of stops. You think about it for a week or so, then you don’t kind of carry it on, having the WhatsApp group, it might not buzz all the time, but if someone puts something on, it refreshes your memory, you’re more likely to carry on” (PPDPIPE, Sophie).

There were further benefits to planning, practice, and understanding that came from being involved in the programme. Anthony mentioned that planning improved from being engaged in the CoP:

“Just because we were talking about it, you were sending information which I’d look at on a Monday, you think OK, I’ve got my 5 lessons now, what am I going to do based on the material, which was sent in the community of practice, you refreshed what I was looking at. I’d look at my 5 lessons for the day...OK, I’m going to make sure I do this, people who went to the workshops, they write the notes but sometimes it doesn’t ever get put into planning” (PPDPIPE, Anthony).

Archie reinforced this by explaining that it gave them opportunities to plan and practice which led to increased understanding of the theories and ability to implement into practice. “The people enjoyed the workshops and came away with ideas and strategies to go off and try, and they’ve included that into their teaching, I know they have. Some are trial and error and positive outcomes and negatives that have been developed. I think that’s what they’ve enjoyed most” (PLCI, Archie). A common view that emerged from the post intervention interviews relating to the principles of CoP within the PDP included the collaborative nature of the programme. This allowed a deeper level of understanding, flexible approach to learning, more sustained development, and an enhanced sharing of practice:

“We looked at how we were going to be sharing best practice; to then upskilling ourselves...to then connecting with you at university level, where we suggested whether we could receive more of the research and theory behind what we do and why we do it...So the community of practice (PDP) allowed us to dip in and out without the constraints of regularly attending meetings. It was very thought-provoking” (PPDPIPE, Archie).

Teachers reported increased autonomy in adapting CoP principles to their own contexts, with Archie noting, “We now share drills across sports—something we never did before”. Peer collaboration was further evidenced by the regular exchange of resources and reflective discussions within the WhatsApp group. This flexibility within a school environment, where time is at a premium, allowed engagement in the programme to continue. Whereas Anthony emphasised the opportunity to collaborate in this comments that it was “Good to share. It’s great to hear other peoples’ thoughts” (PLCI) and welcomed the opportunity of being part of the CoP and the benefits that followed:

“We normally do research groups in school, but this kept it fresh. People posted daily, weekly, or when reminded, which helped me stay focused and think outside the box. I’d see what Archie was doing and relate it to my lessons, sparking professional conversations during lunch breaks. It was far more engaging than a one-off session and started meaningful discussions” (PPDPIPE, Anthony).

The sustainability of the programme allowed collaboration and the development of theory informed practice to occur on a more regular basis. One participant particularly referred to the ability to share practice between the male and female sides of the department that happened as a result of engaging in the CoP:

“I have enjoyed the process. I’ve been teaching a few years now and it’s funny that when you first qualify you get quite a lot of funding to go on courses. Then you don’t get anything really, you left to your own devices, you get stuck in a bit of a rut. It’s been nice to talk about it, I have tweaked a few things and Archie, and I realised as well that we don’t communicate enough good things that we’re doing in our lessons. The boys do it naturally because they teach together” (PLCI, Sophie).

This suggests that engaging in these types of PDPs (with the embedded CoP) enhance and foster a sense of community and can break down some of the barriers that PE departments have faced in the past. Finally, many of the interviewees mentioned how the PD opportunity led to enjoyment, passion, excitement and increased effectiveness. Anthony reported that “the project has been positive...I would suspect...it has been effective. I enjoyed coming along to the first couple of sessions and found them informative” (PPDPIPE). Archie felt that personally “it has regenerated my understanding of what excellent teaching and learning looks like” (PPDPIPE). On a departmental level as Head of Department he remarked “I’ve seen my staff really enjoy the flexibility and the opportunity to go off without constraints, that we’ve been able to go off plan of the initial units of work, we’ve been able to tailor lessons to students’ needs” (PPDPIPE, Archie). Finally, Sophie welcomed the opportunity to reflect on her progress during the CoP:

“I’ve been teaching for 10 years, it’s just made me have a look at my teaching, if anything you get stuck in a groove, you do the same things day in, day out. Thinking why I’m doing things and is that the right way to do it, because I’ve always done it that way?” (PPDPIPE Sophie).

These results suggest several benefits from engaging in PDP that are aligned with the principles of CoP (Yoon & Armour, 2017). Enjoyment, collaboration, flexibility, and impact on practice were the key benefits that emerged from the data.

3.3.3. A Way Forward to Enhance Future PDP Offerings

There were some suggestions that moving forward, there would still be potential barriers to the delivery, maintenance and impact of such a PDP. The interim headteacher mentioned that “managing change is going to be a barrier, because we’re all reluctant to change generally. I think, you know, it’s the message of selling it” (Trevor, PPDPIHT).

However, one of the barriers prior to the PDP was time and Trevor explicitly referred to attempting to address this with future training “rather than having our insets which are all theme-based, we’re going to try to tailor one or two of those for departments to just have time, a day working together, and developing resources and schemes and projects almost to work, moving forward as the new curriculum comes in” (PPDPIHT).

Another perceived barrier following the programme was related to following up on the project. While the CoP lasted for an extended time, Adele the SLT for teaching and learning, felt that there needed to be increased follow up to ensure lasting impact; “we have these different staff CPD opportunities, but I think unless something is followed up, maybe 6 months or a year down the line and we’re looking at the impact on students...but unless somebody prompts them or reminds them it’s not necessarily something that they put into practice” (PPDPISLT, Adele). There is a need to plan for this follow up and make it a critical part of the development and sustainability of the PDP. Most participants mentioned that the project had wider implications, with Archie mentioning that in the post PDP interview:

Each class in each year group has been doing different things. It’s provoked informal by-passing conversations—you can sense the enthusiasm in staff’s voices, like “I tried this, and it worked! But they never thought it would work, they’d never been given the opportunity. It’s allowed us to provoke thoughts on how do we do what we do—but better?” (PPDPIPE).

And that “it’s been delivered and shared at whole-school level as well, so from a staff development perspective, it’s been good as well” (PPDPIPE, Archie). This perspective was not shared by Kate who felt that it still needed to be shared wider “I think what would be really good is for them to be presented to all staff, so all the staff know what’s been going on” (PPDPSLT, Kate). Another interviewee alluded to a wider impact being needed for other staff not involved in the CoP:

“I would probably just say that if we were doing something more on a whole-staff level, they would have had to come back, something that they’ve trialled, the impact they saw. Or just a longer-based project in a way. The difference with the PE department and being part of that community of practice is that they have had some external pressure on them, they know there’s going to be a follow-up” (PPDPISLT, Adele).

This reinforces the impact that a more sustainable and more widespread approach can enhance the impact of the PDP. The PE department reinforced these ideas with Anthony feeling that the ideas could be shared with other year groups (this study was based with Year Nine, Key Stage Three), which would create a bigger impact “So, I think moving forward it would be good to have a look at that Key Stage Four PE classroom-based lessons, because that would probably have a bigger impact on the whole school and all education” (PPDPIPE). The implication of results reported here indicate that consideration of the length of time, the follow-up, and the wider school impact would enhance future PDPs. As Archie indicates, the theoretical concepts at the heart of the current intervention are relevant for the whole school and not just for PE “I’m going to share that practice around with as many people as possible...it becomes empowering education and effective teaching and learning, as opposed to motivational climate for PE and empowering PE. The concepts are so much the same” (PPDPIPE).

Several of the participants described how gathering evidence, engaging in research and disseminating it effectively were important to maximise the impact of the PDP. With education reform taking place and research enquiry being encouraged, Kate wanted “that culture of research constantly being used with all staff and definitely the work you’ve done” (PPDPISLT). Archie reflected on the how this would help the department move forward ‘what is the research going to provide for us? What evidence is it going to give us to then give us a

platform to deliver a new curriculum?’ (PPDPPE). Adele built upon this reinforcing the need to have opportunities to disseminate the information more effectively:

“We haven’t currently got an opportunity where staff are able to feedback on things that they are trialling...You know, we could be missing a trick here, people are continuing and getting some good research and we’re completely unaware of it” (PPDPISLT).

3.3.4. One Year on: Follow-Up Interview

Due to the impact of COVID-19, the lead researcher was unable to complete the one year follow up as planned. However, he did manage to secure an interview with the PE Department to receive their thoughts on the PDP. Overall, there was a variety of perspectives from the PE department. Archie, the Head of Department, gave a clear indication “To answer the impact one, yes. There is still an impact in the practice...we’re still very much a PE department that shares practices, through various, techniques sometimes at whole school sometimes, observing each other’s lessons, sometimes team teaching. I think we’ve certainly evolved as a department in sharing practice” (OYFU). Anthony provided examples of the department continuing to share practice including the theoretical concepts:

“Archie and I will message ideas, things that we think might work in lessons, online lessons. In terms of the involvement in the project. Especially the motivation, and that sense of belonging, especially in online lessons, make them still want to belong and be part of the kind of community” (OYFU).

Anthony also mentioned he still focused on the language he used as understood regarding the theoretical concepts “We think about the concepts of motivation and motivational climate. And I know as a class teacher, I certainly think about some of the language that I use, some of the body language I see from the students” (OYFU). There were a number of attempts to use the theoretical concepts to enhance the relationships with the pupils during COVID-19 “I have been trying to set up online meetings and yeah...ring home for students, email them regularly to make sure that then they know that we are there, there’s a positive relationship between us and I actually want them to do well and invested in them to be honest, that seems to actually motivate students” (OYFU Anthony). Finally, Archie articulated how he continued to use the theoretical concepts in practice:

“We’ve modelled workouts of the week. We’ve had challenges that students and families do together. We’ve had a weekly wellbeing, check-in. We’ve tried to look at various aspects of what would motivate an individual, tailor towards everybody” (OYFU).

The COVID-19 pandemic disrupted the sustainability of the PDP and limited data collection opportunities with senior leadership (SLT) and the headteacher. Despite these challenges, the PE department demonstrated a lasting impact by continuing to share practices and implement theoretical concepts introduced during the workshops. This highlights how the principles of CoPs fostered collaboration and sustained professional growth, even amidst external disruptions. These findings underscore key strategies for developing impactful and sustainable PDPs. Embedding CoP principles proved essential in creating collaborative environments where teachers felt empowered to apply new strategies over time. The study also highlights both the benefits and challenges of using CoP frameworks to underpin professional development, offering valuable insights for future research and practice.

4. Discussion

This study contributes significantly to the literature on PD in PE by demonstrating the effectiveness of integrating CoP principles with theoretical-informed approaches to developing motivational strategies. The longitudinal design and qualitative methodology provide a rich understanding of the complexities of developing and sustaining a CoP-based PDP. The discussion will address the three themes that emerged within the results and the overarching theme of the boundary spanner.

4.1. Understanding the Current Knowledge Context

For situated learning to be effective, the knowledge developed is inseparable from the contexts it originates from (Kern & Patton, 2024; Oliver et al., 2018; Parker et al., 2010). An essential finding within this study was linked to conducting pre-intervention interviews and focus groups so that it was possible to ascertain the school's and teachers' current understanding of the barriers to PD and their knowledge of CoP. Motivation theory highlights the importance of tailoring PD to specific contexts, as adaptive motivational climates are more likely to emerge when teachers' needs and challenges are understood (Duda et al., 2014; Haerens et al., 2015; Ryan & Deci, 2020). This made the boundary spanner more aware of how to shape the PDP. The approach adopted in this study is supported by previous school-based interventions in which an initial needs assessment was considered integral to developing effective PDP's (Edwards et al., 2019). Yoon and Armour (2017) found it challenging to apply the ideas and concepts of CoP to different schools due to their differing contexts. Thus, basing this study on one school had significant benefits.

The knowledge gained from the pre-intervention interviews and focus groups allowed the boundary spanner to be more aware of what the school and teachers needed. For example, he understood that teachers have different experience levels and that a one-size-fits-all model does not provide the best learning experience in school-based research (Hunzicker, 2011). Prior studies have criticised the impact of one-off workshops in PE CPD, as teachers are less likely to retain the content with any longevity (Edwards et al., 2019). Within this study, the teachers generated strategies and information within the PDP, motivating them more by the sustained long-term approach. However, it was also apparent that they did not know what a CoP was or the principles behind its effective implementation. This allowed the boundary spanner to plan and develop an effective intervention using the recommendations for effective PD considering the principles of CoPs (De Carvalho-Filho et al., 2020; Edwards et al., 2019; Trust & Horrocks, 2019). This contextual knowledge was essential and allowed the researcher to adopt the principles from a range of studies to meet the specific needs of this study and the context of this school and this set of teachers. Therefore, the design for the PDP emerged from understanding both the school structures and the teacher's knowledge (or lack of) of effective CPD and CoP (Yoon & Armour, 2017).

4.2. Creating and Sustaining Professional Development Opportunities Incorporating CoP Principles

The PDP, which used the principles of CoP, was developed intentionally. As discussed earlier, CoPs can potentially be created for a meaningful purpose and revolve around authentic tasks (Wenger, 2010). It was essential to keep Wenger's (2010) original concept of mutual engagement, in this case, the involvement of the PE Department, as a joint enterprise where the PE department shared common goals. This aligns with Kern and Patton's (2024) assertion that sustained collaboration within CoPs fosters deeper engagement and more meaningful professional growth, as well as Leat et al. (2006)

findings on collaborative problem-solving within educational communities. The teachers' community (PE Department) worked to solve motivation issues and improve practice and strategies (Leat et al., 2006; Cordingley, 2015). This approach was intended to lead the teachers to apply theory to successful practice (Cordingley, 2015). Following the adapted frameworks for developing PDP's and effective CoPs, the lead researcher established clear principles and identity before launching the opportunity using the tenets of CoP (Edwards et al., 2019; Trust & Horrocks, 2019). Developing guiding principles and giving members a voice and choice in their approach were critical elements in creating the CoP (Lieberman & Miller, 2008; Trust & Horrocks, 2019). In this way, it was made apparent that shared departmental goals and specific goals for the individual were essential to effective strategy development and increased group motivation. Therefore, it can be assumed that personalising content for the teachers alongside the departmental goals (joint enterprise) was critical in the context of this CoP. Further studies on this topic should explore the role of individual goals alongside mutual goals within a CoP.

Another critical finding within this study was the importance of the theoretical content underpinning the CoP. Duda's integrated framework for motivation (2013) further supports embedding theoretical content into CoPs, as it provides a structured approach for fostering adaptive motivational climates within PD settings. The application of Duda's integrated framework provided unique and more comprehensive insights that would not have been possible using single theoretical approaches. By simultaneously addressing the task-involving, autonomy-supportive, and socially supportive (as well as considering the ego-involving, controlling) elements of the environment they have create in PE classes, we were able to identify how the CoP fostered a more empowering environment that enhanced teacher motivation and engagement with the professional development programme. This multidimensional approach to the motivational climate allowed the teachers, within the CoP, to consider the implications of their behaviours on the achievement goals and basic psychological needs satisfaction/frustration of their students.

Prior studies have suggested that models were a distinguishing factor and essential to consider within the shared repertoire of Wenger's approach to CoP (Yoon & Armour, 2017). This common goal associated with the CoP increased a sense of belonging among the teachers. However, in this instance, rather than shared departmental goals, the shared purpose of using the theoretical content promoted a sense of belonging and shared identity, which ultimately translated into meaningful practices and generated knowledge (Wenger, 2000; Krishnaveni & Sujatha, 2012). Examples of this were prevalent throughout the project. The boundary spanner and teachers noted how the theoretical concepts kept them focused on developing their practice and served as a focal point for the CoP. This study confirms that shared goals are vital to implementing CoP-informed PD within education. However, one recommendation would be to continue focusing on the theories underpinning the PDPs. Revisiting these theoretical concepts throughout the CoP is crucial; however, the specific elements of the theory being developed should be driven by the needs of the teachers (Trust & Horrocks, 2019).

A comparison of the findings with those of other studies confirms that the collaborative nature of the CoP was essential to sustainability (Goodyear et al., 2014; Yoon & Armour, 2017). Within the Welsh context where the study took place, this collaborative approach is in keeping with the professional standards for teaching and learning that are part of the ongoing curriculum reform (Welsh Government, 2020). Interestingly, the approach used within this PD programme meets the needs of all five professional standards for teaching and learning. That is, the standard of collaboration and pedagogy, professional learning, innovation, and leadership were realised. Undoubtedly, a key driver in consolidating the collaborative nature was the sustained approach of the PDP, which led to the participants' accountability. In addition, there were opportunities for

social learning and connecting both face-to-face and online to build relationships, and the teachers developed their strategies with input from the boundary spanner (Trust & Horrocks, 2019). Within this specific context, the drive to ensure the productivity of the CoP came from the teachers themselves wanting to move beyond the traditional one-off workshops. Therefore, this created an urgency and more significant commitment within their approach to the programme. Sustaining CoPs beyond initial facilitation requires institutional support, ongoing leadership, and mechanisms for follow-up and accountability; these are critical considerations for policymakers and school leaders.

4.3. Impact of Professional Development Programme

The findings of this study suggested that the use of the social media platform WhatsApp provided the teaching staff within the CoP with the immediacy and flexibility they wanted, aligning with Goodyear et al.'s (2014) findings on social media's role in enhancing collaboration and Hu & Endozo's (2024) emphasis on sustaining CoPs through digital tools. WhatsApp's combination of mediums like videos, pictures, and voice notes, and the constant availability of facilitators and learning has made it a new and convenient tool for teaching-learning activities (Gon & Rawekar, 2017). The argument for using technology as a standard for PD is not a new concept. For example, Armour and Yelling (2004) suggested that e-support could overcome the financial considerations of CPDs. Lund et al. (2008) suggested that teachers could use technical innovations to support teachers exchanging with facilitators over web-based technologies.

More recently, acknowledging the calls for increased opportunities for teachers to be supported in making pedagogical changes, social media was mooted as having the potential to support teachers looking to develop their practice (Elliot & Campbell, 2013; Goodyear et al., 2014; Hu & Endozo, 2024). It works well in the collaborative, flexible, and informal nature of a CoP as a form of social media. It should be considered a voluntary means through which researchers can support teachers in school, not a prescribed means like many digital platforms (Goodyear et al., 2014). Undoubtedly, these interactions helped sustain the use of the theoretical concepts and strategies and be an excellent means of sharing practice. It also allowed the boundary spanner to reinforce changing practices, support the development of strategies, and post resources, questions, and feedback to help facilitate the CoP. The use of WhatsApp was central to the teachers feeling empowered; it gave them another method to have voice and choice; it contributed to their feeling of competence in developing their understanding of motivation and was key to enhancing the teacher's feelings of belonging to each other/the department. Due to COVID-19, there has been a significant development in schools regarding the use of digital technology—however, a note of caution. Using a school-based platform may be more appropriate as they have recently developed similar functionality to WhatsApp.

While tailored to a Welsh secondary school, the CoP principles of mutual engagement, shared goals, and technology-mediated collaboration are adaptable to a range of educational contexts, as supported by comparative studies in medical and higher education (Yarris et al., 2019; De Carvalho-Filho et al., 2020). Consistent with the literature, this study found that a CoP approach helped teachers develop strategies together, improve planning, and increase collaboration (K. M. Armour & Yelling, 2004; Goodyear & Casey, 2015; Yoon & Armour, 2017). Kern and Patton (2024) similarly highlight that collaborative approaches like CoPs foster pedagogical innovation and improve teacher outcomes. Some important findings specific to this study related to the reported increase in sharing between the male and female sides of the PE department. The female department members felt significantly more included and enjoyed the opportunity to share practice, which tended to happen less frequently before the CoP. Another important finding was the enjoyment of engaging within a CoP-informed PE CPD. Such findings

support the implementation of this type of approach, and the consistent and cyclical nature of the CPD delivered (Trust & Horrocks, 2019). The boundary spanner supported the group with resources, feedback, and questions online while also being embedded within the school for improvement cycles to motivate the group to reassess individual and departmental goals. This was important to help sustain and increase the enjoyment and engagement of the teachers. The teachers were empowered due to their increased understanding of motivation and the PDP.

Oliver et al. (2018) suggested that intentional CoPs benefit from having boundary spanners to help develop and 'flesh out' the theoretical concepts. Trust and Horrocks (2019) further argue that boundary spanners play a pivotal role in sustaining engagement within CoPs by bridging gaps between theory and practice. However, this suggests a potentially simplistic notion that an expert is best placed to facilitate these groups in building the PDP. Understanding who will take the boundary spanner role and what skills and relevant experiences they bring are vital to the process and relatively unexplored areas. Literature suggests that CoPs work effectively when boundary spanners get them started and help sustain them (Goodyear & Casey, 2015). However, there are still many unanswered questions about understanding the role of the boundary spanner in these settings. What factors go into choosing and designing the approach the boundary-spanner takes, given their experience and skill set? How do we assess the approach taken by the boundary spanner? Haynor (2002) suggested that CoP facilitators develop social competence and communicate effectively. However, does Haynor's suggestion appreciate the complexity and understanding needed to create successful PE CPDs? Below is a simple list of questions that might need to be asked to generate further the contextual information needed to understand the boundary spanner's role.

1. What theoretical knowledge do they have?
2. What prior experience running a CoP or PDP do they have?
3. What are their digital skills like?
4. What experience in building relationships do they have?
5. What understanding of the context they will be facilitating do they have?

Posing these queries should be fundamental elements of the research design process.

Overall, the findings support continuing to develop PDPs informed by the principles of CoP. The present work contributes to existing knowledge of PE CPD. However, it has also provided unique contributions for researchers to recognise the importance of context, practical principles on planning, and sustain PD informed by CoP, the use of technology, and the boundary spanner's role. As always, these findings need to be interpreted with caution. There were elements within the post-intervention interviews that suggested a need to communicate the success and create a more comprehensive or whole-school impact. In many ways, the success of the PDP was only shared within the confines of the PE department. While the impact of COVID-19 cannot be overstated, and there were elements of the theoretical concepts still embedded within the practice, removing the boundary spanner impacted the long-term sustainability of the CoP. More significant efforts are needed to ensure that a CoP can continue once the boundary spanner, or facilitator is no longer embedded within the school. Recommendations for future studies should be to (a) ensure that PDPs are developed using research-informed and theoretically grounded fundamental principles specific to the context of each study and (b) clarify the use of the boundary spanner and how, once their role has finished, the key learnings and emerging changed practices from PDPs can be sustained. Our findings on the effectiveness of CoP principles in PE professional development align with recent studies in other educational contexts. Yarris et al. (2019) found that medical educators engaging in virtual communities of practice experienced enhanced knowledge sharing, increased career satisfaction, and more effective distribution of workload and expertise.

Goodyear et al. (2014) demonstrated how Twitter-based communities (#pechat) facilitated the development of new teaching practices that teachers could directly implement in physical education lessons. In higher education, De Carvalho-Filho et al. (2020) identified twelve key principles for implementing successful CoP for faculty development, many of which parallel our findings regarding the importance of collaborative spaces, technology integration, and boundary spanning roles. Trust and Horrocks (2019) also identified six key elements for thriving blended CoP that support our emphasis on accessibility and collaborative environments. These comparative findings strengthen our conclusion that CoP-based approaches, when thoughtfully implemented with appropriate technological support and boundary spanning roles, can enhance professional development across various educational disciplines.

4.4. Limitations and Future Directions

Future studies should replicate this approach in other school contexts across the UK in primary and secondary education establishments to assess whether there are similarities in findings and emerging processes across the different contexts. As Edwards et al. (2019) note, context-specific research is vital for understanding how PD frameworks can be adapted to meet diverse educational needs effectively, a sentiment echoed by Hunzicker's (2011) emphasis on tailoring CPD approaches based on teacher needs. This contextual nature of exploring effective PE CPD suggests that understanding the complexities locally and individually is still an essential factor to consider. The single-school, small-sample design limits generalizability, and the involvement of the researcher as boundary spanner may have introduced facilitation bias. Member checking, reflection and peer review were used to mitigate these risks, but future studies should consider independent facilitation. Nevertheless, the approach adopted in this research offered in-depth PD informed by the principles of CoP. The overarching aim was to develop an authentic and sustainable change in practice. Unfortunately, the implications and depth of the one-year follow-up interviews were limited due to the Covid-19 pandemic. Based on the current findings, this impacted the ability to assess sustained change in practice.

5. Conclusions

This research extends the growing body of evidence supporting CoP-based professional development across educational contexts, from medical education (Yarris et al., 2019) to higher education (De Carvalho-Filho et al., 2020), by demonstrating its specific application and effectiveness within Physical Education and in regard to the development of more empowering motivational environments. The principles identified in this study—contextual understanding, theoretical grounding, technology-enhanced collaboration, and the critical role of boundary spanners—have broader applications across educational disciplines and offer a comprehensive framework for designing effective professional development initiatives aiming to enhance student (and teachers') engagement and well-being.

This study makes a significant contribution to the field of PE PD by demonstrating the effectiveness of integrating CoP principles with theory-informed approaches (in particular, an interactive and dynamic way to continue the teachers' exchanges and efforts to implement the principles of the Empowering PETM classroom-based workshop). By combining effective PD strategies with CoP principles, this research offers a novel framework for creating sustained, collaborative learning environments that foster teacher growth and improve student outcomes. The originality of this study lies in its comprehensive approach to developing a PE-CPD programme informed by motivational strategies, which provided teachers with tools to enhance their practice and engage students more effectively. The longitudinal design and qualitative methodology ensured

a thorough understanding of the complexities involved in implementing and sustaining CoP-based PD.

The findings highlight several key impacts of this research. First, the study provides a framework for continuous engagement with CPD material, leading to deeper understanding and promoting lasting behavioural change among PE teachers. Second, it underscores the importance of context-specific, theory-informed approaches in PD, ensuring that CPD aligns with the unique needs of teachers and their school environments. Third, it demonstrates the effectiveness of technology, particularly social media platforms like WhatsApp, in facilitating collaboration and sustaining CoPs. Finally, it emphasises the critical role of the boundary spanner in creating and maintaining effective CoPs by bridging gaps between theory and practice.

This research offers valuable insights for researchers and developers of CPD programmes. It highlights the importance of recognising specific contexts in shaping PD initiatives, underpinning CPD with robust theoretical frameworks, leveraging technology to enhance collaboration, and appreciating the nuanced role of the boundary spanner in facilitating CoPs. These findings provide practical recommendations for designing impactful CPD programmes that are both sustainable and adaptable to different educational settings.

Future research should focus on replicating this approach in diverse school contexts across primary and secondary education to assess whether similar findings emerge. Additionally, further exploration is needed to understand how CoPs can sustain their impact once the boundary spanner's role concludes. By building on this study's findings, future work can enhance the effectiveness and sustainability of CoP-based approaches in PE-CPD, ultimately leading to improved teaching quality and student outcomes in physical education.

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