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Research paper

'It's not a linear thing; there are a lot of intersecting circles': Factors influencing teachers' implementation of Meaningful Physical Education

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ABSTRACT

The purpose of this research was to examine factors that influenced how 12 elementary teachers implemented the Meaningful Physical Education innovation in their classrooms. Qualitative data were collected over 15 months. Analysis was guided conceptually by factors that influence innovation implementation. Results showed that implementation was most strongly influenced by teachers' prior experiences and beliefs, teachers' perceptions of students' responses to the implementation process, and external organizational pressures. The longitudinal nature of this research offers an important contribution to the literature on implementation of education innovations.

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1. Introduction

The last several decades have seen the development of countless educational innovations, which Century and Cassata (2016) believe are all designed with the same aspiration: making education better. In spite of innovative approaches offering an avenue for educational reform, there is often a gap between introducing teachers to innovations and seeing those innovations lead to lasting change in teachers' practice (Fullan, 2007a; Le Fevre, 2014). Indeed, Tyack and Cuban (1995) contend that making lasting changes to teachers' classroom instruction is the "most difficult kind of reform" (p. 135). These challenges have highlighted the need for educational implementation research that is focused on sustainable change (Goodyear & Casey, 2015) and that aims to understand the myriad factors that influence teachers' implementation of innovations (Century & Cassata, 2016). The purpose of the current research is to examine the experiences of 12 elementary teachers in Canada implementing an innovative pedagogical approach – the Meaningful PE approach – in their classrooms and to understand the factors (both at and beyond the level of the teacher) that have influenced the implementation process.

1.1. Educational innovations and implementation research

Educational innovations are "regarded as instrument[s] of necessary and positive change" in response to ever-changing political, economic, demographic, and technological landscapes (Serdyukov, 2017, p. 5). Such innovations can take a variety of forms including, for instance, pedagogical theories and approaches (Hardman, 2019; Zucker et al., 2013), instructional tools and practices (Suprayogi et al., 2017), and innovative curricula (Clements et al., 2015). In recent years, innovations have been designed to support the incorporation of, for example, inclusive practices (Gavish, 2017), social and emotional learning (Garner et al., 2018), critical thinking strategies (Brečka, Valentová, & Lančarič, 2022), and student-centred approaches (Rapanta, 2021; Zhang et al.,

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2021). Within PE, pedagogical models, such as Sport Education and Games-Centred Approaches, have been positioned as tools for pedagogical and curricular reform, providing an alternative to the traditional, multi-activity form that has predominated much of PE (Casey, 2014; Kirk, 2013). The translation of these innovations in teachers' classrooms represents much of the focus of educational implementation research.

Implementation research has been defined as "systematic inquiry regarding innovations enacted in controlled settings or in ordinary practice, the factors that influence innovation enactment, and the relationships between innovations, influential factors, and outcomes" (Century & Cassata, 2016, p. 170). Implementation research is focused on understanding not only the *what*, but also the *why*, and *how* of implementing an innovation (Dearing & Kee, 2012). Given the challenges of translating innovations into practice, educational implementation research is often guided by teacher change theories, which generally acknowledge the role of subjective experiences and beliefs of the end user in the implementation process (Coburn & Talbert, 2006) and the challenges associated with teacher change (Fullan, 2007b). Such research has highlighted, for example, the need to consider teachers' perceptions of risk when implementing innovations (Le Fevre, 2014), the characteristics that define teachers who might be considered 'change agents' (van der Heijden et al., 2015), and the role of a teacher's individual beliefs and values in the implementation process (Hadar & Benish-Weisman, 2019). Within PE, implementation research has focused largely on teachers' (in)ability to implement innovations in a way that might result in lasting change to their practice (Goodyear & Casey, 2015). Sustained implementation often necessitates a conceptual shift from teachers, which is rarely easy in practice (Casey, 2014; Dyson et al., 2010). Despite these findings, implementation research that focuses on the teacher alone has been criticized for its failure to recognize broader influences that impact the implementation process, such as organizational and environmental factors (Liou et al., 2019).

1.2. Teachers' professional development

Research on teachers' professional development (PD) holds strong implications for the implementation of educational innovations, given the wide-spread belief that PD is necessary for supporting teachers in the implementation process (Penuel et al., 2007). While PD can encompass teachers' professional learning from teacher education through to retirement (Sancar et al., 2021), for the purposes of this paper we conceive of PD as including a variety of learning opportunities for teachers related to and designed to improve the quality of their own practice (Darling-Hammond & McLaughlin, 2011). Traditional approaches to PD (often taking the form of one-time workshops that are decontextualized and disconnected from teachers' lived experiences) have been criticized for their inability to result in meaningful opportunities for teachers' learning (Darling-Hammond et al., 2017) and to support teachers in instructional reform (Borko et al., 2010).

In search of alternatives, research on teachers' PD has more recently focused on identifying characteristics of *effective* PD – those PD opportunities that "[result] in changes to teacher knowledge and practices, and improvements in student learning outcomes" (Darling-Hammond et al., 2017, p. 2). Generally, effective forms of PD are continuous, learner-centred initiatives which support teachers' collaboration as they develop professional knowledge in their own context (Borko et al., 2010). Teachers are positioned as active (rather than passive) learners and agents in their own PD (Avalos, 2011). These approaches acknowledge and account for the multi-dimensional and multi-level nature of teacher learning and the needs of individual teachers, rather than trying to apply a one-size-fits-all strategy (Korthagen, 2017). This involves acknowledging the interests and needs of teachers, such as demands on time and ease of implementation (Haug & Mork, 2021). In addition, effective PD often involves the provision of support, feedback and reflection, modelling of effective practice, and facilitation that is conducted with care (Darling-Hammond et al., 2017; Parker & Patton, 2016).

1.3. Meaningful Physical Education

Meaningfulness has been identified as a key element to transformative PE curricula (Ennis, 2017). The prioritization of meaningful experiences in PE has the potential to improve *quality* of life for students and to promote engagement with physical activity across the lifespan (Brown & Payne, 2009; Kretchmar, 2000, 2006). While the value of promoting meaningful PE experiences has been widely acknowledged (Ennis, 2017; Hawkins, 2008), few teachers are taught how to make that a priority for students (Kretchmar, 2000). A lack of attention to meaningfulness has led many students to claim that PE is not relevant or valuable (Lodewyk & Pybus, 2012), which can impact on long-term physical activity participation (Engström, 2008). Recognizing this gap, Meaningful PE has been designed as an innovation to support teachers in prioritizing meaningful experiences (Fletcher et al., 2021). In Meaningful PE the facilitation of meaningful experiences becomes *the* prioritized filter for teachers' pedagogical decision-making. Through using the approach teachers can help students recognize the individual and collective value in their PE experiences and identify ways participation may enhance the quality of their lives. The approach acts as a flexible, overarching framework and can complement other models and approaches.

Meaningful experiences are defined as those that are full of personal significance (Kretchmar, 2007). Dewey (1938, p. 44) suggests that value is attached to an experience 'because of a transaction taking place' between an individual and aspects of the environment. Personal meaning transactions and interpretations are therefore not constructed solely within but in relation to culture (Bruner, 1990), where individuals make connections to 'something that reaches beyond the actual experience, linking it to something else' (Leontiev, 2013, p. 462).

Given this definition, Meaningful PE is grounded in democratic, student-centred pedagogy (Fletcher et al., 2021), where it is assumed that learning occurs as students construct knowledge in relation to prior experiences and their interactions in the learning environment (e.g. with peers, teachers, artifacts) and community (Vygotsky, 1978). Supporting students to develop an awareness of how they and others experience meaningfulness becomes a central purpose of PE, to initiate students 'into a range of worthwhile social and cultural practices' that enrich their lived experiences (Thorburn, 2018, p. 26). Importantly, given its early stage of development, the Meaningful PE approach is designed to have a flexible implementation so teachers may implement it in ways they perceive to be appropriate to their teaching context.

Ideas related to Meaningful PE have developed over the last several years as more conceptual and empirical research has been published (e.g. Beni, NíChróinín, & Fletcher, 2021 Beni et al., 2019; Fletcher et al., 2021; Lynch & Sargent, 2020; Walseth, Engebretsen, & Elvebakk, 2018). Teachers in our research were introduced to the Meaningful PE approach in its early stages when it consisted of three primary principles. First, features of meaningful experiences (social interaction, fun, challenge, motor competence, personally relevant learning, and delight) (Beni et al., 2017; Kretchmar, 2006) support planning and instructional decisions. These features may be prioritized differently in relation to student interests and outcomes and teacher beliefs. Second, the features of meaningfulness

are explicitly shared with students (in age-appropriate terminology) to facilitate a shared language through which teachers and students may discuss, express, and reflect upon the meaningfulness of their experiences in PE. Third, the features of Meaningful PE are best supported through student-centred strategies that are autonomy supportive. Teachers are encouraged to engage students in goal-setting and reflective activities and provide opportunities for students to make choices for themselves and be involved in decision-making processes.

1.4. A conceptual framework for implementation research

This implementation research is focused specifically on teachers' experiences of implementing Meaningful PE, which we position as a pedagogical innovation. A clear and robust implementation framework can help inform design, development, and refinement of both new and existing innovations (Century & Cassata, 2016). Given the early stages of the development and implementation of Meaningful PE, it is imperative that a deep understanding of the factors that influence implementation is gained.

An Actor-Oriented Approach to Implementation Research. Penuel et al. (2014) suggest that much research on implementation of innovations has been framed by integrity-oriented perspectives, which focus on the extent to which teachers implement innovations as the designers intended. Penuel et al. (2014) also highlight the value of an *actor-oriented* approach. An actor-orientation begins with an assumption that implementation is not linear and that adaptations may be necessary within varying contexts (Lee & Choi, 2015). Indeed, there is an 'inevitable' gap between how innovation designers envision materials being implemented and the ways teachers use such tools (Penuel et al., 2014). Thus, adaptations hold potential to add effective strategies, promote contextual relevance, and highlight which elements of an innovation are vital to facilitating student learning (Century & Cassata, 2016). For these reasons, an actor-oriented approach can be particularly beneficial with innovations yet to be tested extensively, as the perspectives of actors implementing the innovation can inform refinements and adjustments to innovation design and delivery.

Actor-oriented implementation research is aimed at describing the *how* and *why* of teachers' decisions and thus explicitly focuses on the ways teachers interpret various characteristics of an innovation and the consequences of those interpretations (Century & Cassata, 2016). Thus, there is an intention to understand the teacher's perspective from an interpretive, rather than judgemental, stance (Penuel et al., 2014). Researchers and innovation designers working within an actor-oriented approach tend to engage in a process of co-creation – collaboratively designing innovations and allowing multiple stakeholders to be a part of the process of making productive adaptations (DeBarger et al., 2013). Given that Meaningful PE has been used primarily by individual teachers and studied as single cases, it has yet to be tested extensively. In light of our intention to listen to teachers' voices in adapting and refining the approach, we take an actor-oriented perspective to this research.

Research around implementation of innovations has a long history; however, much previous implementation research has primarily used barriers and facilitators as the main analytic frame, both in PE (e.g. Luguetti & Oliver, 2020; Moy et al., 2019) and in education more broadly (e.g. Goh et al., 2017; Howard, 2021; Le Fevre, 2014; Parsons et al., 2016). While these inquiries have led to significant contributions, Vasily et al. (2021) argue that Century and Cassata's (2016) framework offers a more conceptually rigorous approach to studying implementation research. Studying implementation through this framework may be beneficial for researchers both in PE and beyond who seek to make sense of teachers' decision-making and their lived experiences of implementation to inform the design and effectiveness of innovations.

Factors that Influence Implementation of Innovations. To move beyond simple descriptions of facilitators and barriers, Century and Cassata (2016) highlight several interwoven 'spheres of influence' that enhance understanding of the how and why of teachers' implementation. These factors are derived from an expansive historical review of implementation research in education, embracing multiple theoretical perspectives such as change theories, diffusion theory, and organizational theories. These factors include the characteristics of individual end users, organizational and environmental factors, attributes of the innovation, implementation support strategies, and implementation over time.

Characteristics of Individual End Users. The characteristics of the individual end user of an innovation can play a significant role in the implementation process (Hill et al., 2015). Characteristics may include those that relate to the innovation itself (e.g. understanding of the innovation) as well as those that are independent of the innovation (e.g. views about teaching and learning; willingness to try new things). This acknowledges that implementation is not merely dependent upon a teachers' 'skillfulness' and involves an element of risk and openness to change. Rather than being passive 'recipients', teachers actively filter the innovation through their dispositions, prior experiences, and beliefs (Penuel et al., 2014).

Organizational and Environmental Factors. Organizational and environmental factors acknowledge the contexts of implementation. Organizational factors, those that exist *within* the organization, may relate to the setting (e.g. class size, resources, physical environment, scheduling) as well as administrative decision-making and organizational culture (Hall & Hord, 2015; Maitlis & Sonenshein, 2010). Environmental factors are generally those that fall within a broader context (e.g. government agencies; economic conditions; geographical context) (Fixsen et al., 2005).

Attributes of the Innovation. Attributes of the innovation itself also play a role in the implementation process and may include both *actual* ('objective') attributes and those which are *perceived* by the end user ('subjective'). Actual attributes may include the number of components involved in the innovation, evidence of its effectiveness, and cost (Century et al., 2012). In relation to Meaningful PE, these may include, for example, the features of Meaningful PE. Perceived attributes may include attractiveness of the materials, how easy the innovation is to use, and its perceived relevance (Dearing, 2009). Whether attributes are considered to be objective or subjective may relate to the way the innovation is presented (i.e. affording more or less room for ambiguity and adaptation of the innovation to the local context).

Implementation Support ***Strategies.*** Implementation support strategies are often considered vital to change efforts (Forman et al., 2013; Hall & Hord, 2015) and include ongoing, intentional efforts to support end-users, including, for example, planning support, mentoring, and PD. Implementation support strategies may be offered by the innovation developer, the enacting organization (e.g., a school, school board/district), or an intermediary. Considering *how* end users are supported in learning to implement the innovation is a key component in implementation research.

Implementation Over Time. Studying implementation over time requires a longitudinal look at the implementation process. This involves consideration of stages of implementation that occur from the point of initial adoption to when its use becomes routine (Hall & Loucks, 1975). Different factors or spheres of influence may play differential roles during phases of implementation or adoption. Since innovations have often been abandoned after 'the honeymoon period', it is important to understand the reasons for ongoing uptake or rejection (Goodyear & Casey, 2015).

Vasily et al. (2021) used Century and Cassata's (2016) framework to examine one teacher's implementation of Meaningful PE in a cycling unit in a Saudi private school. They found that each of the factors influenced implementation to varying degrees, highlighting the strong impact that the teacher's background (experiences, beliefs, values) and the specific context played. While Vasily et al. (2021) demonstrated the value of using Century and Cassata's (2016) framework to gain insights into the influences of implementation, they also identified a need to advance understanding of how the Meaningful PE approach is implemented by examining its use with a larger sample of teachers in different contexts over time. Our particular research addresses this need, studying the experiences of 12 PE teachers in a public school board in Canada across 15 months.

2. Methodology and methods

In this research we took a qualitative approach. We view knowledge construction as a social process grounded in active inquiry and exploration, with teachers making sense of knowledge through reconciling present and future experiences with those from the past and in interaction with the social environment (Vygotsky, 1978). In line with our commitment to prioritizing teachers' voices, we took the perspective that the subjective experiences of participating teachers were worth understanding and sharing. We believe there is value in listening to teachers in order to refine the Meaningful PE approach and identify helpful ways to introduce it to other teachers in the future. This required prioritizing depth over breadth in terms of data collection and interpretation, and for this reason a relatively small sample of teachers was recruited and studied across 15 months.

2.1. Context and participants

Twelve elementary (Grades 1–8) PE teachers from the same school board participated in this research. In the first year, teachers were invited to participate via an email sent by the school board's instructional program leader for PE. From the list of teachers who showed interest, we invited five with a range of experience levels (one-27 years) to participate in Year One (January–June). Three teachers elected to continue their participation into the second year (the others were not allocated to teach PE in Year Two). In the second year, we invited those teachers from the original list who showed interest (but were not invited) and then used a snowball sampling technique to recruit others. This led to seven additional teachers electing to participate in Year Two, beginning in August and ending the following March (earlier than the anticipated June conclusion due to covid-19-related school closures). Many participants had pre-existing relationships with one another through having taught together, collaborated on projects, or participated in PD initiatives. Table 1 provides background information on each participant, collected in pre-implementation interviews, including their teaching experience, grade and school context, duration of their participation in the research, and their opinions of the purposes of PE at the beginning of the research. We share this information to provide a picture of how the teachers were approaching their practice before we began working with them.

2.2. Research design

It was our role as researchers to introduce teachers to Meaningful PE, support their professional learning as they engaged with it, and collect data. Initially, teachers were introduced to Meaningful PE through an online learning platform with several video and print resources (e.g. blog posts, visuals for use in the classroom) designed to help them learn about the Meaningful PE approach and consider suitability of implementation in their schools. We intended to support teachers through a continuous professional development (CPD) initiative, which we designed to align with commonly cited characteristics of effective CPD in that it would be sustained, collaborative, based on teachers' needs and interests, facilitated with care, positioned teachers as active learners and modelled effective practice (e.g. Darling-Hammond et al., 2017; Parker & Patton, 2016). We facilitated a community of practice (CoP; Wenger, 1998) where participating teachers, Stephanie and Tim regularly met to learn with and from one another and share experiences of the implementation process. In the first CoP meeting of each year, we invited teachers to observe our teaching where we modelled how we might use the approach either with a group of students or with CoP members acting as 'students' and participating in a lesson.

After being introduced to Meaningful PE, teachers were asked to implement it in one or more units with a grade/class (see Table 1) and content focus of their choice. In Year One, due to scheduling challenges, the CoP met twice – once before and again after the teachers' implementation – in spite of our intention to meet regularly. Intermittently, teachers were supported through one-on-one meetings and/or phone calls, email, and text messaging with Stephanie and Tim at their request (though they often first reached out to one another for support, following up with us only if questions persisted). Based on feedback from Year One participants, particularly relating to scheduling issues, in Year Two we took a more systematic approach, facilitating CoP meetings every six weeks initially, and then every 8 weeks as teachers became more comfortable. Before each meeting, teachers were invited to share questions and conversation topics they would like to discuss. CoP meetings generally served as a time to regroup, ask questions, share successes and struggles, and develop plans and ideas. Meetings were typically guided by the teachers (e.g. asking questions of one another) rather than researchers, with more experienced teachers typically taking the lead. To test implementation over a longer period of time, in Year Two teachers were asked to implement the approach across the whole school year. However, this was cut short by three months due to the mandated closure of schools in response to covid-19.

2.3. Data collection and analysis

Three qualitative data sources were generated. First, teachers participated in semi-structured interviews at pre-, mid-, and post-implementation periods. Pre-implementation interview questions focused on, for example, teachers' prior conceptions about and experiences of PE and their expectations coming into the study. Mid-implementation interviews occurred following observations in a teacher's classroom when this was feasible within their schedule and centred around teachers' implementation decisions in the lesson. Post-implementation interviews focused on teachers' thoughts about the Meaningful PE approach and their experiences of learning about and implementing it in their classrooms. Interviews ranged from 14 min (introductory interview) to 1 h and were conducted by either Stephanie or Tim.

Second, non-participant observations were conducted by Stephanie or Tim in teachers' classrooms at least once each school year. However, as a result of parental objections to having their children observed, we were only able to observe 7 of the 12 teachers. An observation template was used to guide observations, which involved filling in the activity that was occurring, what was seen/heard, and presence of specific elements of the Meaningful PE approach in each phase of the lesson (warm-up; development segments; cool down), along with any specific comments/actions

Table 1
Background on teacher participants.

Participant (Pseudonym)	Years of Teaching Experience	Years of Experience Teaching PE	Summarized Opinion on the Purpose of PE at outset of research	Grade and School Context	Participation in the Research
Hunter	9	6	Something everyone can succeed and have fun in	Primarily Grade 7; large student body within a small space; supportive administration	Years 1 & 2
Greg	8	6	Not provided	Co-taught with Hunter in Year 1 and Tracy in Year 2 of the research	Years 1 & 2
Tracy	27	27	Important for teaching physical, cognitive, and life skills; should prioritize movement	Grade 1–8; large, highly ethnically diverse school with many newcomer immigrants	Years 1 & 2
Molly	1	1	Should prioritize fun and movement	Grades 6–7; new school where PE program was previously sport-centred	Year 1
Mia	1	1	Should prioritize fun and movement	Co-taught with Molly	Year 1
Emily	5	0	Important for cooperation and social interaction	Grade 3 classroom teacher who has to teach PE; small student body with significant behaviour management challenges	Year 2
Camille	14	14	Should prioritize keeping students active and having fun	Grade 5–6; teaches at the same school as Emily	Year 2
Miranda	19	8	Important for life skills, fun, challenge and risk-taking	Primarily Grades 4–5; well-established PE program and supportive administration	Year 2
Melissa	20	8	Should focus on variety and health-related benefits of activity	Primarily Grades 4–5; large PE class sizes; number of PE classes/week reduced this year	Year 2
Liam	11	2	A place where everyone can have fun and be active	Co-taught with Tracy	Year 2
Felix	8	0	An outlet that prepares students to learn better in other courses	Teaches with Hunter	Year 2
Sharron	1	0	Not provided	Grades 5–8 gifted students with behaviour management challenges; PE program previously very sport-centred	Year 2

from children or teachers related to implementation of Meaningful PE either during the lesson or in conversation before and after.

Third, CoP meetings were audio-recorded and transcribed for inclusion as a data source. To help teachers become comfortable sharing amongst the group, the first CoP meeting each year was not recorded. Topics of conversation within the CoP were guided largely by teachers' needs and requests and typically focused on discussion of practical aspects of implementing the approach in a variety of contexts, such as students' reactions and receiving support from administration. There were six CoP meetings (two in Year One, four in Year Two), all of which were facilitated by Stephanie and Tim, and which ranged from 76 to 103 min. As a result of a series of government sanctions that restricted teachers' ability to participate in PD, followed by the mandated closure of schools in relation to covid-19, an additional three CoP meetings and a full round of interviews were cancelled in Year Two.

An inductive, thematic analysis of all three data sources was conducted, guided by Braun and Clarke's (2012) six phase approach. In phase one, audio files were transcribed, and all data sources (interviews, observation documents, and CoP transcripts) were read and reread for familiarisation. In phase two, initial coding was done by Stephanie using in vivo codes (i.e. coded with a word/phrase used by the participant; Miles et al., 2014) (e.g. 'normal with a twist'). In phase three, data were coded by Stephanie a second time, using descriptive codes to begin grouping in vivo codes together (Miles et al., 2014) (e.g. in vivo codes 'being purposeful' and 'being more mindful' were recoded as 'intentional'). Initial themes were developed in this phase (e.g. 'relating Meaningful PE to current practice/perceptions'), in consultation with Tim and Déirdre. In phase four, themes were reviewed against each other and the data set; one of the four preliminary themes was relabeled as a code rather than a theme. After establishing agreement amongst all authors, the following three themes were defined (fifth phase) and named (sixth phase): teachers' prior experiences and beliefs, teachers' perceptions of students' responses to the implementation process, and external organizational pressures.

3. Findings

Century and Cassata (2016) argue that the conceptualization of an innovation itself offers insight into the *what* of implementation, while the factors that influence innovation enactment provide insight into the *how* and *why*. Importantly, it has not been our purpose to study the extent to which teachers implemented the innovation (i.e. an integrity- or fidelity-oriented approach) and thus we focus predominantly on the *how* and *why* of teachers' implementation decisions. However, understanding the *what* of implementation offers context for the *how* and *why* and thus for addressing the research purpose.

In relation to teachers' conceptualization of the approach, they generally reported that the attributes of the innovation "made sense" to them (Liam-Yr2-Int1), and there were no suggestions that the innovation or its ideas were inaccessible or out of reach. In explaining her interpretation of the key features of Meaningful PE, Miranda described it "as a framework that allows teachers to be able to create culture, [… and] teach their curriculum" (Yr2-Int2). Rather than Meaningful PE involving a step-by-step or linear process, she envisioned it as a Venn diagram with "a lot of intersecting circles where you're getting a lot done at the same time" (Miranda-Yr2-Int2).

A key attribute of the Meaningful PE approach is its flexibility, in that it should be implemented in a way that is most appropriate for teachers and students in their context. Our analysis led us to believe that teachers understood, valued, and made use of the flexible nature of the approach. For example, some perceived the value of Meaningful PE to be its "elastic" nature (Miranda & Felix-Yr2-CoP3). Teachers' perceptions of the attributes of the approach were often influenced by comparisons they made to the ways others in the group were implementing it, which they often heard about through the CoP or informal conversations with each other. For instance, as a result of having compared themselves to their colleagues, some spoke of the approach being "easier to implement" for others (Camille-Yr2-Int2) or said that they "weren't there yet" (Felix-Yr2-Int2).

The implementation process itself also shaped teachers' perceptions of the approach. Although teachers tended to express confidence in their understanding of the approach following our presentation of it, they found that translating that knowledge into practice was, at times, challenging. For instance, while it was easy for Liam to look at aspects of the approach he had been introduced to and say, "That makes sense to me," trying to implement it "in a way that [made] sense" in relation to his teaching practice was a bit more challenging (Yr2-Int1). Indeed, several teachers suggested that, although they understood the approach in theory, they needed to "leap in and see how it [could] work" in practice (Melissa-Yr2-Int1). Thus, teachers' perceptions of the approach were shaped not only by our formal presentation of ideas but also informally by the ways their colleagues were implementing it and their own experience through the implementation process. In the sections that follow, we turn our attention to the factors that influenced the decisions teachers made in the implementation process (i.e. the *how* and *why* of implementation).

3.1. Teachers' prior experiences and beliefs

In learning about and implementing the Meaningful PE approach, teachers tended to compare the approach to their existing beliefs about the purposes of PE, their experiences as educators, and perceptions of their own teaching practice. Century and Cassata (2016) describe these elements as characteristics of end users. This led most teachers to claim that Meaningful PE was very similar to what they believed they were already doing in their classrooms. For example, Felix suggested, "It's been an easy fit. I don't think the pendulum for me has to swing very far" (Yr2-Int1). Teachers often drew specific connections between attributes of their typical PE practice and Meaningful PE. For instance, Hunter and Greg saw alignment between the approach and parts of the Teaching Games for Understanding model (e.g. reflective processes), which they perceived as making the implementation process easier for them and their students (Yr1-Int2).

Given a tendency to view their practice as being closely aligned with the attributes of the approach, many saw their implementation as a source of personal validation for their teaching practice. For instance, Tracy suggested, "It's that new layer, that [other] little piece that kind of validates what I'm doing for all these years" (Yr1-CoP2). Felix also perceived that the research behind Meaningful PE "[gave] some legitimacy" to his practice (Yr2-Int2). Others valued Meaningful PE because it provided a sense of collegial validation, amidst concerns of colleagues perceiving PE as a marginal subject (Sharron-Yr2-Int2).

Although teachers tended to perceive Meaningful PE as closely aligned to their teaching practice, there were also instances when this was challenged. In general, there tended to be a perception amongst teachers that their primary responsibility was to ensure students were active, safe, and having fun, or what Placek (1983) described as keeping students busy, happy, and good. At times, this seemed to conflict with various attributes of the approach, particularly in relation to engaging students in reflection. For some teachers the emphasis on reflective activities challenged the notion that students should constantly be moving; reducing movement time, even marginally, to promote reflection was often seen as a "waste [of] time" (Melissa-Yr2-Int1) or stealing time from students who wanted to be active (Felix-Yr2-Int1). This led some to question their priorities: "What's more important? The getting the kids moving and active and stuff or having those deep, meaningful conversations?" (Mia-Yr1-Int2).

Where teachers' prior conceptions and experiences of PE were perceived as conflicting with the Meaningful PE approach, some viewed it as an opportunity to work toward change. For example, Miranda suggested she was looking for the approach to both fit her philosophy and extend her practice: "This is exciting, because I feel like I'm doing a lot of these things, but it also gives me a lot to work on, and it gives me a framework" (Yr2-CoP1). However, in spite of their desire and willingness to change, some teachers encountered difficulty in translating intentions into actions. For instance, Melissa articulated a desire to take time for student reflection and struggled to let go of her tendency to always keep students 'busy':

> I find we get into a game and they're having fun, they're doing so much … [and I ask myself], "Well, what am I making better use of my time? Let's keep them active." And I end up choosing that where maybe it's better to be having that reflective discussion time. (Yr2-Int2)

Though Melissa wanted to change her approach, she regularly returned to her habit of maximizing movement time. It was noted in observations that, when efforts to incorporate student reflection were included, they were rather "teacher-centred in that most of the … discussion was directed by [Melissa]," rather than engaging students in reflective conversation (Yr2-Obs1). Although Melissa's decision to prioritize movement time may have promoted 'fun' for students, we have cautioned elsewhere about drawbacks of prioritizing fun over student learning (Beni et al., 2017). In this way, the characteristics of individual end users acted as a strong influence on implementation (Syrmpas et al., 2017).

Positively, some teachers were able to highlight specific areas where their practice had changed because of Meaningful PE. For example, Hunter suggested that the greatest change in his practice was "allowing more student voice and student choice in [PE]" (Yr2-Int2). One of the most profound examples of changes in practice occurred for Tracy who had taught for 27 years and had mentored many participating teachers. While much of the approach resonated with Tracy's teaching philosophy, it still left her with room for growth, and at times she was challenged not to "fall back to what [she was] used to" (Yr1-Int1). Like many others, Tracy initially struggled with taking time for reflection and helping students make personally relevant connections. Initially, she questioned if it was even possible to have elementary-aged students make these types of connections. In the second year, Tracy focused a lot of her attention on this attribute of the approach. For example, we noted in an observation that she facilitated discussion with students around the question "How can you make a connection to what you are learning?", which helped students draw connections to other movement environments, transferable social skills, and how developing competence can increase confidence (Yr2-Obs2). Over time, she began to see positive results. Reflecting on the experience, Tracy shared with the group: "The personally relevant learning answers [from students] are brilliant. It just gives you goosebumps […] That's the piece that I feel the most satisfaction from" (Yr2-CoP3). Thus, Tracy's willingness to challenge her own conceptions of PE *and* students' learning allowed her to experience the professional satisfaction of seeing change in her teaching practice that she did not realize was possible.

Given that the Meaningful PE approach was closely aligned with much of what teachers already believed about the purposes of PE, one of the most common changes described was a sense of becoming more "intentional" about prioritizing meaningfulness (Hunter, Tracy, Liam). Part of the perceived benefit of Meaningful PE was that it provided a "framework" to guide that intentionality, helping teachers know where they "need to go with it" (Tracy-Yr1-Int3). In this way, the Meaningful PE approach is working toward correcting Kretchmar's (2000) observation that few teachers are being taught to prioritize meaningfulness.

While teachers' prior experiences and beliefs about PE played an

influential role in the implementation process, their perceptions were also challenged as a result. This led to opportunities for change in their teaching practice, which although challenging, were often viewed as valuable.

3.2. Teachers' perceptions of students' responses to the implementation process

Due to school ethics board restrictions, we were not able to collect data directly from students. Thus, we are not able to report on students' responses to the approach but rather to the ways teachers' perceptions of students' responses influenced their implementation decisions.

Throughout the implementation process, teachers' decisions were heavily influenced by their perceptions of student outcomes and how students were responding. Teachers often suggested they were 'reading' their students and making implementation decisions with them in mind. For instance, Miranda explained:

> I always go back to reading my kids and all the other things that impact them … [If] they haven't been outside for recess, their need for physical activity is [high] and the reflection piece is harder because they are not there. So, it's always taking into account all of those other things. (Yr1-Int1)

For some teachers, knowing their students led them to conclude that certain aspects of the approach may not be viable in their teaching context. For example, Camille perceived that in her class with 12 students on modified individualized education plans, written reflective activities would be challenging (Yr2-CoP3).

Teachers also acknowledged and wanted to be sensitive to the ways implementing an innovation challenged students' conceptions of and experiences in PE. They recognized the implementation process required adjustment for both teachers and students, as students tend to "get accustomed" to PE being delivered in a certain way (Melissa-Yr2-Int2). Because of this, Miranda was very intentional about easing her students into the implementation process by formatting her lessons around a structure that would be familiar for her students to help "make it less jarring for them" (Yr1-Int1). Similarly, Emily felt the need to introduce the language of Meaningful PE slowly but consistently to her students so that it would become "familiar and consistent" before trying to implement too many changes (Yr2-Int2). Teachers thus used their own professional and practical knowledge of teaching to make decisions about the degree of implementation based on their understanding of students and pedagogy.

In their effort to be sensitive to students' needs, teachers' implementation decisions were often influenced by students' reactions and behaviours. When students' reactions were perceived to be positive, teachers tended to express greater confidence implementing the approach more fully. For example, early on Hunter and Greg were feeling apprehensive: "We were pushing each other like, 'Let's do it,' and we were nervous, and then our students just responded really well to that first couple lessons" (Hunter-Yr1-Int2). The positive reactions of their students encouraged them to continue with the implementation process. Similarly, Tracy suggested that not having any "eye rollers" and experiencing student buy-in were keys to her implementation success (Yr2-Int2).

Students' responses and behaviours were not always positive. This sometimes occurred when students' previous experiences were strikingly different from their teacher's implementation of Meaningful PE. For instance, Sharron spoke of getting "push-back from the kiddos, because all they wanted to do [was] play their sports" (Yr2-Int2). Mia and Molly faced similar difficulties with students who were accustomed to a sport-based PE program (Yr1-Int2). Thus, when students' prior conceptions of PE were challenged, at times the implementation process was difficult for both students and teachers.

Some of the perceived negative reactions of students during the implementation process related to prior behavioural issues, which, while unrelated to the approach, posed a serious challenge to implementation. This was particularly true for Camille and Emily who taught in a school where many students were facing behavioural challenges. Because of this, Camille and Emily were often hesitant to implement various elements of the approach, particularly written reflection: "Both of us were talking about [doing a written reflection], and then we were like, 'No.' It's not going to work. We were going to try, and then we just knew" (Emily-Yr2-Int2). Given the context and challenges they were facing, Camille and Emily envisioned themselves using the approach "casually, on the fly" (Camille-Yr2-Int2), as they were unable to see how full implementation would be possible with their students.

In spite of facing some challenges, all teachers were able to identify ways their flexible implementation of the approach resulted in positive outcomes for their students. While other innovations that teachers had previously been exposed to were sometimes perceived to be "fluff," they appreciated that the Meaningful PE approach resulted in "valuable learning for the kids" (Tracy-Yr1-Int2). For teachers who were initially hesitant, their perceptions often became more positive as they were able to see changes in the quality of their students' experiences over time. For instance, Sharron described being able to recognize, "Hey, [student] would never do that, but here he is. He's actually engaged" (Yr2-Int2). Even in contexts where teachers faced challenges related to student behaviour, there was a recognition that the reflective components and language of Meaningful PE provided students with ways to express their frustrations and work toward a more positive PE experience (Emily & Camille-Yr2-Int2).

As with teachers, over time, students seemed more comfortable with their new experiences of PE. For instance, Greg suggested that, while the process was "overwhelming" in Year One, "[students] kind of start expecting it as part of the norm" over time, concluding that "the more and more that you're constantly doing this, the more relevant it is, because kids start thinking more about [the meaningfulness] of their activities" (Yr2-CoP3).

3.3. External organizational pressures

Teachers cited several sources of external organizational pressures that influenced their implementation decisions, which stemmed primarily from their responsibility to ensure the formal curriculum was being taught, managing expectations and demands placed on their time, and administrative and organizational decisions beyond their control.

Teachers tended to evaluate the Meaningful PE approach in relation to the formal provincial PE curriculum. For some, Meaningful PE was perceived as something they needed to plan for *in addition* to curricular expectations. For instance, Liam suggested that when planning he considers, "What are the lessons from the curriculum that I'm trying to hit, and then what are the points from Meaningful PE that I could try and hit within these lessons?" (Yr2-Int2). Similarly, Camille suggested that incorporating the reflective elements of Meaningful PE was not a priority for her based on her perception of its failure to align with curricular objectives: "It's not something I have to assess, so I don't know if I would spend a ton of time [on it]" (Yr2-Int2). However, for other teachers, Meaningful PE was perceived as being directly aligned with the curriculum. For instance, Tracy was able to identify "five fundamental principles in the curriculum that totally connect" (Yr1-Int3) and used

Meaningful PE to plan toward and assess these objectives. Similarly, Miranda found Meaningful PE to align with curricular expectations in relation to students' motor competence, skill development, goal-setting, cognitive development, and living skills (Yr2-Int2). For Miranda, "the value in [Meaningful PE] is how well it relates to the curriculum" and "allows teachers to […] be able to teach their curriculum" (Yr2-Int2). Importantly, all teachers were teaching from the same curriculum document; it was their perceptions of how Meaningful PE did/did not align that differed.

Unsurprisingly, teachers regularly cited time as a source of pressure in the implementation process. Often, finding a balance between all their responsibilities was challenging. For example, Mia and Molly related their ambition in taking on implementation to "When you go to a grocery store and you buy everything because you're like, 'Yeah, I'm so hungry!' But then you have regrets" (Yr1-Int2). Camille faced similar challenges when her teaching role changed to include some science classes: "Science is unfortunately my priority. […] it's so intense and heavy, and I've taught PE for a decade. I can walk into the gym with no plan and I'm okay" (Yr2-Int2). In addition to the need for time in their daily timetables, teachers recognized that learning to implement the approach required a long-term commitment, recognizing that, "it takes a long time to master something" (Miranda-Yr2-CoP3). When teachers faced challenges that prevented them from being able to invest time into the implementation process, they recognized that these constraints were often the result of administrative and organizational decisions that were made for them: "If administrators, principals want the approach in their school, then they can give time to people. So, it's also getting [principals] on board too, because they control our time ultimately" (Emily-Yr1-Int1).

When teachers perceived that they were receiving support from their administration, this was identified as a facilitator of implementation. For instance, teachers perceived PE to be valued by administration when they invested money into hiring specialist PE teachers and releasing them for PD opportunities (Felix, Tracy, James). When Sharron faced "push-back" from students through the implementation process, "the sense that [she] had administrative support" enabled her to continue (Yr2-Int2). However, for some teachers there was less administrative support, which served as a source of frustration. For example, Emily and Camille faced challenges with class sizes, scheduling, and a longer-than-expected renovation to the gymnasium, which became a source of tension: "Is it my job to say, 'Let's rejig the schedule so that the big kids can actually have some space'?" (Camille-Yr2-CoP2). This was also evident during observations. We were present when an administrative decision saw all but six students excused from PE with no notice with over 20 min left in the lesson. In our notes we wrote that this seemed to show "a disregard for PE" and the teacher (Camille-Yr2-Obs1). These tensions often left teachers feeling unable to focus on the implementation process (Emily-Yr2-CoP3).

The most substantial sources of external pressure were a series of 'work-to-rule' sanctions and province-wide labor negotiations followed by the sudden covid-19 related mandated closure of schools. Sanctions disrupted students' routines and left teachers feeling as though they were "fly [ing] by the seat of [their] pants" (Hunter-Yr2-Int2). For some teachers, the frustration with facing sanctions and school closures in the middle of the implementation period was the recognition that these disruptions often caused them to revert to previous ways:

> What I find is, anytime you're working through a new approach or something else that you're adding to your program or a new way to think about doing things is, it's kind of like using a muscle, and then if you don't use it, you kind of go back into some old habits […]It takes a really long time to build something that stays (Miranda-Yr2-Int2).

4. Discussion

The purpose of this research was to examine the experiences of 12 elementary teachers implementing Meaningful PE in their classrooms and to understand factors that influenced the implementation process. Century and Cassata's (2016) implementation framework supported the identification of factors that influenced teachers' decisions in the process of implementing the Meaningful PE approach. The research offers a significant and unique contribution to the literature, while also adding support to previous work conducted by others. Specifically, this research represents, to our knowledge, the first use of Century and Cassata's (2016) conceptual notion of spheres of influence as a framework to analyze implementation research of a longitudinal nature in education. The use of this framework allowed us to generate several insights into the implementation process that would not have been possible through the use of a traditional focus on barriers to and facilitators of implementation. Moreover, when combined with an actor-oriented perspective on implementation (Penuel et al., 2014), we were better able to see the ways in which teachers' perspectives on implementation were influenced by a complex array of factors, such as their beliefs, organizational elements, and the support strategies used to support implementation. In addition to the use of a novel conceptual framework to study the implementation of educational innovations, our research builds on the findings of others who have studied the role and nature of PD in these spaces (e.g. Atlı & O'Dwyer, 2021, pp. 1–19). In particular, we noted the importance of fostering collaborative PD opportunities where a focus was given to attending to the immediate needs of teachers in their specific contexts.

Amongst the spheres of influence proposed by Century and Cassata (2016), the individual characteristics of end users was one of the more prominent in our research. Teachers tended to conceptualize and implement Meaningful PE in relation to their individual characteristics (i.e. prior conceptions of PE and the role of the PE teacher, level of experience, and interpretations of how well the approach did/did not align with their personal priorities and philosophies for teaching PE). Consistent with other studies of implementation of educational innovations (and in the CPD literature), even where teachers saw value in the innovation and consequently wanted to change their practice, their prior experiences and beliefs made it difficult at times to do so (Le Fevre, 2014; Spillane et al., 2002). Indeed, this echoes the impossibility of separating teachers and their implementation of innovations from their personal beliefs (Atlı & O'Dwyer, 2021, pp. 1–19; Ham & Dekkers, 2019).

Century and Cassata (2016) recognize the influence of organizational and environmental factors. These also played a critical role in how teachers implemented Meaningful PE. Decisions made at the administrative level influenced the time, space, and support teachers received within their schools and had the potential to either facilitate or hinder teachers' implementation of the innovation (similar to Goh et al., 2017), reiterating the need for organizational conditions that are conducive to teacher change (Parise & Spillane, 2010). Beyond the level of the school, the provincial curriculum document influenced the extent to which teachers implemented various aspects of the approach. On a broader scale, province-wide labour-negotiations and the transition to online schooling related to covid-19 were extremely influential factors, essentially halting teachers' implementation of the approach.

While these are factors beyond the control of teachers and the research team, they serve as an important reminder of the very dynamic and unpredictable nature of innovation implementation in schools, and the importance of considering a broader range of factors that influence the implementation process (Parise & Spillane, 2010).

The attributes of educational innovations can influence the likelihood that teachers may or may not persist with implementation (Century & Cassata, 2016). To this end, the Meaningful PE approach itself was mostly well-received by teachers, particularly those attributes that might be considered more objective (e.g. the features of Meaningful PE). However, given its flexible nature, teachers tended to interpret certain aspects of the approach subjectively, and at times, these were rejected or neglected as a result. For example, the time and space suggested for students to reflect on and make meaning of their experiences was often forgotten about or de-emphasized by some teachers. Importantly, teachers' initial perceptions of the attributes of the approach tended to change across the implementation process in response to both their own comfort level and their students' responses, as has been shown elsewhere (Guskey, 2020). Thus, the implementation process itself should be viewed as having the potential to influence teachers' perceptions of the attributes of innovations.

Finally, the longitudinal nature of this research emphasizes the importance of implementation over time (Century & Cassata, 2016). In spite of teachers perceiving the approach as being quite close to their practice early on, like teachers in Dyson (2002) and Goodyear and Casey (2015), they often expressed the need for a substantial investment of time over multiple school years in order to make their implementation of Meaningful PE consistent. Along with the implementation support strategies we offered (most notably, the use of a CoP and modelling of the approach), time was highly valued by teachers in this study as supporting their learning about and implementation of the approach (see also. Beni, Fletcher, & Ní Chróinín, 2021).

In summary, while the importance of making sense of teachers' experiences and decision-making processes in depth has elsewhere been shown to be important for thinking about how an innovation and its presentation to teachers can be refined (Penuel et al., 2014), this research highlights the potential value of using a well-grounded conceptual framework to guide educational implementation research. However, while Century and Cassata's (2016) framework provided a valuable lens to consider the implementation process, we recognize a notable gap. Teachers in this research were deeply concerned with their students' responses and behaviours throughout the process, which is consistent with Guskey's (2002) teacher change model. Yet, the role of students is seemingly absent from the spheres of influence that Century and Cassata (2016) highlight. The results of the current research add merit to findings from others suggesting classroom management (Syrmpas et al., 2017) and the responses of students (Goh et al., 2017) are significant factors in the decisions teachers make during the implementation process. Moreover, when teachers perceive positive student outcomes from the implementation process, they are more likely to commit to long-term change in their teaching practice (Guskey, 2002). While the implementation framework has been useful, we caution that the role of students should not be overlooked and suggest the potential value in considering not only teachers but also students as 'end users' who influence the implementation process.

5. Implications for implementation research

This research holds important implications for studying teachers' experiences of implementing innovations. Many of the findings from this research offer support for CPD and implementation research more broadly, highlighting the importance of a) supporting teachers in making sense of innovations in relation to their prior beliefs and experiences and local policy documents (Abrami et al., 2004), b) valuing teachers' perspectives in the design and implementation of educational innovations (Penuel et al., 2017), and c) considering the interplay between and amongst personal, organizational and contextual factors that influence the implementation process (Turner et al., 2009). While many of the findings from this research support that already shared in the CPD literature (including PE-specific CPD), the nuances of how implementation played out in a context that was specific in terms of both the subject matter (PE) and the innovation (Meaningful PE) are important in what resulted. While the need to support teachers in making sense of innovations and to afford some flexibility in the implementation process confirms findings elsewhere, this research has provided insight on how the specific features of the innovation itself and their presentation within the boundary of PE expectations influenced implementation, thus highlighting the need to pay attention to the specific context and content of the innovation. For instance, many teachers remained unconvinced of the critical role of reflection and used it selectively, based on their interpretation of its relative value within a PE-context where the importance of maximizing activity time and keeping students' heart rates elevated is regularly emphasized and prioritized. However, becoming aware of the value of an experience and making connections between experiences (past-present-future) are central ideas in theories of meaningfulness and its contribution to learning (Bruner, 1990; Dewey, 1938; Leontiev, 2013). Recent studies on meaningfulness in PE have also highlighted the critical role of reflection in helping students makes sense of and find value in their learning experiences (O'Connor, 2019; Thorburn, 2020). Thus, the perceived conflict between the content of the innovation (emphasis on reflection) and context in which it was being implemented (emphasis on activity time in PE) influenced teachers' implementation.

Affording teachers some flexibility in the process of implementing an innovation allows for accommodations to be made to suit the context and culture of the school and its community, the needs of the students therein, and the particular content of the innovation itself (Penuel et al., 2014). That teachers in this study valued the flexibility of the approach adds support for recent calls in the literature to develop "more loosely framed guiding principles" for the promotion of meaningful experiences that do not require teachers to "blindly adher[e] to the mandatory and non-negotiable features of practice advised" (Thorburn, 2020, p. 2), which we suggest may also hold merit in relation to other educational innovations, both in PE and in other subject areas, where meaningful student experiences are to be prioritized.

5.1. Limitations and future directions

The current research involves the largest sample of teachers implementing the Meaningful PE approach across the longest period of time. To sustain implementation of Meaningful PE 'beyond the honeymoon period' (Goodyear & Casey, 2015), we argue for the importance of studying the implementation of the approach with other samples of teachers in varying contexts and with various levels of experience across multiple school years. While some preliminary work has been done to understand students' experiences of Meaningful PE (Ní Chróinín et al., 2021), there is also a need to expand understanding of the ways the implementation of Meaningful PE over time does/does not influence the meaningfulness of students' experiences. Further, both the sample size and the nature of teachers' responses served as potential limitations in this study. Specifically, the ways teachers tended to

interpret their implementation of Meaningful PE as a source of validation for their teaching practice may suggest a lack of readiness or reflexivity to challenge assumptions and make changes to their practice. However, this tendency often changed over time. Finally, implementation fidelity was not tested for this study, as this was not our intention, nor did we find it relevant to the questions we were seeking to answer.

The current research adds further weight to the value of an actor-oriented approach (Penuel et al., 2014) to studying the implementation of educational innovations, particularly when guided by an implementation research framework, which can provide insight into the personal, contextual, and organizational factors which influence the implementation process.

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