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Chapter

Physical Education Teacher's Professional Learning of Implementing a Health Promotion Intervention in the Practice of a Research Circle

Linn Håman, Katarina Haraldsson and Eva-Carin Lindgren

Abstract

Scholars recommend that health promotion researchers engage practitioners in the analysis and reporting phase and expand their ability to share their research beyond academia. The purpose of this study was to draw benefit from physical education (PE) teachers' discussions and reflections of the implementation of a health promotion intervention in school during research circle meetings. The health promotion intervention 'Pulse for Health and Learning' (PuLH) focused on moderate-to-vigorous physical activity, incorporating a child-centred coaching approach. This study has an action research approach. The research circle consisted of PE teachers (N = 22, approximately 18 per meeting) from eight primary and middle schools (from grades 4 to 9) in eight municipalities in Sweden and three researchers. The theory of 'practice architectures' was employed to interpret, discuss, and clarify what enables and constrain PE teachers' implementation of the health promotion intervention. During the analysis, three discourses were identified: technical-rational discourse, participating discourse, and steering and supporting discourse. The practice architectures both enabled and constrained the implementation of PuLH. The research circle meetings stimulated critically conscious acting and decision-making through collaboration between PE teachers and together with researchers which improved the implementation of PuLH and contributed to PE teachers' professional development.

Keywords: action research approach, health promotion, implementation, intervention, moderate-to-vigorous physical activity, physical education, professional development, research circle, school

1. Introduction

Schools are considered essential for health promotion interventions [1], but several complex aspects are necessary for successful implementation [2–4]—for instance, teamwork, leadership, assistance, and contextual factors [2, 3]. Likewise,

the competence of the individual teachers and support from the organization they work within is necessary [5]. Through practice-developing school research, teachers' professional knowledge base can be strengthened and developed [6]. Continuing professional learning among teachers is necessary for supporting and encouraging the improvement of knowledge and practice (e.g., [7]). One way to keep this is by conducting different forms of professional development programs for teachers in school (e.g., [7]). Previous research has shown that professional development positively influences teachers' capacity to reflect on new knowledge and practices [8]. It could be significant to teacher professional learning [9]. Teachers will suffer from a lack of professional learning if they are alone for most of their working time, do not receive feedback and support from their colleagues, and do not have contact with teachers at other schools [10]. Collaborative reflection [11] and 'shared values and vision, collegiality and joint practical activities' have been identified as essential parts of professional learning programs [12]. Moreover, scholars describe that professional learning is based on research, engagement, and agency and that teachers are considered active producers instead of recipients of knowledge (e.g., [7, 13]). However, professional communities for learning need architecture or a design; if they are to produce results, they must be organized and arranged [10].

One way of working with professional communities for learning or collegial learning in schools is through so-called research circles, in which teachers and researchers collaborate on specific content [7, 14–16]. Research circles can be regarded as an action research approach, where researchers and practitioners see the process as a collective work [17]. Thus, the action research approach means, for instance, that those affected by the study are involved in joint exploratory work throughout the process on equal terms [17]. A previous study that has used research circles showed that the collaboration and reflections contributed to improvements in their daily professional practices [7]. Furthermore, the teachers anchored their experiences from the research circle in their preschool development plans [7]. Another study among teachers in schools showed that the research circle worked to deepen the development of teachers' competencies [16]. A conclusion from a recent study with teachers who had participated in research circles stresses the importance of when researchers and practitioners work together to translate research-based knowledge and theoretical concepts into practice and specify how practitioners can apply it when developing their actions [18].

Moreover, a study about school leader perspectives shows that they perceived it as an advantage that the teachers who participated in a research circle could exchange experiences from their everyday practice. Another benefit from the school leaders' perspective was that the researchers were necessary for the processes generated in the research circle. For example, they acted as catalysts for the conversation and the ideas that arose [15]. However, there are also challenges surrounding the implementation of a research circle and for example, not having suitable organizational conditions and getting enough time and space aside for the work. Despite this, it can be difficult for teachers to have enough time to participate. Another challenge may be that many teachers at the school are not included in the development work if the research circle focuses on a limited number of teachers, e.g., physical education (PE) teachers [15]. Research circles build on work that fits well in schools since education must be based on scientific grounds and proven experience [19]. In this context, practice-based research projects have a role to fill [6, 20] since teachers can continue professional learning based on research. This is important from a health promotion perspective

where participation and capacity building are highlighted [5, 21]. Moreover, scholars [22] recommend that health-promoting researchers engage users in the analysis and reporting phase and expand their ability to share their research outside academia.

In this study, physical education (PE) teachers collaborated with the researchers (the study's authors) in a research circle consisting of three meeting practices. The ambition was to increase professional learning regarding developing and implementing a health-promoting intervention (the Pulse for Health and Learning Intervention, PuLH) which incorporated a child-centred coaching approach. PuLH lasted for one academic year and focused on three mandated moderate-to-vigorous physical activity (MVPA) sessions per week which lasted 30 min. The pupils were supposed to be in a heart rate zone between 60% and 80% of their maximum heart rate for at least 20 min. The MVPA sessions were implemented for pupils in primary and middle school, in addition to the two ordinary PE lessons [23]. The purpose of this study was to draw benefit from physical education teachers' discussions and reflections of the implementation of PuLH, a health promotion intervention in school. The questions to be addressed are; (1) How do the practice architectures enable and constrain the PE teachers' implementation of PuLH? and (2) What discourses are visible in the PE teachers' discussions and reflections of the implementation of PuLH?

2. Theoretical framework

The development of professional learning among individual health promoters is a necessity but not a sufficient prerequisite for achieving effective health promotion work. The staff in an organization also need, for example, the support of their principals and colleagues and the resources needed to effectively implement health-promoting strategies [5]. The theory of 'practice architectures' [24] is used in this study to interpret, discuss and make sense of what PE teachers' discussed during the research circle about the implementation. Namely, what discourses had enabled and constrained their implementation of PuLH. The theory comprises three interrelated dimensions: cultural-discursive, material-economic, and socio-political arrangements [25]. The arrangements in the theory of practice architectures are structures that influence what is possible to say, do, and how one relates to each other in specific situations that influence practice. The arrangements can, just like the practice, be analytically distinguished, but they are also interwoven. These arrangements form the architectures of practice that enable and constrain or even hinder it [24].

Cultural-discursive arrangements are influenced by what is possible to say and talk about in a specific context and place in a particular time. The PE teachers' speeches in practice are influenced by how they talk about PuLH, what they can do, what is possible to do both in the local context and by discourses that exist both nationally and internationally. The PE teachers' speeches might also shape the tradition of sharing knowledge and reflecting on developing new ways of talking about content in PuLH, form, conditions for implementation, etc. Thus, the arrangements might shape the PE teachers' speeches about content and new ways of 'doing' to understand the role as an implementer and the knowledge that is important for creating new strategies and solutions for developing PuLH.

Material-economic arrangements influence opportunities for collaboration and meetings in practice. The research circle might enable PE teachers to collaborate and reflect on the implementation of PuLH. But, the time and place for meetings in the

research circle influence the opportunity for everyone to meet. Material-economic arrangements also influence the opportunities that exist in the PE teachers' practice to, for example, be able to conduct the PuLH sessions with suitable facilities and equipment.

Socio-political arrangements influence how PE teachers relate to each other. For example, how the PE teachers share their experiences of running PuLH, what activities they do, how the activities work, how they support each other in the development work. These arrangements shape practice based on power, communication, and approaches. Since a research circle is based on participation and collaboration, PE teachers have the opportunity to contribute with knowledge to each other. In addition, the schools' different decisions about PuLH condition the PE teachers' opportunities to run PuLH.

The arrangements keep practices in place, and for a practice to change, the arrangements must also change. In turn, a practice can also contribute to changing the arrangements and influence other practices (a local practice can also influence an entire municipality) [25]. Therefore, it is not only the specific practice that is studied but also its arrangement.

3. Method

This study has an action research approach [26] using research circles that aim to understand and change PE teachers' practices and the conditions that enable and constrain them. The action research approach requires PE teachers to inquire into their practices and is, by nature, participatory [27]. This implies that action research in this study aims to promote change derived from and responsive to the PE teachers' commonly addressed ideas and concerns, grounded firmly in their experiences.

3.1 Setting

The Pulse for Health and Learning Intervention (PuLH) was conducted in eight mixed socio-economic municipalities (population 7000–30,000 inhabitants) in the region of Jönköping, Sweden. The PuLH-intervention involved eight primary and middle schools from grades 4 to 9 (see reference [23] for a more detailed description of the PuLH intervention). During the PuLH-intervention, PE teachers in charge at each school participated in a collegial learning research circle (cf. [28]).

3.2 Research circle

PuLH was a practice-based health promotion intervention, and the initiative to start the PuLH intervention arose from schools' need to increase pupils' chances of improving their grades [23]. The idea of the intervention was based on some research showing that physical activity (PA) and MVPA correlated with pupils' academic performance [29–31] and that MVPA has a beneficial effect on their health [32, 33]. In this study, the research circle consisted of three full days of research circle meetings: in September 2017, in December 2017, and May 2018. The researchers, PE teachers, and each municipality's development managers planned to conduct the research circle. The research circle process was an iterative process where PE teachers discuss

Figure 1.
 The research circle process.

dilemmas and the content in the meetings with researchers, plan for a new act, and then act and so on (**Figure 1**).

The research circle was arranged to reflect in discussions the experiences of the implementation of PuLH and increase PE teachers' understanding of a coaching approach to include all children. The PE teacher's knowledge of their practice in the PuLH was also in focus, and discussions and reading aimed to give new insights to improve practice. The goal was to provide the PE teachers with conditions that enable them to change their practice and address the constraints satisfactorily (i.e., [34, 35]). Indeed, previous research has shown the value of researchers and practitioners working together [18, 22].

Activities were undertaken on a shared electronic platform between the three research circle meetings. This virtual space was supportive and allowed everybody to prepare and express their ideas and views for the meetings and read texts and scientific articles distributed by the researchers. During the research circle meetings, the researchers contributed to the process of relating the PE teachers' knowledge about their practices to scientific knowledge in a critical way.

We divided the PE teachers into two groups (A and B). At each meeting, the groups were mixed to receive input from different PE teachers and schools. Group A started to participate in lectures and applied workshops, and group B discussed experiences of the implementation of PuLH. After that, the groups switched. The researcher in charge at Halmstad University led each research circle meeting, and the two other researchers were observers. The first research circle meeting focused on health promotion and a child-centred coaching approach. The second meeting covered self-determination theory (SDT) concerning coaching. The third meeting focused on MVPA activities for pupils with disabilities and a presentation of preliminary results on the pupils' voices of PuLH [23] which we jointly reflected and discussed. The researcher asked relevant questions in the discussions but had a lowkey during the discussions. During the discussions, the PE teachers were encouraged to exchange experiences of the implementation of PuLH. Researchers led the lecture, and PE teacher educators led the applied workshops.

The first two research circle meetings were held at the conference room distributed by the Department of Research and Development within Education, Region Jönköping County, and the last one at Halmstad University.

3.3 Participants

The participants were PE teachers (N = 22, approximately 18 per meeting) from eight different primary and middle schools. The PE teachers represented a wide span, from a few years to those with several years of experience in the profession. At the beginning of the research circle meetings, only a few PE teachers had the experience of running MVPA activities at schools.

3.4 Data collection and ethical considerations

The data consist of group discussions, (n = 6) audio-recorded and transcribed verbatim in the research circle meetings. The transcribed empirical data amounted to 302 pages, Times new roman 12 points, double line spacing.

The PE teachers permitted to participate in the study and were informed of its purpose. They were ensured the data could not be traced to individual respondents or workplaces. The principles concern that all participants provided written consent and confidentiality. The Regional Ethics Review Board of Lund University approved this study (DNR 217/601), and the research follows The Swedish Research Council’s guidelines [36].

3.5 Data analysis

The first and last author conducted the data analysis. However, to reach a consensus in the data analysis, all research group members discussed all phases and steps. An abductive data analysis approach was adopted [37], which allowed us to engage in a dialectic process of considering data and draw on the theory of ‘practice architectures’ [24].

The analysis started with the transcripts being read several times to gain an overall impression of the material and distinguish patterns, variations, and differences in PE teacher’s discussions. The intention was to get an initial picture of the visible text through close empirical reading. Second, the selected texts were decontextualized into meaning units that covered the PE teacher’s sayings, doings, and relating’s that shaped the practice [26]. The meaning units were enabling and constraining aspects that we marked, condensed, and coded. Third, the codes were sorted and compared to identifying and arranged into discourses. Fourth, we identified key concepts in each discourse to highlight the nuance of the discourses (Table 1). Quotations from the PE teachers are presented to illustrate the discourses.

Discourse	Key concepts
Technical-rational	An optimistic approach To handle challenges
Participating	Challenges to motivate all pupils Including all pupils
Steering and supporting	Anchoring work Issues with scheduling Principal prioritization Support from principals and colleges

Table 1.
The identified discourses and key concepts in the research circle meetings.

4. Findings

During the analysis, three discourses were identified consisting of key concepts: how the practice architectures enabled and constrained the PE teachers' implementation of PuLH (**Table 1**). The findings are discussed about practice architectures [24] in the following section. In the excerpts, "IP" means interview person and "R" means researcher.

4.1 Discourses visible in research circle meetings

4.1.1 Technical-rational discourse

The *technical-rational discourse* dominated in the first research circle meeting but was also focused at the second meeting. This discourse refers to PE teachers' *optimistic approach* to technical solutions and their *challenges to handle* with them. The technical solutions covered heart rate equipment, maximum heart rate test, and heart rate zone. At the beginning of the research circle meetings, the more experienced PE teachers who had conducted MVPA activities during a more extended time before PuLH started acted as mentors to less experienced ones. Thus, the practice's social-political arrangements [24] enabled the PE teachers to share knowledge as they shared their experiences, received collegial support, and interacted with each other and the researchers. The more experienced PE teacher's optimistic approach to technical solutions influenced the other PE teachers to initially perceive the equipment as indispensable for pupils' MVPA activities. This means that the cultural-discursive arrangements [24] also initially constrained the PE teacher's discussions. Thus, experienced PE teachers' perspectives influence how they talk about PuLH and introduce less experienced PE teachers.

During the discussions in the first research circle meeting, large parts covered the challenges with the technical solutions. The PE teachers discussed the MVPA session's duration and how long the pupils should be in the correct heart rate zone. A joint decision was made in the discussions, i.e., a heart rate zone between 60 and 80%, since the PE teachers saw a risk of not receiving the desired effect if the heart rate was too high or too low. They expressed that it was challenging to get the pupils to be within the correct heart rate zone, i.e., not too high and not too low heart rate, and sometimes pupils' efforts did not seem to match what the heart rate monitor showed. Besides, the PE teachers discussed that some pupils need to get to know their bodies better, and they informed the pupils that it is not dangerous to have a high heart rate. In the first and second research circle meetings, the PE teachers also discussed that they shared experiences regarding difficulties in performing satisfactory maximum heart rate tests among pupils. That was especially difficult among pupils who had poor physical fitness, which can be seen in the following excerpt:

IP2: Yes, I agree with the maximum heart rate test, that it is difficult to get the pupils' heart rate up. Many pupils do not have a routine of being out and physically active, and may even feel uncomfortable getting out, as they have not done it before. One thinks they are completely exhausted even though one may not be close to their max...
(Research circle meeting 2, afternoon).

The maximum heart rate test among pupils [38] and the correct heart rate zone were problematized during the meetings due to methodological differences in previous studies (e.g., [39–42]).

At this time in Sweden, there was a societal discussion about MVPA and that these would positively impact pupils' academic performance and grades. The PE teachers' attitude to and discussions about this might have been influenced by cultural-discursive arrangements (cf. [24]), such as this societal discussion and an attentive book [43] within the theme and similar projects at other schools (e.g., [44]). The PE teachers' positive view of MVPA's impact on academic performance and grades might also have been influenced by results from systematic literature reviews, which indicate a relationship between MVPA and increased academic performance [40–42]. This shows that both national and international discourses influence what is possible to say and do in a specific context at a particular time [24]. However, the researchers problematized the evidence of MVPAs impact on academic performance within the research circle meetings since studies show that only one-third of the studies meet the criteria for estimating statistical power (e.g., [42]). Likewise, MVPA has a minimal beneficial impact on the pupil's academic performance or even a negative impact [39].

In the PE teachers' discussions in the two first research circle meetings, the PE teachers discussed allowing pupils who have learned to be in the correct heart rate zone to do MVPA without a heart rate monitor.

IP4: I think that it is the movement we want, and I notice that they [the pupils] have better movement sometimes; it is ok that not everyone wears a heart rate monitor.

IP6: it is also possible to use it in another teaching.

IP4: yes exactly, it certainly is not a loss in that way. I think it's a poor argument that it [the heart rate band] should only be for that [MVPA activities].

R: it may be good at first, and then later it can be lent out to another school.

IP4: yes, exactly. Or some new ones [pupils in grade 7] that are coming.

Since perhaps the eighth graders [pupils in grade 8] are already familiar and accustomed to it, it will be a financial saving for them instead of buying new all the time.

IP5: they know roughly how they are to be [in the heart rate zone] to...

R: they [the pupils] have learned it [the heart rate zone] (Research circle meeting 3 – forenoon).

In the third research circle meeting, discussions of the importance of technical solutions were no longer dominating. The PE teachers developed knowledge over time in parallel with us presenting and problematizing current research results (e.g., [39–42]) and their experiences of implementing PuLH and the possibility to discuss with each other. The PE teachers discovered that if MVPA can be conducted without a heart rate monitor, it provides an opportunity for them to be outdoor and space for more classes to participate in MVPA. Some schools had a sports hall for MVPA sessions, whereas others were forced to have MVPA sessions in a big lecture hall that was unsuitable for PA. Thus, the material-economic arrangements [24] constrained some of the PE teachers' practices by not having the opportunity to have the PuLH lessons in a sports hall and having a heart rate monitor for all pupils.

4.1.2 Participating discourse

The *participating discourse* occurred within all discussions in the research circle meetings but increased after each meeting and became most dominant in the last meeting. This reflects the content and development of the research circle meetings that included health promotion, a child-centred coaching approach, SDT, and adapted PA.

This discourse covers PE teachers' discussions regarding *challenges to motivate all pupils* and how to handle these by coaching pupils to participate in MVPA. Coaching was something that the PE teachers also applied in the first research circle meeting. Challenges to motivating all pupils were experiences that several PE teachers shared, especially those who seldom participated in ordinary PE.

IP5: It is, of course, the pupils who do not go there at all, it is really very difficult. They do not participate in ordinary PE lessons either, etc. //...// We have not really found those pupils that ... we have motivated others, but not them (Research circle meeting 1, forenoon).

At the first and second research circle meetings, the PE teachers also discussed motivation issues covering some pupils not wanting to participate if they show their bodies in front of peers. They said, for instance, some pupils express discomfort in the locker room when they put on the heart rate monitor since they must expose their bodies in front of peers. This also emerged in the study where we interviewed the pupils in the PuLH intervention [23]. Indeed, some pupils associate PE and MVPA with anxiety and discomfort due to negative self-image and body perception [45]. The social-political arrangements [24] enabled the PE teacher to share the experience of some solutions. For example, some PE teachers expressed that they adapted the locker room situation by motivating the pupils to shower in private such as using shower curtains or having school staff in the locker room. Other PE teachers shared experiences adapting the MVPA activities to include all pupils, such as listening to pupils' voices of their needs so that all could and wanted to participate. The PE teachers also discussed that since the MVPA activities were not graded, it made it easier to *include all pupils* to participate, which also was found in the study with the pupils [23]. In addition, to include all pupils, the PE teachers allowed them to choose activities, which can be seen in the following excerpt:

IP1: There is no assessment there at all; there is no one who stands and examines me [the pupils] critically and checks what skills and abilities I have. It's a way of attempting to get them involved. It's just, you should just try to move about more here. And we often have that they get to choose between different activities and that is great because then one chooses something one feels safe and comfortable with (Research circle meeting 1, forenoon).

To encourage the pupils to participate in the MVPA activities, the PE teachers created individual solutions for pupils with special needs, such as neuropsychiatric disabilities and physical disabilities. For example, they were offering additional MVPA activities each week to make it possible for them to concentrate better in the classroom, which also was found in the study with the pupils [23]. Furthermore, to make it possible for all pupils to want to participate in MVPA activities, they offered some pupils (often girls, pupils with overweight, and immigrants) to enter the locker

room earlier to avoid exposing their bodies. The following excerpt illustrates how one PE teacher creates a solution to increase the possibility for pupils with overweight to want to participate:

IP2: We have had problems with some finding it uncomfortable to have a heart rate monitor and then having to feel it, having to put on the heart rate monitor in front of others in the locker room if they are perhaps a little overweight, and things like that. So, in such a situation, we have made alternative arrangements available to them; they are not required to wear the heart rate monitors every time; it is better that they still move about ... but they are not connected up [attached] (Research circle meeting 1, forenoon).

These adjustments align with the content of the research circle meetings in which the PE teachers took part in lectures and workshops on health promotion and health coaching. These activities might explain this adaptation and development of PuLH. The PE teachers received lessons and workshops on adapted PA and health coaching in the research circle meetings to encourage all pupils to participate. In the last research circle meeting, the PE teachers shared the experience that they had adapted the MVPA sessions over time to create opportunities for all pupils to participate. The PE teachers also described that they noticed that the pupils' conflicts had decreased, and cohesion improved. Thus, the cultural-discursive arrangement [24] has enabled the PE teachers to jointly reflect and contribute to shaping the PE teachers' talk about PuLH content and new ways of coaching and knowledge necessary for creating new ways and solutions to develop PuLH activities.

R: has your way of working with MVPA changed over time when they have worked with it? //...//.

IP1: ... We have put more focus on the fact that they only raise the heart rate. //...// We play more now we did than before. //...//.

IP2: Gradually, we have loosened up a bit [the activities] a little more voluntarily. From the beginning, the situation was that everyone does the same things when one stays in the heart rate zone, but then when it gets where one wants it [the pupils feel that they are in the right heart rate zone], they get a little more in terms of alternative options to do something else. I'm going to practice my ballet dance, well then do it. //...// One finds a corner so that they can do it so that they not only stand in front of that board but rather they can ...

R: be flexible [?]

IP2: yes (research circle meeting 3, afternoon).

4.1.3 Steering and supporting discourse

The *steering and support discourse* occurred in the discussions in all research circle meetings but dominated, especially in the second meeting. At these meetings, the PE teachers discussed and reflected upon how to progress with the implementation process in their schools. They discussed the importance of conducting school *anchoring work* to involve all school staff. This is a social-political arrangement [24] that enables

to carry out the implementation. Another issue within this discourse refers to *issues with scheduling*. PE teachers at some schools discuss that poor scheduling, e.g., short time between MVPA sessions and the following lesson, contributed to a stressful situation for the pupils. Some of the PE teachers in the theoretical subjects were very negative and gave invalid absences to the pupils that arrived a little late.

IP3: ...it became very tight in the schedule. The pupils only have ten minutes to change clothes before the MVPA activities //...//. Then after the workout, they have a quarter of an hour to be back in the classroom after showering and changing again...

IP4: I can fill in there. We have had the same dilemma with the schedule. The negative impacts are that the colleagues who are connected to the MVPA activities' become very negative and have even started to put invalid absence on the pupils [record], even though they have ten minutes on the schedule to finish and change [clothes] to go to the next lesson (Research circle meeting 2, forenoon).

The PE teachers in the theoretical subjects have a power position over the pupils, which indicates the importance of clearly anchoring the implementation of PuLH in the schools so that all PE teachers facilitate a good situation for the pupils. The PE teachers discussed the importance of scheduling MVPA carefully to prevent pupils' stress. Some of the pupils in PuLH also expressed that they experienced negative stress due to poor scheduling [23]. The school's decision on how MVPA activities' scheduled is a social-political arrangement [24] that conditions the PE teachers' opportunities to run PuLH. PE teachers at schools who had planned PuLH carefully described that the scheduling between ordinary lessons and PuLH had worked well. The PE teachers also discussed the importance of schedule MVPA before lunch to positively affect the pupils during the whole school day. Similar findings were also found among the pupils in PuLH [23].

The PE teachers discussed the pupils' energy balance, and the need to promote their opportunities to get enough food at school as they became hungry when they were more physically active. Some of the PE teachers describe that the pupils became hungrier after PuLH started; despite this, they were not allowed to eat more lunch because there was no more food available. The limited school lunch constrained the practice and therefore was framed by the material-economic arrangement [24] because the pupils had difficulty coping with the lessons after PuLH if they were hungry. At the same time, this arrangement enables the practice in other schools since the *principals prioritized* and had decided that the pupils were offered refreshments and breakfast to have enough energy to manage the whole school day after introducing PuLH. They have also decided to extend the school week by 90 minutes to reduce stress between lectures. These efforts entail increased costs, and some of the PE teachers described that their school does not have the financial opportunities. In contrast, other PE teachers said that their principal had prioritized it.

IP4: it is precisely this comprehensive way of thinking so certain heart rate-boosting activity in all its glory, but then there is a lot of other things in terms of sleep and diet that have an impact and that is how we as a school deal with it? We have extended our school day, unlike some others, because some drive, take a little time from each subject. We have actually extended our school week by 90 minutes, which means that they ended at 10 to 3 at the latest. Now we have those who go to a quarter to four and the days that they go a long time, they also get a snack in the afternoon. So it was also such a thing as after this that we replenish with that energy intake even after lunch.

IP2: it is where we want to be (Research circle meeting 2, forenoon).

This discourse also involves discussions regarding PE teachers' experience of *support from principals and colleagues* and lack of support. Some PE teachers feel lonely as they do not get enough support and help from other colleagues. In these cases, they would like the principal to mark. Other PE teachers express positive support experiences from their principal, who has communicated that the PuLH-intervention will be conducted. Also, the principal has provided an additional teaching resource. However, some PE teachers described feeling a lack of support from principals due to a lot of responsibility placed on them to do PuLH work. The support is framed by a material-economic arrangement [24] that influences PE teachers' practice opportunities.

Another aspect of this discourse covers that PuLH was arranged so the PE teachers could participate in the research circle meetings and discuss with teachers in the same profession and be free from teaching during the three full-days meetings. This material-economic arrangement [24] of the practice enabled all PE teachers to participate in research circle meetings. In the last research circle meeting, the PE teachers reflected upon the value of taking part in these meetings. The PE teachers discussed that they had learned a lot since they had had the opportunity to discuss with the researchers and support and help each other since they share many similar experiences.

IP1: It has been positive, it has been nice to meet others who have also struggled with the same difficulties, or the same issues, and get input on how the leadership stands at different schools. How to solve purely in terms of logistics and scheduling. Getting new thoughts and ideas.

IP5: Yes, we have really looked forward to these meetings, to discuss certain things and hear how things should be done and such.

IP2: Getting some critical eyes, how can one do that in that way, or what did you think about that there? (Research circle meeting 3, afternoon).

The social-political arrangements [24] for the meeting practice made it possible for the PE teachers to collaborate and develop the activities. Indeed, a previous study confirms the value of researchers and practitioners working together to develop teachers' actions [18]. Finally, some PE teachers expressed that their school principal had decided that PuLH should become an ordinary part of the school day, which is a material-economic arrangement [24] that enables the PE teachers' implementation of PuLH.

5. Conclusions

When implementing a health-promoting intervention with an influence of a bottom-up approach such as PuLH, the PE teachers' interests, and questions are central, unlike other more traditional top-down programs [46]. However, the implementation of PuLH has been challenging since the implementation is both enabled and constrained by the practice of other PE teachers and principals practices. Challenges often arise when interventions are implemented [2, 3]. The

material-economic arrangement [24] shapes the practice visible in the steering and supporting discourse, which meant that all PE teachers were allowed to participate in the research circle meetings and were given enough time aside to implement PuLH. This is essential for PE teachers to be able to run and implement interventions (cf. [3, 15]). In this study, the findings demonstrate that PuLH worked well for the pupils in the schools that provided enough food (refreshments, lunch, and sometimes breakfast) and extended the school day to reduce stress between PuLH and the next lesson. In these cases, PuLH was well-planned and proved to offer equal conditions for all pupils. Indeed, PuLH promoted health and well-being among the pupils [23]. Well-planned health promotion interventions in school should promote pupils' well-being and thus align with the UN Convention on the Rights of the Child (UNCRC) [47]. At the same time, the findings also demonstrate that some PE teachers were given unequal conditions to implement PuLH. For example, a low level of anchoring had been implemented, they had poorer scheduling and received less support from colleagues and principals, which constrained the implementation work. Good conditions in health promotion interventions are essential for teachers to be able to run and implement interventions [2, 3]. However, the discussion in the research circle meetings about contextual factors increased the PE teachers' awareness that structural challenges must reach the principals of schools where this was a problem.

Another conclusion is that the PE teachers' reflections and discussions were shaped by cultural-discursive arrangements (cf. [24]), showing how the PE teachers strengthen each other by willingly sharing experiences and helping each other during the research circle meetings to develop a well-planned PuLH. By sharing experiences, they found out how others dealt with practical issues, and in turn, they could bring new insights to their practice to develop, reflecting the idea within the research circle (i.e., [34, 35]). With PE teachers' interactions and openness in the social intersubjective space [24], the research circle meetings assisted new relationships and collegial support. The PE teachers' professional development might have been influenced by the other teachers' practices and initiatives and their ability to collaborate with the others. In addition, the PE teachers' professional development may have benefited from the collaboration with the researchers when jointly critically reflecting on the implementation of a child-centred perspective on practice. Indeed, researchers can act as catalysts for the discussions within the research circle meetings necessary for teachers' processes and professional development (cf. [15]).

The process of the research circle meetings demonstrated that the PE teachers started to problematize the implementation of PuLH. The PE teachers' new insights and transformed views were shaped by social-political arrangements (cf. [24]). In this arrangement, the technical-rational discourse dominated initially and then decreased during the meetings. The PE teachers took a critical stance, revalued the heart rate equipment, and found new ways of using it by sharing experiences. For instance, the PE teachers became convinced that the heart rate equipment is not needed in the same way and extent. They maintained that it is helpful in the beginning when pupils need to get to know their body and their heart rate. In the participating discourse, it was clear that the PE teachers created solutions to include all pupils in PuLH, for instance, listening to the pupils' voices, adapting the locker-room situations, and tailored solutions for pupils with special needs. The content might explain this solution-oriented approach in the research circle meetings, which focused on a child-centred coaching approach. The participating discourse in this study is also in line with a health promotion practice (cf. [48]).

An action research approach can play an essential role in implementing health-promoting interventions for pupils. In this way, PE teachers are stimulated to participate more actively in the research process than is usual. The researchers helped shape the design of the PuLH, and at the same time, the PE teachers have contributed insights into what works and does not work in practice. Thus, the PE teacher's specific knowledge of their practice is essential since an intervention needs to be implemented within the particular context and their contextual factors [2]. Through this collaboration, theory and practice have intertwined as both parties have contributed with experiences and knowledge that developed PuLH. This has been important to stimulate critically conscious acting and decision-making, which is essential when building coalitions between researchers and practitioners.

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Conflict of interest

The authors declare no conflict of interest.

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Author details

Linn Håman^{1*}, Katarina Haraldsson^{2,3} and Eva-Carin Lindgren¹

1 School of Health and Welfare, Halmstad University, Halmstad, Sweden

2 Department of Research and Development Within Education, Halmstad, Sweden

3 School of Public Health and Community Medicine, Institute of Medicine,
University of Gothenburg, Gothenburg, Sweden

*Address all correspondence to: linn.haman@hh.se

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