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Implementation of triple the time spent on physical education in pre-school to 6th grade: a qualitative study from the programme managers’ perspective

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Highlights

• Involvement of schools in programme content development may improve implementation

• School programme promoters help managers address problems at an early stage

• A professional development course supports teacher capabilities and motivation

• Outdoor physical education supplements limited indoor facilities and resources

Abstract

Schools constitute an important arena for promoting physical activity. However, school-based programmes often face implementation challenges, and the identification of factors influencing the implementation process is considered important in order to secure the effectiveness of future interventions. The aim of this study was to identify factors influencing the various implementation stages during the initial years of a programme.
tripling the amount of physical education at the primary school level. Document analysis of publicly available programme descriptions and meeting minutes, were conducted. Document analysis was complemented by two semi-structured group interviews with main programme managers to gather in-depth programme experiences and perspectives. Results show that early involvement of schools may ensure the best possible match between programmes and the needs and resources of schools, and that an ongoing shared partnership may help programme managers address program challenges in early stages. It seems that predetermined core elements in programmes are essential. At the same time programmes must be flexible enough for adaptation to individual school contexts. Finally, the implementation of triple the amount of physical education, is supported by teachers receiving a professional development course focusing on how to organise outdoor physical education in different seasons and weather conditions.

**Keywords**

*Health promotion; Physical education; Physical activity; School; Implementation; Qualitative research approaches; CHAMPS-study DK*

**Abbreviations**

PA, physical activity; PE, physical education; SP, The Svendborgproject; ATC, Age-related Training Concept; CHAMPS-study DK, Childhood Health, Activity, and Motor Performance School Study

**1. Introductions**

Studies have made it clear that physical activity (PA) has positive effects both on children and adolescents physical and mental health and on their academic achievement (Bauman, 2004; Bugge, 2015; Pedersen, Andersen, Bugge, Nielsen, Overgaard, et al., 2016; Singh, Uijtdewilligen, Twisk, van Mechelen, & Chinapaw, 2012; Strong, Malina, Blimkie, Daniels, Dishman, et al., 2005). International guidelines recommend that children of school age participate in at least one hour of moderate to vigorous PA a day (WHO, 2010). However, globally only a fraction of school-aged children and youth achieve this guideline (Inchley, Currie, Young, Samdal, Torsheim, et al., 2016; Kalman, Inchley, Sigmundova, Iannotti, Tynjala, et al., 2015). This is
troubling, and there is a need for strategies that can lead to a sustained increase in PA in the younger generations. Studies have identified the school setting as an important arena when promoting the recommended daily level of PA among children and young people (Dobbins, Husson, DeCorby, & LaRocca, 2013; Harris, Kuramoto, Schulzer, & Retallack, 2009; Waters, de Silva-Sanigorski, Hall, Brown, Campbell, et al., 2011). Yet, despite this focus on the inclusion of PA in primary schools, there is still a continuing need for implementation research that focuses on how to translate and disseminate effective interventions into everyday school practice with meaningful outcomes (Antikainen & Ellis, 2011; Austin, Bell, Caperchione, & Mummery, 2011; De Meij, Chinapaw, Kremers, Van der Wal, Jurg, et al., 2010; Naylor, Nettlefold, Race, Hoy, Ashe, et al., 2015; Saunders, Evans, Kenison, Workman, Dowda, et al., 2013).

Since multifaceted school interventions in real-world settings often face implementation challenges, the documentation of both planned and realized pathways to put interventions into effect represents a key component in translating promising initiatives into practice (Austin, et al., 2011; Dobbins, et al., 2013; Naylor, et al., 2015). The aim of this study, then, is to describe and analyse the experiences of the initial implementation of the Svendborg project (SP) – a long-term intervention programme, based in the Danish municipality Svendborg, focusing both on improving the quality of physical education (PE) and tripling the amount of PE in public schools. SP is regarded as an important school-based initiative to promote child and adolescent health. Quantitative research has proved its effectiveness in relation to overweight and obesity and a reduction in cardiovascular risk factors (Klakk, Andersen, Heidemann, Moller, & Wedderkopp, 2014; Klakk, Chinapaw, Heidemann, Andersen, & Wedderkopp, 2013). Subsequently, researchers were able to demonstrate that the increased amount of PE in SP-schools had no negative effect on the academic ability of involved children and young people (Bugge, Moller, Tarp, Hillman, Lima, et al., 2017). It was also demonstrated that children attending SP-schools were more active and less sedentary during school time than students attending Non SP-schools (Moller, Tarp, Kamelarczyk, Brond, Klakk, et al., 2014) – an important finding for political decision-makers because it suggests that schools, offering an added amount of PE, may reach children and adolescents that otherwise are rather sedentary in their leisure time. These reports triggered even higher political interest. For instance, a few years into the programme the mayor of Svendborg, with the backing of the local government, announced that the municipality would allocate the funds necessary to involve all
schools fully in the programme (Henriksen, May 5, 2011). The continued interest from both research partners and key municipal decision-makers is a salient feature of SP and have been suggested as part of the reason for the long-term sustainability of the programme over a period of nearly ten years and the expansion to all seventeen schools in the municipality. However, no qualitative studies have been conducted to investigate which factors have influenced implementation during the initial years.

1.1 Staged implementation

Implementation of school-based, behaviour-related interventions is a process that typically occurs in a number of stages, many times unfolding over the course of years, and typically including some core functions in each stage (Fixsen, Blase, Naoom, & Wallace, 2009; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Metz & Albers, 2014). According to Metz and Albers (Metz & Albers, 2014), the implementation process often starts with a number of preliminary steps prior to the actual intervention activities. Such early work ideally begins with a planning stage in which the needs of stakeholders and the implementing site as a whole is established. The fit of suggested intervention components with identified needs are subsequently appraised, together with the initial readiness and capacity of implementation teams and systems to adopt new practice (Metz & Albers, 2014). Via the following preparation stage, the necessary competencies and infrastructural support to deliver and maintain the intervention are developed further and consolidated (Metz & Albers, 2014). Following these initial stages, the intervention is put into practice and implemented with a focus on fidelity (understood as consistency of delivery as intended) and ongoing improvement and sustainability (Metz & Albers, 2014). While the stages imply a linear sequence of steps, in reality there is often a dynamic flow to the work. In other words, in practice the stages overlap with a number of iterations.

This study aim to identify factors influencing the planning, preparation and implementation stages of SP, as described by Metz and Albers (Metz & Albers, 2014) - among other things to evaluate to what degree the programme has followed an ideal format as sketched out above. This study provides unique insight into a real-world programme containing more PE in primary school that has successfully been implemented, maintained and later scaled up. By exploring the factors influencing the various implementation stages it is possible to support the implementation and sustainability of future school-based PA interventions.
2. Method

2.1 Setting

In Denmark children attend school from the age of 6 (pre-school) to the age of 16 or 17 (9th or 10th grade) and public schools are funded from taxes and organized by the local authorities in the municipality. The impetus for the SP came from municipal authorities initiating a partnership with Team Denmark (the Danish Elite Sport Foundation) promoting an added focus on PE in the municipality’s primary schools. Municipal employees highly involved in the initiation of the partnership also took the role as programme managers and initially designed the outline of the programme. SP was designed in a political setting that valued evidence-informed approaches and where supporting children and youth in being active was part of the local education agenda. Consequently, all nineteen primary schools in the municipality of Svendborg were invited to participate in SP, of which six chose to participate. These six schools have been part of the programme since initiation in 2008 and been scheduling 4.5 hours of weekly PE for ten years. Schools choosing not to participate in the programme substantiated that it was due to either logistical or economic reasons (e.g. allocating resources for teacher salaries due to the additional hours of PE and PE teachers needing time to participate in the professional development course). However, shortly before SP was initiated by the schools, politicians decided to support the six participating schools financially.

School managers and PE teachers from the six participating schools were invited to take part in a working group responsible for designing a setup that would triple the amount of weekly PE from pre-school to 6th grade. The core elements of the programme, which all schools had to implement, involved the school-children receiving a minimum of 4.5 hours of PE every week spread over at least three school days. When SP was initiated the norm in Denmark was 1.5 hours of PE every week. In addition, each school had to assign a programme promoter (a school staff member) to act as ambassador for the programme and participate in programme meetings, and all PE teachers were to attend a professional development course based on an Age-related Training Concept (ATC) developed by Team Denmark (Bach & Eiberg, 2010; Pryce, Willeberg, Falkentoft, & Meyhoff, 2005). The main principles of ATC are to focus on children’s physical, physiological,
mental, and social development to enhance and optimize motor skills. The resulting plan was accepted by the city council prior to implementation at the participating schools.

The programme was not initiated for the purpose of research, which markedly increased the likelihood that similar approaches could, if relevant, be implemented elsewhere in Denmark and maybe even in other countries. From the very beginning, however, key sponsors and managers of the programme allowed researchers to follow the programme. Hence SP has been characterized as a community-based intervention, studied by researchers as a so-called natural experiment (Craig, Cooper, Gunnell, Haw, Lawson, et al., 2012; Wedderkopp, Jespersen, Franz, Klakk, Heidemann, et al., 2012). In a multifaceted quasi-experimental study, with matching of SP-schools and Non SP-schools, the research group was able to demonstrate that the intervention lead to relevant modifications in PA behaviours among school-aged children and important health aspects (Klakk, et al., 2014; Klakk, et al., 2013; Moller, et al., 2014). An overview of the various operators in the initial process is illustrated in Figure 1.
2.2 Design of this study

The present study is part of a larger programme of research, the Childhood Health, Activity, and Motor Performance School Study (CHAMPS-study DK), that addresses the overall evaluation of SP (Wedderkopp, et al., 2012). This research programme has two aims: a) to identify the effects of the programme on physical health and cognitive performance/academic achievement, and b) to evaluate the implementation process of SP in order to establish recommendations on how to translate new findings from school-based PE programmes into practice and identify applicable procedures to design and implement multifaceted PA initiatives at the school level. The present study relates to the latter.

2.3 Methodology

To identify factors influencing the various implementation stages described by Metz and Albers (Metz & Albers, 2014), both document analysis and semi-structured group interviews were conducted. The document analysis was used to identify salient implementation factors and to underpin the construction of a more pertinent interview guide (Greene, 2007a). Following the interview rounds, the documents and interviews were collated with a view to have them complement each other through an integrated analysis (Greene, 2007a). Additionally, the study adopted a pragmatic standpoint, focusing on identifying elements that could be important and/or have worked in a particular programme aimed at engaging schools in increasing the amount of PE (Denscombe, 2008; Greene, 2007b).

2.4 Interviews

2.4.1 Sampling

To complement the document analyses, interviews focused in particular on programme experiences during the planning and preparation stage. Purposeful sampling of key informants was used to create a pool of respondents who were most likely to have accumulated detailed insight into the programme over prolonged periods of time.
Kelly, 2010). Respondents were chosen from those programme managers who had been employed during the initial years of the programme. Programme managers were chosen as they have not only been disseminating strategies and guidelines to schools and other stakeholders but have also been in close dialogue with each school and gathered information from all stakeholders in the programme (Figure 1). Thus, programme managers had in-depth knowledge and insight of the preparation, planning and implementation stages. Five programme managers met this criterion and three of these were invited to participate. Two were still working on the programme, while the third, who was considered to be the founder of the programme, was no longer attached to the municipality. The two programme managers not included in the study sample had only been temporarily involved in the programme.

2.4.2 Conducting the interview

Interview data were collected by means of two face-to-face semi-structured group interviews and conducted by the first author (JVN) and the fourth author (MLA). All three programme managers were present at both interviews. Semi-structured group interviews were chosen in order to bring together these three primary respondents and gather their collective memory and constructions. Due to the possibility of respondents experiencing memory gaps of different processes, being in a group interview allowed them to comment on things that they not would have brought up in a single interview due to re-call difficulties. Interviews were performed in a private room at the workplace of the current programme managers. Both interviews were audio recorded.

The interviews were based on the various implementation stages presented by Metz and Alberts (Metz & Albers, 2014). The interview guide consisted of open-ended questions and an example of the interview-guide can be found in Appendix A. The first interview mainly focused on, but was not limited to, the planning stage and the aim of the programme. This formed the basis for the second interview, which mainly focused on the preparation stage through planned implementation strategies. Respondents received a letter of information before the interviews, explaining the purpose of the interview, underlining the focus on the pre-programme period and programme start-up phases. Following the first interview, the data were analysed and a second interview with the same three programme managers were performed. This was done to increase depth
and credibility of the information gathered in the first interview by promoting elaborations and clarifying unclear descriptions or uncertainties. Examples of supplementary questions in the second interview were: During the last interview, we talked about the goal of the programme. Our impression was that the two overarching goals were [results from the first interview] - Is this correct?

2.5 Documents

Documents were retrieved in two stages, firstly via programme managers responsible for documents dating back to the initial programme planning period, and secondly by searching the municipal electronic archives and school websites for additional records regarding SP. All retrieved documents formed part of the public record ([Dataset] & Nielsen, 2017) and can be sorted into five categories: city council minutes (n=3), collaboration minutes (n=9), information material on programme content (n=1), early evaluations (n=2) and individual school strategy reports (n=5).

City council minutes outlined the initial programme plan, as it was presented and subsequently approved by local political committees and councils. The collaboration minutes mainly describe and map the working relationship between programme managers and school promoters (comprising both school leaders and PE teachers). The specific information materials (in the form of a comprehensive brochure) was produced by the programme managers and contained information on core content and what being part of SP involved. Early evaluations are from two different timepoints; one after two years by school promoters and programme managers assessing the initial implementation process; and one after three years collecting the experiences from participating schools on how to implement the programme. School strategy reports were produced by participating schools describing their implementation process during the first three years. Only five school strategy reports were created due to two schools from the same district choosing to compile a joint school strategy report. Altogether, the documents recorded experiences reported both by programme managers and by schools covering the period of 2007-2012, the main weighting being on 2010-2012 (n=16).

2.6 Ethical considerations
Written informed consent, also containing consent for publication, was collected from all participants at the beginning of each interview. The programme of research was approved by the Danish Research Ethics Committee (Project-ID: S-20080047 and S-20140105).

2.7 Analysis strategy

Both document and interview data were analysed using qualitative content analysis (Schreier, 2014). Firstly, data were inductively sorted into emerging categories, and sub-categories were created among the individual categories. Subsequently, all material was examined by the first author (JVN) to make sure all relevant aspects had been covered by a category.

2.7.1 Documents

Documents were analysed prior to conducting the interviews – among other things to establish to what degree they could fulfil their intended role in supporting the design of the guide for the interviews and offering a supplementary perspective to the empirical materials generated via interviews.

2.7.2 Interviews

Prior to actual analysis, the recordings of the interviews were listened through to achieve familiarity and then transcribed by the first author (JVN) and fourth author (MLA). Respondents were anonymized and assigned a number (1 to 3).

2.7.3 Integrated analysis

As a final step, the interviews and the document materials were combined in an integrated analysis. Categories and sub-categories identified in the interview were compared with the initial categories from the document analysis in order to confirm congruity, to make adjustments or to create new categories. To enhance trustworthiness, MLA was given access to the coding and assessed the analysis through peer-debriefing, systematically and critically examining the adequacy of the coding (Barbour, 2014). Through discussion of discrepancies, JVN and MLA reached consensus for the categories and sub-categories. Finally, a joint list of
categories and sub-categories was constructed across the two methods. To ensure the credibility of the analysis all categories and sub-categories were identified in both interviews and in at least two of the different document sources (Table 2). Findings were sent to the interviewed programme managers for comments and validation. In the final step of the analysis all categories and sub-categories were categorized in relation to each of the implementation stages outlined by Metz and Alberts (Metz & Albers, 2014) (Figure 2).

<table>
<thead>
<tr>
<th>Categories and sub-categories</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>City council minutes</td>
</tr>
<tr>
<td>Ownership</td>
<td>(N = 3)</td>
</tr>
<tr>
<td>- Early involvement</td>
<td>3</td>
</tr>
<tr>
<td>- Autonomy</td>
<td>-</td>
</tr>
<tr>
<td>Professional quality</td>
<td>-</td>
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<tr>
<td>- Skills</td>
<td>-</td>
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<tr>
<td>- Practicability</td>
<td>-</td>
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<tr>
<td>Co-creation</td>
<td>-</td>
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<tr>
<td>- Partnership</td>
<td>-</td>
</tr>
<tr>
<td>- Close dialogue</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2: Categories and sub-categories across data sources
3. Results

Integrated analysis revealed three categories influencing the implementation process: (i) Schools’ sense of ownership of SP, (ii) Professional quality of the PE lessons, (iii) A collaborative and creative mindset shared by programme managers and schools. Two sub-categories were identified in each of these categories. An overview of sub-categories with short descriptions is displayed in Table 1.

<table>
<thead>
<tr>
<th>Categories and sub-categories</th>
<th>Elaborations of sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td></td>
</tr>
<tr>
<td>- Early involvement</td>
<td>Schools were asked if they were interested in participating in a programme increasing the amount of PE. Interested schools were invited to join the initial workgroup that developed the final version of the programme</td>
</tr>
<tr>
<td>- Autonomy</td>
<td>Programme managers acknowledged schools as having individual autonomy and interests and encouraged schools to fit the programme to their individual school context</td>
</tr>
<tr>
<td>Professional quality</td>
<td></td>
</tr>
</tbody>
</table>
- Skills
PE teachers participated in a mandatory professional development course giving them new skills concerning teaching methods

- Practicability
PE teachers became more aware and were given tools to help them arrange outdoor PE in all seasons and all weather conditions

Co-creation

- Partnership
Schools assigned programme promoters, who participated in collaboration meetings at which they had ongoing influence on programme improvement and development

- Close dialogue
Programme managers strived to be visible at the schools and established regular meetings with school promoters

Table 1: Overview of categories and sub-categories with sub-category descriptions

3.1 Ownership

Early involvement: Interviews and minutes from city council decision meetings, showed that all schools in the municipality of Svendborg were initially asked if they were interested in participating in a programme focusing on increasing the amount of PE. Those schools who chose to be part of SP were also asked to join a working group. This group adjusted initial ideas and suggestions on programme content into a plan best suited to the schools of the municipality. For instance, the working group produced a strategy for unrolling the programme over a three-year period, which at the start included pupils from pre-school to 4th grade in 2008, adding 5th grade students in 2009 and 6th grade students in 2010. The content suggested was initially outlined by Team Denmark and the programme managers. One of the aims of this process was also to establish core programme elements that had to be implemented at all participating schools. However, the working group was not limited by this content but could develop additional aspects. The workgroup was, at first, asked not to think in terms of the economical expenses, such additional working hours or the lack of materials and facilities (e.g. gym time and equipment).

[The schools] were to report back if they had interest [in participating in the programme]. And those who were... helped create the concept ... that’s the secret! ... They were not to think of limits, they were not to think of
economy, and they had to think out of the box ... it took a while, but then it just dawned on them, and they could not stop smiling, and it was like this...
this is going to be great! [Programme manager 3]

Autonomy: Interviews show that the programme managers acknowledged schools as autonomous partners and assisted them in adjusting the concept to their specific institutional context. Acknowledging autonomy encouraged the schools to find their particular way of implementing core programme elements (4.5 hours of PE distributed over at least 3 days a week and having all PE teacher participate in a professional developing course and having a programme promoter) and, in the process, tailoring them to their individual conditions. The interviewees points to this feature as important for school compliance with the program – among other things because it supported both school heads and teachers in their work with making the programme work in an already full curriculum.

Even though the schools focus on physical education, they can still focus on other things, e.g. creative subjects. The school is of course for all children - not just those interested in sports [Internal evaluation, 2010]

All schools developed individual school strategy reports describing how they had adopted and implemented core elements and how being part of the programme had affected their school. Schools had different ways of fulfilling the core elements and made different adjustments in their approach to the programme. Some schools, for instance, chose to split the 4.5 hours of PE over five days a week, and some chose to split the same amount of PE over three days a week.

If schools had supplementary ideas, they were also encouraged to make additional initiatives as part of their involvement in the programme. Hence, some schools chose to increase focus on PA in other subjects by adding extra elements like dancing in their music lessons or by jumping to multiplication tables in maths. Some schools also increased focus on conducting more lessons outside the classroom to promote PA, and some promoted active commuting to school (walking, cycling etc.).
During the winter period, we have trained for a joint spring concert and it was a huge success. We repeat the concept again this year. Students are given the opportunity to immerse themselves in something special, master it and show it. It has been a very valuable and inspiring first year. We have also operated with a structure where teachers were planning together so that several classes could have physical education at the same time. They had different stations in the gym and it led to high intensity and positive energy [School strategy report 2009]

3.2 Professional quality

Skills: Interviewees emphasised that one of the core aspects of SP was not only to implement more PE but also to ensure an increase in professional quality of PE. This was done by enrolling all participating PE teachers in a professional development course providing them with (i) the skills needed to deliver new teaching methods and new ways to organize the extra PE, and (ii) knowledge and understanding of the primary aims and unique qualities of SP. Initially this course had been established as one of the core elements that all schools had to implement to be part of the programme. However, the course was not available until almost a year into the programme, even though teachers had requested it. Both interview data, documents covering the initial program evaluation and individual school strategy reports reveal how, once provided, the course promoted teacher support and their ongoing motivation for implementing extra amounts of PE. Interviewees emphasized the importance of investing in the teachers and showing them that they were of crucial importance for the success of the programme.

Teachers have gained new knowledge and been energized. It [the professional development course] have forced teachers to reflect on the content of their physical education lessons in a new way ... The physical
education lessons have changed significantly - the teachers have brought a lot of new knowledge to school... [Internal evaluation, 2010]

Practicability: A part of the mandatory professional development course focused on practicability and how to organise the additional PE. This included the use of outdoor facilities by conducting PE in different seasons and weather conditions. The interviews, individual school strategy reports, collaboration minutes and initial evaluations all show that the use of outdoor facilities supported the teachers in their planning in the event of the gym being occupied due to the general increase of PE at the schools. Awareness of practicability was perceived as supporting elements that boosted the quality of teacher preparation and skills in delivering a greatly enhanced volume of PE. Interviews also revealed that the courses aimed at facilitating the teachers’ creativity about new curriculum activities.

There is also a module in the professional development course where [the teachers] learn how to use the available outdoor areas - because everyone can’t use the gym at the same time. But how do we use this outside, for example, how do you use parkour in physical education, how to use all such things? So [the teachers] became more creative and got new ideas...

[Programme manager 3]

Interviews, initial evaluations and collaborative minutes also revealed that the course enabled teachers to have professional discussions and share ideas with colleagues on how to plan and conduct PE. This allowed the teachers to create a shared language and understanding of the task at hand.

3.3 Co-creation

Partnership: The programme is based on a partnership between the programme managers, representing the municipal administration, and the participating schools. The partnership is grounded in a vision in which participating schools are involved in ongoing decision-making regarding programme improvement and
development. The empiric data, gathered and generated for this article, reveal not only the degree to which schools were informed during the programme meetings, but also the extent to which they were asked to comment and make decisions about the adjustment and development of the programme. Furthermore, both interview and document materials report on how each school selected a programme promoter, acting as the primary contact person to strengthen the link between the overall programme and the individual schools. School promoters helped the programme managers to identify and act on any emerging problems, enabling programme managers to facilitate local problem-solving at an early stage. School promoters also acted as programme ambassadors at their schools and took part in the regular collection of implementation experiences from PE teachers. These experiences were shared at programme meetings attended by programme managers and school promoters from all participating schools. The interviewees point to this partnership process as a key component in the successful implementation of the programme at both school and municipality level.

_We have a planning group, which consists of the schools and me... and I need to find out what they need and what we need to talk about... because it shouldn’t come from me, it must be the schools... like how would the like to work with the programme... and then we facilitate that from our end... and these meetings is crucial, because otherwise it would only be top-down... that we as programme mangers just created something and gave it to them, but it was an interaction, it was a collaboration! [Programme manager 2]_

_Close dialogue: From the outset, efforts have been made to build strong connections between overall municipal administration and the individual schools Programme managers have made continuous efforts to be visible at participating schools and to set up regular meetings with school promoters to follow up on core activities, joint agreements and to support continued school engagement. The aim has been to combine top-down (starting from the perspective of central decision-makers) and bottom-up (starting from a network actors involved in service delivery) approaches in the implementation of the programme. Additionally, the programme managers – in order to build strong relationships with participating schools and supporting teachers - regularly made use_
of school events to highlight the main aims, concepts and visions of the programme to key partners such as school staff, students and their parents. For instance, the empirical data included in this study show that programme managers used parent meetings to explain the prospects of the programme and to give teachers and parents the opportunity to ask questions.

Well, it breaks down some barriers because it's like two cultures. We're [Administration in the municipality] a culture and the schools are another culture, and it may be that something we think is simple is hard for them and vice versa... I think it helps break down those cultural gaps and then they don't say, "You're just sitting at City Hall" because we are out on site and have been so often that they feel there is a genuine interest [Programme manager 1]

3.4 Categories and sub-categories across implementation stages

All categories identified had an influential impact during one or two of the implementation stages described by Metz and Albers (Metz & Albers, 2014). Analysis shows that the planning stage, which involved the early involvement of schools, led to marked school ownership to SP.

The preparation stage involved a collaborative and creative mindset by establishing a partnership between programme managers and the schools. At this stage schools also chose a promoter to support close dialogue between schools and programme managers of the overall programme. A professional development course with special focus on ATC was also to be part of the preparation stage. However, this component was not established until a year into the programme.

The implementation stage started with the initiation of the programme at all six participant schools. To promote solid programme ownership at school level, these were encouraged to establish their own 'local implementation structures', and thus individualize the programme to their particular context. In the implementation stage, programme managers maintained the collaborative mindset by involving schools in the
improvement and development of the programme. An overview of the timeline of SP across the categories and sub-categories identified and the different implementation stages is displayed in Figure 2.

The delay of the professional development course for the PE teachers resulted in an overlap of the preparation and the implementation stages. For this reason, the programme had a preparation stage A (establishing partnership and close dialogue) and a preparation stage B (the professional development course) as well as an implementation stage A (promoting ownership by encouraging individualised implementation strategies at participating schools) and an implementation stage B (maintaining partnership and close dialogue through shared decision-making regarding programme improvement and development).

4. Discussion

The present study aims at identifying factors of particular importance in different implementation stages related to a long-lasting programme promoting PE in primary school. To our knowledge this is the first study to examine the implementation process of a multi-year, natural experiment designed to add a substantial amount of PE in primary school curriculum. Using a combination of document analysis and interview methodology this study expands existing literature by identifying factors that programme managers and other key participants in the mobilisation of school participation find to be particularly important in the initial stages of implementing more PE in primary schools. Our results suggest (i) that early involvement and ongoing shared decision-making by key stakeholders helps to ensure that school-based programmes from the outset and continuously matches the individual needs and context of schools and enhances school entities sense of ownership (ii) that appointing school promoters, and setting up frequent meetings focused on timely problem solving communication, assist programme managers in the ongoing improvement of the programme and allow them to address difficult issues at an early stage, and (iii) that intervention programmes such as the one described seems to benefit from having PE teachers attend professional development courses focusing, among other things, on building teacher commitment to core programme elements and, very practically, advise on how to organise outdoor PE in various seasons and weather conditions.

4.1 The planning stage
Our findings reveal that the early introduction of collaborative work between especially schools and programme managers, and the establishment of school ownership for the successful execution of the programme, was perceived as a key factor in securing successful implementation. This supports the findings of others (Durlak & DuPre, 2008; Fixsen, et al., 2005), highlighting the importance of early and continuous stakeholder involvement to obtain successful programme initiation and maintenance. In this study, a high degree of ownership was sought in the planning stage by actively involving schools that had shown interest in the overall programme vision. This enhanced the feasibility of implementation.

In early programme stages, it is generally perceived as crucial to ensure that the programme clearly meets the needs of and resources of end-users (Metz & Albers, 2014). SP strived to accommodate this by involving schools in the formulation and design of core programme elements (4.5 hours of weekly PE over at least 3 days and including all PE teachers participate in a tailored professional development course and having a programme promoter). Schools were required to implement these core elements if they were to be part of SP. However, programme managers acknowledged individual school autonomy, and schools were allowed some degree of freedom when applying the programme to their school context. To promote this process, schools were encouraged to develop a school strategy report, describing how SP would be carried out in practice and be adapted to their specific school. Thus, although SP consisted of specified, obligatory components designed to be delivered using ATC, the programme allowed for flexibility and adaptability to the school context. This top-down leadership approach and bottom-up practice has been highlighted as an important factor for successful implementation as it promotes knowledge dissemination as a two-way street in which ‘evidence based practice’ and ‘practice based evidence’ are combined (Ogden & Fixsen, 2014).

This flexibility, via the possibility to adapt the programme to specific school contexts, is deemed to have empowered localized decision-making and supported both operational capacity to install the programme and foster adaptive capacity to underpin continuous programme innovation - hereby enhanced the likelihood of successful implementation (MacDonald & Green, 2001; Naylor, et al., 2015). This supports the argument that individualized programme adaptation should not be considered as implementation failure (Durlak & DuPre, 2008). Instead, our results suggest that the adaptation of programmes should be viewed as beneficial for promoting ownership, strengthening implementation and developing sustainable programmes.
Still, it is important to note that core elements of a programme must be delivered in order for it to produce expected impacts (Fixsen, et al., 2005; Howie, Brewer, Brown, Pfeiffer, Saunders, et al., 2014; Lloyd, Dean, Creanor, Abraham, Hillsdon, et al., 2017). In SP, the core delivery consisted of a) 4.5 hours of mandatory PE distributed over at least 3 days a week, b) that all PE teachers participated in professional development courses and c) having a programme promoter.

4.2 The preparation stage
Teacher buy-in was deemed especially important because it was primarily their role to provide the additional PE and to increase the quality of PE lessons. To support the teacher’s capabilities and their motivation for the programme, a mandatory professional development course was planned to be ready at programme start-up. Development of teacher competencies is generally considered a key component in ensuring solid delivery and fidelity of school-based intervention programmes (Metz & Albers, 2014). However, the course was not ready until a year into the programme and the teachers had to figure out how to plan the extra PE without the intended development skills. Results show that teachers expressed a need for upgraded and updated qualifications and that, when the professional development course was finally available, it was highly valued by teachers, giving them new ideas for training exercises and ways of differentiating PE across the different student ages.

Previous studies have identified the shortage of facilities, lack of resources and weather conditions as barriers to implementing schools-based PA (Naylor, et al., 2015). In SP these barriers were addressed during the teacher professional development course by including the use of outdoor facilities in different seasons and weather conditions. This aided the teachers towards more creative planning of PE and in delivering the additional amount of PE despite shortage of indoor facilities and activity resources and in all weather conditions.

The training of programme providers, such as teachers, is generally considered a core implementation component throughout the literature (Durlak & DuPre, 2008; Fixsen, et al., 2005; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Naylor, et al., 2015). However, these courses should not only develop the skills of teachers but also feed into their expectations, motivation and self-efficacy in order to ensure their continuous support of the programme (Durlak & DuPre, 2008; Forman, Olin, Hoagwood, Crowe,
& Saka, 2008). The professional development course was also designed to prepare teachers for the changes that SP would bring by including a focus on the added pressure on gyms and facilities. Furthermore, the course made it possible for teachers to have professional discussions and share ideas with colleagues on how to plan and conduct PE, which led to the teachers creating a common language and a shared understanding of how to implement SP. Nevertheless, it is worth noting that no matter how well a professional development course is constructed it is often not, by itself, enough to change practitioners behaviour (Fixsen, et al., 2005; Pearson, Chilton, Wyatt, Abraham, Ford, et al., 2015). Establishing a foundation for successful implementation needs additional structures to support teachers’ practice and ensure programme delivery (Fixsen, et al., 2005; Forman, et al., 2008; Masse, Naiman, & Naylor, 2013; Pearson, et al., 2015). Our results suggest that these supporting structures for teaching practice were most effectively developed by having a school promoter serving as programme ambassador, by sharing knowledge among all participating schools through regular meetings and by designing the programme as a broad-based partnership.

4.3 The implementation stage
Durlak and DuPre state that a non-hierarchical approach with shared visions and decision-making has a positive impact on organizational capacity to secure successful implementation (Durlak & DuPre, 2008). In SP this capacity was promoted by maintaining close dialogue between the programme managers and participating schools and by approaching the programme as a partnership in which participating schools are involved in ongoing decision-making. School promoters were a specific component in the partnerships, acting as a link between individual schools and programme managers. School promoters kept the programme managers informed about what was actually being done on the individual schools. This supported the programme managers in making information based assessments of implementation status, to react swiftly to any problems and to fine-tune future programme development. Such reflections and focus on the ongoing implementation process is considered an essential hallmark ensuring programme quality and fidelity (Metz & Albers, 2014).

Programme managers also invested considerable time and energy in being visible at participating schools and facilitating local problem-solving related to programme development and
implementation. This included communicating the potential and progress of the programme to key stakeholders in the form of teachers, school management, students and their parents. The high degree of visibility and interactive information has been important in the promotion of programme visions and goals – resulting in adequate programme interest and commitment of schools and parents.

4.5 Strengths and limitations

SP has successfully been implemented, maintained and scaled up. Thus, the study provides a unique insight into a real-world programme containing more PE in primary school and presents itself as ideal for exploration factors influencing the various implementation stages. However, in the quest of fulfilling this aim we recognize that the study has a number of limitations. Our document analysis mostly reports on the process from the start of implementation in 2008 and contains relatively sparse information concerning the planning and preparation stage of the programme. To strengthen our empirical foundation of the early implementation stages, we used document analysis to develop relevant content for subsequent interviews with programme managers. The interviews contained only a small sample size as only three programme managers were identified to yield in-depth knowledge on the various implementation stages of SP. Also, the interviews could contain some degree of recall-bias as the interviewees were asked to describe processes dating back several years. Group interviews were chosen as respondents could experience memory gaps of different processes, being in a group interview allowed them to comment on things that they not would have brought up in a single interview due to re-call difficulties. Hereby group interviews sought to combine programme managers’ collaborative recollection on the implementation process and strategies. To promote depth and credibility of the information gathered in the first group interview, a second was performed to clarify unclear descriptions or uncertainties. Additionally, to counter the small sample size in interviews and minimize potential recall-bias, we combined document analysis and interviews to create an integrated and complementary analysis that ensured that all statements from programme managers were supported by at least two other data source (Table 2). The complementary approach aimed to promote a more comprehensive understanding of the planning, preparation and implementation stages of SP, emphasizing key implementation factors deemed especially relevant by programme managers and schools. Nevertheless, it is important to recognize that both interviews and documents may display a positive
bias towards the programme due to participants’ affiliation to it. However, this does not belie the fact that the programme has been successful in maintaining 4.5 hours of weekly PE for all schools in the municipality over several years and expanding to the rest of the schools in the municipality. Finally, programme managers were identified to hold the best in-depth knowledge and insight of factors influencing both the preparation, planning and implementation stage. However, future research is needed focusing on entire implementation process’ in order to achieve a more detailed insight into schools’ experiences of staff mobilization and organizational readiness when implementing increased amount of PE. In particular, a school perspective on the adoption, fidelity and processes securing maintenance would add value to the knowledge of how to support the implementation of future school-based PA interventions.

5 Lessons learned

Firstly, an important lesson has been learned in relation to the evaluation of natural experiments and collaboration with practice. When evaluating these types of programmes, initiated and facilitated in a real world setting by private or governmental institutions, it is important to gather as many insights as possible during the planning and preparation stages. In our view experiences from these programme stages are important to support and expand best-practice guidelines on translating evidence-based programmes into effective practice. Thus, we recommend close collaboration with practice in order for scientists to document how and why decisions are made during the planning and preparation stage - contributing with knowledge on how early programme decisions can influence the implementation, efficacy and sustainability of the entire programme lifecycle.

Secondly, a valuable lesson for future programmes concerning PE in primary schools has been established. When adding more PE in primary schools, programmes should require schools to fully implement core elements, but still be flexible enough for each school to fit these core elements to their daily practice. Such a double-sided approach supports the best possible design and realisation of effective programmes in specific contextual circumstances. Additionally, adding more PE in pre-school to 6th grade may put a high pressure on indoor PE facilities. To compensate for this potential challenge, teachers should focus on arranging outdoor
PE. In relation to this, PE teachers can benefit from participating in a professional development course – for instance focusing on how to arrange outdoor PE.

Finally, early involvement of key actors, delivering the programme, helps to ensure that initiatives, such as the Svendborg project, from the outset match the needs, ambitions and individual context of the implementation sites. Furthermore, joint programme ownership seems to be promoted by solid partnerships between overall programme management and the actors (i.e. schools and involved staff) responsible for actual programme delivery.

6. Conclusion

The present study contributes to existing literature by presenting factors that programme managers and schools experience as particularly important in the early stages of implementing a highly-elevated amount of PE in primary schools. Our findings point to the significance of early involvement of schools during the planning stage by asking school representatives to assist in the development of programme content and planning. During the preparation stage, it was important to establish a shared partnership through the appointment of school promoters and through regular meetings. These actions have assisted the programme managers in the ongoing improvement of the programme and made it possible for them to address problems and struggles at an early stage. Additionally, professional training on a specialist course for teacher development played an important part in enabling PE activities in all seasons and weather conditions and thereby ensuring the success of the programme. Finally, programmes can benefit from the balanced requirement that core elements be implemented fully while at the same time securing that initiatives can be adopted with some degree of flexibility to meet individual schools’ needs and wider context.

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Competing interests

The authors declare that they have no competing interests

References


Appendix A
This is an example of the interview-guide used in the first of the group-interviews with programme managers in the Svendborgproject. The full interview-guide will be sent on request by contacting the first author.

Introduction to the interview
Introduction:
In general, we conduct the interview because we are interested in learning more about the history of the Svendborgproject. We are aware that the Svendborgproject was born and raised in the municipality and it is especially the municipal and your perspective as managers that we would like to have a better insight into. The interview will initially and mainly address the planning and structuring of the Svendborg project. Below we will also ask what consideration was given to how the plan should be implemented and the actual implementation of the project. In the end, we will talk about the process after the project was started and how it has developed and been maintained over time.
We hope that at a later date in the process you will want to talk to us if we find interesting topics that we will follow up or if we do not reach all our questions today.
The purpose of the Svendborgproject
What led to the initiation of the Svendborgproject?
- Did you observe a need for the project?
- How did the idea originate?
- What enabled the project?

Who were you aiming the SvenborgProject at?
- Who were to benefit of it?
- Should the students achieve something?
- Specific student groups or grades?
- Should the parents achieve anything?
- Specific parent groups or classes?
- Should the schools achieve anything?
- Specific groups; managers or teachers

Establishing the Svendborgproject
How were you planning on achieving the purpose of the Svendborgproject?
- On what background did you expect the elements to meet the purpose?
- Were there any elements that you considered as more important than others in terms of accomplishing the purpose of the Svendborgproject?

How were schools and teachers recruited?
- Were all schools informed and invited to attend?
- How were the schools informed about the project (mail, meeting, telephone)?
- What information did the schools receive before choosing to participate?

How many schools did you ultimately want to recruit?
- Did you experience any restrictions regarding the recruitment of schools?
- What considerations did you have regarding the schools involvement and capacity?

How many teachers did you ultimately want to recruit?
- Did you experience limitations in relation to the recruitment of teachers?
- What considerations did you have regarding the teachers' involvement?

Initiation of the Svendborgproject
How did you plan to initiate the Svendborgproject?
- What role did the school leaders play?
- Did you experience that the school leaders were equipped for the task?
- What role did the teachers have?
- Did you find that the teachers were equipped for the task?

Who did you think had the main responsibility for the initial implementation?
- What was your role in the initial implementation process?
- Did you take special initiatives to ensure implementation?
- What role did the school promoters have?
- Has the responsibility mainly been with the municipality, the school management, school promoters or the teachers?

How did you experience the school’s response to the Svendborgproject?
- How did you feel that interested schools responded?
- How did you experience that non-interested schools responded?
- How did school response affect the implementation process?

How did you plan to follow the implementation process?
- How did you follow up on the individual school process?
- What methods did you use (meetings, oral feedback, reports, questionnaires, white papers etc.)?
- What was the idea behind the schools developing a individual strategy report on how they operated the Svendborgproject (for documentation of implementation?)?
- Did you expect the programme to be adjusted during or after implementation?

Implementation of the Svendborgproject
Did you set goals for when implementation could be accepted?
- Did you set a quality-score or a set of minimum requirements for the implementation?
- Did you set a criterion regarding teachers’ participation in the professional development course?
- Did you set a criterion regarding the percentage of physical education lessons the students were receiving?
- Did you set a criterion regarding the use of the age-related training concept?
- Did you set a criterion regarding the level of intensity during physical education lessons?
- Did you set any other criterions?

The adjustment of the Svendborgproject
To what extent has the project changed since it was initiated in 2008?
- Has there been a change in the definition of the Svendborgproject?
  - Why?
- Have there been any changes in the vision the Svendborgproject?
  - Why
- Have changes occurred in the requirements of being part of the Svendborgproject?
  - Why?
- What was the basis for the revision of the concept as of 2012?

What has contributed to adaption of the Svendborgproject?
- What circumstances have made these changes possible?
- What restrictions have caused changes in the programme?
- What role has the research played?
- What role have the schools played?
- What role has politicians played?

**Maintenance of the Svendborgproject**

What did you think was the most important thing about the project?
- What is a story you tell others about the project?

Have there been any particular challenges or resistance along the way?
- Can you give an example of this?
- How did these challenges affect the programme?
- How have the challenges affected your work with the programme?

Are you aware of any threats that could affect the survival of the Svendborgproject?
- Can you give an example of these threats?
- How are you dealing with these threats?