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ELLEN CAROLINE MENDES DA SILVA

**IMPLEMENTAÇÃO, SUSTENTABILIDADE E IMPACTOS DE UM  
PROGRAMA DE ATIVIDADE FÍSICA NO ÂMBITO ESCOLAR:  
*CREATING ACTIVE SCHOOLS***

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Orientador: Prof. Dr. Danilo R. P. da Silva  
Co-orientadora: Prof<sup>a</sup> Dr<sup>a</sup> Anna Chalkley  
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Londrina, 04 de Novembro de 2024.

Dedico este trabalho a todas as mulheres da minha família, especialmente às minhas avós, Elenildes Miranda e Maria Gomes (*in memoriam*), cujos esforços como donas de casa e trabalhadoras rurais possibilitaram a formação dos meus pais como professores. Também dedico a todas as meninas e mulheres que sonham em ser cientistas: o caminho pode ser desafiador, mas cada passo em busca do conhecimento é valioso.

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*“É fundamental diminuir a distância entre o que se diz e o que se faz, de tal forma que, num dado momento, a tua fala seja a tua prática.”*

Paulo Freire

Silva, Ellen Caroline Mendes. **Implementação, Sustentabilidade e Impactos de um Programa de Atividade Física No Âmbito Escolar: Creating Active Schools**. 2024. 109 f. Tese (Doutorado em Ciências da Saúde) – Centro de Ciências da Saúde. Universidade Estadual de Londrina, Londrina, 2024.

## RESUMO

Abordagens sistêmicas para a promoção da atividade física no âmbito escolar têm sido consideradas as mais adequadas e têm sido adotadas por pesquisadores e formuladores de políticas internacionalmente. No entanto, lacunas na implementação surgiram, com evidências mostrando pequenos efeitos dessas intervenções nos níveis de atividade física das crianças, com limitações na sustentabilidade a longo prazo. Portanto, são necessárias evidências sobre o processo de implementação, sustentabilidade e expansão de programas de atividade física em ambientes escolares. O programa *Creating Active Schools* (CAS) foi desenvolvido para promover mudanças organizacionais e culturais que incorporem a atividade física nos sistemas escolares. O objetivo geral desta pesquisa é expandir a base de evidências existente sobre a implementação e eficácia, examinando a implementação do CAS no nível escolar. Esta pesquisa incluiu dois estudos descritivos qualitativos para capturar as percepções e experiências de diversos participantes do programa, por meio de grupos focais e entrevistas semiestruturadas. O Estudo 1 concentra-se na implementação de médio prazo do CAS (após dois anos) no nível escolar dentro de uma localidade (Bradford), e o Estudo 2 no nível mais amplo de localidades (em toda a Inglaterra). A amostra foi constituída por funcionários escolares (professores, diretores e líderes do CAS nas escolas; n = 26), coordenadores externos do CAS (n = 9) e líderes de localidades (n = 14). Os dados foram analisados por meio de análises temáticas, combinando uma abordagem indutiva com temas dedutivos derivados do roteiro de avaliação de implementação de McKay et al. e alinhados com o modelo consolidado para pesquisa de implementação (CFIR). No estudo 1 foi identificado que o programa CAS avançou no sentido de ser integrado e sustentado nas escolas que continuavam a implementá-lo dentro da localidade de Bradford. Além disso, foi destacada a importância de identificar e compreender o contexto educacional mais amplo e as influências do sistema na implementação como aspectos fundamentais para a continuidade do CAS, além da implementação inicial. No estudo 2 participantes sugeriram a importância de uma implementação específica para os contextos, facilitada pela colaboração e parcerias intersetoriais para alavancar estruturas existentes e adaptar a implementação do CAS de acordo com as necessidades específicas das escolas. Os resultados destacam a importância de uma abordagem com foco em pequenas mudanças para garantir que as ações sejam sustentadas e possam resistir a influências negativas do contexto educacional mais amplo. A adaptabilidade das abordagens sistêmicas para atividade física no âmbito escolar, é essencial para apoiar escolas nesse processo de mudança, sendo mais específicas ao contexto, mantendo as funções principais dos componentes do programa e das estratégias de implementação.

**Palavras-chave:** Atividade Física. Promoção da Saúde no Ambiente Escolar. Ciência da Implementação

Silva, Ellen Caroline Mendes. **Implementação, Sustentabilidade e Impactos de um Programa de Atividade Física No Âmbito Escolar: Creating Active Schools**. 2024. 109 f. Tese (Doutorado em Ciências da Saúde) – Centro de Ciências da Saúde. Universidade Estadual de Londrina, Londrina, 2024.

## ABSTRACT

A whole school physical activity (WSPA) approach has been considered the most suitable for promoting physical activity in schools and has been adopted by researchers and policy makers internationally. However, a ‘translation gap’ has emerged with evidence demonstrating small effects of these interventions on children’s physical activity which are unlikely to be sustained in the long-term. Evidence on the process of implementation, sustainability, and scaling of physical activity programmes within school settings is needed. The Creating Active Schools (CAS) programme was developed to promote organizational and cultural changes that embed physical activity within school systems. The overarching aim of this research is to build on the existing evidence base relating to the implementation and effectiveness of WSPA by examining the implementation of CAS at the school level. This research included two qualitative descriptive studies to capture the perceptions and experiences of various program stakeholders through semi-structured focus groups and interviews. Study 1 focuses on the medium-term implementation of CAS (after two years) at the school-level within one locality (Bradford). and Study 2 at the wider locality level (across England). The sample consisted of school staff (teachers, principals, and in-school CAS leads; n = 26), CAS champions (n = 9), and locality leads (n = 14). Data were analysed using thematic analysis, combining an inductive approach with deductive themes derived from the McKay et al.'s implementation evaluation roadmap and aligned with the Consolidated Framework for Implementation Research (CFIR). Study 1 established that CAS had progressed towards becoming embedded and sustained in the schools which were continuing to implement within the Bradford locality, however the importance of identifying and understanding the broader educational context and wider system influences on implementation was highlighted as key to progressing with CAS beyond initial implementation. Study 2 demonstrated the need for context specific implementation of WSPA which was facilitated by collaboration and cross sector partnerships to leverage existing structures and tailor the implementation of CAS according to schools’ specific needs. Findings highlight the necessity of a small-change approach to ensure that actions to support WSPA are sustained and can withstand any negative influences from the broader educational context which may challenge implementation. Tailoring of WSPA approaches to be context specific, while retaining the core functions of programme components and implementation strategies, is essential for supporting schools through this process of change.

**Keywords:** Physical Activity. School Health Promotion. Implementation Science.

## LIST OF FIGURES

<b>Figure 1</b> - Timeline of formal documents supporting public health promotion and physical activity in schools. ....	166
<b>Figure 2</b> - The CAS Framework .....	222
<b>Figure 3</b> - Map of the neighbourhoods included in the study, Bradford, United Kingdom. .	277
<b>Figure 4</b> - Delivery Model of CAS within Bradford. ....	288
<b>Figure 5</b> - Reach of the CAS Programme in England and the number of schools implementing during the 2023/2024 academic year.....	299
<b>Figure 6</b> - The CAS Annual cycle.....	311
<b>Figure 7</b> - A conceptual model of the influences on the implementation of CAS in the medium-term .....	68
<b>Figure 8</b> - Map of locality leads included in the study implementing WSPA in England .....	75

## LIST OF TABLES

<b>Table 1</b> - Example International WSPA Programmes.....	20
<b>Table 2</b> - Description of CAS and school role of participants in Year 2.. <b>Error! Bookmark not defined.</b>	3
<b>Table 3</b> - Implementation outcomes and determinants of the second year of CAS Implementation.....	<b>Error! Bookmark not defined.</b>
<b>Table 4</b> - Summary of participants by CAS Locality.....	76
<b>Table 5</b> - Implementation outcomes and determinants of the national implementation of CAS .....	84

## LIST OF ABBREVIATIONS

APEASE	Affordability, Practicality, Effectiveness, Acceptability, Side-effects, and Equity
ASF	Active School Flag
CAS	Creating Active Schools
CFIR	Consolidated Framework for Implementation Research
CoP	Communities of Practice
CPD	Continuous Professional Development
CSPAP	Comprehensive School Physical Activity Programs
JU:MP	Join Us: Move Play
MATs	Multi Academy Trusts
MVPA	Moderate to Vigorous Physical Activity
PA	Physical Activity
PE	Physical Education
SENCo	Special Educational Needs Co-ordinator
SLT	Senior Leadership Team
SGO	School Games Organiser
UK	United Kingdom
WHO	World Health Organization
WSPA	Whole-School Physical Activity

## SUMMARY

<b>1 INTRODUCTION.....</b>	<b>15</b>
<b>2 OBJECTIVES .....</b>	<b>25</b>
<b>3 MATERIALS AND METHODS .....</b>	<b>26</b>
3.2 OVERVIEW OF THE PROGRAMME .....	26
3.3 PROGRAMME ACTIONS.....	29
3.4 ASSESSMENT OF THE IMPLEMENTATION AND IMPACTS.....	31
3.5 DATA ANALYSIS .....	32
<b>4 RESULTS .....</b>	<b>33</b>
4.1 MANUSCRIPT 1:.....	34
4.2 MANUSCRIPT 2:.....	69
<b>5 FINAL CONSIDERATIONS .....</b>	<b>94</b>
<b>6 REFERENCES (THESIS) .....</b>	<b>96</b>
<b>APPENDICES .....</b>	<b>101</b>
APPENDIX A.....	102
APPENDIX B.....	107

## 1 INTRODUCTION

Physical activity has been identified as an important protective factor against non-communicable diseases and has been associated with various health benefits across different populations (1). The benefits range from social to physiological and cognitive aspects (2). For paediatric populations, access to physical activity opportunities from an early age has been identified as essential for physical, motor, social, and cognitive development (1,2). A substantial amount of epidemiological evidence from across the globe reinforces the importance of promoting physical activity for health (3–5) and suggests that adherence to this behaviour in the early years of life tracks into childhood and adolescence (1,2). For example, a previous systematic review found that physical activity was consistently favourably associated with health indicators such as physical fitness and promotes healthy growth, which is critical for preventing obesity and related health issues (6).

In response to this evidence, the World Health Organization (WHO) recommends an average of 60 minutes per day of moderate to vigorous physical activity (MVPA) for children and adolescents (aged 5-17 years), and suggests that all countries adopt national physical activity guidelines and targets to support adherence through the implementation of national and subnational policies and programmes to ensure access to physical activity and its benefits for all (2). However, despite various initiatives, insufficient levels of physical activity remain high among children and adolescents globally. A pooled analysis of data from 298 cross-sectional studies in 146 countries with 1.6 million students aged 11 to 17 identified that 81% were insufficiently active (3). These results are even more concerning for groups of children from lower social classes, girls, and older age groups (4). Therefore, being insufficiently active has been recognized as a public health issue and is being characterised as a global pandemic (7).

Physical inactivity is a complex public health issue, influenced by multiple factors that interact with each other. The socio-ecological model provides a framework for understanding these influences and the different levels at which they operate, including individual, interpersonal, organizational, community, and policy levels (8). For example, community attributes, including access to safe recreational spaces, further facilitate or hinder physical activity levels (9). Therefore, effective strategies to increase access to opportunities and raise physical activity levels require multiple approaches, including policies and actions that consider the determinants of implementation in different contexts and sectors of society (10). Among the sectors that enable the promotion of health enhancing physical activity in children and adolescents, the educational system has been identified as a key for implementing various actions (11). Health promotion in schools, especially over the past two decades, has received significant attention and is recognized as a key strategy for promoting health outcomes and

healthy behaviours in children and adolescents, such as oral health promotion, healthy eating, and physical activity (12,13) (Figure 1).

The Ottawa Charter for Health Promotion, from 1986, for example, is recognized as one of the earliest records encouraging actions from a systemic and intersectoral perspective for public health (14). The document promotes the definition of health not only as the absence of disease but as the result of daily life conditions and opportunities (15). Additionally, it suggested fundamental values such as equity and community participation, which should guide public health actions. It also identified five priority areas of action that go beyond the limits of the traditional health sector, such as strengthening intersectoral policies, including education, to ensure a broad and integrated approach to health promotion (15).

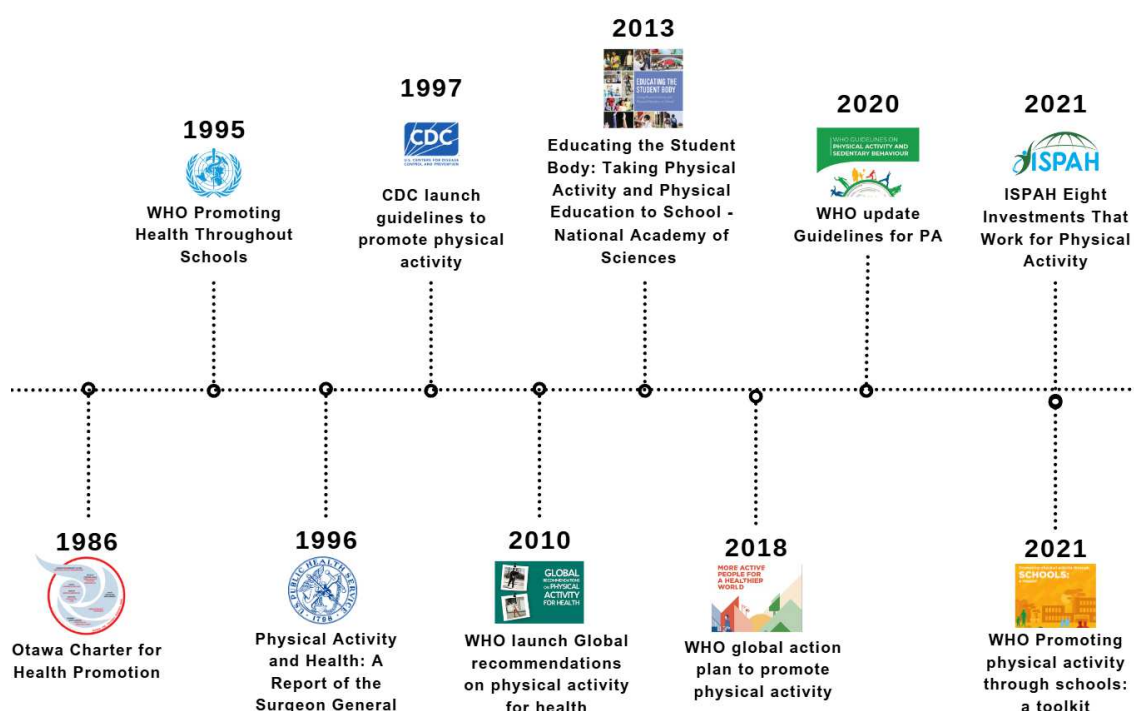


Figure 1. Timeline of formal documents supporting public health promotion and physical activity in schools.

The concept of Health Promotion in Schools was established by the WHO in 1995, based on the principles of the Ottawa Charter (16). The WHO defines health-promoting schools as those that are continuously committed to promoting actions and empowering the school community, the aim of creating a healthy environment for living, learning, and working. In this way, initiatives for health promotion in the school environment began to be implemented and strengthened, resulting in an increase in research and publications with guidelines that encouraged actions in this context.

In 1996, the Surgeon General's Report on Physical Activity and Health highlighted the role of schools in encouraging physical activity, recommending Physical Education (PE) programmes that ensure students engage in at least 30 minutes of MVPA daily (17). In 1997, the Centers for Disease Control and Prevention published specific guidelines to promote physical activity in schools, such as incorporating regular PE programmes and creating environments conducive to sports activities (18). These guidelines were fundamental in integrating physical activity into the school curriculum, particularly for PE, recognizing schools as key spaces for providing access to physical activity opportunities and fostering healthy lifestyle habits from childhood.

The first formal recommendations for physical activity for children and young people from the WHO were published in 2010 (19). These guidelines were later updated in 2020, with more detailed recommendations on the amount and intensity of physical activity needed to promote health and well-being for children and young people (2). The WHO physical activity guidelines suggest that children and young people engage in at least 60 minutes of MVPA daily, and national guidelines emphasize the role played by different contexts in which children spend their daily lives.

In the school context, national guidelines such as those from the UK for example, suggest that provided opportunities should contribute at least 30 minutes of MVPA, as children tend to spend a large part of the day in this environment (20). However, studies have identified that most children do not meet these recommendations during the school day, and recent findings suggest that children are engaging in less MVPA during school hours now compared to the past two decades (21). The traditional teaching model is currently composed of a structured routine with activities primarily focused on academic content and fixed schedules. In this sense, physical activity is limited in most traditional curricula, with short breaks throughout the day. Furthermore, little is known about the quality of the opportunities provided.

In this context, in 2018, the WHO published the Global Action Plan on Physical Activity 2018-2030, setting goals and suggesting strategies to reduce physical inactivity by 15% by 2030 (22). Among the policy action recommendations, the document highlights the need to strengthen the promotion of opportunities for physical activity in educational institutions. The plan suggests the use of an integrated and systemic approach, that recognises the multiple factors influencing the implementation of opportunities for physical activity and the interconnection and adaptive interaction between the determinants (22). In this regard, the WHO subsequently launched a series of tools (ACTIVE technical packages) developed to support countries and programmes in implementing effective policies and strategies that

contribute to increasing physical activity to achieve the goals established by the Global Action Plan on Physical Activity.

For the school context, the toolkit from 2021, *Promoting Physical Activity Through Schools*, outlines six opportunities for promoting physical activity: 1) Through quality PE, 2) Active transportation to and from school, 3) Physical activity programmes before and after school hours, 4) Opportunities during recess to encourage physical activity, 5) More active classes, and 6) Inclusive approaches to physical activity for individuals with special needs (23). Additionally, the document suggests that single component interventions are insufficient and that there is a need to utilize systemic approaches that maximize school-based physical activity promotion and delivery.

This approach called 'Whole-School Physical Activity' (WSPA) encourages the implementation of physical activity throughout the whole-school day and beyond through the recognition that all aspects of the school can impact upon health and wellbeing and that learning and health are interlinked (11,23). Integral is the engagement of different stakeholders who operate directly or indirectly within the school system. These stakeholders include teachers, coordinators, administrators, students, parents, the community, and departments involved in the social and physical environments of the school. This approach suggests a model of action focused not only on isolated actions, but also on strengthening the ethos, meaning the set of values, ideas, or beliefs established regarding physical activity in the school so that the entire school community engages as active participants rather than passive recipients of the programmes (23).

This approach to implementing physical activity in the school context has been considered the gold standard for promoting physical activity in schools and has been adopted by researchers and policy makers internationally (4,24–26). Table 1 presents some of the most established programmes that utilize a whole-school physical activity approach within primary schools. Whilst specific elements of these programmes and their implementation differ, two components are common to all: PE and opportunities for physical activity during classes. Another noteworthy aspect is the pathway to scale up whereby the development of these programmes has predominantly been tested and driven through research as opposed to practice (via engagement with teachers and other school stakeholders). Consequently, these programmes have been evaluated using effectiveness indicators—such as levels of physical activity, for example—and few studies have focused on the determinants, mechanisms and outcomes, of implementing these programmes that have used a whole-school physical activity approach or tier sustainability in the longer term (27). Lastly, the heterogeneity of the theoretical models adopted to understand the determinants, mechanisms of action and

sustainability in the implementation of the programmes tends to place emphasis on the physical activity opportunities, lacking the contextual determinants that involve and influence the school system and, consequently, the implementation of physical activity programmes.

Focusing on individual components of school-based physical activity provision in isolation, without considering a multi-level approach that encompasses all parts of the school system (e.g. policy, stakeholder, environments and physical activity opportunities), often leads to quick and immediate solutions, but with little or no impact on changes to the system as a whole, resulting in unsustainable or inequitable outcomes in the long-term (26). Therefore, for the implementation of school interventions for physical activity to be effective and sustainable in the long-term, it is necessary to adopt a theoretical model that understands the school as a complex and adaptive system, engaging the school staff, and capable of generating a change in the culture and ethos of the school system (27,28).

Table 1. Example International WSPA Programmes

<b>Authors</b>	<b>Country</b>	<b>Programme</b>	<b>Start year</b>	<b>Overarching goal</b>	<b>Components and opportunities</b>	<b>Implementation in terms of scale</b>
Carson & Webster, 2008 (29)	United States	<i>Comprehensive School Physical Activity Programs (CSPAP)</i>	2008	To provide a variety of school-based physical activities to enable all students to participate in 60 minutes of moderate-to-vigorous physical activity each day.	Physical education, physical activity before and after school, physical activity during school, family and community engagement, staff involvement.	National
Belton et al., 2020 (30)	Ireland	<i>Active School Flag (ASF)</i>	2009	To enable 'more children to be more active, more often'.	Physical activity during the school day, physical education, community partnerships (pupils, parents, local communities and national agencies), and Active School Week.	National
Salmon et al., 2011 (31)	Australia	<i>TransformUs</i>	2009	To create a supportive school environment, for students of all ages to move throughout the day.	Health lessons incorporating key physical activity/sedentary behavior messages, active academic lessons, active breaks, changes to the school environment, active homework, and parent newsletters promoting physical activity/reducing sitting time.	Local
Bloom et al., 2018 (32)	Finland	<i>Finnish Schools on the Move</i>	2010	To establish a physically active operating culture in schools by promoting physical activity and decreasing excessive sitting especially during recess time and academic lesson.	To support structured and unstructured physical activities throughout the day, transport and the environment; active transport to school, infrastructure; training for school healthcare personnel on physical activity, fitness and wellbeing, communication and public education, whole-of-community approach involving key settings such as cities and municipalities, local governments and schools, and sports and recreation.	National

With this in mind, a multi-stakeholder group of 50 specialists from the United Kingdom (UK), including teachers, school principals, coordinators, public health professionals, representatives of national sports and education organizations, and UK-based and international researchers, developed the Creating Active Schools (CAS) framework (33). The framework identifies key aspects required to address the organizational structure and culture and promote systems change, see Figure 2 (33).

Embracing a systems-based approach, the CAS framework recognises the multiple influences on whole-school physical activity at multiple levels of the system. The bottom half of the framework identifies the in-school factors while the top half of the framework identifies factors within the wider education system. The framework is colour coded into four different sections. The cornerstone of the framework is whole-school practice and ethos which sits within the **Policy** section (Purple). **Environments** (Orange) relates to both the physical environment of the school i.e. the amount, variety (e.g. green space, playground, school hall) and quality of school spaces and resources available as well as the social environment which reflects the degree to which the stakeholders (e.g. teachers and school staff engage and support each other to provide and promote physical activity). Operating within the environments are the five people orientated pillars or key **Stakeholder** groups (green) school leaders, teachers and other school staff, children/young people, parents/guardians, and wider stakeholders (e.g. active school coordinators, public health specialists). Combined, the environment and key stakeholders determine the implementation of physical activity across the seven physical activity **Opportunities** (yellow) (33).

Unique to CAS is the integration of multi-stakeholder perspectives with behaviour change theory and implementation science, to ensure that its development and subsequent implementation is theoretically and practically informed by both research and practice (33). To support the translation of the CAS framework into practice, an implementation model (the CAS programme) was iteratively developed as part of the Bradford-based and Sport England funded, Local Delivery Programme (Join Us: Move Play – JU:MP) (34). A detailed description of the CAS programme is provided in the publication by (35). The paper presents the complex logic model that underpins the CAS change process, identifying determinants, mechanisms, programme components, mechanisms of actions and programme outcomes.

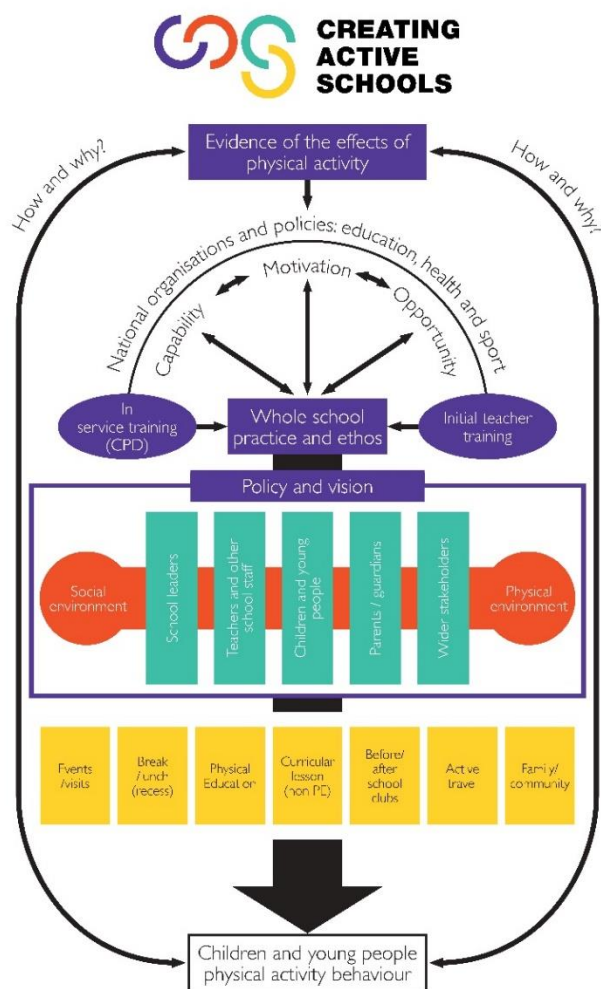


Figure 2. The CAS Framework.

Source: Morris et al., 2023 (36)

Promising results from the adoption of the CAS framework and implementation of the CAS programme have been observed in the UK (36,37). After nine months of implementing the CAS programme in 53 schools in Bradford, England, teachers and headteachers reported an increase in the promotion of various opportunities, such as incorporating physical activity into the teaching of curricular subjects and improvements in the physical spaces of the school environment. Additionally, the programme appeared to be a viable strategy for facilitating changes to include physical activities at the organisational level in schools located in low-income areas (37).

Further insight into the programme's implementation, comes from Morris et al., (36) study which used the Implementation and Scale-up of Physical Activity Interventions Framework (38) and The Consolidated Framework for Implementation Research (CFIR) (39)

to assess the implementation determinants and outcomes after nine months of implementing the CAS programme. Staff from 22 schools, along with CAS Champions and Facilitators, deemed the programme an effective and sustainable approach for facilitating organisational change for physical activity (36). The CAS programme was also perceived to align with school values, build useful and valued communities of practice, have a positive impact on school policies, facilitate improvements in the physical activity environment and the mindset of school staff, and increase physical activity opportunities for students. However, implementation challenges related to limited visibility and permeation of CAS in some schools, the need for in-school CAS leads to having the autonomy to make decisions, to rebalance school culture around the importance of physical activity, and the staff time taken to implement CAS were reported. In addition, the determinants and outcomes for the implementation of CAS in the long-term (>9 months) remained unknown.

While there has been progress in exploring the effectiveness and implementation of school-based physical activity programmes there is less known about sustaining school-based physical activity programmes beyond the initial pilot phase. Sustainability refers to the adherence to interventions that present continuous long-term positive effects (40). By identifying aspects which promote programme sustainability, it is possible to suggest and adjust implementation components, for the promotion of benefits for individuals and the system, creating longer term impacts, and allowing external validity of the findings (27). Also, by observing the dimension of long-term impacts, it is possible to support and suggest future actions towards a more feasible and effective programme (40). Implementation is “a specific set of activities designed to put into practice an activity or programme of known dimensions” (41) and encompasses all aspects of the programme’s delivery. Scaling is “deliberate efforts to increase the impact of innovations successfully tested in pilot or experimental projects to benefit more people and to foster policy and programme development on a lasting basis” (42).

Since 2022 the CAS programme has been scaled and implemented nationally across England through a partnership with the Active Partnership Network (a national non-governmental network of 42 partnerships with a remit to support physical activity sport through the co-ordination of local agencies). This national CAS Community of Practice (CoP) consists of ~200 primary schools across 18 localities which are using the programme’s assets to create organisational and cultural change for physical activity. However, little is known about the adoption and implementation process of CAS outside of the Bradford locality and what the challenges and enablers are for the implementation of whole-school physical activity across multiple diverse localities and contexts in England.

Considering this information, there is a need for the development of research that evaluates the determinants and outcomes of implementation, as well as the mechanisms that promote changes within the school system through a whole-school physical activity approach. Additionally, it is essential to investigate the impacts and sustainability aspects of such programmes, as well as to identify how these components manifest when they are scaled to different locations. Such investigations have the potential to contribute to a better understanding of the multiple factors influencing the implementation process and the development of actions and strategies suitable for the contexts in which the programmes are situated. These aspects can help achieve the desired outcomes and support effective and sustainable changes at the educational system level.

## **2 OBJECTIVES**

### **2.1 GENERAL OBJECTIVES**

- To assess the perceived impacts, implementation (short and medium-term) and sustainability of a Whole-School Physical Activity programme.

### **2.2 SPECIFIC OBJECTIVES**

- To assess the medium-term impacts, determinants and outcomes for implementation after 18 months (2 academic years) of the Creating Active Schools Programme in Bradford, UK.
- To assess the implementation of the Creating Active Schools and identify the key ingredients that are perceived to facilitate change in whole-school physical activity at the locality level in England.

### 3 MATERIALS AND METHODS

#### 3.1 STRUCTURE OF THE THESIS

The organisation of this thesis is based on the guidelines of the Post-graduation Program in Health Sciences, in which different objectives give rise to the writing of scientific manuscripts. Considering the evaluated outcomes, two articles were developed to understand the perceived impact, implementation (short term- and medium term) and sustainability of a whole-school physical activity programme. Thus, the first manuscript focuses on evaluating the medium-term implementation and sustainability in primary schools in Bradford, UK. The second article present a description of the national implementation of the programme, aiming to understand the determinants, outcomes, and impacts in different locations that adopted a Whole-School Physical Activity approach in England. Therefore, the overall conclusion of the thesis is supported by qualitative analysis, providing contextually rich data and understanding the experiences of different stakeholders associated with the implementation of CAS .

#### 3.2 OVERVIEW OF THE PROGRAMME

This study was conducted during a doctoral sandwich programme in Bradford (UK) and is part of the CAS programme. This is a quasi-experimental study aimed to evaluate the implementation of the CAS programme at the local level, in 57 schools in Bradford, and at the national level, in approximately 200 schools across 18 localities.

Bradford is a city and metropolitan district in West Yorkshire, northern England. The city has the highest ethnic diversity in the country, with 34% of its neighbourhoods in the lowest deprivation tertile across the UK and high levels of physical inactivity (43). During the COVID-19 pandemic, 73% of children in Bradford did not meet the international physical activity (44). In 2017, Sport England – a public body of the UK government (<https://www.sportengland.org>) – selected projects that presented innovative proposals and solutions to facilitate access to sports and physical activity for people from different communities, particularly in regions identified with high levels of physical inactivity. A series of workshops were held across the UK, engaging over 700 researchers and local authorities. Among the projects submitted from 12 locations in England, the JU:MP program in Bradford was selected to receive funding (45). In 2019, children and adolescents aged between five and 14, along with their families from three neighbourhoods in Bradford, were invited to participate in the pilot study of JU:MP. In 2021, the program was expanded to include all public and private schools in the city that catered to children within the same age range. A total of 57 schools were invited. The initial contact with schools was made via email, followed by phone calls 48 hours later to schedule

an in-person or virtual meeting for presenting the study and requesting consent. The schools agreed to participate and were instructed to appoint a representative for physical activity, referred to as in-school CAS leads. In addition to the three neighbourhoods that previously took part in the pilot study, children from five new neighbourhoods in Bradford were included (Figure 3). In total, approximately 1,500 children from schools in eight neighbourhoods were involved in the project.

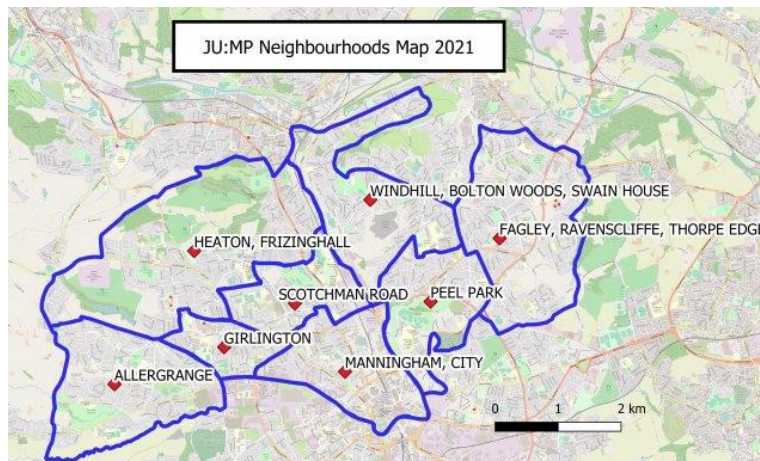


Figure 3. Map of the neighbourhoods included in the study, Bradford, United Kingdom.

Source: Bingham et al., 2023 (46)

The joint actions of the JU:MP and CAS programmes involve financial and human resources to support the local school leaders (such as principals and physical education coordinators designated by the schools themselves), through external coordinators (qualified public health or physical activity professionals hired to support the schools, referred to as CAS Champions) and the national leadership of the CAS and JU:MP programmes to implement initiatives (Figure 4).

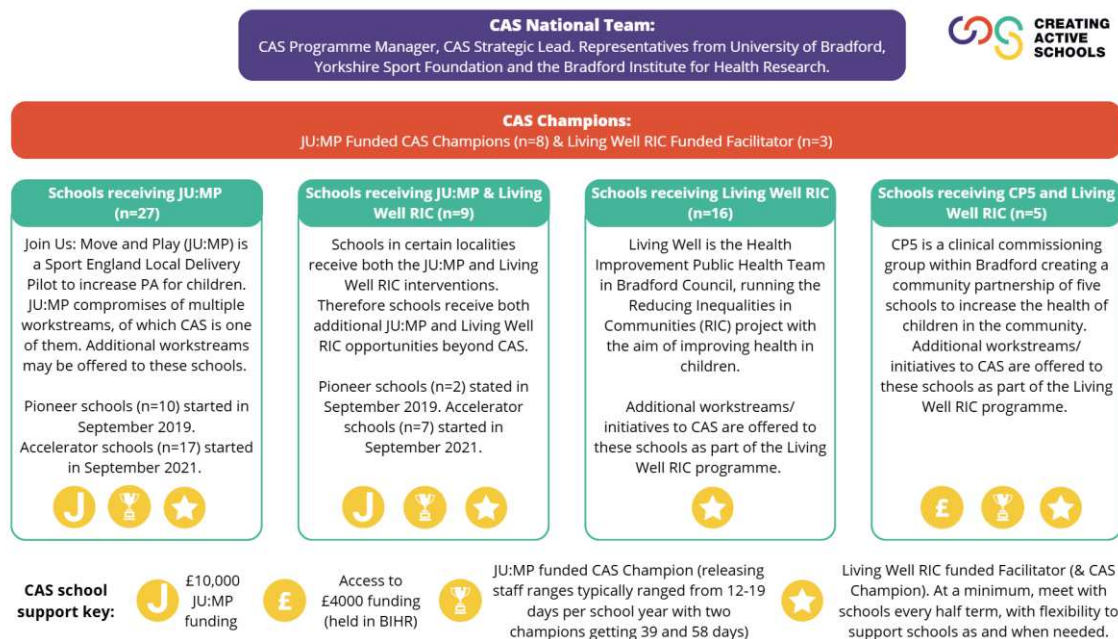


Figure 4. Delivery Model of CAS within Bradford.

Source: Morris et al., 2023 (36)

The Creating Active Schools programme was developed in partnership between the University of Bradford, Bradford Institute for Health Research and the Yorkshire Sport Foundation (one of the 42 Active Partnerships). Through the CAS core team, the national programme provides partnership-based support and a national CoP (of which the Bradford locality is a member).

Each locality appoints a CAS Locality Lead to oversee the co-ordination and implementation of CAS within the locally defined area. The locality lead recruits, trains and supports the CAS champion(s) and reports to the National Programme Lead. Similarly, the CAS Champions provide external support for an allocated set of schools to implement CAS. Figure 5 presents a map of the localities and the number of schools currently implementing the programme in England.

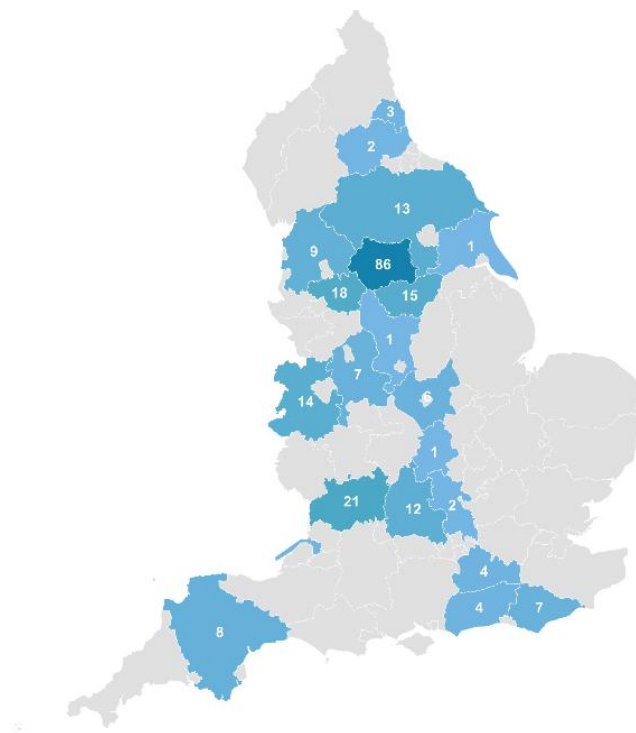


Figure 5. Reach of the CAS Programme in England and the number of schools implementing during the 2023/2024 academic year.

Source: Data based on the localities onboarded to CAS for the 2023/2024 academic year, as taken from the CAS locality dashboard ([www.creatingactiveschools.co.uk](http://www.creatingactiveschools.co.uk))

### 3.3 PROGRAMME ACTIONS

The structure of the programme's actions is organised into a four-step annual cycle, aligned with the school improvement process (Figure 6). The School Improvement Plan is a strategic document used by schools in the UK to outline their goals and actions for enhancing student outcomes and overall performance.

- Stage 1: External coordinators associated with the programme—also known as CAS Champions—provide support to in-school program leaders (in-school CAS leads). To plan actions and offer support, in-school CAS leads conduct a self-assessment through an online profiling tool. The profiling tool is aligned with the domains of the CAS framework and divided into different blocks of questions within each domain: 1) policy (5 blocks), 2) physical and social environments (5 blocks), 3) stakeholders (5 blocks), and 4) opportunities for physical activity (7 blocks) (37). This tool was developed through consultations with multiple experts to ensure ecological validity and to ensure that the language and terminology were understood by in-

school leads with less experience in physical activity programmes. The responses for each question were organized in a Likert scale (ranging from strongly agree to strongly disagree). After completion, a score is presented informing schools of areas with the greatest and least need, and priorities for future actions are suggested accordingly.

- Stage 2: Schools are invited to select three to four priority areas indicated by the profile tool, that should be integrated into the planning for the following academic year. In collaboration with the CAS Champion, the in-school CAS lead formulates an action plan to address the identified priority areas. The CAS Champion shares opportunities for initiatives to be implemented, such as initiatives adopted by other schools, external programs and projects that can help the promotion of actions in the locality, and information on strategies adopted from previous intervention studies. They also facilitate communication between schools, promoting a Community of Practice to support implementation.
- Stage 3: Receiving ongoing support through digital platforms and materials provided by the CAS Champions, in-school CAS leads access online modules for professional development. Additionally, the Locality Lead promotes conferences and meetings to support schools and create a space for sharing actions and strategies in CoP.
- Stage 4: To enhance actions, schools are encouraged, at the end of each cycle, to internally evaluate and monitor the effects of the initiatives through surveys and focus groups. Additionally, they are invited to conduct a new assessment using the online profile tool to update their progress. Through this new evaluation, along with the data collected internally, priorities and actions for the subsequent year are identified, allowing the cycle to restart.

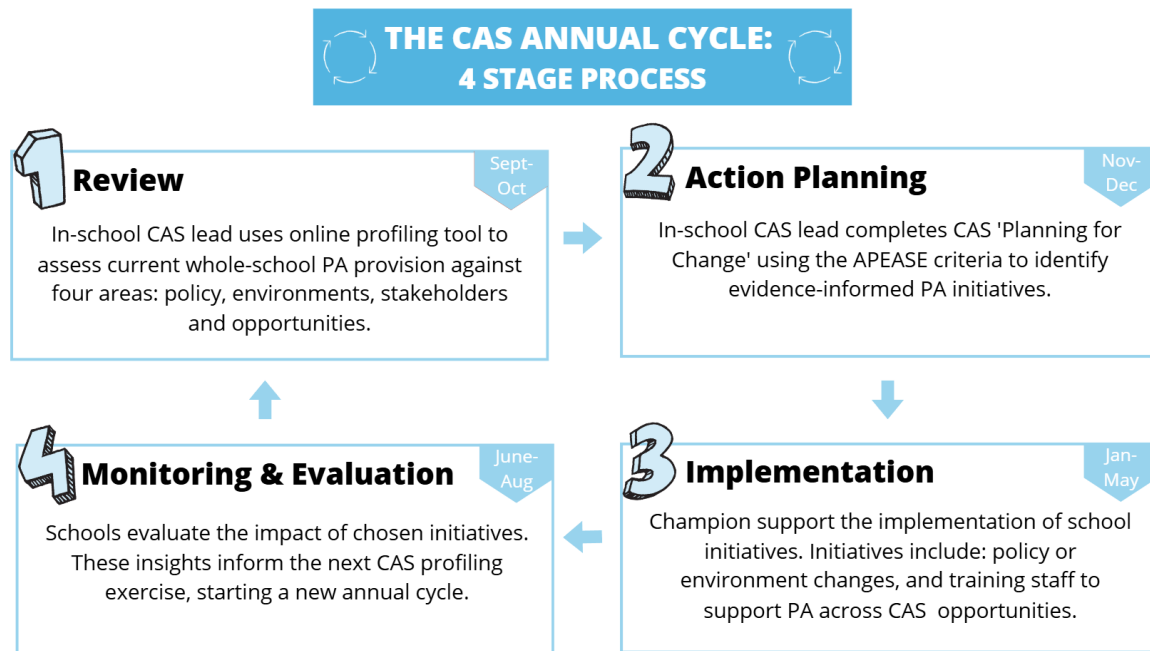


Figure 6. The CAS Annual cycle.

### 3.4 ASSESSMENT OF THE IMPLEMENTATION AND IMPACTS

The evaluation of the implementation and impacts at the locality level in Bradford builds on a previous assessment of the first nine months of programme implementation (36). To provide continuity and a deeper understanding between the initial findings and after two academic years, the methods applied in this study were consistent with the initial evaluation. Therefore, interviews and focus groups were conducted with multiple stakeholders engaged in the programme's implementation in Bradford, including in-school CAS leads, school staff, CAS Champions, and Bradford CAS locality leads. For the national implementation assessment, a similar methodology was applied by collecting qualitative data to gather insights on the implementation, perceived impacts, and sustainability at each locality from England. The sample for the second study consisted of CAS locality leads who co-ordinate the implementation of CAS in their respective localities.

Interviews and focus groups from both studies were led by the PhD student and facilitated by the CAS research team. Guides were developed to assist with the questions and prompts during the participants' discussions (Appendix 1). The questions were designed based on the CFIR framework, focusing on five key multilevel implementation domains: characteristics of individuals (i.e. school stakeholders), inner setting (i.e. the school), innovation characteristics (i.e. characteristics of CAS), and outer setting (i.e. wider educational context). This framework is frequently used to guide evaluations of scaled-up programmes and

interventions, offering standardized constructs to determine what works, in which contexts, and why (39).

To understand aspects of the implementation longitudinally, following the implementation of the programme after two academic years, the guide for study one categorized the questions around five main themes: i) differences in the implementation of CAS from the first year of implementation; ii) identification of key ingredients which have led to successful implementation; iii) the perceived effect(s) of CAS at the school level; and iv) how the effects changed during the second year of implementation.

The discussions were audio-recorded and transcribed into Microsoft Word (Microsoft, Redmond, WA). After verifying the transcripts against the recordings for accuracy, all data were anonymized and assigned an identification code. Additionally, the researcher took field notes after each focus group session, which were used to complement and, when needed, enhance the precision of the transcripts.

### 3.5 DATA ANALYSIS

The analysis from both studies utilized a thematic coding, following a data-driven inductive approach. Additionally, a deductive approach was applied, informed by determinants and outcomes themes from McKay et al.'s implementation evaluation roadmap (38). Definitions aligned with the CAS programme as described by Morris et al. (36) for each theme were utilized in the study to assess the implementation in Bradford schools. For the national implementation study, definitions were adapted to fit with the locality model. The transcripts were thoroughly reviewed multiple times to generate preliminary notes and categorize the data into new themes and codes. These themes were organised in rows within a Microsoft Excel spreadsheet, and relevant data were copied into a matrix format, referencing the transcripts. Initial insights and interpretations were documented in analytical memos. Two researchers conducted the analysis, and the proposed themes and subthemes were openly discussed and critically examined to reach a shared agreement.

## 4 RESULTS

According to the guidelines of the Post-graduation Program in Health Sciences, the results and discussion section will be presented in the form of scientific articles, with the format required by the journal to which it was submitted.

### 4.1 ORIGINAL MANUSCRIPT 1: SUSTAINABILITY OF A WHOLE-SCHOOL PHYSICAL ACTIVITY PROGRAMME: THE 2-YEAR IMPLEMENTATION AND IMPACTS OF CREATING ACTIVE SCHOOLS IN BRADFORD, UK

Submitted to the Implementation Science (Impact Factor = 8.8 (2023)). The author's guidelines outlining the rules for manuscript preparation can be found at: <https://implementationscience.biomedcentral.com/submission-guidelines>.

### 4.2 ORIGINAL MANUSCRIPT 2: NATIONAL IMPLEMENTATION OF A WHOLE-SCHOOL PHYSICAL ACTIVITY IN ENGLAND: INITIAL INSIGHTS AND IMPACTS OF CREATING ACTIVE SCHOOLS PROGRAMME

This manuscript will be submitted to the International Journal of Behavioural Nutrition and Physical Activity (Impact Factor = 8.7 (2022)). The author's guidelines outlining the rules for manuscript preparation can be found at: <https://ijbnpa.biomedcentral.com/submission-guidelines>.

#### 4.1 MANUSCRIPT 1:

### **Sustainability of a Whole-School Physical Activity Programme: The 2-year Implementation of Creating Active Schools in Bradford, UK**

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## **Abstract**

**Background:** Evidence on the long-term implementation and sustainability of whole-school physical activity programmes remains limited. The Creating Active Schools (CAS) programme was developed to support schools to focus on organisational and cultural change for physical activity in schools. This study aims to evaluate the medium-term implementation of CAS, assessing the determinants and outcomes of the implementation over two academic years.

**Methods:** A qualitative descriptive approach was employed. Thirty-five participants from 30 Bradford schools were included in semi-structured focus groups, including school staff, CAS Champions, and Bradford CAS locality leads. Thematic analysis followed a codebook method, combining inductive, data-driven insights with deductive themes based on McKay et al.'s implementation evaluation roadmap, and aligned to the Consolidated Framework for Implementation Research.

**Results:** After two years, most schools continued to implement CAS despite challenges from the wider educational system. The programme increased the reach compared to the first year, with more staff buying into CAS and gaining confidence as advocates of physical activity. Schools shifted from focusing on creating new initiatives to embedding and sustaining previous efforts. Core components of CAS that provided protection from, and compensated for, any negative influence from the wider educational system, included peer-to-peer learning, and inter and intra-knowledge exchange arising from the communities of practice. Collectively, these factors contributed to the combined agency within the school to implement CAS.

**Conclusions:** Our findings suggest that successful implementation of whole school physical activity in the medium - term is dependent on identifying and understanding the broader educational context and wider system influences. Whilst the reach of CAS had increased within schools and begun to become embedded and sustained, our findings underscore the

complexity of this process in real-world contexts and emphasise the need to anchor them in the realities of the educational system.

### **Keywords**

Creating Active Schools, Whole-school physical activity, Physical activity promotion, Children, Implementation Science, Implementation outcomes, Implementation determinants

### **Contribution to the literature**

- Limited research has examined the sustained implementation of school-based physical activity initiatives and little is known about implementation beyond the initial adoption period.
- Wider system influences and the broader educational context (e.g. staff retention), were perceived by school staff as influencing sustained implementation of a whole school physical activity programme (Creating Active Schools). Peer to peer learning and inter and intra knowledge exchange via communities of practice helped to protect against and compensate for any negative influence.
- Findings demonstrate the importance of using a place sensitive approach to shift cultural norms and develop school agency for physical activity.

## Background

Extensive evidence supports the health benefits of physical activity, particularly in promoting healthy development among children and adolescents [1,2]. However, physical inactivity, remains prevalent [3]. Whole-school physical activity programmes are identified as one of eight investments that work for physical activity [4]. However, despite an abundance of physical activity interventions [5], school-based programmes designed to increase children's physical activity have failed to effectively shift the dial on inactivity, and persistently high levels exist among children and youth globally [3]. The implementation of school-based physical activity initiatives is challenging [6] and there is a lack of understanding of mechanisms that support effective and sustainable interventions, and how they can be translated into practice [7].

Schools are increasingly being recognised as complex adaptive systems [8] which acknowledges the school context as a contributing factor to intervention effectiveness [9,10]. Recently, there have been calls for school-based programmes which are contextually relevant and support autonomy so that they are fit for purpose and their implementation can be optimised [11]. However, there is also a need to refine our understanding of the relational and dynamic features of the broader context which may shape the mechanisms through which a programme works. Previous studies on implementing school-based interventions have identified key constructs across various domains, particularly concerning initial adoption and the facilitators and barriers of different approaches [12]. However, context-specific and key components for implementation of programmes are still underexplored [13].

Creating Active Schools (CAS) [14] is one example of a whole-school physical activity programme which has been developed as a place-based approach which uses asset based co-development to create organisational and cultural change for physical activity. As such, implementation flexes to the needs of the system depending on individual school contexts, stakeholders relationships and local knowledge. Underpinned by the COM-B model of behaviour change (which identifies three factors- capability, opportunity and motivation- that must be present for behaviour change to occur [15]), the implementation model also draws on

implementation science to allow the exploration of implementation over time and between different school and locality contexts [16].

Whilst several factors have been identified as predictors of whole-school implementation (e.g. resource availability/quality and supportive school climate [17]) there are a limited number of studies which have investigated the factors related to the sustainability of school-based physical activity interventions arising from long-term implementation [18]. Often, studies only address individual or school-level outcomes at six months post-intervention with few having sufficient follow-up [19] or implementation ceasing after a year. For example, a recent systematic review and meta-analysis of randomized controlled and controlled studies identified that 96% of existing school-based programmes last <3 years [20]. Consequently, it remains unclear if and how these interventions are sustained over time and what this looks like in practice.

Previous research with primary schools implementing CAS demonstrated positive cultural change for physical activity after nine months (one academic year), facilitated by supportive implementation processes and the formal and informal communities of practice which provided “safe spaces” for cross-school support [21]. However, it is important to consider the extent to which these impacts are sustained in the longer term and the stakeholder behaviours and programme components that facilitate these impacts. Thus, the aim of the current study is to identify the determinants and outcomes for implementation in the medium term [22] after 18 months (2 academic years).

## **Methods**

### **Intervention**

The CAS programme was developed to support the implementation of the CAS framework [14]. While the framework identifies the multiple components of a whole-school approach to physical activity, the programme focuses on a process of change across four areas: (i) policy, (ii) environments, (iii) stakeholders, and (iv) opportunities. CAS draws on the schools' assets

(e.g., facilities, environments, staff, capacity), to make sustainable organisational and cultural changes to promote physical activity.

A total of 57 Bradford schools were invited to participate in September 2021 through three different delivery models, all of which provided different amenities and funding opportunities. The CAS Bradford team recruited CAS Champions from local schools and public health teams to provide external support to schools and facilitate engagement. For example, they onboarded schools to the programme and supported them through the CAS annual cycle, trained in-school CAS leads (responsible for implementing CAS within their individual school) and developed inter-school communities of practice (CoP). For further description of the delivery models, initial implementation of CAS in Bradford and the CAS programme logic model, refer to Morris et al., [21] and Helme et al. [23].

### **Study design**

This qualitative descriptive study aimed to assess the implementation of the CAS programme within Bradford schools, two school years after adoption. The study was underpinned by a contextualist epistemology [24]. It used semi-structured focus groups to gather contextually rich data and understand the diversity of experiences associated with implementing CAS in the medium term. The ethical approval of this study was obtained from the Ethics Committee of the University of Bradford (authorisation: E926).

### **Selection and recruitment**

For a comprehensive assessment of CAS implementation, focus group participants included the in-school CAS leads, CAS Champions and Bradford CAS locality leads. Each stakeholder group was recruited at different points to coincide with programme activities. The two CAS locality leads were invited to collect data on the strategic implementation of CAS across the locality. Additionally, the in-school CAS leads were recruited via the winter CoP (N=26). Finally, the CAS Champions (n=9) were recruited during a Bradford-based CAS Champion training day. All invited stakeholders agreed to participate.

## Data collection

All focus groups were conducted by members of the authorship team (AC, ADS, ES, JM, ZH, VA), trained in qualitative interview techniques. Two semi-structured focus group guides were developed to facilitate discussions and understand school-based implementation. One, for Bradford CAS locality leads and CAS Champions and the other for the operationally based in-school CAS leads. Questions were informed by CFIR and structured into five themes: i) differences in the implementation of CAS from the first year of implementation; ii) identification of key ingredients for implementation; iii) perceived effect(s) of CAS at the school level, and iv) how outcomes changed during the second year of implementation (see Additional file 1).

Data were collected in November 2023. Discussions were audio recorded and transcribed verbatim into Microsoft Word (Microsoft, Redmond, WA), where the data were de-identified and referred to by an identification code before the transcripts were checked against the recordings for accuracy. In addition, the researcher took field notes, which were used to supplement and improve the accuracy of the transcripts. Average duration was 60 min, ranging from 39 minutes to 110 minutes.

## Data analysis

Analysis included codebook thematic analysis, guided by a data-driven inductive approach. In addition, a deductive approach was used, guided by *a priori* themes based on McKay et al's implementation evaluation roadmap [25], and definitions adopted from an earlier study [21]. The transcripts were read and reread to generate initial coding ideas and notes. A coding template was generated in Microsoft Excel with rows representing *a priori* themes. ES and AC led the analysis whereby data were copied into the matrix from transcripts and referenced. Initial perceptions and interpretations were captured in analytic memos and codes were collected under the *a priori* themes before comparing coding clusters together. Coding was hierarchical with variation in each theme being coded under sub-themes. Candidate themes and subthemes were openly discussed with members of the authorship team (ZH and ADS)

and challenged by critically probing for explanations until consensus was achieved. The inclusion of supporting quotations from participants interviewed enhanced trustworthiness [26].

## Results

Thirty-five stakeholders representing 30 Bradford schools participated in the focus groups. Of these, 21 were in-school CAS leads, seven were members of the senior leadership team (SLT) seven were school staff, five were CAS Champions, two were Living Well CAS Champions, and two were Bradford CAS locality leads. Twelve of the participants from the current study also participated in the 9-month implementation evaluation of CAS [21], see Table 1.

<<Table 1. Description of CAS and school role of participants in Year 2 >>

Data were coded across the 16 *a priori* themes (presented in bold below to guide the reader and demonstrate alignment through the findings). One additional theme of perceived effectiveness and impact was identified to capture participants' descriptions and anecdotal accounts of CAS on various school level and individual level outcomes. Whilst not an aim of this study we thought it useful contextual information to include and have reported data relating to this theme as a supplementary file (see Additional File 2). Due to the initial adoption phase of the programme occurring in the first year of the project, no data from the current study were coded to the adoption theme (Table 2).

<<Table 2. Implementation outcomes and determinants of the second year of CAS Implementation >>

### **CAS continues to be implemented**

CAS was perceived as established in many schools across Bradford as the majority of participants were still implementing CAS and engaging with its components two years after completing the onboarding process. Following a period of rapid growth and development during the first year, focus shifted to embedding and **sustaining** changes made, rather than

initiating further initiatives, for example: *“I would say it’s slowed down for us. In the first year, we had a lot to do and we did a lot. Last year was more embedding that, not doing anything grand”*. P36.

The **dose delivered** by CAS Champions and in-school CAS leads focused on maintaining capacity for current provision and initiatives already underway. Some schools required repeated doses to reinstate CAS as a priority where there had been high staff high-turnover or superficial initial buy-in. For instance,

*“Since last year, lots of staff left. The CAS champion comes and does the initial sort of presentation, introducing it to the school. [...] We need to revisit that kind of presentation to the school.”* P25.

This included repeating staff training to compensate for changes within the school which had negatively impacted implementation, such as high levels of staff turnover and reduced budget.

SLT buy-in was repeatedly mentioned as a prerequisite for successfully implementing CAS and influencing cultural change in schools. CAS Champions and In-school CAS leads reported using meetings, training workshops and events, as strategies to reinforce SLTs’ awareness and commitment to the programme. For instance,

*“I think CAS as a thing, definitely with SLT, we’re getting them on board. As a school, I think that target is a big part of it, which has really helped. Because otherwise, if we were just thinking ‘let’s just increase physical activity in school’, unless it was actually a recognised thing, it might not have had investment. So I think CAS has helped.”* P15.

Consequently, some in-school CAS leads were able to successfully leverage SLT support to overcome some of the challenges experienced in the first year of implementation such as **reach** and permeation of CAS into other areas of the school. Thus, participants suggested that CAS has become more embedded in school **culture**. Whereas previously, the concept of

CAS may have been conflated with PE, one participant described the change in mindset in allocating the responsibility to CAS and physical activity provision among staff:

*Whereas before, it was just the responsibility of the PE lead or the CAS lead. Now, everybody's understanding is better, which means everybody feels responsible for making children more active. P16.*

Participants perceived that CAS had gained greater recognition as an approach, not only within schools but also across other organisations and institutions. The CAS programme and annual cycle meant that schools could work towards both short and longer term goals relating to their physical activity provision in a more sustainable way. As a result, some CAS Champions reported that the level of support needed by schools was reduced and became more self-directed as schools took ownership of implementing their improvement plans:

*In schools I support, I've noticed that CAS has become a lot more embedded and part of daily life now, rather than something that we're having to drive. Two out of the three have been taking much more of a lead themselves on it, rather than me pushing them. P8.*

Similarly, the **cost** of continuing to implement and maintain CAS initiatives was reported to be less in the second year. A common challenge experienced by the schools related to underutilised outdoor space. Participants recalled that in the first year of the implementation, schools required more investment, especially in materials and resources to support initial actions. However, once in place, the focus turned to implementing changes to support the social and cultural environment of the school. For instance,

*I feel like the funding was a good way to raise the profile, push it initially by, you know, having these physical changes within school to promote physical activity. Now, the aim of the end of the past year or so has been more the culture and mindset of the school. P19.*

Participants reflected that the quality and specificity of support provided in the second year of implementation was higher, as relationships between the in-school CAS lead and CAS Champion were more established and the needs of the schools were better understood. Many participants reported that this was facilitated by their participation in the CoP events, which were identified as contributing to CAS becoming more embedded within schools.

Whilst programme implementation continued, participants recognised that the level of engagement with CAS and its **fidelity** likely varied between schools and fluctuated throughout the year, as “*it's really dependent on what the school is looking at as a priority as a whole*”. P3. For example, there was inconsistent use of the profiling tool, with some participants reporting completion time remained as a barrier, as one participant described:

*I mean, let's face it, the profiling tool itself is a large document. And our message through CAS champions, and through our training sessions is that once you're using that, you're implementing it, you're evolving, and you're evaluating as you go along. You don't have to go through the whole thing all the time, because that is a very much off putting element of it, because of the time involved. P5.*

For others, the comprehensiveness of the profile tool meant that the insight gained from year one was still relevant, enabling them to take an evidence-informed approach to review their provision. Those in-school CAS leads who reprofiled in year two were complimentary about the data insights and how it helped track and monitor the actions taken. One participant recalled:

*What I love about CAS is obviously we have the profile tool, with the questionnaire. I aim to do that twice, three times a year to check where we are. So I remember doing it the first time, again this time last year, and the score that came out was about 39%, which, you know, wasn't the worst. But when I did it again, in the summer the score was 50%. P20.*

### **Elements that increased the satisfaction and fidelity to the CAS programme**

Participants expressed a high level of **acceptability** related to CAS. This was largely due to its flexible approach and belief that it supported staffs' ability autonomy to plan their school's provision and work in a place-sensitive way. This was particularly important for securing its longevity and sustained implementation beyond the first year. An example of the place-sensitive nature of CAS within Bradford was the development of open afternoons, whereby the in-school CAS lead would showcase how they had developed a priority area within their school, and the learning gained from doing so, to other Bradford CAS schools. The open afternoons also supported staff buy-in and motivation as other in-school CAS leads could attend with colleagues from their school, as one participant described:

*It's easier to get SLT to then go and see it because it is local, which is a big thing. If you send them a link to something they won't always look at it but if you say I'm going to a school, come with me. So the open afternoons are really good as well. P15.*

In particular, P15 suggested that the visibility given to CAS by showcasing practice in this way was seen as key to contributing to peer to peer learning and providing tangible solutions. This was especially useful for those who initially perceived CAS as a **complex** programme and difficult to understand:

*CAS has been accepted in lots of similar and obviously different contexts. Because they are in a very similar context you can translate directly to your context. P15.*

Furthermore, the open afternoons were useful for helping in-school CAS leads judge the feasibility of potential actions for their school. Thus, practical examples and shared evidence-based practices supported the compatibility of CAS with their school, its needs, and specific context.

*It's just adapting your surroundings and what works for us might not work for others and just trying to convince your senior management to buy into or to understand what it is. Back it with research and they'll buy into them. P14.*

Additionally, the CoP facilitated termly in-person meetings between the CAS Champions and the in-school CAS leads of the same and different schools. Meetings focussed on sharing evidence-based practice relating to the implementation of CAS across schools in the network and peer-to-peer learning. Participants reported that they provided protected time for planning and a rare opportunity to go off the school site, thereby facilitating networking within and between schools:

*I would say the networking and all the meetings that we come to, gives me the ideas to then drive improvement and development, you know, making the school more active. Whether it's actually doing it from the toolkit, to the champion, to the implementation.*  
P28.

Thus, they facilitated knowledge sharing for effective practice in different contexts and environments across a variety of priority areas. This was reported to build staffs' individual and collective capability for implementing physical activity. For instance, one participant reported:

*I think quite often you get that sort of entrenched in my school, not me personally, but the CAS leads. I'm stuck in my school I never go anywhere, I just do this same thing, then you've got the conferences or to the community of practice, and they get to see the presentations that our schools do and talk to people on the tables about what they've done. And they get so many ideas to take back, that even if they take a small chunk of those, its having a big impact. P8.*

Furthermore, many participants also provided examples of where they had continued to support one another independently and informally, sharing information via email and arranging meetings. This occurred not only among CAS Champions but also among in-school CAS leads. As such, the in-school CAS leads reported being more self-directed and/or using the CoP as a source of support rather than the Bradford CAS locality lead or the CAS Champions. The CoP provided an opportunity for participants to learn about research findings related to whole-school physical activity and understand how it could be applied to their own day to day

practice. Consequently, it was described as cultivating school staff's reflective practice and helping to establish an evidence-based approach to developing physical activity within schools. Not only did this provide CAS with a level of credibility and gravitas, but participants reported an increase in **self-efficacy** and professional growth. For example, the in-school CAS leads reported feeling empowered and confident to check and challenge school practices and to advocate for physical activity to their SLT, as one participant described:

*When you go to have the meetings with the school leaders, you're more confident now because you've not just aware of your school, and your setting, but I'd like to link that to the research as well in terms of that blend of research and practice. So you go to a community of practice or an event, conference, whatever, and you hear the research element. And it's like, you know how to answer those awkward questions from school leaders in terms of 'so show us the impact, show us the evidence'. P6.*

### **Challenges to CAS implementation**

Not all schools were able to continue implementing CAS into a second academic year. Many participants identified persistent barriers to implementation, which appeared to be systemic and related to the wider educational **context** within which the schools were operating. This context was described as particularly volatile, with post-pandemic pressures and the current cost-of-living crisis placing unprecedented financial pressure on schools:

*I feel the thing that's become far tighter for schools, increased energy costs, so many increased costs, without necessarily the backing behind it to pay for those things, then it's a challenge for them, isn't it? And it's a restrictor in what they do and what they choose to do. P1.*

Consequently, many schools experienced high levels of staff losses, some due to redundancies, and across diverse roles, including teachers, teaching assistants, and PE leads, as one participant described:

*One of the schools had, I can't remember how many members of staff it might have been eight team members of staff, most of which were LSAs (learning support assistants)/ TAs (teaching assistants), made redundant. So there's literally no additional support available. P3.*

For some, this included their in-school CAS lead and/or their CAS Champion which limited their ability to continue to implement CAS or prevented it altogether. Those who were able to continue implementing reported that there was less time to do so and their ability to respond to competing demands negatively impacted the **feasibility** of implementation in some schools. Resultantly, some participants felt that they were not able to engage in CAS as much as they had planned or wanted to:

*Something that I find hard is workload, as well as being [CAS] lead, I'm also a SENCO (special educational needs co-ordinator) and year six teacher. So I think it's hard to sort of monitor the things that we implement. P22.*

One reason given was that participants felt that the staff changes disrupted the momentum and/or priority being given to CAS, particularly due to the need to revisit training and staff meetings to onboard new members:

*It doesn't take a lot to rock a school's boat, you only need a few members of staff to leave and they stall, they pause for a while. And for some schools, it feels like they're starting again when they get going again. P1.*

Participants reiterated the need to increase the buy-in of all stakeholders, in the sense of sharing the responsibility to reduce burden and increase sustainability: *But if it did filter down better, and everybody knew about the message and was it was a priority like that, then it would be less workload. P25.* Conversely, some participants reflected that this provided an opportunity to reinforce key messages and that “taking smaller steps” might prove more fruitful in the long term as CAS was more likely to be implemented in a sustainable way:

*We have a new headteacher, quite a few changes basically over the last year and a half. And now we are trying to get it through the system and getting everything embedded. So it taking it all in and trying to embed more. P14.*

Additional pressures reported by participants related to the demands of accountability defined by OFSTED inspections and the rigid curriculum structures enforced by some Multi Academy Trusts (MATs), reinforcing the performative culture within schools. Participants suggested that the demands and accountabilities of these bodies dictated school priorities which prioritised learning and educational based outcomes above all else. As such, some in-school CAS leads felt there was a sense of hesitancy and resistance among some SLT to do anything outside of the norm for fear of repercussion:

*We were going through all these wonderful things about what I wanted to do and just one by one, they just got shut down. P20.*

However, where there was strong SLT support and buy-in, implementation of CAS was valued and prioritised in school. One participant described their participation in CAS as “being ahead of the curve” (P15), where the headteacher had been keen to embrace the focus on whole-school physical activity. Similarly, other participants reported support from a MAT and a positive experience from a recent OFSTED inspection where their physically active learning work arising from CAS was showcased, and actively championed by the headteacher:

*I've gone from my head, not even knowing the word CAS, not willing to support me doing CAS to now, you know, he's spoken about it in whole staff meetings, he's telling everyone what's been put in place to when Ofsted visited it was on the agenda. P5.*

## **Discussion**

This study assessed the implementation of CAS, identifying the determinants and outcomes related to implementation in the medium-term, two years after initial adoption. It builds on the initial insight gained from the implementation of CAS after one academic year [21]. Findings demonstrated the need to identify and understand the role of the broader educational context

and wider system, and the influences they exert, on the implementation of whole-school physical activity. Despite challenges associated with the volatile educational system within England, the majority of schools were continuing to implement CAS after 2 years. CAS had greater reach and permeability within the schools compared to the first year of implementation, with more individual staff members buying into the programme and growing confidence to be a CAS and physical activity advocate. Implementing new initiatives, gave way to embedding and sustaining those from the first year within the school system. Core components of CAS that provided protection from, and compensated for, any negative influence from the wider educational system, included the peer to peer learning, and inter and intra knowledge exchange arising from the CoP. Collectively, these factors were perceived to contribute to the combined agency within the school to implement CAS, see Figure 1. Key aspects of the implementation of CAS in the medium term shall now be discussed in more detail drawing on the wider literature.

<<Figure 1: A conceptual model of the influences on the implementation of CAS in the medium-term >>

### **Outer setting and wider context**

Key active and dynamic forces were found to be operating for and against implementation efforts. These included the negative impact of regulatory systems and curriculum pressures on school priorities and physical activity. Whilst not new or unique to CAS [27], it was found to be compounded by the myriad of other pressures that teachers and SLT were also facing described as operating within a 'perfect storm'. These included the post pandemic recovery [28], the impact of rising costs on schools, namely higher energy costs and higher than expected staffing costs [29], additional financial pressures created by the current demographic decline in primary pupil numbers [30] and teacher recruitment and retention challenges [31].

Collectively, these were believed to contribute to an increasingly volatile climate within the education system which served to isolate physical activity from other priorities in the school.

Encouragingly, participants reported the importance of the CoP as facilitating their participation in CAS by acting as a buffer to the negative influences from the wider context. The CoP promoted knowledge exchange within and across schools within the locality allowing members to contribute discuss and share knowledge relating to the implementation of CAS and developing their Physical Education, sport and physical activity provision more broadly. CoPs are regarded as one of the most effective means for facilitating professional learning for physical activity within schools [32]. Initially, the CoP was established as a core component of CAS in the form of events and network meetings and open afternoons. However, as the CoP became more established, it also became more collaborative and integrated, with members autonomously creating a space within the outer setting that facilitated peer-to-peer learning and intra- and inter-knowledge exchange. Sustaining CoPs through collective capacity building is widely acknowledged as a CoP development strategy [33]. The distributed leadership through the establishment of thematic leads and action plans for different themes (e.g. physically active learning, outdoor play etc) represented an evolution of the CoP to a Community of Learning for CAS [34]. This promoted the stimulation of new ideas and collaborations, and the embedding of these into a formal, coordinated system [35], reflecting a maturation of the system within which CAS is embedded. Consequently, we would suggest that distributed leadership among member schools is needed to increase capacity and motivation for sustained involvement in CAS, and to reduce organisational resistance to change in school practices.

### **School agency**

At the school level our findings showed that school staffs' participation in the community of learning was successful in building stakeholder agency. The community of learning provided a safe space for staff to test and learn ideas thus increasing the level of risk they were prepared to accept in adopting new practices. The In-school CAS leads were able to act autonomously

in the development and delivery of their schools' physical activity provision and reinforce practices and policies that support whole-school physical activity.

Previous literature has described how CoP help position SLT and teachers as agents in their own professional development based on their understanding of the school's need and knowledge of their local context [36]. Doing so in this way helped to build a positive school culture for physical activity which protected against any negative influences on the implementation of CAS (e.g. high staff turnover). The support provided by the CoP aligns with the three dimensions of the conceptual implementation model to facilitate research-based practice proposed by Hofmann [37]. First, the CoP gave rise to identifying proximal 'problems of practice', making connections between specific barriers within the contexts in which schools operate. Second, they served as a forum to offer insights into the processes necessary for change to occur, increasing staff agency. Finally, the CoP contributed to presenting and mitigating the potential risks associated with those changes, promoting greater security among participants by openly sharing what other schools had trailed and the risks involved. Consequently, the social relations between members of the school community and school structures that supported whole-school physical activity were perceived to be more embedded and sustained two years post adoption of CAS compared to the first year of implementation.

### **Programme implementation**

Contributing factors to the successful ongoing implementation of CAS included participant's perceptions of the programme's adaptability, flexibility and the ongoing support provided by the CAS Champions. Collectively, these factors were believed to be particularly important for driving the increase in the programme's reach and permeation throughout the schools and for maintaining the momentum in the second year.

While CAS continued to be implemented, it was acknowledged that engagement fluctuated throughout the year. This is common within school-based physical activity programmes and previous research has referred to the 'dynamic tension' and trade-off between needing to

establish best fit within different contexts while ensuring fidelity [38]. Consequently, school-based physical activity programmes often evolve as a result and self-organise into a state of stability which aligns with the school's organisational capacity and existing policies and practices [39]. This was reflected within Bradford where some schools reported a change in the specificity and type of support required from the Bradford CAS locality leads and CAS Champions. Nevertheless, they were perceived to be central change agents in the implementation of CAS. The influential role of champions to support school-based physical activity is widely reported [40–42] and our findings suggest that the quality of the relationships between the CAS Champions, SLT and school staff was particularly important for the ongoing implementation of CAS. That is, the positive influence of an advocate for CAS with sufficient influence and autonomy to galvanise the whole-school and secure commitment from staff.

SLT buy-in was frequently mentioned as a contributing factor to ongoing implementation and ensuring that activities became embedded and sustained. Continued executive or leadership support has been found to be an essential element of health intervention sustainment in schools [43]. However, our findings suggest that as autonomy to implement CAS within schools increased, the support provided by the CoP (as opposed to the Bradford CAS locality lead) became more significant. This supports the suggestion that the function of evidence-based strategies to support school-based implementation may be of more importance than the form that they take to better suit a given context [44]. We would recommend that school-based programmes include strategies which invest in these relationships in the longer term.

### **Strengths and Limitations**

This is the first study within the UK to provide a more nuanced understanding of the longitudinal implementation of a place sensitive whole-school physical activity programme and serves to illustrate the complexity of maintaining and sustaining school based physical activity initiatives beyond the period of initial implementation. Moreover, it strengthens the argument that programmes need to be developed to be contextually specific to ensure that its components are specifically aligned with the priorities and resources of the participating schools [44]. It also

highlights the need for continued research to monitor implementation as it evolves over time to report on the process of change and its outcomes. Such consideration is paramount to the successful implementation of evidence-informed physical activity interventions in schools [45].

A key strength of this work is the consistent use of both implementation and evaluation frameworks (namely CFIR (18) and McKay's evaluation roadmap framework [25]) to conceptualise and discuss school-based physical activity implementation over a long period of time. Thus, developing the evidence base iteratively, and informing the scaling of interventions in schools [46]. The recruitment and data collection process benefited from using the captive audience at a CoP event. Whilst this has the potential for selection bias in respect of recruiting those participants and schools which were more engaged in the programme and continuing to implement CAS, the inclusion of CAS Champions contributed to providing an overview of the implementation process in a broad range of schools across the locality, especially those which were potentially not represented at the CoP.

## **Conclusion**

This study highlights the importance of identifying and understanding how the broader educational context and wider system influence the implementation of whole-school physical activity. The data shows that CAS successfully shifted social norms within the system by cultivating a CoP that acted as a buffer against negative influences from the wider context. The CoP facilitated connections between school staff, which enhanced relational expertise and supported whole-school physical activity. These connections also helped schools develop agency, reinforcing the importance of physical activity as a priority. Our findings underscore the complexity of implementing and sustaining school-based programmes in real-world contexts and emphasise the need for place sensitive approaches to anchor them in the realities of the educational system.

## **List of abbreviations**

CAS: Creating Active Schools

CFIR: Consolidated Framework for Implementation Research

CoP: Communities of Practice

SENCo: Special Educational Needs Co-ordinator

SLT: Senior Leadership Teams

MATs: Multi Academy Trusts

## **Declarations**

### **Ethics approval and consent to participate**

Ethical clearance was granted by the University of Bradford Research and Innovation Services (reference=E926). All participants gave consent to participate in the study.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

Summarised data generated and analysed during this study are included in this published article and its additional information files.

### **Competing interests**

The intellectual property for the Creating Active Schools programme is co-owned between the Yorkshire Sport Foundation (YSF) and The University of Bradford. The YSF is the lead delivery partner for the programme. The University of Bradford and BIHR support the evidence-based development and evaluation of the programme. The CAS programme is funded through fees paid to YSF by localities who opt into the programme. The programme is run on a non-profit basis with any surplus reinvested into the development of further assets and programme support.

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## **Authors' contributions**

AC, ADS and ECMS conceived the idea of the project. ECMS, AC and ADS led the design and secured funding. ECMS, ZH, JLM, VA, AC and ADS facilitated data collection. ECMS and AC conducted the data analysis, wrote the results and drafted the initial manuscript. AC and ADS provided equal senior author support for this study, ensuring alignment with the overarching evaluation of CAS within the JU:MP whole-systems physical activity project in Bradford. All authors contributed to reviewing and editing the manuscript and have approved the final version.

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**Table 1.** Description of CAS and school role of participants in Year 2

CAS Role	Participant	Sex	School Role
Bradford CAS locality leads	P1	Female	N/A
	P2	Male	N/A
<p>Locality leads are members of the locality delivery team with responsibility for the strategic leadership of CAS within the locally defined area. They recruit, train and support the CAS Champions and report to the CAS National Programme Lead</p>			
Living Well RIC Facilitator	P3	Female	N/A
	P4	Female	N/A
<p>Living Well (Reducing Inequalities in the Community) is a partnership between Bradford Council and West Yorkshire Health and Care Partnership. Living Well facilitators are professionals with expert subject knowledge who work with schools to help them implement health and wellbeing initiatives. These individuals have dual responsibility as a CAS Champion (see below) as part of their RIC Facilitator role.</p>			
CAS Champions	P5 <sup>1</sup>	Female	PE Teacher
	P6 <sup>1</sup>	Male	N/A
	P7	Female	Teacher & PE Lead
	P8*	Male	PE Teacher
	P9*	Male	Teacher & PE Lead
<p>CAS Champions provide external support for an allocated set of schools to implement CAS. They have specialist knowledge and experience of the educational system and the promotion of physical activity. For example, they onboard schools to the programme and support them through the CAS annual cycle, train in-school CAS leads and</p>			

develop inter-school communities of practice (CoP)			
In-school CAS leads	P10	Male	PE Lead
	P11	Female	Teacher
	P12	Female	Senior Leadership Team
A member of school staff responsible for implementing CAS within their individual school	P13	Female	Senior Leadership Team
	P14	Male	Teacher & PE Lead
	P15	Male	Teacher & PE Lead
	P16	Female	Teacher & PE Lead
	P17	Male	Teacher
	P18	Male	PE Lead
	P19 <sup>1</sup>	Male	Teacher & PE Lead
	P20	Male	Teacher & PE Lead
	P21 (P9)*	Male	Teacher & PE Lead
	P22	Male	Teacher, SENCo & PE Lead
	P23	Female	Senior Leadership Team & PE Lead
	P24	Female	Senior Leadership Team & PE Lead
	P25 <sup>1</sup>	Female	Teacher & PE Lead
	P26	Female	Teacher & PE Lead
	P27 <sup>1</sup>	Male	PE Lead
	P28	Male	PE Teacher
	P29	Male	Teacher & PE Lead
	P30	Female	Teacher
	P31	Male	Teacher
	P32	Male	Senior Leadership Team
	P33 (P8)*	Male	PE Teacher
	P34 <sup>1</sup>	Male	Teacher & PE Lead
	P35 <sup>1</sup>	Male	Senior Leadership Team
	P36 <sup>1</sup>	Male	Senior Leadership Team

*Note.* \*Individuals that participated in two focus groups: CAS Champions and In-school CAS leads; <sup>1</sup>Participated in data collection for Morris et al's 2023 study; SENCo: Special Educational Needs Co-ordinator.

**Table 2.** Implementation outcomes and determinants of the second year of CAS Implementation.

Themes	Definitions**	Subthemes
Implementation Outcomes		
Dose delivered	Intended CAS components delivered by the delivery team	Refreshers: Ongoing Training Sessions
		Investment in Buy-In: Building Support and Engagement
		The change was Slow but Meaningful: Prioritizing Sustainable Progress
Reach	The proportion of the intended priority audience (schools and school staff) participating in CAS	Awareness & Buy-In Increased
		Ownership of CAS in Bradford Increased
Fidelity	The extent to which CAS is implemented as prescribed in the intervention protocol - by the delivery team	Network and Open Afternoons facilitated adherence
		Profile Toolkit used to track the progress and set new goals
Sustainability	Whether CAS continues to be delivered and/or individual behaviour change is maintained	Quality over Quantity: Prioritizing Long-Term Impact
		Embedded and Sustain Phase: Ensuring Lasting Integration
		CAS Champions Seen as Essential for Support and Continuous Commitment of Schools
Implementation Determinants		
Context	Aspects of the larger social, political, & economic environment that may influence CAS implementation	Volatility in Educational System: High Staff Turnover
		Staff Capacity Constraints Given Multiple Roles
		Multi Academy Trusts Structure Rigidity Impacted on Initiatives
		Ofsted Influenced on School Priorities Regarding PA

		Financial Pressures Given Budget Reductions
		SENCo Challenges to Support Neurodiverse Pupils
Acceptability	Perceptions among the delivery team that CAS is agreeable, palatable, or satisfactory	Evidence-Based Approach Supports continuing Acceptability, Compatibility, and Commitment to CAS
Compatibility	The extent to which CAS fits with the mission, priorities, and values of schools	
Adaptability	The extent to which CAS can be adapted, tailored, refined, or reinvented to meet local needs	The flexible approach of CAS built autonomy and External Validity
Feasibility	Perceptions among the delivery team that CAS can be successfully used or carried out within schools	Impacts of Time Constraints and Workload burdens
		Pressure from Inspections and Curriculum Structures
		Need for Buy-In from Wider School Staff to Facilitate Implementation
Cost	Money spent on the design, adaptation, and implementation of CAS	Cost Efficiency: Utilization of Existing Resources Reduced Cost
Culture	Schools' norms, values, & basic assumptions around selected health outcomes (physical activity)	Mindset Shift: Schools Prioritizing PA and Holistic Child Development
		SLT Buy-In Establish a Supportive Culture in Schools and Sustainable Actions
		Challenges in increasing buy-in of the wider school community
		Reluctance to take risks influenced by Ofsted
Dose satisfaction	Delivery team's satisfaction with CAS (and encompassing components) and with interactions with the support system	Varied Engagement Levels between schools
		Positive Perception of the Network and Communities of Practices
		Satisfaction with Autonomy, Profile Tool and Reflective Practices

Complexity	Perceptions among the delivery team that CAS is relatively difficult to understand and use; number of different intervention components	Practical Examples of Peers and Evidence Facilitate Understanding
Self-efficacy	Delivery team's belief in its ability to execute courses of action to achieve implementation goals	<p>Evidence-Based Practices Build Confidence and Professional Growth</p> <hr/> <p>Increased Confidence of CAS Champions and in-school CAS leads</p> <hr/> <p>In-school CAS leads feel empowered to Advocate for Physical Activity</p>
Perceived effectiveness & Impacts*	Anecdotal effectiveness on whole-school physical activity aligning with the CAS framework (PESO)	<p>Outdoor Environment and PA Opportunities Enhanced</p> <hr/> <p>Inclusion of Initiatives in the School Improvement Plan</p> <hr/> <p>Increased Engagement of School Staff</p> <hr/> <p>Integration of Pupil Voice</p> <hr/> <p>Positive Perception of PA, Mental Health, and Children's Behaviours</p>

*Note.* \* New added theme; SENCo: Special Educational Needs Co-ordinator; \*\* Definitions from Morris et al. [21] .

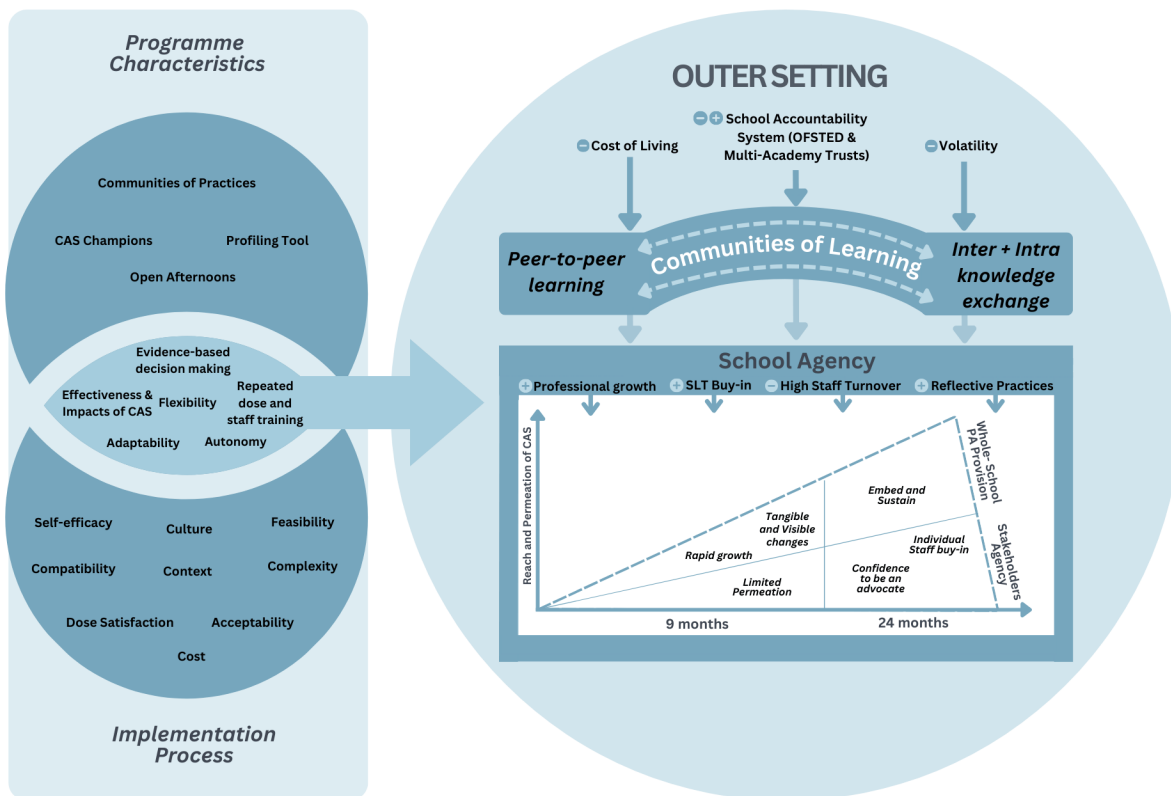


Figure 1: A conceptual model of the influences on the implementation of CAS in the medium-term

## 4.2 MANUSCRIPT 2:

### **National Implementation of a Whole-School Physical Activity in England: Initial Insights and Impacts of Creating Active Schools**

#### **Abstract**

**Background:** Creating Active Schools (CAS) is a whole-school physical activity and systems-based programme that facilitates change, focusing on asset development and provision to support change for physical activity opportunities. This study aimed to assess the implementation of CAS at a locality level, focusing on identifying key factors perceived by locality leads to facilitate change within a whole-school physical activity approach.

**Methods:** A qualitative descriptive approach was employed to explore the perspectives and experiences of locality leaders responsible for coordinating whole-school physical activity (WSPA) initiatives in England. Fourteen participants representing eleven localities from nine regions of England were included in semi-structured focus groups and interviews and shared their experiences and insights on CAS program adoption, implementation, and sustainability. Thematic analysis, with deductive and inductive approaches, was used to understand the role of locality leads in facilitating CAS, as well as challenges across different contexts.

**Results:** CAS Champions and National Communities of Learning emerged as essential in driving programme adoption, offering consistent, tailored support that enabled schools' engagement. CAS Champions, through regular face-to-face contact with school staff, were crucial for building trust, which facilitated collaboration and commitment to the programme. The CAS structure promoted flexibility, allowing locality leads to implement the programme in a contextually appropriate way based on school specific needs while navigating constraints such as limited resources, competing priorities and pressures from the wider educational context. Distributed leadership, involving shared responsibilities across stakeholders, was identified as critical for sustaining programme continuity, aligning with local priorities, enhancing programme adoption and sustainability of implementation.

**Conclusion:** This study identified the importance of trust-building, consistent support, and distributed leadership for the implementation of CAS at the locality level. These elements contribute to the sustainability of WSPA initiatives and provide valuable insights for similar systems-based interventions in educational settings.

**Keywords:** School-Based Physical Activity, Systems-Based Interventions, Stakeholders, Implementation Science, Whole-School Physical Activity.

## Background

Promoting physical activity in schools has been recognized as a promising strategy to provide children and adolescents from diverse backgrounds with opportunities to engage in physical activity and experience its associated health benefits (1–5). National programmes and policies have focused on supporting physical activity throughout the school day, utilizing a whole-school approach (4,6–8). However, less than 3% of physical activity interventions have been successfully scaled up (9–13), and only a few have been fully translated into practice and sustained over time in the school setting (14). As a result, the impact of these initiatives remains limited, particularly when it comes to integrating these changes within the school system and achieving institutionalization (9,15).

Traditional school-based physical activity interventions are typically designed with a focus on the inner setting of schools (12), but often fail to consider the broader system within which schools operate, such as the economic, social, or political national context (16). This narrow focus creates a gap in understanding how interventions can be effectively implemented at the locality level or scaled up. Contextual factors, both within the school and in the wider community, are critical for understanding how physical activity interventions can successfully promote change and overcome implementation barriers (17). Therefore, research efforts should focus on these underdeveloped areas and explore new methods for implementing and scaling up physical activity interventions (9,14,18).

In this context, it is essential to prioritize population-level changes, focusing on moderate improvements across a broad population rather than major changes for a select few (18). Effective community-based programmes often blend top-down (social planning) and bottom-up (local development) approaches to ensure sustainability and relevance at both local and national levels (19). Thus, it is important to draw lessons from programmes that have successfully scaled across different inner and outer contexts to better understand the processes of adoption and implementation.

Creating Active Schools (CAS) is a systems-based programme that facilitates a change process to support school physical activity provision, (20,21). It focuses on asset development and provision to support change within a locality, rather than implementing pre-defined assets in a prescriptive way at

the school level. The programme was launched in 2021 in Bradford, across 57 schools, and has been evaluated in previous studies, highlighting its mechanisms (20,22), organizational changes (23), and perceived impacts in schools (17,22). However, there is a need to understand how the programme is being implemented and the perceived impacts by leaders in different localities across England. This study aims to assess the implementation of CAS at a locality level and identify the key ingredients that are perceived to facilitate change in whole-school physical activity (WSPA).

## **Methods**

### *Design of the study*

A qualitative descriptive approach was employed to explore the perspectives and experiences of locality leaders responsible for coordinating WSPA initiatives in England. This approach facilitated an in-depth understanding and interpretation of the factors influencing the initial adoption, implementation, and sustainability of these changes. The study design and analysis were guided by the Consolidated Framework for Implementation Research (CFIR) (12), which frames implementation constructs into five domains: intervention characteristics, process characteristics, outer setting, inner setting, and individual characteristics. By grounding the research in a contextualistic philosophy (24), this approach allowed the capture and analysis of participants' perceptions and provided insights into the implementation. Ethical approval for this study was obtained from the Ethics Committee of the University of Bradford (Reference: E926).

### *Intervention*

The CAS programme operates on a systems-based approach, structured at three levels: national, locality, and school (20). At the national level, CAS promotes evidence-based practice for physical activity in schools through a place-based approach. That is, one which is sensitive to local context and allows for flexibility and tailoring to suit local needs. Localities are onboarded into the CAS process through formal agreements, and implementation is facilitated with ongoing support throughout the year, including guidance for recruitment and training of CAS champions, continuous professional development (CPD), and conferences that aim to share evidence and best practices. At the locality level,

CAS champions work closely with schools, providing tailored support to identify priority areas for change using tools such as the CAS profiling tool. This includes using the APEASE framework (Affordability, Practicality, Effectiveness, Acceptability, Side-effects, and Equity) to promote evidence-based decision-making during action planning and setting priorities (25). Champions assist in creating a community of practice by facilitating collaboration among schools, conducting training sessions, and supporting school leaders in planning and implementing physical activity strategies.

At the school level, CAS helps schools assess their readiness for change and supports them in implementing individualised as well as collective solutions. Schools participate in an annual four-stage implementation cycle, which includes assessing organizational readiness, planning for change using the CAS profiling tool and receiving online CPD modules to support their physical activity strategies. This process is designed to ensure that schools prioritize their efforts, focus on specific domains for improvement, and monitor the effectiveness of their initiatives across the academic year. Each year, schools review their progress, which informs the next cycle of CAS profiling and implementation.

#### *Participants and recruitment*

Purposive sampling was used to recruit leads from various localities across England implementing WSPA initiatives. Initially, all members of the national community of practice, organised by the national CAS programme team, were invited to participate of an online conference (n=6). For those unable to attend the event, further invitations to participate in the study were sent via email (n=8).

#### *Data generation*

Data collection took place between March and June 2024. Three focus groups were held in person during the CAS community of practice (n=6) with the remainder of participants engaging in online interviews (n=8) using Microsoft Teams videoconferencing software, to allow flexibility and suit participants' availability. In total, 14 participants, representing localities from 9 counties in England, were included in the study (Figure 1). Guides for semi-structured focus groups and interviews were developed to explore participants' experiences of implementing WSPA initiatives in their localities. These guides addressed factors that underpinned implementation, elements of the CAS programme that

provided support, changes over time and perceived effectiveness. All topics were informed by, and aligned with, the five domains of the CFIR (appendix 1).

The focus groups were facilitated by researchers experienced in conducting focus groups and interviews. AC, AD, and ZH led the focus groups, and ECMS conducted the interviews. The anticipated duration of the interviews was agreed upon with participants before starting, and ongoing check-ins during data collection were made to ensure they were comfortable to continue. Informed consent was obtained from all participants and recorded. On average, the recordings lasted 53 minutes (ranging from 41 minutes to 1 hour and 6 minutes).

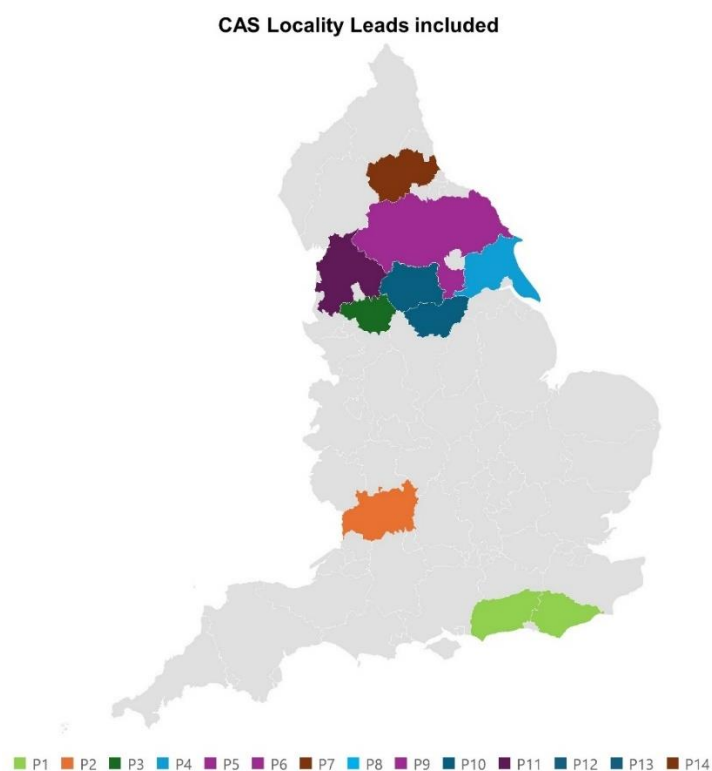
### *Analysis*

All interviews were transcribed verbatim, and the data were anonymized and stored in Microsoft Word files. A thematic analysis, using a data-driven inductive approach, was employed. Additionally, a deductive approach was employed, guided by themes related to determinants and outcomes from McKay et al.'s implementation evaluation roadmap (26). Definitions from McKay et al.'s roadmap were adapted to align with the locality model. The transcripts were thoroughly reviewed multiple times, generating preliminary notes and categorizing the data into themes and codes. A coding template was generated in Microsoft Excel with rows representing a priori themes. These themes were organized in rows within a Microsoft Excel spreadsheet, with relevant data copied into the matrix, and cross-referenced with the transcripts. Initial insights and interpretations were documented in analytical memos. The analysis was conducted by ECMS, KM and AC, with the proposed themes and subthemes openly discussed and critically examined to reach a consensus. Supporting quotations from participants were used to enhance the trustworthiness of the analysis (27).

### **Results**

Fourteen participants representing eleven localities from nine regions of England were included in the focus groups and interviews (Figure 1). The organisation of CAS across localities differed, each shaped by local contexts, resources and needs (Table 1). The typical model included direct partnerships with the respective regional Active Partnership Network whose remit is to support physical activity

delivery through the co-ordination of local agencies such as local authorities. This facilitated cross-sector integration and collaborative partnership working to ‘connect the system’ so that stakeholders and their activities are aligned, and resources and expertise are leveraged effectively. This ensured that any gaps in development could be addressed and that identified solutions were more likely to be comprehensive and sustainable.



**Figure 1.** Map of locality leads included in the study implementing WSPA in England

Note. Regions are colour-coded by implementation area.

Many localities reported collaborating closely with public health organisations, community groups, charities and community groups to provide accessible expertise and resources. These partnerships ensured that the implementation of CAS was aligned with broader locality goals and aspirations making whole-school physical activity a shared responsibility among schools, local government and community stakeholders.

**Table 1.** Summary of participants by CAS Locality

Participant	CAS Locality	Lead Delivery Agency	Funded by	CAS Champion Agency
P1	Sussex	Active Sussex (Active Partnership)	Active Sussex	Active Sussex
P2	Gloucestershire	Active Gloucestershire (Active Partnership)	Gloucestershire Integrated Care Board**	Move More (A sports-based community interest organisation)
P3	Manchester	GM Moving (Active Partnership)	GM Moving	Active Education Leads across multiple School Sports Partnerships ***
P4, P8	Humberside	Active Humber (Active Partnership)	Active Humber	Humber & North Lincs School Games Organisers*
P5	Doncaster	Get Doncaster Moving Local Delivery Pilot	Get Doncaster Moving Local Delivery Pilot	School based champions
P6, P7	Teeside	Tees Valley Sport (Active Partnership)	You've Got This (South Tees Local Delivery Pilot)	Redcar & Eston School Sport Partnership
P9, P10	North Yorkshire	North Yorkshire Sport (Active Partnership)	North Yorkshire Sport	North Yorkshire Sport
P11	Lancashire	Active Lancashire	Together an Active Future Local Delivery Pilot****	Burnley School Sports Partnership
P12	Leeds	Yorkshire Sport (Active Partnership)	Yorkshire Sport Foundation	Leeds Well School Partnership
P13	Wakefield	Wakefield Council	Yorkshire Sport Foundation	Wakefield Council
P14	Newcastle	RISE (Active Partnership)	RISE	RISE

\*School Games Organisers are funded by Sport England and are a national network of 450 individuals who work with schools to support sport and physical activity. \*\* Integrated Care Boards are National Health Service organisations responsible for planning health services for their local population. \*\*\* School Sports Partnerships are networks of schools that work together to improve physical education and sports for young people. \*\*\*\* Local Delivery Pilots are a series of national programmes in the UK that aim to increase physical activity levels and create healthier communities. The pilots are part of a strategy by Sport England to test and learn how to promote physical activity as a part of everyday life.

The data were coded across 15 themes, and the perceived effectiveness and impacts were identified as a new additional theme (Table 2). Findings relating to each theme are summarised below.

### *Ingredients that facilitated the adoption and implementation of WSPA across localities*

The implementation of WSPA varied across localities, with several key factors influencing successful adoption and implementation. Locality leads suggested that the **adoption** was dependent on localities' strategic alignment with health priorities, particularly in schools focused on post-COVID recovery and whole-school approaches to health promotion.

*“But that [COVID] was a real pivotal point where schools took a step back and thought ‘actually, there's more than one way to support children within an educational setting. And it's not necessarily the best practice to sit down for six or seven hours a day, we can do more to support our children, particularly when we talk about the recovery curriculum when schools reopen fully’. And at that time, schools were certainly embracing or continuing to embrace physical active learning as a strategy, increased amount of play and lunchtimes, after school clubs, you know, that kind of thing.” P9.*

The promotion of physical activity was perceived as an integral component of a holistic approach to children's health and well-being. In this regard, locality leads suggested that factors related to health data, identified inequities among different population groups, and other sociodemographic aspects of the schools were used as selection and invitation criteria for the schools. Additionally, awareness and understanding of the CAS framework and the principles underlying the approach were pivotal in the adoption decision-making process. CAS was seen as compatible with the localities' strategic goals and ambitions, as well as the schools' needs. Similarly, participants emphasized the importance of clearly articulating a purpose for WSPA when onboarding schools to CAS to secure commitment and anchor decision-making in a long-term goal, as one participant reflected:

*“I think the framework itself, and then the support that wraps around the framework, especially within our place, it has helped schools understand that it's a longer piece of work. And it's not just something that's going to land in the school and then be there for a bit and then just leave again [...] it's allowed us to create a different approach to schools.” P6.*

An important factor in the success of the implementation was the **dose delivered**, which involved elements of the CAS programme such as CAS champions. They provided consistent, tailored support, being the primary point of contact for schools. Participants suggested that CAS Champions played an instrumental role in the programme's delivery, providing individualized guidance to “handhold when appropriate and empower when needed”, allowing them to focus on specific areas for improvement.

*"So I think CAS champions were, were critical in that first instance, in terms of supporting schools, onboarding schools, and giving sort of the CAS school lead the license to be creative and look at potential options and examples of what would work well in their school." P9.*

Participants expressed **dose satisfaction** in terms of the level of support and resources provided by CAS. However, there were varying levels of engagement across schools, with some fully utilizing CAS tools and others applying the resources and tools more selectively to focus on a specific component of the framework due to time constraints. Many participants acknowledged the importance of autonomy in how the CAS components were applied, as this flexibility allowed schools to implement the programme according to their capacity.

*"I think actually that part of both the profiling toolkit and the CAS framework is really useful because I think often stuff is thrown in without consideration to that. And that's massive, because if they don't accept it, and if they don't have the motivation, capabilities to be willing to change, it's less likely to happen, isn't it?". P11.*

In addition, many suggested that the **reach** of CAS in schools was dependent on the involvement of key stakeholders, especially the school leadership teams (SLTs) and headteachers. The locality leads reported that reach was not simply a matter of numbers but rather the actual understanding and engagement with stakeholders. In this regard, SLT buy-in was essential for broadening the programme's impact, as suggested by one locality lead:

*"So if you get support from that senior leadership team within that school, and they value it, that's really helped them to come on board and kind of embrace kind of the approach." P3.*

**Self-efficacy** emerged as an important determinant for successful implementation. The confidence of the locality teams in their ability to support initiatives was crucial for the buy-in. One participant emphasized the importance of having that skill in the role of locality lead:

*"Supporting schools from the outside in being able to effectively communicate how physical activity can support particularly to head teachers. So is to be able to have those higher level conversations with head teachers, CEOs of trusts, public health, wider, wider partners in sectors to have to be able to communicate effectively, how physical activity and the CAS process can support the agendas or the priorities." P10.*

In addition, trust in local stakeholders and the establishment of strong relationships were also seen as critical factors in building self-efficacy among the teams. Many felt empowered by the training and structure offered by the national team, which provided capability to implement the programme.

*“What I did like, and as I said, about the CAS is that there's a structure there for them. And that, for me is essential, because it gives them an outline and examples of what they should be aiming for. So that's why I think it is indispensable because teachers need examples of good practices and what they should be aspiring to have in their schools. So that process made it really valuable”. P8.*

### **Challenges for the implementation of CAS across localities**

Locality leads identified that maintaining **fidelity** to the programme's four-stage implementation cycle, was challenging for some schools. While most schools adhered to this cycle, fidelity was often influenced by factors from the **context**, such as competing priorities within the school year. As one participant shared:

*"But a lot of schools have just said they didn't feel in the position to be able to take on at that moment. So when we asked why, it was either due to other priorities on the school improvement plan, or they didn't feel as if they had the staff in the right place, they didn't feel as if they could run with it in the position they were in, but they were looking ahead to next year." P7.*

This variability in fidelity highlights the dynamic nature of the school environment, where physical activity can sometimes be deprioritized in favour of other initiatives. In addition, some participants also commented on the initial **complexity** of CAS. They reported difficulty in understanding how the programme was operationalised and what it “looked like in practice” given the systems-based approach. There were also some misconceptions about CAS being primarily for “sporty” schools, which was seen as a factor that limited the reach in some localities.

*“I found that they all tend to be newer to teaching and themselves the like, either the PE lead or heavily involved in sport in their school already.” P5.*

The novelty of CAS required some localities to invest additional time in training CAS Champions to be able to communicate effectively with schools during the onboarding process. This specifically focused on the ‘why’ of physical activity and helping schools to understand the value of their current provision in the content of WSPA and a whole-systems approach.

*"The support individually to schools has been crucial. We wouldn't have been able to engage the schools that we have engaged without that kind of CAS champion. And that person can have support in the schools." P3.*

Nearly all locality leads referred to the **sustainability** of CAS and the importance of building capability and supporting flexible implementation. Cross-sector collaboration and local partnerships at both a strategic and operational level were viewed as essential components of a whole-systems approach to ensure that longer-term aspirations for CAS and broader planning goals were aligned. For instance,

*"When CAS was then created, and the framework was agreed we collectively brought our active partnership and our school sports partnership. And in fact, anybody else in physical activity sector together, to look at how we could implement CAS and through our pilot, we encourage collaborative commissioning." P6.*

Whilst limited funding was acknowledged as a barrier to ongoing implementation, at the school level, the creation of CAS communities of practice enabled localities to support the sharing of experiences between schools and promoting evidence-based practice relating to the implementation of CAS. This was felt to increase the likelihood of CAS becoming more embedded within schools.

*"It [Communities of Practice] gives you more things to think about, it makes you feel like you're not alone doing this. And it might be that some places through the Community of Practice, come up with new ideas that you'd never thought of. Or they reinforced the right ways of going about it. And it encourages us to stick out it rarely. We could be really struggling with an element but I think it's a right way to go." P6.*

Additional contextual factors were identified as being important to the implementation of CAS. Examples were provided of different elements of the broader system surrounding schools which were thought to influence the way the programme was implemented. For example, several locality leads discussed the ability to leverage existing delivery infrastructures, such as School Games Organisers (SGO), to facilitate implementation by recruiting them as CAS Champions. This was a role which complemented their skill set of working with schools to support physical activity provision and aligned with their experience as advocates for physical activity.

*"But they [School Games Organizers] come onboard with an impartial hat over active education. So, we can say 'look, you're already liaising with schools, you know, through your school games work, how else can you support around wider agendas linked to active education such as active travel, such as Creating Active Schools'. So that's why when CAS came as an opportunity for us as an active partnership, we went to them and*

*said, 'Look, this is an opportunity and we want now you to kind of lead on this, is it something that you want to lead on?' And they saw the value of it." P3.*

Similarly, there were several examples of where existing and complementary funding streams had been directed towards supporting the implementation of CAS to amplify and strengthen their impact locally by “scaffolding each other” and helping to bridge the gap between schools and the community. For example, these included the PE, School Sport Premium, the Opening School facilities Fund, the Holiday Activities Fund and Sport England’s Local Delivery Pilots. However, participants also remarked that the current educational climate and increased financial and curriculum pressures often made it difficult for schools to prioritise physical activity. In this sense, P 13 reported:

*“One school came back to me, one of our trailblazers, and I hadn't heard from them for quite a while, and couldn't get hold of the CAS lead, and he called me out of the blue couple of months later and just said, 'I'm really sorry, we've just had a really bad time at school. We've had to not ditch CAS but we've had far more. We've got other priorities that had to be dealt with.' They'd had a bad Ofsted and we had to address that. So we haven't ditched it, we haven't shelved it. Can you help us to bring it back? So that's perhaps another threat, that it's just not a school's priority to do that.” P13.*

Consequently, concerns were raised about the feasibility of implementing CAS, particularly in schools where staff already faced heavy workloads. Time constraints were frequently cited as a barrier, with several participants mentioning the difficulty of balancing CAS with other responsibilities. One locality leader explained,

*“Often in a small school, you'll have an individual teacher who's got responsibilities for multiple subjects. So they'll be teaching their entire class for the whole week. But they may have, in some cases, three or four specific subjects that they're responsible for leading on. So, then it comes back to capacity priorities. [...] Prioritizing where you position your time is the real challenge. And I think unless you have a senior leader, whether that be a head teacher or deputy head, that is, it's driving this message and sort of leading this area, you know, in a sense, it's a real challenge. So, I think senior leadership buy-in, and how they value and perceive physical activity and physical education is crucial in terms of the onboarding process. P9.*

The importance on the onboarding process and the need for wider school staff to fully buy into the programme was highlighted as essential for overcoming these feasibility concerns.

Despite these challenges, there was a strong sense of **acceptability** and **compatibility** of CAS and WSPA initiatives among participants. The evidence-based, place-based approach was well received

given that it allowed flexibility, enabling localities to implement the programme to match their specific needs. Local teams appreciated that CAS was not a rigid, one-size-fits-all model, but rather a framework that could be tailored to fit their local priorities. This adaptability was seen as crucial, as localities were able to implement changes according to their specific capacity and resources. One participant suggested,

*"Using the CAS framework created a model that schools can look at, and understand and see where they fit. And I suppose the flexibility of the framework and, and making schools feel quite assured that they don't have to do everything in the framework, they can just self-assess themselves and look at, look at where they might get an easy win, or look where the momentum is". P6.*

### ***Perceived cultural shifts, effectiveness and impacts***

Cultural shifts within schools were identified as key to the successful implementation of CAS. Many participants referred to shifts and changes in mindset among school staff and wider school stakeholder where physical activity is prioritized as part of holistic child development. One participant observed,

*"We've definitely seen a difference around the mindset of physical activity and how physical activity should be incorporated across the whole school day. So that's going to impact your policy. I think generally how people talk about physical activity and how the CAS framework has allowed them to just not assume that it has to happen in sports all the time." P6.*

Finally, participants reflected on the perceived **effectiveness and impact** of CAS. Many shared anecdotal evidence of positive changes they had experience in schools. These included increased engagement from both staff and students, and the integration of pupil-voice in decision-making processes. Even small changes, such as greater staff involvement in physical activities, were seen to have ripple effects, reflective of broader organizational change. For instance,

*"I think that's what's helped and that's what shifted in terms of when schools have started to see the small changes, they've wanted to go and speak with other schools about that. And then we do have community learning." P3*

Participants also emphasised the cumulative benefit of a small-step-approach, with consistent implementation over time and longer-term investment, creating sustainable change. In particular, P3 reflected on the importance of distributed leadership for WSPA at the strategic level within the locality

and cross-sector collaboration were also emphasized as essential for ensuring lasting impact. As the same lead suggested:

*“Once we’ve started to see some of the or some of our schools that are on board, once they’re starting to see the kind of small ripple effects or the small kind of impacts that are being made in schools, it helps kind of start to naturally form some champions”.*  
P3

Table 2. Implementation outcomes and determinants of the national implementation of CAS

Themes	Definitions**	Subthemes
<b>Implementation Outcomes</b>		
Adoption	The initial decision of the locality to onboard and adopt CAS	Compatible with strategic objectives (around place based/systems approaches and child health/ COVID recovery) Good awareness and understanding of the CAS Framework
Dose delivered	Intended CAS components delivered by the delivery team	CAS champions facilitate delivery (consistent point of contact external to the school) Tailored support towards individual schools
Reach	The proportion of the intended priority audience (System partners, CAS Champions, schools, in-school CAS leads and school staff) participating in CAS	Focus on quality not quantity SLT and headteachers buy in is key Data driven approach to targeting schools
Fidelity	The extent to which CAS is implemented as prescribed in the intervention protocol - by the CAS national team	Adherence to 4 stage annual cycle and use of tools and resources
Sustainability	Whether CAS continues to be delivered and/or individual behaviour change is maintained	Cross-sector collaboration and distributed leadership for CAS National community of practice supports knowledge exchange among and between localities Expansion limited by funding
<b>Implementation Determinants</b>		
Context	Aspects of the larger social, political, & economic environment that may influence CAS implementation	Existing delivery infrastructure (School Games Organisers) Complementary funding streams (PE, School Sport Premium, Opening School Facilities, Holiday Activities Fund, Sport England Local Delivery Pilot) which align with CAS. Current educational climate can make engagement with schools challenging who struggle to prioritise physical activity
Acceptability	Perceptions among the locality team that CAS is agreeable, palatable, or satisfactory	Evidence-Based Approach Supports continuing Acceptability, Compatibility, and Commitment to CAS

Compatibility	The extent to which CAS fits with the mission, priorities, and values of localities	Systems-based approach is attractive to localities
		Flexibility to test and learn is valued
Adaptability	The extent to which CAS can be adapted, tailored, refined, or reinvented to meet locality needs	The flexible approach of CAS built autonomy and External Validity
Feasibility	Perceptions among the delivery team that CAS can be successfully used or carried out within localities	Impacts of Time Constraints and Workload burdens
		Need for Buy-In from Wider School Staff to Facilitate Implementation
Culture	Schools' norms, values, & basic assumptions around selected health outcomes (physical activity)	Mindset Shift: Schools Prioritizing PA and Holistic Child Development
		SLT Buy-In Establish a Supportive Culture in Schools and Sustainable Actions
Dose satisfaction	Locality team's satisfaction with CAS (and encompassing components) and with interactions with the support system	Varied Engagement Levels between schools
		Positive Perception of the Network and Communities of Practices
		Satisfaction with Autonomy, Profile Tool and Reflective Practices
Complexity	Perceptions among the locality team that CAS is relatively difficult to understand and use; number of different intervention components	Practical examples from peers and sharing of experiences facilitate understanding and give CAS visibility
		Misconceptions that CAS is for 'sporty' schools
Self-efficacy	Locality team's belief in its ability to execute courses of action to achieve implementation goals	Working with trusted stakeholders across the local system
		Having the right people in the CAS Champion role is key
Perceived effectiveness & Impacts*	Anecdotal effectiveness on whole-school physical activity aligning with the CAS framework (PESO)	Shift in mindset and culture of the school from PE and Sport to physical activity and holistic health
		Inclusion of Initiatives in the School Improvement Plan
		Increased Engagement of School Staff
		Integration of Pupil Voice and Wider Stakeholders
		Small impacts create ripples

## Discussion

The present study aimed to assess the implementation of CAS at a locality level and identify the key ingredients that are perceived to facilitate change using a WSPA approach. Findings suggest that CAS Champions and National Communities of Learning were essential in facilitating programme uptake in schools through consistent tailored support and collaborative engagement. The results demonstrate that the structure of the CAS programme permitted locality leads to support schools through context specific implementation. This was made possible through fostering collaboration with different sectors to promote feasible changes and meeting school-specific needs. Findings highlighted the importance of building trust in local partnerships and the need for distributed leadership to reinforce the long-term success of whole-system approaches. Furthermore, the autonomy from leads using evidence-based initiatives and CAS components created a balance of “handholding” with empowerment across localities. This balance was critical to tailoring the implementation of programme effectively within various school settings, especially those affected by contextual determinants such as competing priorities in schools, time constraints, limited funding and external pressures from the broader educational climate.

The importance of CAS Champions in establishing and maintaining effective working relationships, which emerged as fundamental to fostering trust and buy-in, is one of the key findings of this study. The consistency of face-to-face contact provided by CAS Champions allowed them to develop rapport with school staff, creating trust and collaboration (28). Trust between partnerships and collaborative cross-sector working has been identified as a vital component of the “secret sauce” in scaling up school-based physical activity interventions (9). In the context of CAS, trust enabled CAS Champions to collaborate with SLTs, which is essential for the adoption, implementation, and sustainability of the programme.

Another important aspect is the role of cross-sector collaboration on distributed leadership within the locality-level partnerships. Distributed leadership, which involves shared responsibility across multiple stakeholders (29), was particularly beneficial in allowing the continuity of the programme across localities. Collaborating with the existing structures of the school system (such as

School Games Organisers) helped prevent dependency on only one individual and allowed the flexibility needed to tailor implementation to the changing demands of the school environment (16). By supporting the programme's alignment with local priorities, distributed leadership also increased the acceptability and adoption of initiatives.

The findings also highlighted the challenge of maintaining fidelity to the CAS implementation cycle within complex, often resource-limited educational contexts. Locality leads encountered diverse challenges related to sociocultural determinants, identifying barriers such as resource inequities and differing school structures. In this regard, gaining support from SLTs to adopt physical activity initiatives was essential to engage other stakeholders and enhance the initiatives' sustainability amid competing priorities. This was facilitated by building relationships and emphasizing that actions are tailored to meet specific needs and leverage existing school structures, without rigid prescriptions that could add pressure or create tension (15). This demonstrated the need for flexible components and approaches that can integrate seamlessly with other school-based priorities and contextual influences (16). This is consistent with existing literature on systems-based interventions, which suggests that flexibility and adaptability are essential for success in complex settings such as schools (9,30). Future research would benefit from exploring how the core function of implementation strategies can be retained while adapting the different forms that they take to accommodate varying levels of school readiness, determinants, and capacity to implement.

While this study has add insights into the implementation of CAS within local partnerships, the locality-specific focus limits the generalizability of results to other localities and contexts with distinct structural characteristics. However, our findings provide a detailed understanding of local partnerships, demonstrating approaches that could be useful to other localities facing similar challenges. Future research should investigate the long-term sustainability of CAS across other localities, particularly exploring the role of cross-sector collaboration in embedding physical activity within a broader educational context. Also, investigating the role of distributed leadership could provide insights into whole-system initiatives, to support the development of effective programmes.

## **Conclusion**

This study provides insights into the implementation of the CAS programme at the locality level, emphasizing the vital roles played by CAS Champions, National Communities of Practice, and the role of distributed leadership among cross-sector partnerships. The findings suggest that the success of CAS adoption is contingent upon flexible and consistent relationships between locality leads, CAS Champions and school staff. Additionally, the necessity of distributed leadership highlights the importance of engaging multiple stakeholders in shared responsibilities, which can promote context specific implementation and programme sustainability. By demonstrating how CAS can be integrated into existing school structures and priorities, this study contributes to the understanding on WSPA implementation in educational settings.

## **Declarations**

### **Ethics approval and consent to participate**

Ethical clearance was granted by the University of Bradford Research and Innovation Services (reference=E926). All participants gave consent to participate in the study.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

Summarised data generated and analysed during this study are included in this published article and its supplementary information files.

### **Competing interests**

The intellectual property for the Creating Active Schools programme is co-owned between the Yorkshire Sport Foundation (YSF), The University of Bradford and the Bradford Institute for Health Research (BIHR). The YSF is the lead delivery partner for the programme. The University of Bradford and BIHR support the evidence-based development and evaluation of the programme. The CAS programme is funded through fees paid to YSF by localities who opt into the programme. The programme is run on a non-profit basis with any surplus reinvested into the development of further assets and programme support.

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## 5 FINAL CONSIDERATIONS

Building on this research's initial objectives, the two studies sought to evaluate the impact, implementation, and sustainability of the CAS programme. The findings underscore the necessity of WSPA approaches that are fit for the purpose and are contextually sensitive to effectively support diverse localities. A collaborative approach that brings together researchers, policymakers, practitioners, and other stakeholders is fundamental to co-designing programmes that aim to promote sustainable change and address the varied needs of schools. In this sense, stakeholders' capability to advocate for WSPA and their autonomy to implement change must be supported by SLTs and the wider school community. This requires not only leadership skills but also knowledge and understanding of behaviour change to influence and facilitate positive shifts in school culture and opportunities for physical activity.

Longitudinal studies which examine implementation beyond the initial implementation period and have sufficient follow-up, are essential to build the evidence-base for the sustainability of WSPA and to identify what this looks like in practice. By continuing the evaluation into the medium to longer-term it is possible to understand the mechanisms for long-term impacts and provide recommendations for further programme development. It would be beneficial for this to be done in association with effectiveness studies which measure children's physical activity, for example, to establish links between programme implementation and positive health outcomes. In addition, the use of robust methods is essential to understand and identify constructs from different domains of influence, thus identifying opportunities to intervene and leverage points within the system.

The use of established frameworks for evaluation, such as the Consolidated Framework for Implementation Research and McKay et al.'s implementation evaluation roadmap, should be used within both small- and large-scale studies and across the programme lifecycle, to improve the quality and consistency of research assessing the implementation and scaling of WSPA in different contexts. At the national level, the adoption of a practice-led and research-based WSPA framework would facilitate alignment between top-down approaches to physical activity promotion and partnerships at the locality level, supporting a cohesive, system-based approach. In this sense, from a methodological perspective, it is important to move beyond assessing if WSPA programmes work and focus on how they contribute to reshaping the educational system to support the change process.

To support the transfer of learning from this research and the implementation of WSPA in other county contexts, such as Brazil, the adoption of a systems-based approach is recommended. Countries should first begin by mapping what the system, surrounding the

promotion of WSPA, looks like. This research demonstrates that it is important to understand the prevailing social, political, and educational norms of the specific country context, and how they may influence WSPA implementation. This can facilitate improved communication between, and an enhanced understanding of, the different actors and actions and reciprocal interactions relevant to the promotion of physical activity within a school setting. Only once this has been completed would it be possible to undertake a stakeholder engagement exercise (research, policy and practice) to understand how the CAS framework may be applied, and its potential to drive change at the systems level. Preparatory work to review the framework with multi-stakeholders (including those representing research, policy and practice in relation to WSPA) would be beneficial to identify its applicability and relevance to the country context prior to implementation. An asset-based approach should be adopted as part of the implementation process, to help localities and schools to recognise and leverage available resources (e.g. skills, abilities, experiences and networks) to support children's physical activity.

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**APPENDICES**

## APPENDIX A

## GUIDES FOR STUDY 1



## INSIGHTS INTO THE IMPLEMENTATION OF CAS YEAR 2

**Aim**

Understand the second year of CAS implementation in the Bradford locality.

**Objectives**

1. What does implementation look like in schools that have adopted CAS in year two and how does this differ to the first year of implementation?
2. How have the key ingredients within CAS that have led to successful school implementation changed during the second year?
3. What effect is CAS having at the school level, considering the four pillars: policy, environment, stakeholders, and opportunities? How have the effects changed during the second year?

**Methods**

Recruitment of the CAS project co-ordinator and CAS Manager (n=2), Living Well CAS Champions (n=2), JU:MP CAS Champions (n=5), and CAS leads and teachers from schools actively implementing CAS (n=26).

## **INTERVIEW GUIDE FOR CAS CHAMPIONS/MANAGER/COORDINATOR**

Ensure copies of the framework are available in the focus group so that you can use this to facilitate the questions; specifically using prompts on policy, environments (social & physical), stakeholders and opportunities.

### ***Ice-breaker question***

1. Can you tell me your name, the CAS schools/areas you work with, and how long have you been a Champion/Manager/Coordinator?

### ***Implementation/Sustainability***

2. How has the implementation of CAS been since we last spoke?
3. What does the implementation of CAS look like in your schools now?
4. What has gone well (can you give me some examples)?

Prompt: on each of the CAS domains: Policy, Environment, Stakeholders, Opportunities

5. What challenges have you faced? (can you give me some examples examples)?

Prompt: on each of the CAS domains: Policy, Environment, Stakeholders, Opportunities

6. What impact has this had?

Prompt: On each of the stakeholder groups- leadership, school staff, pupils, parents and external stakeholders

### **Thinking about reasons for any change (link to the CFIR domains)**

#### ***Characteristics of individuals:***

7. How have the roles or characteristics of school staff changed, if at all (e.g. motivation, skills, leadership, etc)

Prompt: For example, from our previous work we know that wider school staff's knowledge and understanding of PA was limited

#### ***Inner setting:***

8. How has the school's characteristics changed, if at all (e.g. infrastructure, communications, culture)

Prompt: For example, from our previous work many of the schools reported that the profile of CAS and knowledge of the programme within the school was limited

#### ***Innovation characteristics:***

9. How has the CAS programme changed or perceived to have changed (e.g. adaptability, trialability, complexity, cost, relative advantage, evidence base)

Prompt: For example, from our previous work, some of the schools reported that completion of the profiling tool was detailed and time consuming

***Innovation process:***

10. Innovation process: How has the process of implementing CAS changed (e.g. evaluation, planning, training)
11. Reflecting on your role as a CAS Champion/Manager/Coordinator, what changed from last year?

***Outer Settings:***

12. Has there been anything within the wider education context which has changed the way your schools implement CAS (e.g. wider educational context, policy, funding etc)

## **INTERVIEW GUIDE FOR CAS LEADS, TEACHERS AND SLT**

Ensure copies of the framework are available in the focus group so that you can use this to facilitate the questions; specifically using prompts on policy, environments (social & physical), stakeholders and opportunities.

### ***Ice-breaker questions***

1. Can you tell me your name, the CAS school you work with, and how long have you been a Cas Leads, Teacher/SLT?

### ***Implementation/Sustainability***

2. How has the implementation of CAS been since we last spoke?
3. What does the implementation of CAS look like in your schools now?
4. What has gone well (can you give me some examples)?  
Prompt: on each of the CAS domains: Policy, Environment, Stakeholders, Opportunities
5. What challenges have you faced? (can you give me some examples examples)?  
Prompt: on each of the CAS domains: Policy, Environment, Stakeholders, Opportunities
6. What impact has this had?  
Prompt: On each of the stakeholder groups- teachers, pupils, and parents.

### **Thinking about reasons for any change (link to the CFIR domains)**

#### ***Characteristics of individuals:***

7. How have the roles or characteristics of school staff changed, if at all (e.g. motivation, skills, leadership, etc)  
Prompt: For example, from our previous work we know that wider school staff's knowledge and understanding of PA was limited

#### ***Inner setting:***

8. How has the school's characteristics changed, if at all (e.g. infrastructure, communications, culture)  
Prompt: For example, from our previous work many of the schools reported that the profile of CAS and knowledge of the programme within the school was limited

#### ***Innovation characteristics:***

9. How has the CAS programme changed or perceived to have changed (e.g. adaptability, trialability, complexity, cost, relative advantage, evidence base)  
Prompt: For example, from our previous work, some of the schools reported that completion of the profiling tool was detailed and time consuming

***Innovation process:***

10. Innovation process: How has the process of implementing CAS in your school changed (e.g. evaluation, planning, training)
11. Reflecting on your role as a Cas Leads, Teacher/SLT, what changed from last year?

***Outer Settings:***

12. Has there been anything within the wider education context which has changed the way your schools implement CAS (e.g. wider educational context, policy, funding etc)

***End***

13. Is there anything else that we have not asked that you would like to add?

## APPENDIX B



## INSIGHTS INTO THE IMPLEMENTATION OF WHOLE-SCHOOL PHYSICAL ACTIVITY IN UK

***Aim***

Understand the challenges and enablers to the implementation of whole-school physical activity at the locality level in England.

***Objectives***

4. What are the localities that have adopted WSPA?
5. What does implementation look like in these localities?
6. How have the key ingredients within CAS led to locality-level implementation of WSPA?
7. What are the impacts at the locality level, considering the four key areas: policy, environment, stakeholders, and opportunities?
8. What are the challenges to implementing CAS?

***Methods***

Recruitment of the CAS leads from different localities across the UK actively implementing .

## INTERVIEW GUIDE

*Ensure copies of the framework are available in the focus group so that you can use this to facilitate the questions; specifically using prompts on policy, environments (social & physical), stakeholders and opportunities.*

### **Ice-breaker question**

1. Can you tell me your name, locality, your current job role, time and experience with the implementation of Whole-School Physical Activity (WSPA)?
2. Can you share some key words that help you describe what your understanding is of whole-school physical activity (WS:PA)?s

*For the purpose of this focus group/interview, we would like to provide a description of what we understand as the concept of Whole-School Physical Activity for you to keep in mind: WSPA consists of multicomponent approaches to providing physical activity opportunities, both within and beyond the school day, whether it is high-quality PE lessons, movement integrated into learning, and active travel, for example... It is a cohesive, collective, and collaborative approach that enables various actions through the support of school policies and engagement with different stakeholders such as staff, students, parents, and the wider community.*

### **Intervention Characteristics:**

3. Firstly, can you tell me about your journey with the WSPA implementation in your locality?
  - Prompt: When did you start and why?
  - Prompt: How did you manage logistic aspects (where the funding comes from, training etc)
  - Prompt: How was the recruitment? Who is involved?
  - Prompt: How many schools signed up?
4. Secondly, can you tell me about your journey with the CAS implementation in your locality?
  - Prompt: When did you start and why?
  - Prompt: How did you manage logistic aspects (where the funding comes from, training etc)
  - Prompt: How was the recruitment? Who is involved?
  - Prompt: How many schools signed up?
5. What do you think have been the key drivers/motivations for schools that adopt the WSPA program in your locality? And specifically, why CAS?
  - Prompt: before start, during the process and now.
6. Can you tell me WHAT you think has supported the implementation of WSPA (and then specifically CAS) within the schools you are working with?
  - What are the core components that are indispensable to the implementation?

### **Process Characteristics**

7. Reflecting now on your experience with Creative Active Schools (CAS), what did it look like? How did it go? Did it change over the time?

- Follow-up: Did the implementation process change over time? (From the beginning versus now? If so, how and why?)
8. Think about the different elements of the CAS offer (profile tool, CAS champions, communities of practice etc).
- Have these elements supported the implementation in your locality? If so, how?
  - Did you have to tailor/adapt any element for the implementation process? If so, can you give me examples?
  - Is there anything that is not “officially” part of CAS that has been used for the implementation? Can you give me an example?

### ***Inner setting***

9. Thinking about the framework, can you share any examples where schools succeed with using the CAS framework?
- Prompt: Policy, Social and Physical Environments, Stakeholders, Opportunities
10. Can you share any examples where you think CAS has not worked so well? What may have been the reasons for this?
- Prompt: Policy, Social and Physical Environments, Stakeholders, Opportunities
11. If applicable, can you tell me about any similarities/key characteristics for schools that have either not adopted CAS or quickly dropped CAS following adoption?

### ***Outer setting***

12. Has there been anything within the wider context which has impacted the way your locality implements CAS (e.g. wider educational context, policy, funding etc)

### ***Effectiveness/Impacts***

13. Given the successes previously shared – have any impacted pupils’ physical activity, and/or participation in PE, and school sports within the locality you are working with as a CAS lead? (have CAS framework to show)
- Prompt: Policy, Environments, Stakeholders, Opportunities

### ***Characteristics of Individuals***

14. Thinking about the staff who have changed the provision within their schools. What are the skills/characteristics that have helped facilitate this change?
15. Reflecting on your role as a CAS Locality Lead, can you tell me what you feel has enabled schools from your locality to better succeed with using the CAS framework?
16. What abilities do you think you require to be an effective CAS Locality Lead?

### ***End***

Is there anything else that we have not asked that you would like to add?