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METHOD ARTICLE

REVISED Designing a context-specific intervention in practice: learning from a school-based physical activity intervention

[version 2; peer review: 2 approved]

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Abstract

Background

Public health interventions need to be designed for the intervention setting. Traditionally, to maximise internal validity, school-based pupil physical activity interventions deliver an identical programme across all settings. However, an interventions' success will depend on the context in which it is implemented, i.e. a schools' social, cultural, economic, environmental and other characteristics. In this paper we use the development of the PASSPORT (Physical Activity via a School-Specific PORTfolio) intervention as a case study for the development of context-specific public health interventions. We outline how we developed the intervention and draw out key learning from this for public health interventions generally.

Methods

The PASSPORT intervention takes a portfolio approach that allows schools to select and deliver tailored intervention content that is most suitable to their setting. The intervention was developed across multiple research steps that were designed to progressively build knowledge on school context and physical activity and integrate these into intervention design. We outline these in the paper. Formative studies include: a scoping review of intervention components; school staff interviews; a rapid ethnography; and a school survey. These findings informed the co-design of the intervention tool with primary

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school staff and the development of the portfolio content. Finally, we conducted a pilot study in two schools to learn from both the delivery of the intervention and associated evaluation data collection.

Key learning

Key learning for context-specific intervention design has been gathered around four areas: Ground intervention design in a range of data and insight, Centre contextual experience, Design for intervention flexibility and user autonomy, and, Build in processes to test and iterate.

Conclusions

Each of the formative studies and the intervention design steps provided parts of the complex picture of intervention context and design needs. Combined, the results of the studies supported the development of a context-specific intervention.

Plain Language summary

Programmes designed to support people's health need to be appropriate for the specific community they serve. For example, schools are a great place to support lots of children to be more active, but a programme needs to fit into the day-to-day life of a school for it to work well. Usually, health programmes are the same in each setting. But each setting is different, with different resources, people, equipment, and cultures. In this paper we describe how we designed a flexible programme that would be different in each school setting. We outline the steps we took to develop the programme and draw out key learning from this, to help other researchers who want to develop similar programmes.

We did several smaller projects to build up the information we needed to develop the flexible programme. These are described in the paper and include looking at current academic literature, doing interviews with school staff, spending lots of time in three schools, and doing a survey with many schools. We then took our learning from these projects to design the programme in workshops with school staff, and we used school knowledge and staff to develop the activities that make up the overall programme. We then tried out the intervention in two schools to learn from this.

We learnt several key lessons that would be useful for other researchers who want to design a similar programme. 1) It was useful to have such a range of information to bring into the programme. 2) It was important to have the users, the people who would deliver the programme, at the centre of the programme development. 3) Designing the programme to be flexible was helpful, so that it could be different in each setting, and it was good for schools to be the decision-makers in this. 4) It was necessary to try out and improve the programme lots of times.

Keywords
physical activity, public health, interventions, schools, context, settings, complex interventions

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REVISED **Amendments from Version 1**

Abstract edited to include more detail on the flexible intervention and how it was developed.

Text added to the Introduction to explain the rationale for the study focus on the end of primary school including additional references.

Text added to the Introduction to explain the funding of the full PASSPORT study and the stepped-wedge trial and evaluation of the intervention.

Edits made to the 'Patient and public involvement' section to add more detail on the diversity of public members and the work they have informed.

Section '2. The PASSPORT intervention' expanded to include more detail on the intervention and the process and to provide an illustrative example.

Section '3. Developing the PASSPORT intervention' edited to clarify the role of the formative studies and how findings were established and synthesised.

Across section '3.1 Formative work' small edits have been made to clarify where full methods and findings are published, and what specific insight came from each study, including better aligning to Figure 3.

Reflection on the sample in section 'School survey' added.

Information on how data was collected and processed added to the section 'Co-design of the PASSPORT tool', as well as further description of the synthesis of formative study findings.

The section heading 'Physical Education and school expertise in content development' has been changed to the more descriptive 'Portfolio content development' to keep the reflection on the role of contextual expertise to the key findings section. This section is also expanded to include illustrative examples of intervention content to support comprehension.

Key learning section heading 'Centre user experience' has been broadened to 'Centre contextual experience' to improve comprehension.

Reflections on limitations added to the section 'Key learning'.

Figure 8 updated with a higher resolution.

Small edits considering all reviewer comments and to improve comprehension made throughout.

Any further responses from the reviewers can be found at the end of the article

1. Introduction

Public health interventions should be designed for their setting, addressing the needs of the people they are impacting and the systems they work within.[1,2] It is increasingly recognised that this means intervention settings should be viewed as complex adaptive systems, and that interventions in turn must adapt to that complexity to be successful.[3] In children's physical activity research, school-based interventions have great potential to support large numbers of children to be active.[4–6] However, despite a small number of exceptions, research has shown, in general, that these interventions have not increased children's moderate-to-vigorous intensity physical activity (MVPA).[7–13] This is a critical issue, as physical activity is essential to children's physical and mental health and wellbeing.[14–16] However, the majority of children are not meeting the recommended minimum levels of physical activity[17,18] in the UK or globally.[19–22] Evidence shows that physical activity levels decline across childhood and adolescence,[23–25] and the transition from primary to secondary appears to be a key moment in this decline.[26] Thus, primary school is an important setting for interventions to slow or reverse this decline.[25] Traditionally, school-based pupil physical activity interventions (as with many public health interventions) take a 'one-size-fits-all' approach, designed to deliver an identical programme across all schools or settings with a focus on internal validity. A key aspect that is assumed independent from the active component of an intervention in this approach is the context in which it is implemented, i.e., a schools' social, cultural, economic, environmental and other characteristics.[27] We have suggested that this could be a key factor in the limited success of school-based physical activity interventions,[27] and can contribute to low external validity and a lack of intervention sustainability and success when scaled up.[28] Contextual variation in school-based interventions should be no different from real-world interventions implemented in other environments. Therefore, this is potentially an issue for all public health interventions generally.

PASSPORT (Physical Activity via a School-Specific PORTfolio) is a five-year project at the University of Bristol that aims to develop and evaluate a context-specific school-based physical activity intervention that attempts to address the problem outlined above. Therefore all formative studies, development work, pilot, and trial and evaluation were funded and delivered in this period. The intervention is being evaluated with a stepped-wedge randomised controlled trial[29] and is focused on Year 5 (aged 9-10) due to the potential of improving physical activity participation in this age group before the transition to secondary school and to establish lifelong habits. The central question at the outset of this study was to explore and establish what was meant by 'context' in relation to primary school pupil physical activity, and what a 'context-specific' intervention design could look like.[27] We hypothesised that an intervention where content is optimised to its local context would maximise impact on pupil physical activity outcomes and could have population level impact. One way we could design a context-specific intervention is with a portfolio approach that allowed schools to select and deliver tailored intervention content that would be most suitable to their setting.

In this paper we use the development of the PASSPORT intervention as a case study for designing context-specific interventions. To achieve this aim, this paper has four elements:

1. Provide a brief description of the PASSPORT intervention
2. Outline how the context-specific intervention was developed
3. Outline how the context-specific intervention was pilot tested and the associated findings
4. Highlight the key learning from this project and how it can be applied to context-specific intervention development in public health generally.

Ethical approval

All studies with participants outlined in this paper received ethical approval from the University of Bristol Research Ethics Committee. Their individual references are: school staff interviews (Ref: 15866 19/10/2023), rapid ethnography (Ref: 16095 18/01/2024), school survey (Ref: 20041 06/08/2024), co-design workshops (Ref: 20957 23/08/2024), and pilot study (Ref: 23839 11/03/2025).

Consent

Across all studies informed consent or assent was obtained from all participants.[30] All participating schools signed school study agreements. All school staff and wider school community members provided written consent to participate as an individual in a research activity, with the exception of observational data collected in the rapid ethnography, where lead staff members provided verbal consent. This was deemed most feasible in consultation with schools, where observation of lessons is a day-to-day practice. All school staff were provided with study information sheets, consented to arrange an observation, and consented again for the observation to go ahead. In our studies that involved minors, parents provided written consent and pupils written assent. Pupil participants in the creative research activities, part of the rapid ethnography, provided written assent on paper at the start of the activity. Pupil participants in the pilot study provided written assent via the family consent form, through which parents and children consented to participate in the study.

Patient and public involvement

School staff, parents, and pupils have informed each formative study described in this paper from the design stage, commenting on and shaping data collection plans, information sheets, topic guides and other communication and recruitment processes and materials. Details of this public involvement and engagement is described in individual study papers. As part of the context-specific approach we have taken to intervention design, school staff experience was brought into the research team to lead this work. The intervention was primarily developed through co-design workshops with school staff in a range of positions and from schools with a broad range of socio-demographic and geographical contexts. Intervention content was reviewed by primary school PE expertise. Extensive engagement with staff, parents, and pupils was undertaken with the schools in the pilot study, both of which have high deprivation indicators, to develop the best approaches for inclusive and accessible participation, namely in communication and consent processes. We have established a School Advisory Group of teachers, head teachers, and PE leads to support ongoing intervention development by advising on our research planning and design, provide comment on study documents, and assist with queries or contextualising that relates to school. Members of this group represent a range of primary schools within the wider Bristol area.

2. The PASSPORT intervention

The PASSPORT intervention is a flexible, context-specific portfolio. The intervention supports primary schools to select a bespoke physical activity programme that builds on their current strengths, acknowledges limitations of the school setting, and identifies opportunities to introduce physical activity across the school day. A digital PASSPORT 'tool' supports staff to select their bespoke programme and support their delivery of it. The intervention takes a whole-of-school approach to physical activity[31] and the intervention and implementation support strategies are aligned to the Consolidated Framework for Implementation Research (CFIR),[32,33] to ensure it addresses key determinants of implementation in primary school settings.

The PASSPORT intervention (outlined in Figure 1) has three main steps: 1) schools complete a baseline context assessment to provide information on their physical activity environment and practices. The context assessment captures the current provision across the school day, as well as their facilities, policies, organisational structure, and physical activity culture. 2) This information is used by the research team to recommend activity options from the portfolio that work for that school, via the tool. 3) Schools use the tool to select and deliver their bespoke programme from the recommended activities.

The content for the portfolio (i.e. the possible activities schools are recommended and build their bespoke programmes from) is designed along six pathways that cover physical activity opportunities across the school day and whole school community (Figure 2). These pathways are: *Physically Active and Outdoor Learning; Active Breaks; Breaktime and Lunchtime; Active Travel; Before and After School Activities;* and *School and the Wider Community.* Schools are recommended activities from priority pathways identified through their context assessment. There is no fixed number of pathways that must be identified, and instead this is derived from a schools' context assessment. However, we are seeking to identify the greatest potential for growth and for the programme to be focused. Again, the number of activities a school is recommended on each pathway not fixed and is derived from the context assessment, but we are balancing providing sufficient choice for a school without an overwhelming quantity. The portfolio currently has over 40 activities across the six pathways, but this can expand if additional activities are identified and is part of the interventions' flexible design. Activities on each pathway are designed to build, establishing foundational steps that can be deepened. For example, a completed school context assessment could identify supportive senior leadership and established partnerships with local organisations as strengths, alongside limited awareness of active travel initiatives and deteriorating playground markings as areas requiring further development. It may also identify opportunities to build on, for example, by developing physically active and outdoor learning approaches in the school's extensive outdoor spaces. Based on these findings, the school would then be recommended around 20 tailored activities across the *Physically Active and Outdoor Learning*, *Active Travel* and *Breaktime and Lunchtime* pathways. The school would then select approximately 5-15 of these recommended activities to create their bespoke programme.

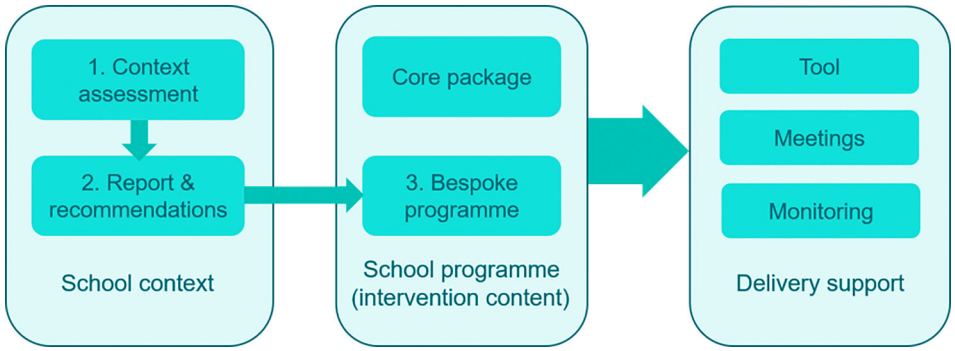

Figure 1. Flow of the PASSPORT portfolio intervention.

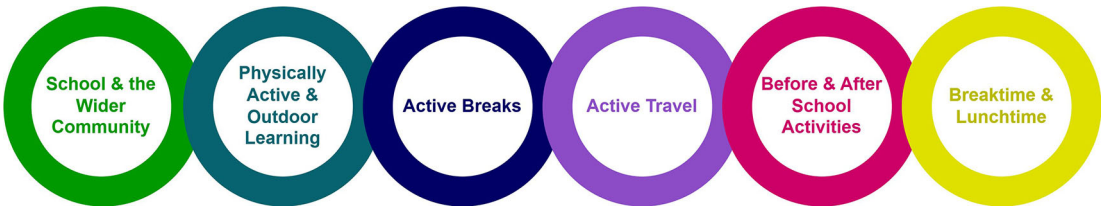

Figure 2. The PASSPORT physical activity pathways (portfolio content).

To support the success of the bespoke programmes, all schools access a core package of resources to guide the development of school physical activity culture, staff pedagogy and skills, and alignment to school systems and priorities. Examples of these resources include guides to embedding physical activity in a school development plan or developing whole-school physical literacy. The core package resources are identical in all schools, and are incorporated into the PASSPORT tool.

Schools deliver their programmes with the support of PASSPORT staff and the ongoing use of the PASSPORT tool, which has budget, action plan, and milestone tracker functions.

3. Developing the PASSPORT intervention

The PASSPORT intervention was developed and iterated across multiple work packages, each designed to establish necessary knowledge that progressively built.

This section summarises each of these studies and work packages and describes key findings that contributed to the development of the context-specific intervention. Section *3.1) Formative work* describes: a scoping review of intervention components; school staff interviews; a rapid ethnography in three primary schools; and a school survey. Section *3.2) Intervention design and content development* describes how we synthesised these findings for: the co-design of the intervention tool with primary school staff, and; the portfolio content development. Figure 3 provides an overview of the development of the PASSPORT intervention, highlighting which studies provided which key insight.

3.1 Formative work

The formative work for the PASSPORT intervention sought to a) establish the meaning of 'school context' in relation to pupil physical activity, and b) provide the necessary data and insight to develop an intervention that would be useful and suitable for schools. Key to the formative work was to use a variety of methods capturing a wide range of perspectives. Combined, this work provided a complex but consistent picture of the aspects of primary school context that are key for pupil physical activity, particularly around school facilities and resources, school culture, physical activity provision, and a strong sense of the policy and structural/organisational context of schools. These insights were built into the design of the intervention.

Scoping review of physical activity interventions in primary schools

We conducted a scoping review to identify previous school-based physical activity interventions that could form the basis of the PASSPORT intervention content. The full scoping review and protocol are published elsewhere.[34,35] As we were focussed on the whether it was feasible to deliver each intervention component it was not a requirement that an

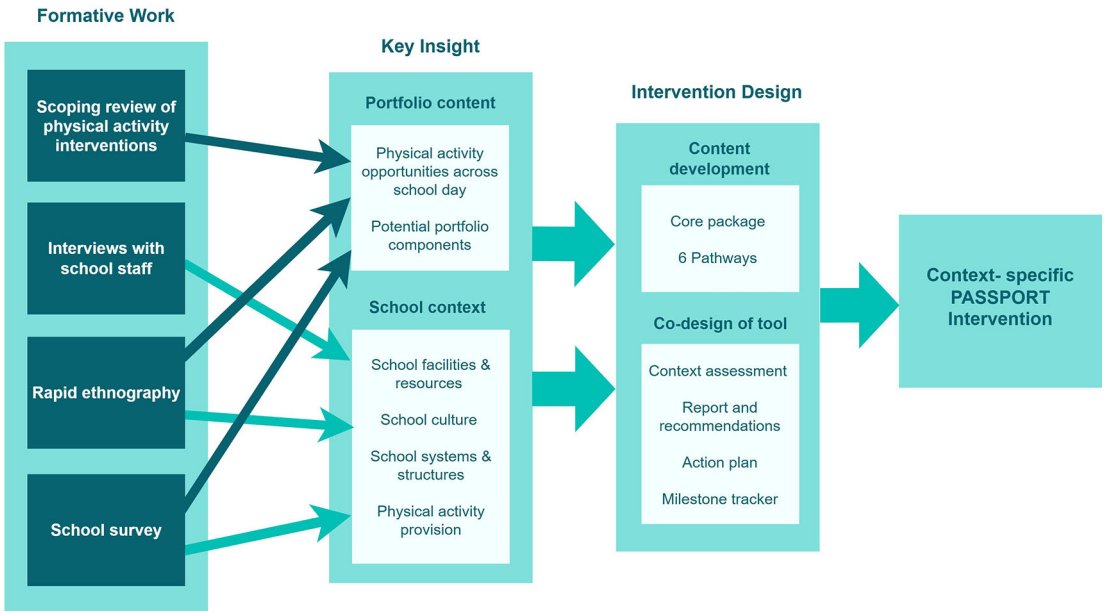

Figure 3. Development of the PASSPORT intervention.

intervention had been shown to have positively impacted on physical activity. This is important because it may be that an intervention did not achieve a statistical impact on physical activity in all schools because the context was different in each school. The intervention could still be useful in the right context. European school-based intervention studies aimed at increasing physical activity in children aged 7–11 years published in English since 2015 were included in the review. 79 articles were included, constituting 45 intervention studies. We identified 177 intervention components, which were synthesized into a framework of 60 intervention component types across 11 activity opportunities: six within the school day, three within the extended school day and two within the wider school environment. These intervention components, and particularly the opportunities for activity across the school day, guided the other formative studies, for example interview topic guides, and formed a basis for the development of the PASSPORT intervention content as a first iteration of the pathways (Figure 3).

Semi-structured interviews with school staff

We next conducted a study of semi-structured interviews with primary school staff to establish a foundational understanding of 'school context' for pupil physical activity to inform the intervention. These interviews surfaced the elements of school context that impact pupil physical activity and the feasibility and acceptability of a portfolio intervention design. A study protocol is available,[36] and full school and participant information, study processes, and findings are reported in published papers.[37,38] We conducted 33 interviews with staff from 19 primary schools in the wider Bristol area[36] between November 2023 and January 2024. Staff roles included headteacher/principal or deputy, class teachers, teaching assistants, Physical Education (PE) subject leads, dedicated PE teachers, and a Parent Teacher Association (PTA) chair. Schools were purposively-sampled with a range of sizes, locations, and sociodemographic characteristics. Analysis of these interviews brought out the role of facilities and resources for pupil physical activity in primary schools, namely, that facilities provide opportunities for pupils to be active, but to fully maximise these requires a supportive school culture and has logistical challenges.[37] Analysis also established the role of social context, i.e. the organisational, political, cultural, and sociodemographic characteristics of a school (Figure 3).[38]

Rapid multi-site team ethnography

Following these interviews, we conducted a rapid, multi-site team ethnography in three purposively sampled Bristol primary schools between March and July 2024 to provide greater depth and perspectives from within a school system. The study protocol is available[39] and detailed information on all study schools, participants, processes, and findings are reported in published papers.[40–42] This approach prioritises understanding structures, decision-making processes, and culture, as well as the experiences of people, within the settings.[43] Documentary, conversational, and observational data collection captured multiple perspectives from the school communities over time, which enabled comparison across the schools, roles, and pupils. The focus for data collection activities was informed by the interview study and scoping review, for example, guiding the focus for which activities to observe and which school roles to interview. Participants included staff that have a role in delivering physical activity or broader health programmes, or governance and decision-making, as well as broader school community members such as external providers of active clubs and PE, school Governors, or PTA members. Data on physical activity provision, spend, and participation as well as school demographics were collected and informed further data collection in each school. Observations were conducted throughout the school day to understand when, where, and how pupils were active and where any potential opportunities for physical activity and the intervention lay. Additionally, school meetings and events were observed to understand broader school structures and priorities. Interviews were conducted with a range of key community members in each school, and creative research activities were undertaken with Year 5 pupils to bring in their perspectives and experiences. This rich data provided deeper insight on all aspects of school context and additional ideas for the portfolio content (Figure 3). Across these three schools there were areas of convergence and divergence on pupil physical activity. This highlighted consistent features we could build on in the intervention (e.g. consistency across the roles of different school communities for physical activity), but also where flexibility and difference were key to an acceptable intervention (e.g. building on the schools' idea of success for physical activity in their school, or the need to provide multiple opportunities across the whole school day to meet the needs of every school context).

School survey

Finally, we conducted a survey to collect data on school physical activity provision, policies, and readiness for change among a broader sample of schools. With this we also aimed to understand how much context differed between schools on a broader scale, and to trial questions to be included in the school context assessment. A study protocol is available.[44] The school survey was conducted across the wider Bristol area with responses collected between September and December 2024. Primary school staff who were either PE leads, dedicated PE teachers, or members of the school Senior

Leadership Team (SLT) were asked to complete the survey. The questionnaire consisted of four sections: 1) How physical activity is provided and promoted to pupils outside of PE lessons; 2) The perceived quality of pupil physical activity provision and promotion outside of PE lessons; 3) School culture towards physical activity and level of priority physical activity is given within schools; and 4) School-level readiness to change regarding pupil physical activity provision and promotion. We received 59 unique school responses from 311 schools who were invited to participate (19% response rate). Table 1 presents the demographic characteristics of the schools and participating school staff in the sample. The majority of participating schools were located in urban areas (76%), from areas of lower deprivation (59% with Index of Multiple Deprivation[45] of 7–10) and with below national percentages of pupils eligible for free school meals (78%).[46] Most school staff completing the survey were teachers with a PE lead role. This study provided useful findings (outlined below), however, the sample bias highlights the value of not relying on this approach alone. Whereas this survey was sent to the school offices of all eligible schools, our staff interview and rapid ethnography studies recruited schools with a range of socio-demographic positions via snowballing and network building recruitment activities.

Table 1. School survey participating school and staff demographic characteristics (N = 59).

School characteristics	**n**	**%**
Urban/rural classification		
Urban	45	76%
Rural	14	24%
School Region		
City of Bristol	23	39%
South Gloucestershire	16	27%
North Somerset	8	14%
Bath and North East Somerset	12	20%
Free School meal[1] *%*		
Below national percentage eligible	46	78%
Equal to or above national percentage eligible	13	22%
School postcode Index of Multiple Deprivation[2]		
1–3 (most deprived)	12	20%
4–6	12	20%
7–10 (least deprived)	35	59%
Number of pupils in school		
0–200	15	25%
201–400	24	41%
400+	20	34%
School Management		
Local Authority Maintained	22	37%
Academy	37	63%
Participant characteristics	**n**	**%**
Participant roles		
Senior leadership team member only	12	20%
Senior leadership team member and additional role(s) (i.e., PE lead)	5	9%
Dedicated PE teacher, PE Coordinator, or PE Lead	8	14%
Teacher and additional role(s) (i.e., PE lead)	27	46%
Teacher only	5	9%
Other	2	3%

[1]a UK government scheme to provide free school meals to children from low income families, data from academic year 2023/24 when 24.6% of pupils nationally were eligible for free school meals[46]
[2]a measure of area deprivation, with 10 being least deprived and 1 being most deprived[45]

The findings from the survey informed the portfolio content and our understanding of school context (Figure 3). The school survey highlighted variation across schools in physical activity provision, culture, and readiness for change, suggesting that a contextually-sensitive approach to a physical activity intervention was necessary, i.e., each school had different needs and areas for development. For example, overall, school staff reported their perceived quality of their physical activity provision and promotion was good, however there was varying agreement in areas such as whether their physical activity clubs were oversubscribed and whether it was difficult to timetable pupil physical activity opportunities across the school day (Table 2). Schools reported a variety of areas in which they planned to spend their PE and Sports Premium funding,[47] with external providers (88% of schools), new equipment (78% of schools), resources/materials (71% of schools), and teaching training (61% of schools) most frequently selected. However, all possible areas of spending had a strong response rate, with subsidising club fees lowest (42% of schools), suggesting all areas needed to be included as options in the PASSPORT intervention. These findings and others informed areas of focus for the

Table 2. School survey perceived quality of pupil physical activity provision and promotion (N = 59).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know	N/A
The opportunities for physical activity are inclusive to all children in our school	42%	49%	7%	2%	0%	0%	0%
The facilities and equipment used for physical activity are inclusive to all children in our school	31%	59%	7%	3%	0%	0%	0%
Our sports and play equipment (e.g. rackets, balls, bibs, games) are high quality	12%	61%	24%	3%	0%	0%	0%
The national or local programmes/initiatives that our school takes part in have been worth doing to increase the physical activity levels of our pupils	17%	53%	24%	0%	2%	3%	2%
The training and resources school staff have been provided with makes them feel confident to support pupil physical activity	10%	56%	19%	8%	3%	2%	2%
Our physical activity facilities (e.g. playground, fields, courts, indoor spaces) are high quality	15%	41%	15%	19%	8%	2%	0%
Physical activity clubs at our school engage less active/less sporty pupils	5%	39%	22%	32%	0%	2%	0%
In our school, timetabling pupil physical activity is difficult to do within the school day	15%	29%	3%	36%	15%	2%	0%
In our school, timetabling pupil physical activity is difficult to do before or after school	5%	24%	8%	42%	17%	2%	2%
The physical activity clubs (e.g. before school, lunchtime, after school) at our school are over-subscribed.	8%	20%	36%	32%	2%	0%	2%

intervention content, but of key importance the school survey, combined with previously used measures of school physical activity environments,[48,49] formed a basis of the school context assessment in the PASSPORT intervention. School survey questions and results were reviewed to identify key items to include in the first draft of the context assessment. Survey items were included based on their relevance and importance to understanding school physical activity context and how schools had responded. For example, questions were not included if the answers were very similar across all schools and thus did not help distinguish between different contexts.

3.2. Intervention design and content development

The next step was to use data and insight from the formative work to undertake a structured approach to design a context-specific portfolio intervention and develop the portfolio content. Key to this was centring school experience in these processes to best support the development of an intervention that understood and was designed for primary school context.

Co-design of the PASSPORT tool

The PASSPORT tool that schools use to assess their context, select a bespoke programme, and support programme delivery, was developed through a co-design process with primary school staff,[50] to ensure that it was shaped by the experience and insight of the potential users. We held three ideation workshops[51] between November 2024 and May 2025. Workshop 1 had 10 attendees, Workshop 2 had 10, and Workshop 3 had 6. This was a total of 11 staff from 11 local primary schools with a range of contexts (i.e. size, location, socio-economic indicators), including head teachers (n = 2), dedicated PE teachers (n = 3), class teachers with a PE lead role (n = 5), and class teachers (n = 1). Data was collected from these workshops as researcher notes, audio recordings (where functional), and through the visual materials produced. Audio recordings were transcribed and all data coded and analysed after each workshop to support the iteration of the tool design.

We used design principles to structure and plan these workshops,[52,53] following the double diamond design process[54] and applying user-centred design methods described below. The insight from the formative studies was synthesised for the workshops, by taking the findings from analyses that had been completed and by returning to original transcripts and data and coding these for tool design information. This data was revised by the team to identify and draw out constraints, opportunities, and solutions for physical activity in school and the tool, and developed into workshop activities that are described below. Through these activities the findings from formative studies were explored and validated by participants, and across the workshops we tested and refined the context assessment and iterated prototypes of the tool. Figure 4 outlines this design process, and each workshop is described below.

In Workshop 1 (in-person), group members validated and scrutinised our understanding of the school system, different staff priorities, and the general role and landscape of physical activity in primary schools, through several activities. We used insight from the formative work to develop user personas for key school staff and pupils, which workshop members read, annotated, challenged, and validated (Figure 5), ensuring we understood the position and priorities of each user group. We also used the formative work to create opportunity statements that highlighted key opportunities for supporting pupil physical activity in school which workshop members were asked to prioritise by most important. Improving participation of all pupils and embedding a physical activity culture were identified as areas of highest priority. Members then developed initial design ideas and features for the tool via paper prototyping activities, exploring how information could be organised and the level of detail necessary for decision-making when selecting activities, such as cost, time resource, and target audience (Figure 6). Following Workshop 1 we developed prototypes of each part of the tool, and the idea of the core package of resources to build physical activity culture and staff also emerged at this stage.

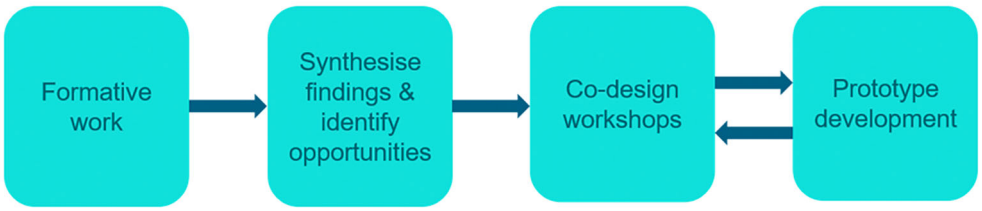

Figure 4. Overview of the co-design process.



Figure 5. Workshop 1 persona group work.

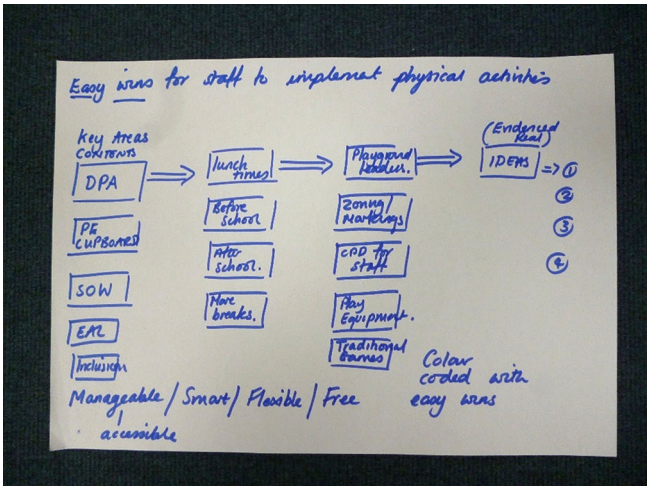

Figure 6. Workshop 1 initial ideas for the tool.

Workshop 2 (in-person) further explored issues and ideas that were identified in Workshop 1 and the core package was introduced, as well as logic models for using the tool. School physical activity culture was explored through a prioritisation activity, and members engaged with several general questions about intervention design and content that had arisen between the two workshops. Members then completed and refined a draft context assessment on paper, advising on what needed to be kept, removed, and expanded on in order to maximise the usefulness for the tool and for schools broadly. Finally, the group explored the updated paper prototypes which they iterated and refined (Figure 7). The importance of aligning the tool and content to key policy frameworks was communicated by workshop members, namely the Ofsted inspection framework, the national curriculum for PE, and the PE and School Sport Premium, and that this would support schools in a practical and meaningful way to meet their existing demands and reporting requirements. Design features, such as how and where to best include different staff in using the tool, and the inclusion of an action plan, also arose from this workshop. Following Workshop 2 we refined the paper prototypes of the tool and draft context assessment. The context assessment was translated to Online Surveys (https://onlinesurveys.jisc.ac.uk/) and a digital wire-frame prototype of the tool was developed in the design software Penpot.[55]

In Workshop 3 (online), members were guided to interact with and 'use' the digital prototype, including completing the context assessment digitally and giving feedback on the tools' design, user journey, and content (Figure 8). After Workshop 3 the prototype tool was further refined and iterated based on feedback, and the inclusion of a milestone tracker

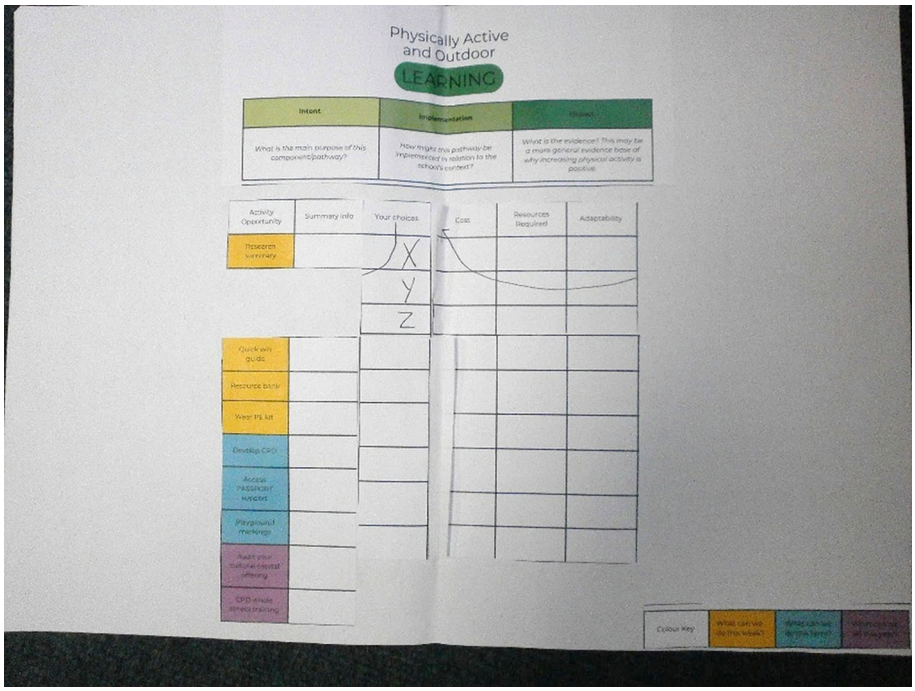

Figure 7. Workshop 2 paper prototyping group activity.

function was added. Then, for use within the scope and limits of the PASSPORT study, we translated the Penpot prototype into a useable system within the MS Office package.

Additionally, workshop activities and conversations informed the portfolio content, i.e. the activities that would be recommended to schools through the tool. Members helped to refine content to the six pathways (see Figure 4) and emphasised how all content needed to provide options for pupils with Special Educational Needs and Disabilities (SEND) and be adaptable to all contexts.

Portfolio content development

Alongside the development of the tool, content was required for the portfolio. To maximise the quality and relevance of this content to schools, an experienced PE teacher joined the study to lead this work and provide school PE and physical activity expertise, system understanding, and language, as well as lead intervention delivery support. Informed by the formative studies (scoping review, rapid ethnography, and school survey (Figure 3)) and co-design process, desk research was undertaken to map out activities across the six pathways and develop the materials and resources required for a school to implement each activity. For example, for the *Breaktime and Lunchtime* pathway, investment in pupil leadership programmes was identified as an activity, and so the practical resources, guidance and implementation materials a school would require in order to introduce and sustain this was created, in this case a guide to developing physical activity ambassadors, template certificates to be given to them, and a catalogue of pupil leadership packages that can be purchased. For additional input and scrutiny, all draft content was reviewed by a primary PE specialist and feedback integrated.

The Consolidated Framework for Implementation Research (CFIR) was used to further strengthen the intervention content.[32,33] CFIR provides a structure to consider factors that influence implementation, including characteristics of the intervention, the school environment, external influences, individual staff factors and the processes used to support change. Using this framework helped ensure that implementation was embedded within design decisions rather than treated as a separate phase. For example, consideration of implementation climate, a CFIR construct, informed the inclusion of content focused on developing school leadership support, engaging staff and aligning physical activity with existing school and national priorities, recognising that the wider school environment would influence the feasibility and sustainability of the intervention implementation.

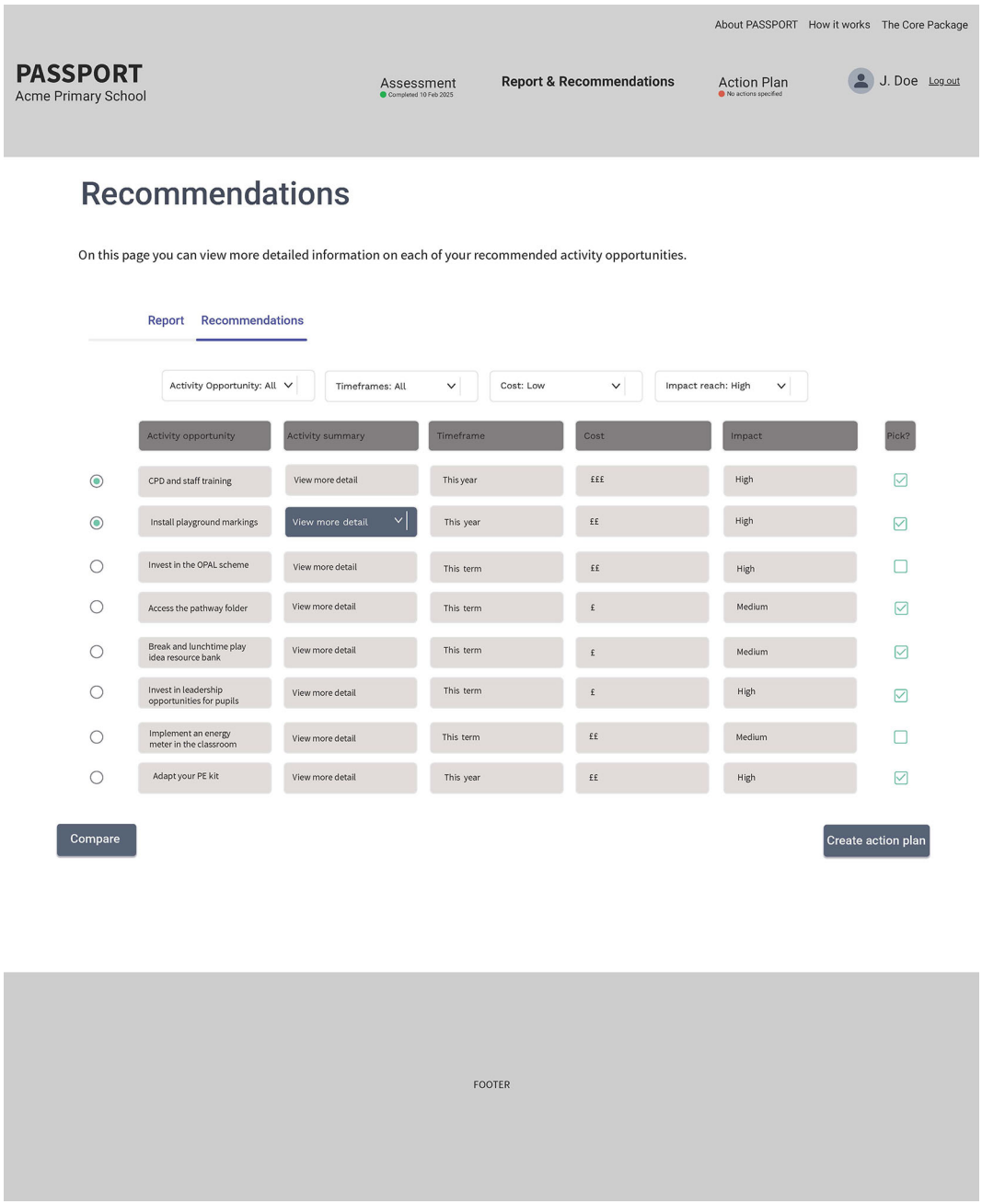

Figure 8. Workshop 3 screenshot from the digital prototype.

4. Piloting the PASSPORT intervention

To pilot and refine the PASSPORT intervention, a study was conducted with two contextually contrasting schools (inner city and suburban, differing pupil demographics, both with high indicators of disadvantage) in the Bristol area as learning partners over a seven-month period (June 2025 – December 2025). The study protocol is available.[56] This pilot was also used to test and improve plans for school and pupil recruitment, communications, and physical activity data collection for a main evaluation, and so did not aim to estimate the impact of the intervention on physical activity outcomes.

Pupil recruitment and quantitative data collection

Alongside the intervention delivery and evaluation, physical activity data were collected from pupils to monitor recruitment and retention rates, and amount of valid data. Parent consent and pupil assent was provided, along with

pupil demographic information. All Year 4 pupils were eligible to participate, and physical activity data were collected via wrist-worn Axivity AX3 triaxial accelerometers worn for six days on three occasions (once at T0, T1, and T2). Pupils completed a paper questionnaire in school time which they completed twice (T0 and T2). Pupil absence data was collected for the study cohort year group (T0 and T2). Data collection in the schools was successful, and demonstrated our plans a future trial and evaluation are feasible. A total of 46 pupils were recruited at baseline from a potential total of 57 across the two schools, with high levels of data provision across the three measurement points (64–85%). At each measurement point (T0, T1, T2), two weekdays of valid accelerometer data were required to calculate a pupil's mean weekday MVPA. Nearly all (45; 98%) pupils provided a valid weekday MVPA from at least one measurement point and over half (25; 54%) had measurements for all three. Table 3 provides school and participant demographic information, and Table 4 summarises data provision by time point.

Intervention and evaluation

Schools completed a school-study agreement to consent to the study, which included providing school demographic data. At T0 (baseline, Term 6 of the 2024–25 school year, June–July 2025), both schools completed the context assessment and received their recommended activities via the PASSPORT tool, as well as the core package resources. At T1 (Term 1 of the 2025–26 school year, September–October 2025) each school received £3,000 to spend on their bespoke programme, as well as their action plans and milestone trackers via the tool. They began delivery of their bespoke programmes which continued into T2 (Term 2, November–December 2025). A process evaluation was conducted to understand implementation and user experiences and further improve the overall intervention. Semi-structured interviews with intervention

Table 3. Pilot study school and participant demographic information at baseline.

	School 1		School 2	
	n	%	n	%
School data				
% pupils in receipt of Pupil Premium	-	49%	-	40%
% girls	-	48%	-	63%
% non-white ethnicity	-	27%	-	95%
Participant data				
Total pupils in year group	27	100%	30	100%
Total pupils recruited	17	63%	29	97%
Pupil Premium*	4	33%	8	30%
Pupil Premium missing/prefer not to say	5	29%	3	10%
Girls*	9	64%	10	53%
Gender missing/prefer not to say	3	18%	11	37%

*excluding missing data

Table 4. Pilot study data provision.

	T0 Baseline (Term 6 24/25)		T1 (Term 1 25/26)		T2 (Term 2 25/26)	
	n	%	n	%	n	%
Pupils recruited	46		45		46	
Pupil questionnaires returned	45	98%	-		46	100%
Valid wellbeing scores	37	80%	-		39	85%
Accelerometer measurements	41	89%	40	89%	34	74%
Weekday MVPA* scores (which included at least 2 weekdays)	40	87%	35	78%	30	65%

Note: in School 2 one pupil left after baseline (T0) and an additional pupil was recruited T2.
*MVPA = moderate-to-vigorous physical activity

leads (in both schools this was the Head Teacher) at T0 and T2 (four interviews in total) explored experiences of using the tool and selecting their programme, delivering the programme, any successes or barriers, and key learning for us to take forward to improve the intervention. At the start of T2, schools completed an intervention implementation form to provide an update on progress, thoughts about the programme and the support given, as well as the response of the wider school staff and pupils. At the end of T2 schools completed an intervention component form to assess their bespoke programme, associated costs, and the engagement of staff and pupils.

Findings

The delivery of the intervention and use of the PASSPORT tool was well received. Quotes have been used to illustrate points in the text below. These quotes are identified by the school ID (S1, S2), data collection method (interview = I, intervention implementation form = IIF, and intervention component form = ICF), and where interviews, the interview number (I1, I2). For example, S1I2 is school 1 interview 2, or S2IIF is school 2 intervention implementation form.

Both schools made progress on the delivery of their bespoke programmes, although progress varied between the schools. The intervention implementation forms indicated that after one term of implementing their bespoke programmes (the start of T2), schools were still in the early stages, but delivery was progressing, with early engagement from pupils and staff alongside organisational and contextual factors that shaped the pace of implementation. For example, one school noted that *"some staff have already begun to try […] movement breaks in classrooms,"* (S1IIF), and they were in the planning stage for further activities. Several factors were highlighted that influenced early implementation and explained some difference between the schools, including competing priorities for school staff and practical challenges linked to environmental changes such as school procurement rules.

Interviews indicated that the intervention process, including completing the context assessment and using the tool to select and deliver their bespoke programme, was generally viewed as acceptable and appropriate. The context assessment was perceived as manageable and useful for reflection, with one participant noting that it *"didn't […] feel really onerous"* and could help schools *"reflect on where you are or what your priorities are"* (S1I2). The programme selection part of the tool was also viewed positively, with one respondent describing it as *"easy to use … and not overly time consuming"*, adding that *"it flows absolutely fine"* compared with other reporting systems used in schools (S2I2). Participants spoke positively about the support provided by the research team, describing the overall process as *"a very supportive process throughout"* (S1I2).

Despite this, some implementation planning and support features of the tool were used less frequently than intended. Schools reported limited engagement with the action plan and milestone tracking elements because of competing demands on staff time. As one headteacher explained, *"you had to spend a bit of time doing it … it [lack of engagement] was more of a time thing"* (S1I2). Additionally, the intervention component forms showed mixed progress with allocating the programme budget which indicated that this could be better supported.

Participants described the activities recommended to them as practical and relevant to their school contexts, with one noting that *"they were all things that could be useful"* (S1ICF) and that the recommendations reflected areas where schools were already seeking to increase activity opportunities. The structured presentation of options was also viewed as helpful for decision making, with one headteacher explaining that the process helped move ideas *"from just having it in your head"* (S2I2) towards planned implementation. Pupils in school 1 were reported to respond positively to the opportunities for movement, and staff attitudes were generally supportive. The school reported one lunchtime activity was *"very inclusive … [and] suit children with a variety of needs"* (S1IIF). They explained that they saw early positive behavioural impacts from this activity, stating *"lunchtime incidents have dropped dramatically and there is less [pupil] dysregulation after lunch"* (S1IIF), and described it as engaged in by *"many children who weren't otherwise as active"* (S1IIF).

Taken together, the responses suggest that the bespoke programme activities selected by the schools were suitable and appropriate to each school, and were integrated into existing school priorities and routines, with perceived benefits for pupil engagement and behaviour alongside increased opportunities for movement during the school day. The pilot and evaluation also brought out key learning and feedback to further develop the intervention. This included improving budget planning support in the tool at the activity selection and delivery stages, planning for an additional support meeting between the research team's intervention delivery lead and a school to support using the action plan and milestone tracker, developing a video and information sheet to support the use of the tool, and the inclusion of questions to explore suggested areas for potential impact beyond MVPA in a future trial process evaluation, namely for pupil behaviour and attainment as well as attendance.

Table 5. Key learning from the PASSPORT study for designing context-specific public health interventions.

Key learning	Summary
Ground intervention design in a range of data and insight	Using depth and breadth in formative work that feeds into intervention development supports it to be context-specific by providing multiple steps of exploration and validation of ideas.
Centre user experience	Centring user experience in the design of a context-specific intervention works to ensure it will meet user needs, be suitable and appropriate, and be more likely to work within systems and priorities.
Design for intervention flexibility and user autonomy	Identifying where flexibility needs to be built in to the intervention design, and the balance of autonomy and guidance that is necessary at each step, centres context in the intervention by being responsive and adaptive.
Build in processes to test and iterate	The design of context-specific interventions requires not just evidence-based or co-design elements, but an interactive testing process to ensure that it works in practice and meets the needs of all involved.

5. Key learning for designing context-specific public health interventions

Public health research is increasingly seeking to design complex interventions that are sensitive to different setting and community needs. This paper has outlined how the PASSPORT intervention, a school-based physical activity intervention, was developed, as a case study of designing a context-specific portfolio intervention to deliver bespoke programmes in schools. This section outlines key learning from the PASSPORT study to support putting context at the centre of public health intervention design broadly, beyond schools and physical activity. Table 5 summarises the key learning.

Ground intervention design in a range of data and insight

Grounding the intervention development in a range of data and insight generated through the formative work and co-design supported the context-specific design. However, synthesising findings from across this number of formative studies required time and a structured approach and this must be factored into plans for future studies. For example, from the outset a central research question was what was meant by 'school context for pupil physical activity'. Initial exploration of this in the interviews, deeper exploration in the ethnography, broader insights in the school survey, and then validation of the insights in co-design, established which aspects of schools needed to be considered and included in the intervention, which communities needed to be involved, and highlighted practical design and implementation issues such as how decision-making takes place and where physical activity sits within broader school priorities. As demonstrated in Figure 3, the interconnectedness of the data and insight has been key to understanding school physical activity context. None of the formative work studies or intervention development processes alone provide the whole picture, and the strength is in their combination. For example, the breadth and depth of the formative work enabled identification of which aspects of pupil physical activity diverge across school settings and which are broadly consistent, to feed into the intervention design.[40] Designing a context-specific, and in our case flexible, intervention is complex; creating a structured approach to capture this complexity and richness is valuable.

Centre contextual experience

Centring contextual experience in the design of a context-specific intervention works to ensure it will meet user needs, be suitable and appropriate, and be more likely to work within systems and priorities. Employing user-centred design methods and processes carefully, and co-designing with school Physical Education and physical activity expertise (both within and outside of the research team), have supported the suitability of the PASSPORT tool through understanding the level of information needed to use the tool effectively, how and where content needed to be adaptable, and which broader regulatory and statutory reporting systems it could support and align with. The co-design process of the PASSPORT tool brought forward insight and design decisions that would not have been apparent otherwise. Examples of this include: understanding the context assessment could meet a current gap in primary schools as a physical activity audit tool and expanding areas school staff identified; identifying the need for the core package to support school physical activity culture and the delivery of bespoke packages; designing for activities and areas of work to start with foundations and build, allowing a school at any stage in their physical activity provision to have relevant content; the importance of adaptability for pupils with SEND; and the addition of delivery tools such as the action plan and milestone tracker. Bringing context-specific expertise within a research team developing an intervention can provide further insight and contextual implementation support. Therefore, including user-centred design methods such as ideation workshops

with key stakeholders, and bringing in contextual expertise, is valuable in developing context-specific public health interventions.

Design for intervention flexibility and user autonomy

A key mechanism for making the PASSPORT intervention 'context-specific' was to design a process for schools to select their own bespoke intervention, i.e. schools could have choice over a bespoke intervention that would differ in each setting. Across the development of the PASSPORT intervention school communities expressed their support for this premise, having experienced resources and programmes that were not be suitable for their particular setting.[37] A central question throughout the intervention design was identifying where flexibility needed to be built in and the balance of autonomy and guidance that was necessary at each step. For example, in the PASSPORT intervention completed context assessments are reviewed by a school physical activity expert in the research team and recommendations provided based on it. This is a structured process to focus priorities and avoid school overwhelm, but it takes place in conjunction with a meeting to discuss the recommendations, and schools can advise if adaptations are needed. Schools are then expected to select the activities they think are most suitable and ideal for their school, and therefore have autonomy over their choice, with support from the research team. Another area where flexibility has been intentionally designed is that the structure of the tool is easily extendable to accommodate additional intervention activities or pathways as the work develops. Designing for flexibility and user autonomy, therefore, centres context in the intervention by being responsive and adaptive. Results from the pilot study are promising and indicate this approach supports staff use of the tool and a context-specific approach, however, a full trial of the intervention with process evaluation is needed to better evaluate this.

Build in processes to test and iterate

The context-specific intervention developed in the PASSPORT study involves a set of steps that alone are simple but is it essential they work together and that appropriate support is provided throughout. It is therefore helpful to build in processes and time to test and iterate the intervention, as with any intervention development process, but with attention on keeping the intervention design focused on setting context, usability, and acceptability. The ideation workshops were a structured process for this, with the aim of developing and iterating prototypes of the tool, but this was further explored by delivering and evaluating the intervention in the pilot study. Across these processes aspects of the intervention that were initially included or developed were dropped or adapted. One example is after Workshop 1 the tool paper prototypes organised intervention activities by time frame, actioned 'this week', 'this term', and 'this year', to break down intervention delivery into more manageable steps and deliver some 'quick wins'. However, during Workshop 2 and in iterating the prototype afterwards it became clear this approach did not account for the immediate actions necessary to deliver longer term activities. Ultimately, this iteration and co-design led to the action plan and milestone tracker features of the PASSPORT tool. However, even with the PASSPORT study funded through development to trial, further testing and iteration would be beneficial, and therefore we recognise there are practical project limits to conducting this. This highlights that the successful design of context-specific interventions requires not just evidence-based or co-design elements, but an interactive testing process to ensure that it works in practice and meets the needs of all involved. This is particularly the case for complex interventions with multiple components or stages that need to work together.

6. Conclusion

Designing context-specific public health interventions has the potential to improve intervention success across the field. In this paper we have outlined the steps we took to design a portfolio intervention that supports schools to select and deliver tailored intervention content that would be most suitable to their setting. These steps included undertaking a range of formative studies to generate a breadth of contextual and practical insight, and then taking this insight into intervention design and content development, via co-design, embedding school expertise, and piloting. Each of these studies or steps provided useful insight and information on the setting context and for intervention design. However, combined they provide a rich and complex grounding from which to develop a non-traditional intervention approach.

Acknowledgements

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Data availability

Repository: PASSPORT study formative work.[57]

https://doi.org/10.5523/bris.26yg5hhyaxlez24w8fhxvkrrpk

This project contains the following underlying data:

Scoping interviews

- Scoping_interviews_participant_data.csv (interview participant information)
- Context 1_anonymised.pdf (anonymised interview transcript)
- Context 2_anonymised.pdf (anonymised interview transcript)
- Context 3_anonymised.pdf (anonymised interview transcript)
- Context 4_anonymised.pdf (anonymised interview transcript)
- Context 5_anonymised.pdf (anonymised interview transcript)
- Context 6_anonymised.pdf (anonymised interview transcript)
- Context 7_anonymised.pdf (anonymised interview transcript)
- Context 8_anonymised.pdf (anonymised interview transcript)
- Context 9_anonymised.pdf (anonymised interview transcript)
- Context 10_anonymised.pdf (anonymised interview transcript)
- Context 11_anonymised.pdf (anonymised interview transcript)
- Context 12_anonymised.pdf (anonymised interview transcript)
- Context 13_anonymised.pdf (anonymised interview transcript)
- Context 14_anonymised.pdf (anonymised interview transcript)
- Context 15_anonymised.pdf (anonymised interview transcript)
- Context 16_anonymised.pdf (anonymised interview transcript)
- Context_17_anonymised.pdf (anonymised interview transcript)
- Context_18_anonymised.pdf (anonymised interview transcript)
- Feasibility 1_anonymised.pdf (anonymised interview transcript)
- Feasibility_2_anonymised.pdf (anonymised interview transcript)
- Feasibility_3_anonymised.pdf (anonymised interview transcript)
- Feasibility_4-anonymised.pdf (anonymised interview transcript)
- Feasibility_5-anonymised.pdf (anonymised interview transcript)

- Feasibility_6_anonymised.pdf (anonymised interview transcript)
- Feasibility_7_anonymised.pdf (anonymised interview transcript)
- Feasibility_8_anonymised.pdf (anonymised interview transcript)
- Feasibility_9_anonymised.pdf (anonymised interview transcript)
- Feasibility_10_anonymised.pdf (anonymised interview transcript)
- Feasibility_11_anonymised.pdf (anonymised interview transcript)
- Feasibility_12_anonymised.pdf (anonymised interview transcript)
- Feasibility_13_anonymised.pdf (anonymised interview transcript)
- Feasibility_14_anonymised.pdf (anonymised interview transcript)
- Feasibility_15_anonymised.pdf (anonymised interview transcript)
- Passport information sheet_context interviews.pdf (interview participant information sheet)
- Passport information sheet_feasibility interviews.pdf (interview participant information sheet)
- Passport scoping interviews participant consent form.pdf (interview participant consent form template)

Rapid ethnography

- Interviews_participant_information.csv (completed observation template)
- Pupil_activities_participants.csv (completed observation template)
- S1O1 Year 5 forest school.pdf (completed observation template)
- S1O2 Y5 Y6 lunchtime football club.pdf (completed observation template)
- S1O3 Year 5 PE external provider.pdf (completed observation template)
- S1O4 Active travel.pdf (completed observation template)
- S1O5 Forest School YR 5.pdf (completed observation template)
- S1O6 YR 6 Girls Football Club.pdf (completed observation template)
- S1O7 YR 5 PE External Provider.pdf (completed observation template)
- S1O8 Lunchtime.pdf (completed observation template)
- S1O9 Y6 PE with PE teacher.pdf (completed observation template)
- S1O10 Active travel.pdf (completed observation template)
- S1O11 mixed football after school club with PE teacher.pdf (completed observation template)
- S1O12 Lunchtime Observations.pdf (completed observation template)

- S1O13 After School Active Travel.pdf (completed observation template)
- S1O14 YR 6 PE lesson with PE teacher.pdf (completed observation template)
- S1O15 YR5 class A PE lesson with class teacher.pdf (completed observation template)
- S1O16 YR5 class B PE with class teacher.pdf (completed observation template)
- S1O17 Y5 PE with class teacher 1.pdf (completed observation template)
- S1O18 Y5 PE with class teacher 2.pdf (completed observation template)
- S1O19 Mixed football after school club with PE teacher.pdf (completed observation template)
- S1O20 YR 5 class A Daily Mile.pdf (completed observation template)
- S1O21 morning active travel.pdf (completed observation template)
- S1O22 Y5 class 1 morning lessons.pdf (completed observation template)
- S1O23 morning break.pdf (completed observation template)
- S1O24 Y5 class 2 morning lessons.pdf (completed observation template)
- S1O25 YR 5 & 6 after school netball club.pdf (completed observation template)
- S1O26 Lunchtime girls football run by external provider.pdf (completed observation template)
- S1O27 YR 5 PE Lesson with External Provider - 1.pdf (completed observation template)
- S1O28 YR 5 PE Lesson with External Provider - 2.pdf (completed observation template)
- S1O29 After School Dance Club Led by External Provider.pdf (completed observation template)
- S1O30 morning breaktime.pdf (completed observation template)
- S1O31 Y5 PE lesson with class teacher.pdf (completed observation template)
- S1O32 teaching staff meeting.pdf (completed observation template)
- S1O33 breakfast club morning wrap around care.pdf (completed observation template)
- S1O34 Y6 class C PE with PE teacher.pdf (completed observation template)
- S1O35 Y6 class B PE with PE teacher.pdf (completed observation template)
- S1O36 after school wrap around childcare.pdf (completed observation template)
- S1O37 YR 5 PE.pdf (completed observation template)
- S1O38 YR 5 normal lesson post PE.pdf (completed observation template)
- S1O39 Wrap Around Care (PM).pdf (completed observation template)
- S1O40 Y5 catch up swimming lesson.pdf (completed observation template)

- S1O41 Green Team Meeting.pdf (completed observation template)
- S1O42 Mode Shift active travel award system.pdf (completed observation template)
- S1O43 Governors meeting.pdf (completed observation template)
- S1O44 Y3, Y4 and Y5 Sports Day.pdf (completed observation template)
- S1O45_LSA staff meeting.pdf (completed observation template)
- S1O46_bikeability.pdf (completed observation template)
- S1O47 lunchtime.pdf (completed observation template)
- S2O1 lunchtime observation.pdf (completed observation template)
- S2O2 year 5 class observation.pdf (completed observation template)
- S2O3 PE session observation.pdf (completed observation template)
- S2O4 End of day travel observation.pdf (completed observation template)
- S2O5 Lunchtime Observation.pdf (completed observation template)
- S2O6 Year 5 Class Observation.pdf (completed observation template)
- S2O7 Year 5 PE Observation.pdf (completed observation template)
- S2O8 Active Travel.pdf (completed observation template)
- S2O9 lunchtime observation.pdf (completed observation template)
- S2O10 Year 5 PE.pdf (completed observation template)
- S2O11 Active clubs.pdf (completed observation template)
- S2O12 lunchtime observation.pdf (completed observation template)
- S2O13 Active clubs.pdf (completed observation template)
- S2O14 year 5 class observation.pdf (completed observation template)
- S2O15 Year 5 PE.pdf (completed observation template)
- S2O16 staff meeting.pdf (completed observation template)
- S2O17 Judo club.pdf (completed observation template)
- S2O18 AM AT.pdf (completed observation template)
- S2O19 AM break.pdf (completed observation template)
- S2O20 external club.pdf (completed observation template)
- S2O21 staff meeting.pdf (completed observation template)

- S2O22 Sensory circuit.pdf (completed observation template)
- S2O23 School leaders meeting.pdf (completed observation template)
- S2O24 enrichment led by external provider Y4.pdf (completed observation template)
- S2O25 enrichment led by external provider Y2.pdf (completed observation template)
- S3O1 PTA Meeting.pdf (completed observation template)
- S3O2 lunchtime.pdf (completed observation template)
- S3O3 afterschool travel.pdf (completed observation template)
- S3O4 class pre-lunchtime.pdf (completed observation template)
- S3O5 lunchtime.pdf (completed observation template)
- S3O6 Y5 class after lunchtime.pdf (completed observation template)
- S3O7 Y5 class pre-lunchtime.pdf (completed observation template)
- S3O8 lunchtime.pdf (completed observation template)
- S3O9 Y5 class after lunchtime.pdf (completed observation template)
- S3O10 Y6 class pre-lunchtime inc movement break.pdf (completed observation template)
- S3O11 Y6 class after lunchtime.pdf (completed observation template)
- S3O12 Staff meeting.pdf (completed observation template)
- S3O13 Y5 PE with PE teacher_Class B.pdf (completed observation template)
- S3O14 Y5 PE with PE teacher_Class A.pdf (completed observation template)
- S3O15 Before school travel.pdf (completed observation template)
- S3O16 Trust Sports Day.pdf (completed observation template)
- S3O17 Afternoon breaktime.pdf (completed observation template)
- S3O18 Indoor PE with Y5 class 1.pdf (completed observation template)
- S3O19 Indoor PE with Y5 class 2.pdf (completed observation template)
- S3O20 afternoon break.pdf (completed observation template)
- School 1_Activity 1_anonymised transcript.pdf (pupil activity group discussion transcript)
- School 1_Activity 2_anonymised transcript.pdf (pupil activity group discussion transcript)
- School 2_Activity 1_transcript.pdf (pupil activity group discussion transcript)
- School 3_Activity 1_Anonymised transcript.pdf (pupil activity group discussion transcript)

- S1I1_PE teacher_Transcript.pdf (anonymised interview transcript)
- S1I2_chair of governors_Transcript.pdf (anonymised interview transcript)
- S1I3_external_coach_Transcript.pdf (anonymised interview transcript)
- S1I4_head_teacher_Transcript.pdf (anonymised interview transcript)
- S1I5_previous_PE_lead_Transcript.pdf (anonymised interview transcript)
- S1I6_business manager_Transcript.pdf (anonymised interview transcript)
- S1I7_healthy_schools_lead_Transcript.pdf (anonymised interview transcript)
- S1I8_LSA_Transcript.pdf (anonymised interview transcript)
- S1I9_Y5_teacher1_Transcript.pdf (anonymised interview transcript)
- S1I10_PTA_Transcript.pdf (anonymised interview transcript)
- S2I1_SENCo_Transcript.pdf (anonymised interview transcript)
- S2I2_External Provider_Transcript.pdf (anonymised interview transcript)
- S2I3_KS2 Teacher_Transcript.pdf (anonymised interview transcript)
- S2I4_PE Lead_Transcript.pdf (anonymised interview transcript)
- S2I5_School Govenor_Transcript.pdf (anonymised interview transcript)
- S2I6_Deputy Head_Transcript.pdf (anonymised interview transcript)
- S2I7_Relevant Programme Leads_Transcript.pdf (anonymised interview transcript)
- S2I8_LSA_Transcript.pdf (anonymised interview transcript)
- S3I1_PTA_Transcript.pdf (anonymised interview transcript)
- S3I2_KS2 Teacher_Transcript.pdf (anonymised interview transcript)
- S3I3_Staff_Transcript.pdf (anonymised interview transcript)
- S3I4_Head Teacher_Transcript.pdf (anonymised interview transcript)
- S3I5_KS2 Teacher_Transcript.pdf (anonymised interview transcript)
- S3I6_LSA_Transcript.pdf (anonymised interview transcript)
- S3I7_PE Teacher_Transcript.pdf (anonymised interview transcript)
- S3I8_Forest School Lead_Transcript.pdf (anonymised interview transcript)
- Pupil activity assent form.pdf (pupil activity assent form template)
- Pupil activity parent consent form.pdf (parent content form for pupil activity template)

- Pupil activity parent information sheet.pdf (parent/carer information sheet for pupil activity)
- Pupil activity pupil information sheet.pdf (pupil activity pupil information sheet)
- School information sheet.pdf (school information sheet)
- School study agreement form.pdf (school study agreement template)
- Staff interview consent form.pdf (staff interview consent form template)
- Staff interview participant information sheet.pdf (staff interview information sheet)

School physical activity survey

- Passport information sheet_school survey.pdf (survey participant information sheet)
- Passport school survey participant consent form.pdf (survey participant consent form template)
- Codebook.csv (codebook for survey data)
- Coded dataset.csv (survey dataset)
- School_demographic_information.csv (survey participant information)

Co-design workshops

- Co-design workshop participant roles.csv (workshop participant information)
- Co-design workshop consent form.pdf (workshop participant consent form template)
- PASSPORT study co-design workshop participant information sheet.pdf (workshop participant information sheet)
- CA_group design activity_anonymised transcript.pdf (workshop activity anonymised transcript)
- CA_group feedback_anonymised transcript.pdf (workshop activity anonymised transcript)
- CA_sketching ideas activity_anonymised transcript.pdf (workshop activity anonymised transcript)
- Intervention_group design_anonymised transcript.pdf (workshop activity anonymised transcript)
- Intervention_group feedback_anonymised transcript.pdf (workshop activity anonymised transcript)
- OS_discussion_anonymised transcript.pdf (workshop activity anonymised transcript)
- Personas discussion_anonymised transcript.pdf (workshop activity anonymised transcript)
- Tool use design_group work_anonymised transcript.pdf (workshop activity anonymised transcript)
- Tool_use_group_feedback_1_anonymised transcript.pdf (workshop activity anonymised transcript)
- Tool_use_group_feedback_2_ anonymised transcript.pdf (workshop activity anonymised transcript)
- Tool_use_group_feedback_3_anonymised transcript.pdf (workshop activity anonymised transcript)
- Understanding the problem_transcript.pdf (workshop activity anonymised transcript)

- CA_transcripts_group_discussion.pdf (workshop activity anonymised transcript)
- CA_transcripts_Group_discussion_section_2 and 4.pdf (workshop activity anonymised transcript)
- CA_transcripts_Group_discussion_section_3 and 4.pdf (workshop activity anonymised transcript)
- CA_transcript_feedback.pdf (workshop activity anonymised transcript)
- CP_transcripts_exercise_group_feedback.pdf (workshop activity anonymised transcript)
- School_Porfolio_group_feedback_Transcript_anonymised.pdf (workshop activity anonymised transcript)
- School_Portfolio_group_discussion_1_Transcript_anonymised.pdf (workshop activity anonymised transcript)
- School_Portfolio_group_discussion_2_Transcript_anonymised.pdf (workshop activity anonymised transcript)
- School_Portfolio_group_discussion_3_Transcript_anonymised.pdf (workshop activity anonymised transcript)
- PASSPORT Study_Co-design workshop 3_Anonymised transcript.pdf (workshop activity anonymised transcript)

There is no extended data for this study.

The data can be accessed at https://doi.org/10.5523/bris.26yg5hhyaxlez24w8fhxvkrrpk. The metadata record published openly by the repository at this location clearly states how data can be accessed by bona fide researchers. Requests for access will be considered by the University of Bristol Research Data Service, who will assess the motives of potential data re-users before deciding to grant access to the data. No authentic request for access will be refused and re-users will not be charged for any part of this process.

Due to the sensitivity of the data involved, whereby it was possible for school staff or pupils to reveal sensitive data about the schools or their experiences, these data are published as a restricted dataset at the University of Bristol Research Data Repository data.bris. For this reason the dataset does not carry a re-use licence in the sense of a CC-BY licence. Instead, its use is governed by the terms of the Data Access Agreement for Restricted datasets. This approach was advised by the University Research Ethics Committee as suitable in school-based studies.

For more information or to arrange an MS Teams meeting please email the Research Data Service at data-bris@bristol.ac.uk.

Applications must fulfil the following criteria:

- The dataset you have requested is available for sharing
- You have provided verifiable institutional affiliation and contact details
- You have nominated an appropriate institutional signatory (someone with the legal authority to negotiate and sign contracts on behalf of your institution)
- Evidence of ethical approval (if required for the requested dataset)
- Evidence of funding, commission, or sponsorship (if applicable to your study)
- A summary of how you will use the requested dataset in your study
- PDFs of your institutions' data protection, data security and/or information security policies

Please note the form may take between 20 to 50 minutes to complete. We will respond within 20 working days.

If your application meets the criteria, a Data Access Agreement (example - http://bit.ly/2LV1OcR) is sent to your institutional signatory. Once the agreement is signed and returned, the Research Data Service team will arrange secure access to the dataset.

See our webpages for accessing data via data.bris for more information: https://www.bristol.ac.uk/staff/researchers/data/accessing-research-data/

Repository: PASSPORT study pilot.[58]

https://doi.org/10.5523/bris.jpczkm6e8sa82fcv2f87j5xu4

This project contains the following underlying data:

- P1_I1.pdf (anonymised interview transcript)
- P1_I2.pdf (anonymised interview transcript)
- P2_I1.pdf (anonymised interview transcript)
- P2_I2.pdf (anonymised interview transcript)
- Pilot_interviews_IDs.csv (interview participant information)
- Pupil_data.csv (pupil physical activity dataset – accelerometer, questionnaire, and demographic)
- Parent carer consent form.pdf (parent/carer consent form template)
- Parent carer information sheet.pdf (parent/carer information sheet)
- Pupil information sheet.pdf (pupil information sheet)
- School information sheet.pdf (school information sheet)
- School study agreement form.pdf (school study agreement template)
- Staff interview consent form.pdf (interview participant consent form template)
- Staff interview participant information sheet.pdf (interview participant information sheet)

There is no extended data for this study.

The data can be accessed at https://doi.org/10.5523/bris.jpczkm6e8sa82fcv2f87j5xu4. The metadata record published openly by the repository at this location clearly states how data can be accessed by bona fide researchers. Requests for access will be considered by the University of Bristol Research Data Service, who will assess the motives of potential data re-users before deciding to grant access to the data. No authentic request for access will be refused and re-users will not be charged for any part of this process.

Due to the sensitivity of the data involved, whereby it was possible for school staff or pupils to reveal sensitive data about the schools or their experiences, these data are published as a restricted dataset at the University of Bristol Research Data Repository data.bris. For this reason the dataset does not carry a re-use licence in the sense of a CC-BY licence. Instead, its use is governed by the terms of the Data Access Agreement for Restricted datasets. This approach was advised by the University Research Ethics Committee as suitable in school-based studies.

For more information or to arrange an MS Teams meeting please email the Research Data Service at data-bris@bristol.ac.uk.

Applications must fulfil the following criteria:

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- You have nominated an appropriate institutional signatory (someone with the legal authority to negotiate and sign contracts on behalf of your institution)
- Evidence of ethical approval (if required for the requested dataset)
- Evidence of funding, commission, or sponsorship (if applicable to your study)
- A summary of how you will use the requested dataset in your study
- PDFs of your institutions' data protection, data security and/or information security policies

Please note the form may take between 20 to 50 minutes to complete. We will respond within 20 working days.

If your application meets the criteria, a Data Access Agreement (example - http://bit.ly/2LV1OcR) is sent to your institutional signatory. Once the agreement is signed and returned, the Research Data Service team will arrange secure access to the dataset.

See our webpages for accessing data via data.bris for more information: https://www.bristol.ac.uk/staff/researchers/data/accessing-research-data/

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Open Peer Review

Current Peer Review Status: ✔ ✔

Version 2

Reviewer Report 19 October 2026

https://doi.org/10.3310/nihropenres.15783.r42833

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✔ **Cátia Paixão**
University of Aveiro, Aveiro, Portugal

I would like to thank the authors for addressing all my comments. I have no further questions. Congratulations!

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Physical activity; respiratory diseases

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 14 October 2026

https://doi.org/10.3310/nihropenres.15783.r42834

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✔ **Claire Madigan**
Loughborough University, Loughborough, UK

Thank you for making the changes and it is much clearer now.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My area of research is behavioural weight management interventions. I have developed interventions, conducted qualitative research and co-design workshops. I have also

worked as a research assistant on the WAVEs study which was a school based physical activity/ dietary intervention. However I have not developed a context-specific intervention.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 28 July 2026

https://doi.org/10.3310/nihropenres.15620.r40938

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Cátia Paixão
University of Aveiro, Aveiro, Portugal

Overall comment
This is a methodological paper about the development of a context-specific intervention aiming to increase physical activity in primary school children. The intervention development process included interviews, an ethnographic study, a survey, and a pilot study, combined with co-design workshops with school staff.
Overall, the paper is well-written and clearly structured, and some sections (particularly the description of the co-design workshops) present a good level of detail. However, I believe additional detail is needed in several areas to allow other researchers to replicate or adapt this approach, as the value of a methods paper like this one lies largely in its practical transferability.

Introduction

- Could the authors further clarify why they focused on children aged 7–11 years specifically? Is this age range based on developmental considerations (e.g. autonomy, ability to engage with active travel or breaktime activities), alignment with UK primary school key stages, precedent from the existing literature/scoping review, or a more pragmatic/logistical decision (e.g. school structure, ease of recruitment)? A brief justification would help readers understand whether this age range is a necessary feature of the approach or one that could be adapted for other age groups.

Methodology

- *Survey response rate*: The survey achieved a 19% response rate (59/311 schools). I think the authors could reflect more on this, as it would help readers who want to use this framework understand what barriers were faced in engaging schools, and whether the responding schools may differ systematically from non-responders (e.g. the sample skews towards urban, less deprived schools, as shown in Table 1 — was this anticipated, and how might it affect the generalizability of the context assessment items derived from this survey?). Some discussion of possible response bias and how this was accounted for (or not) in developing the context assessment would strengthen the methodology.

- *Description of the intervention*: The intervention itself is not entirely clear from the current description. Could the authors expand on: how many activities/options are typically included within each of the six pathways; what a "bespoke programme" concretely looks like once selected (e.g. how many activities does a school typically choose, over what timeframe); how prescriptive versus flexible the research team's recommendations actually are in practice; and what the relationship is between the "core package" (identical for all schools) and the bespoke, school-selected content. A concrete example or illustrative case (even briefly) of one school's context assessment leading to specific recommended activities and a final bespoke programme would substantially help readers understand how the tool operates in practice.
- *Figure 8*: The image quality of Figure 8 (the digital prototype screenshot) is poor, and much of the text within the screenshot is illegible. Could this be replaced with a higher-resolution image, or could the key elements be summarized in the accompanying text/caption to ensure the content is accessible even if the image quality cannot be improved?

Results

- It would be helpful if the authors linked findings from the related published papers more explicitly within this section (e.g. specific relevant findings from references 32, 33, 35, 36, 38 that directly informed particular design decisions), rather than relying mainly on citation. Even a sentence per referenced study summarizing the specific finding that shaped a specific aspect of the PASSPORT design would make this methods paper more self-contained and easier to follow without needing to consult each underlying paper separately.

Is the rationale for developing the new method (or application) clearly explained?

Yes

Is the description of the method technically sound?

Partly

Are sufficient details provided to allow replication of the method development and its use by others?

No

If any results are presented, are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions about the method and its performance adequately supported by the findings presented in the article?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Physical activity; respiratory diseases

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have

significant reservations, as outlined above.

Author Response 29 Sep 2026

Danielle House

Thank you very much for your helpful comments on our paper. We have addressed these and feel they have improved the clarity and focus of the paper. Details on how we addressed each of your comments are provided below.

Overall comment

This is a methodological paper about the development of a context-specific intervention aiming to increase physical activity in primary school children. The intervention development process included interviews, an ethnographic study, a survey, and a pilot study, combined with co-design workshops with school staff.

Overall, the paper is well-written and clearly structured, and some sections (particularly the description of the co-design workshops) present a good level of detail. However, I believe additional detail is needed in several areas to allow other researchers to replicate or adapt this approach, as the value of a methods paper like this one lies largely in its practical transferability.

Response: Thank you, we have tried to address this and have outlined this below.

Introduction

Could the authors further clarify why they focused on children aged 7–11 years specifically? Is this age range based on developmental considerations (e.g. autonomy, ability to engage with active travel or breaktime activities), alignment with UK primary school key stages, precedent from the existing literature/scoping review, or a more pragmatic/logistical decision (e.g. school structure, ease of recruitment)? A brief justification would help readers understand whether this age range is a necessary feature of the approach or one that could be adapted for other age groups.

Response: Thank you for this comment. The PASSPORT study focuses on Year 5 children (aged 9-10 in the UK). This is because evidence shows that physical activity levels decline with age across childhood and the transition from primary to secondary school appears to be a key moment in this decline. This rationale for the focus on primary school broadly, and children at the end of primary school specifically, has been added to the 'Introduction' section.

Methodology

Survey response rate: The survey achieved a 19% response rate (59/311 schools). I think the authors could reflect more on this, as it would help readers who want to use this framework understand what barriers were faced in engaging schools, and whether the responding schools may differ systematically from non-responders (e.g. the sample skews towards urban, less deprived schools, as shown in Table 1 — was this anticipated, and how might it affect the generalizability of the context assessment items derived from this survey?). Some discussion of possible response bias and how this was accounted for (or not) in developing the context assessment would strengthen the methodology.

Response: Thank you for this suggestion. We have added reflection on the sample in

the section 'School survey', namely that the survey was useful in many ways but demonstrated the value in triangulating data across several study designs.

Description of the intervention: The intervention itself is not entirely clear from the current description. Could the authors expand on: how many activities/options are typically included within each of the six pathways; what a "bespoke programme" concretely looks like once selected (e.g. how many activities does a school typically choose, over what timeframe); how prescriptive versus flexible the research team's recommendations actually are in practice; and what the relationship is between the "core package" (identical for all schools) and the bespoke, school-selected content. A concrete example or illustrative case (even briefly) of one school's context assessment leading to specific recommended activities and a final bespoke programme would substantially help readers understand how the tool operates in practice.

Thank you for this comment, we have expanded on the section 'The PASSPORT intervention' in several ways to address this:

- **We have added details on the assessment, recommendation, and selection process, including on the likely numbers of activities that would be recommended and selected during the process.**
- **We have added an illustrative example from a hypothetical school, to demonstrate how a context assessment would identify strengths and opportunities, how this would inform recommendations for that school, and how a school would select a number of these activities to create their bespoke programme.**
- **We have moved the information on the core package to the end of the section and expanded on this to provide additional detail, with examples of core package resources, to demonstrate how it provides guides and evidence to support the delivery of bespoke programmes.**
- **We have also provided more description and detail of the content, i.e. the materials and resources a school might be given, in the 'Portfolio content development' section.**

Figure 8: The image quality of Figure 8 (the digital prototype screenshot) is poor, and much of the text within the screenshot is illegible. Could this be replaced with a higher-resolution image, or could the key elements be summarized in the accompanying text/caption to ensure the content is accessible even if the image quality cannot be improved?

Response: Thank you for this comment and apologies the original image quality was not sufficient. We have created a new version of this image with higher resolution.

Results

It would be helpful if the authors linked findings from the related published papers more explicitly within this section (e.g. specific relevant findings from references 32, 33, 35, 36, 38 that directly informed particular design decisions), rather than relying mainly on citation. Even a sentence per referenced study summarizing the specific finding that shaped a specific aspect of the PASSPORT design would make this methods paper more self-contained and easier to follow without needing to consult each underlying paper separately.

Response: Thank you for this suggestion. We have used this prompt to emphasise and bring this out across each study in the section '3. Developing the PASSPORT intervention'. Specifically, we have:

- **Stated more clearly where full study findings can be accessed.**
- **Better aligned sections and language to Figure 3 which demonstrates which studies provided information on which aspects of the intervention.**
- **Expanded across each study section on the precise findings that emerged and how these informed the intervention development and design.**

Competing Interests: No competing interests were disclosed.

Reviewer Report 15 July 2026

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Claire Madigan
Loughborough University, Loughborough, UK

This is a methodological paper aiming to share with other researchers about the development of a context specific intervention. There was a portfolio of interventions offered aimed to increase physical activity in primary school children and flexibility based on circumstances enables schools to choose which interventions to implement. This project of work consisted of interview, ethnographic study, survey and pilot study to create the intervention. The studies are already published and therefore if they were read first, it would make this methodological paper easier to understand.

Overall, it is very well written paper but there could be more detail to help researchers use this approach in future. I was uncertain until the end of the introduction of the purpose of this paper.

Abstract
In the abstract perhaps the aim could be the same as the introduction of using the passport intervention as a case study for the development of context- specific interventions.

In the methods of the abstract could the authors identify that the pilot study was conducted within two schools.

Could the methods also add more about the context specific part of the intervention as the really interesting part is the flexibility of the intervention and less about the formative work

Methodology

It would be great to know how the information was synthesised together to create the Passport intervention. In Figure 4 there is a section on synthesizing findings and identify opportunities, however I couldn't find that section in the paper. How did you do this? Did any of the research studies have divergence, how did you take what you learned from all the work packages. What are the practical steps that were undertaken? This would be helpful to know for other researchers who want to use this approach.

Thinking about NIHR equality diversity and inclusion focus can you mention about the diversity of the patient and public involvement members.

There is a lack of justification in the paper about the methodology for example why were only year 4 pupils targeted for recruitment and how were participants recruited. However, that might be because this has already been published elsewhere. Perhaps this could be added as a sentence to each study e.g. the findings of this study have been published xxx. It might help the reader realize that the lack of detail it because it is elsewhere and this is an overview of the methodology?

Results
It was nice to see the learnings from the development of the intervention. It would also be helpful to better understand what worked well and what didn't work so well. Was it hard to recruit, to keep involvement. How did you manage funding these series of studies. What were the limitations of this approach and how could we learn from this. Was it difficult to synthesize?

Thank you for your consideration.

Is the rationale for developing the new method (or application) clearly explained?
Yes

Is the description of the method technically sound?
Partly

Are sufficient details provided to allow replication of the method development and its use by others?
No

If any results are presented, are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions about the method and its performance adequately supported by the findings presented in the article?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My area of research is behavioural weight management interventions. I have developed interventions, conducted qualitative research and co-design workshops. I have also

worked as a research assistant on the WAVEs study which was a school based physical activity/ dietary intervention. However I have not developed a context-specific intervention.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 29 Sep 2026

Danielle House

Thank you very much for your helpful comments on our paper. We have addressed these and feel they have improved the clarity and focus of the paper. Details on how we addressed each of your comments are provided below.

Overall comment

This is a methodological paper aiming to share with other researchers about the development of a context specific intervention. There was a portfolio of interventions offered aimed to increase physical activity in primary school children and flexibility based on circumstances enables schools to choose which interventions to implement. This project of work consisted of interview, ethnographic study, survey and pilot study to create the intervention. The studies are already published and therefore if they were read first, it would make this methodological paper easier to understand. Overall, it is very well written paper but there could be more detail to help researchers use this approach in future. I was uncertain until the end of the introduction of the purpose of this paper.

Response: Thank you. Changes outlined below to the abstract have hopefully helped to clarify the purpose of the paper for the reader earlier on.

Abstract

In the abstract perhaps the aim could be the same as the introduction of using the passport intervention as a case study for the development of context- specific interventions.
In the methods of the abstract could the authors identify that the pilot study was conducted within two schools.
Could the methods also add more about the context specific part of the intervention as the really interesting part is the flexibility of the intervention and less about the formative work

Response: Thank you for these suggestions, we have incorporated these into the abstract.

Methodology

It would be great to know how the information was synthesised together to create the Passport intervention. In Figure 4 there is a section on synthesizing findings and identify opportunities, however I couldn't find that section in the paper. How did you do this? Did any of the research studies have divergence, how did you take what you learned from all the work packages. What are the practical steps that were undertaken? This would be helpful to know for other researchers who want to use this approach.

Response: Thank you for this comment. We have addressed it in several ways across the paper to add clarity on the intervention development process. Namely:

- **We have expanded on how we synthesised the data from the formative studies in the section 'Co-design of the PASSPORT tool' and have linked this to Figure 4.**
- **Additionally, throughout the paper we have clarified and added detail on the findings that came from each formative study and how these were integrated into the intervention, with better linking to Figure 3.**

Thinking about NIHR equality diversity and inclusion focus can you mention about the diversity of the patient and public involvement members.

Response: Thank you for this suggestion. It has been complicated to report on details of information like this, as this paper is summarising work across 6 work packages which had individual processes for PPIE. To improve clarity about PPIE we have:

- **Edited the section 'Patient and public involvement' to clarify that PPIE is described in published papers for relevant studies and add more detail on PPIE in the intervention development and pilot study.**
- **We moved information on our School Advisory Group from the 'Portfolio content development' section to the 'Patient and public involvement' section.**
- **PPIE contributors have not consented for us to share their demographic information. Where possible we have commented on the diversity of the schools public members came from.**

There is a lack of justification in the paper about the methodology for example why were only year 4 pupils targeted for recruitment and how were participants recruited. However, that might be because this has already been published elsewhere. Perhaps this could be added as a sentence to each study e.g. the findings of this study have been published xxx. It might help the reader realize that the lack of detail it because it is elsewhere and this is an overview of the methodology?

Response: Thank you for this comment that has pushed us to improve clarity of methodologies for the various studies. As with PPIE, it has been complicated in this paper to include details on all studies referred to across the intervention development. To address your comment we have:

- **Explained the rationale for the focus on Primary school, and children at the end of primary school specifically, in the 'Introduction' section.**
- **Added further explanatory detail on the overall process of delivering each study in the first paragraph of section '3. Developing the PASSPORT intervention'.**
- **Where each formative study is described in section '3.1 Formative work', we have clarified and added statements on accessing full details on participants, study processes, and findings. We have moved these to early in these paragraphs so the reader understands this from the outset.**

Results

It was nice to see the learnings from the development of the intervention. It would also be helpful to better understand what worked well and what didn't work so well. Was it hard to recruit, to keep involvement. How did you manage funding these series of studies. What were the limitations of this approach and how could we learn from this. Was it difficult to synthesize?

Response: Thank you for these suggestions. We have addressed these by:

- **Adding additional detail on the PASSPORT study, including that "all formative studies, development work, pilot, and trial and evaluation were funded and delivered in this period", to the 'Introduction'.**
- **We have added additional information on how we synthesised data across the studies to inform the intervention development across the paper and in section 'Co-design of the PASSPORT tool', and have commented on the challenges of this – namely that time and a structured approach is required – in the key learning section 'Ground intervention design in a range of data and insight'.**
- **In addition to the challenge of synthesising data, we have added further limitations to the key lessons sections, namely, the need to better trial and evaluate the levels of intervention flexibility and user autonomy, and the limit of how much testing and iteration is possible within project timeframes.**

Participant recruitment was on a study-by-study basis, and so these details are provided in published study papers. Some schools participated in more than one study, for example, all schools in the rapid ethnography study had a member of staff participate in the staff interviews study and this was a part of the recruitment approach (this is detailed in those published papers). In the main, different schools and staff participated in different studies and work packages, therefore maintaining involvement was not an issue.

Competing Interests: No competing interests were disclosed.