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Integration of physical activity throughout the school day – A mixed method study

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ABSTRACT

Despite schools providing an important environment for promoting active behaviors, achieving recommended physical activity (PA) levels among children remains challenging. In Sweden, the national Movement Initiative in Schools (MIS) (2021–2031) aims to increase PA throughout the school day. However, schools face difficulties integrating such initiatives into daily practice. Therefore, this study aimed to investigate the facilitators and barriers to the integration of MIS and explore school staff's experiences and perceptions of its integration into daily practice. A mixed-method explanatory sequential design was used. This study included 132 schools in central Sweden. Survey findings informed an interview guide based on Normalization Process Theory (NPT) constructs: coherence, cognitive participation, collective action, and reflexive monitoring. A total of 135 participants completed the surveys, of whom 14 participated in focus group interviews. Overall, 80% reported positive agreement or strong agreement across the four NPT constructs. Qualitative content analysis resulted in five categories concerning resources and support, leadership, information transfer, perceived value, and dependency on local champions. In conclusion, while engagement and perceived psychosocial benefits of MIS were high, integrating PA into routine school practice depended largely on school-level capacity and support. Key barriers included limited resources, inconsistent leadership support, and insufficient knowledge transfer.

IMPACT STATEMENT

Findings demonstrate that national school-based physical activity initiatives require strong local leadership, adequate resources, and shared responsibility to become sustainable. The results can inform policymakers and school leaders seeking to embed physical activity into everyday school practice.

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Introduction

Children's physical activity levels are low globally (Mitchell, 2019). Insufficient physical activity during childhood often persists into adulthood, contributing to an increased risk of cardiovascular disease, cancer, and osteoporosis later in life (Norum, 2005). Physical activity (PA) is widely acknowledged for its critical role in promoting the physical and psychological health and well-being of children and adolescents.

The World Health Organization (WHO) highlighted school-based physical activity as a key area for promoting child and adolescent health (World Health Organization, 2020). Socioeconomic disparities within families are key determinants of children's access to PA, reinforcing broader patterns of health inequity (World Health Organization, 2020). Schools represent a uniquely accessible and structured platform for engaging, monitoring, and promoting PA among diverse child populations. Given the strong social patterning of physical inactivity (Wells et al., 2017), schools play a central role in advancing equitable health outcomes.

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Although the benefits of school-based PA are well established (Bloch et al., 2025; Wang et al., 2025), a recent systematic review revealed uncertainties regarding the impact of school-based PA interventions on health-related quality of life and the occurrence of adverse events (Neil-Sztramko et al., 2021).

Current evidence suggests that integrating PA into the school curriculum through a whole-school approach supported by school policies can effectively promote physical activity and improve children's cardiorespiratory functioning (CRF) (Tomporowski et al., 2011; Yin et al., 2025). Furthermore, studies have shown that teachers can contribute to increased PA in early childhood education settings (Carroll et al., 2022). However, implementing such interventions in practice is challenging (Saamong et al., 2025) despite teachers' central role in the process (Augustsson et al., 2024). Common barriers to promoting physical activity (PA) in early childhood education settings, as identified by teachers, are competing role expectations and responsibilities, inadequate facilities and resources, and limited knowledge and interest. The latter has been suggested not to be considered as a teacher's responsibility (Augustsson et al., 2024). While preschool curricula include explicit requirements regarding PA, they often contain similar statements encouraging teachers to integrate PA into their provisions in various ways during the school day (Martínez-Bello et al., 2021).

Since no single intervention can achieve optimal PA levels for all children or within a given school (Khambalia et al., 2012), there is a clear need for broader and more integrated strategies. The most effective way to maximize opportunities for physical activity is through the implementation of a whole-of-school approach (Kriemler et al., 2010; Pearson et al., 2015; Van Sluijs et al., 2007). This model emphasizes integrating PA across all aspects of the school environment rather than limiting efforts to a single intervention. Supportive school policies provide an essential foundation for embedding a whole-of-school approach by offering the structure and commitment needed to consistently promote physical activity across school settings (World Health Organization, 2021).

One example of such an initiative is the national Movement Initiative in Schools (MIS) (2021–2031), a Swedish government assignment aimed at increasing physical activity among schoolchildren throughout the entire school day. In 2024, a large project was initiated to investigate the integration of MIS into daily school practice in a region with 287,000 inhabitants in central Sweden. Despite strong policy support, schools face several challenges in embedding initiatives such as MIS into routine practice. Understanding how such initiatives become integrated, embedded, and sustained in everyday school activities is therefore important.

To examine integration, Normalization Process Theory (NPT) is a suggested theoretical framework. NPT is a middle-range implementation theory that explains how individuals and groups embed and sustain new practices in real-world settings through the processes of coherence, cognitive participation, collective action, and reflexive monitoring (May & Finch, 2009). Unlike determinant frameworks such as the Consolidated Framework for Implementation Research (CFIR), which primarily identify barriers and facilitators to implementation, NPT focuses on the work people do to operationalize, integrate, and sustain an intervention in everyday practice (Damschroder et al., 2009; May & Finch, 2009). Given the interest in understanding how MIS becomes integrated into routine school practice, NPT was considered particularly suitable for the present study.

Therefore, this study aimed to investigate the facilitators and barriers to the integration of MIS and to explore school staff's experiences and perceptions of its integration into daily practice.

Method

Study design and data collection

This study used a mixed-methods explanatory sequential design, combining quantitative survey data with qualitative focus-group interviews (Creswell and Plano Clark, 2018).

A mixed-methods approach was used to achieve both breadth and depth in understanding the integration of the MIS across schools in the region. Participation in the initiative is voluntary, and schools enroll through the national MIS programme coordinated by the Swedish Sports Confederation and its regional sport federation districts (RF-SISU). All schools participating in MIS in the region were invited to take part in the study, and 132 schools agreed to participate. To ensure informed responses, each

participating school nominated a staff member who was responsible for, or closely involved in, MIS. A purposive sampling strategy was considered appropriate given the study's focus on integration processes and the fact that not all school staff were directly involved in the initiative. Data collection was conducted between March and December 2025.

MIS intervention

MIS is a government-funded school-based physical activity initiative for children in compulsory education (ages 6–16 years) in Sweden. The initiative supports schools in creating a more physically active school day through strategies such as active recess, classroom movement breaks, active transport, school sports activities, and collaboration with local sports clubs. Schools receive implementation support from the regional sports federation, including training, action planning, educational resources, and networking opportunities.

Quantitative data

The quantitative component consisted of a questionnaire based on the validated Swedish version of the Normalization Measure Development questionnaire (S-NoMAD), which is grounded in Normalization Process Theory (NPT) (Elf et al., 2018). NoMAD assesses key mechanisms that support or hinder the integration of interventions into routine practice through four theoretical constructs: coherence (4 items), cognitive participation (4 items), collective action (7 items), and reflexive monitoring (5 items). The 20 core items are rated on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. In the Swedish version, respondents may also indicate that an item is not applicable by selecting one of three additional response options: *not relevant to my role*, *not relevant at this stage*, or *not relevant to the intervention*.

In total, 132 schools and MIS representatives participating in the initiative completed the NoMAD survey. The survey targeted school staff aged 18 years and older (no minor age participants), with relevant experience and responsibilities related to implementing physical activity interventions within the MIS framework. By responding to the survey, participants provided informed consent and at the end of the survey, respondents were asked to indicate their interest in participating in follow-up focus-group interviews, and 45 respondents (33%) expressed interest to participate.

Qualitative data

The qualitative component consisted of two focus groups conceptualized as unstructured group interviews supplemented with elements of participant observation. Focus groups were chosen because they allow participants with shared experiences to elaborate on meanings, negotiate perspectives, and reflect collectively, which is an important aspect of the social nature of implementation work (Morgan, 1997; Wong, 2008). The interviews were conducted by two of the authors (HB and MA), who served as interviewer and observer, respectively, following the established focus group methodology.

To ensure variation in perspectives, a stratified sampling strategy was applied based on gender and variation in responses to key NoMAD survey items (high and low scorers). This process resulted in a sample of 23 eligible participants who were invited to take part in the focus group interviews. Survey findings also informed the development of a semi-structured interview guide consisting of open-ended questions.

In total, 23 individuals were invited to participate in the focus group interviews. Fourteen agreed to participate and were included in the study, whereas nine declined. The most common reason for non-participation was unavailability on the scheduled interview date. Several individuals also indicated that they had recently changed, or were in the process of changing, work roles and therefore did not consider themselves relevant participants for the study.

The focus groups were conducted at two locations within the region. Invitations were sent by email to the selected participants. The final sample comprised 14 participants, divided into two focus groups of seven participants each (two men and five women per group). All participants received written study information in advance, and written informed consent was obtained at the beginning of each session.

Data analysis

Quantitative NoMAD data were analyzed using descriptive statistics. Due to the small number of responses, the three additional response options ('not relevant to my role', 'not relevant at this stage', and 'not relevant to the intervention') were merged into a single category, reported as 'not relevant'. Survey findings were used to inform and refine the focus-group questions, thereby integrating the quantitative and qualitative components.

Qualitative data were analyzed using qualitative content analysis with a focus on manifest content, following the steps described by Graneheim and Lundman (2004): identifying meaning units, condensing, coding, and grouping into categories reflecting participants' shared experiences. All authors participated in the final analysis and collaboratively organized the data into categories.

Results

A total of 156 individuals from 132 schools and MIS representatives responded to the survey, of whom 135 completed it, with a response rate of 87%. Tables 1 and 2 present respondents' characteristics, involvement in MIS, and the distribution of responses across the NoMAD items.

NoMAD

In *step 1* of the mixed-methods approach, the overall results indicated varying degrees of support for integration across the four core domains of the Normalization Process Theory: coherence, cognitive participation, collective action, and reflexive monitoring.

The results from the NoMAD instrument indicate that MIS intervention was largely perceived as normalized and integrated into routine practice. Overall, 80% of the respondents express agreement or strong agreement across the key NPT domains. As illustrated in Figure 1, the highest level of agreement was observed in cognitive participation (engagement), with 92% of respondents selecting 'agree' or 'strongly agree' on relevant items. Coherence (sense-making) and reflexive monitoring (appraisal and evaluation) followed closely, each with 82% agreement. These results suggest that respondents largely understood the purpose of the intervention, felt committed to its implementation, and engaged in a reflective evaluation of its impact. In contrast, collective action, which relates to practical integration into day-to-day work, received lower scores, with only 63% agreement.

Within the collective action domain, the NoMAD results revealed mixed patterns. Only two of the six items in this domain received high scores. Specifically, 76% of the respondents agreed that they could easily integrate the intervention into their daily work, and 83% expressed confidence in their colleagues' ability to implement it. These results suggest positive perceptions of role clarity and colleague competence.

Table 1. Participant characteristics and involvement in MIS.

Category	Subcategory	%
Gender	Women	73
	Men	27
Professional role	Recreation instructor/Leisure-leader	39
	Certified teacher	27
	Other (eg social pedagogues, assistants)	34
Years in current role	1–5	35
	≥6	65
Primary age group (multiple choices)	Preschool to grade 3	81
	Grades 4–6	70
	Grades 7–9	12
Time in MIS	3 years or more	51
Types of activities involved in	Recess and movement-based activities	93
	Day of Sports and Physical Activity	62
	Structured movement breaks	50
	Movement in leisure-time centers	50
Engagement and support	Participation in network meetings and lectures	84
	Use of materials	81
	Participation in training	67

Table 2. Distribution of responses (%) to the NoMAD items (n = 135).

Construct	Item	SA	A	N	D	SD	NR
Coherence	I can see how MIS differs from usual ways of working	29.6	51.1	17.0	0.0	0.0	2.2
	Staff in this organisation have a shared understanding of the purpose of MIS	20.0	40.7	25.2	12.6	1.5	0.0
	I understand how MIS affects the nature of my own work	25.9	60.0	11.9	0.0	0.7	0.7
	I can see the potential value of MIS for my work	57.8	40.7	0.7	0.7	0.0	0.0
Cognitive participation	There are key people who drive MIS forward and get others involved	40.0	43.0	11.1	5.2	0.7	0.0
	I believe that participating in MIS is a legitimate part of my role	48.9	42.2	7.4	1.5	0.0	0.0
	I'm open to working with colleagues in new ways to use MIS	63.0	33.3	3.0	0.7	0.0	0.0
	I will continue to support MIS	65.9	30.4	2.2	0.0	0.7	0.7
Collective action	I can easily integrate MIS into my existing work	31.9	44.4	13.3	9.6	0.0	0.7
	MIS disrupts working relationships	0.7	8.9	23.0	33.3	30.4	3.7
	I have confidence in other people's abilties to use MIS	30.4	52.6	14.1	2.2	0.7	0.0
	Work is assigned to those with skills appropriate to MIS	25.9	37.8	28.9	5.2	0.7	1.5
	Sufficient training is provided to enable staff to implement MIS	25.9	48.9	20.0	3.7	0.7	0.7
	Sufficient resources are available to support MIS	8.9	34.1	31.9	18.5	5.0	0.7
	Management adequately supports MIS	22.2	40.7	23.0	11.9	2.2	0.0
Reflexive monitoring	I am aware of reports about the effects of MIS	33.3	45.2	16.3	3.7	0.7	0.7
	The staff agree that MIS is worthwhile	28.1	45.2	25.9	0.7	0.0	0.0
	I value the effects that MIS has had on my work	45.9	43.7	8.9	1.5	0.0	0.0
	Feedback about MIS can be used to improve it in the future	42.2	51.1	6.7	0.0	0.0	0.0
	I can modify how I work with MIS	34.1	43.0	14.1	7.4	0.0	1.4

MIS: Movement Initiative in Schools; SA: Strongly Agree; A: Agree; N: Neither agree nor disagree; D: Disagree; SD: Strongly Disagree; NR: Not Relevant.

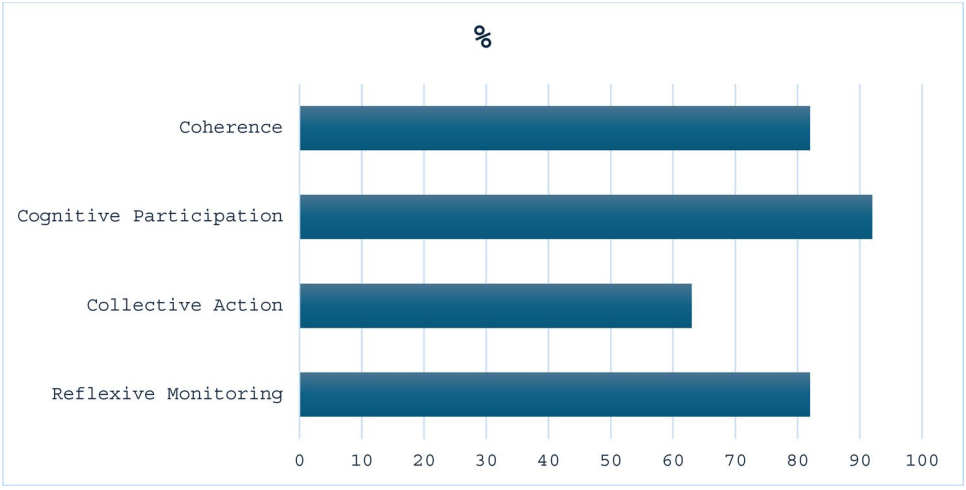

Figure 1. Proportion of respondents agreeing with NPT constructs.

However, only 43% of respondents agreed that sufficient resources were available to support the intervention, highlighting a significant structural barrier to its implementation. Although 64% disagreed with the statement that the intervention disrupted working relationships, this finding still suggests the presence of interpersonal challenges.

In addition, 64% of respondents agreed that the intervention was allocated to staff with appropriate competencies, and 63% perceived adequate managerial support. The perceived adequacy of the training was reported by 75% of respondents, indicating room for improvement.

Overall, the NoMAD results indicated that MIS was largely perceived as normalized and integrated into routine school practice. However, variation in responses suggested that organizational and contextual factors, such as resources, leadership support, collaboration, role clarity, and competence development, may influence the implementation process. To further examine these findings, six areas identified through the NoMAD analysis were incorporated into a semi-structured interview guide with open-ended questions: *shared understanding and integration, resources and preconditions, leadership and responsibility, collegial collaboration and work climate, competence and training, and evaluation and improvement*. These areas were aligned with the NPT constructs of coherence, cognitive participation, collective action, and reflexive monitoring.

Focus group interviews

In *step 2*, the developed interview guide was used in two focus-group sessions. Each session lasted approximately two hours and was audio-recorded.

The recordings were then transcribed verbatim. Analysis of the survey responses identified key areas for further exploration, which informed the interview questions used in the focus groups. The qualitative content analysis resulted in five categories: *resources and support for continued integration of MIS, encouraging leadership – an important prerequisite for sustainability, the importance of theoretical and practical information transfer for consensus and status, perceived value of MIS for the school environment, concerns about high dependency on local champions*

Resources and support for continued integration of MIS

The integration process was challenged by limited resources, including materials, personnel, and planning time. These constraints often require creative and adaptive solutions at the local level. A key facilitator identified by participants was the support provided by the regional sports federation. This support includes lectures, structured training sessions, and continuous professional meetings aimed at ensuring the development of competence. These measures have been consistently described as central to sustaining the initiative over time.

> It feels like there are always some kind of professional development sessions going on that we are invited to, as well as networking meetings. So, I think it's a really great concept, that it's a living document all the time. (Woman 3, Group 1)

> Yes, the question that I thought was the most important was about resources. It does not necessarily have to be material resources because you can do a lot without materials. It's the time allocation where I see shortcomings, that we're not able to make it work today. (Woman 7, Group 2)

Encouraging leadership – An important prerequisite for sustainability

The degree of support and involvement in school leadership varied considerably across schools. Participants emphasized the importance of present and proactive leadership that not only provides structural support but also demonstrates commitment and engagement with the initiative. They expressed a strong need for feedback and recognition, highlighting that leadership appreciation fosters motivation and strengthens engagement in the implementation process.

> There are countless examples of what you are saying: if you do not have any support from the management, the person working with it will quit. Then, the movement initiative ends, or the recess activities, or whatever you call it. I have experienced this myself, and you hear it from almost every school you meet. I have been working with this for 10–15 years and have heard the same thing for 10–15 years. It can't be a coincidence anymore. (Man 8, Group 2)

The importance of theoretical and practical information transfer for consensus and status

Participants reported a lack of systematic follow-up and feedback on overall outcomes, which limited their understanding of the initiative's impact and progress. The dissemination of information regarding working methods was reported as an opportunity to achieve consensus and elevate the perceived status of the initiative. Participants expressed a desire for clear and tailored communication to enable them to influence decision-making processes and advocate for initiatives within their schools. Regional sport federations were identified as key actors in bridging this gap by providing theoretical frameworks and practical guidance.

> When you get to hear what everyone else is doing, how they've done it, what resources they need, then you can go to your colleagues, the management, and so on and say, 'Look, this is how they do it.' It's much easier to pass it on instead of standing alone. (Man 4, Group 1)

Perceived value of MIS for the school environment

Participants perceived MIS as valuable for the school environment through reduced conflicts, improved peer relationships, increased inclusion, and enhanced social cohesion. These perceived benefits were described as important reasons for continued engagement with the initiative.

Participants highlighted several psychosocial benefits associated with MIS. These included fewer conflicts during the school day, enhanced opportunities for relationship building, strengthened social cohesion among children, and increased feelings of safety and inclusion. Breaktime activities were described as particularly effective in promoting positive interactions and fostering a sense of community.

> And not only that, it helps prevent conflicts. As I said, it can also help children find new playmates. (Woman 3, Group 2)

Concerns about high dependency on local champions

Despite an overall attitude toward the initiative, participation levels varied among the staff. A recurring concern was the high degree of dependency on a small group of highly committed individuals, referred to as 'local champions.' This dependency was perceived as a risk to the initiative's sustainability, as continuity could be threatened if these key actors were disengaged. Some participants stated that their colleagues were uncomfortable with the initiative, indicating a need to broaden capacity by developing skills and confidence among more staff and distributing responsibilities more evenly.

> I feel that right now it relies a lot on committed individuals who make everything happen, and if they're not there, then there's basically no one who cares. (Man 5, Group 2)

Discussion

The aim of this study was to investigate the facilitators and barriers to the integration of MIS and explore school staff's experiences and perceptions of its integration into daily practice. While previous research has highlighted the importance of positive staff attitudes toward promoting children's physical activity, our findings suggest that favourable attitudes alone are insufficient to ensure sustainable implementation (Mikkelsen, 2011).

The NoMAD results suggested that MIS was well accepted among participating schools. respondents reported a clear understanding of the purpose of the initiative and indicated strong commitment to its integration. These findings were reflected in the high levels of coherence, cognitive participation, and reflexive monitoring identified through the NoMAD survey. Notably, collective action received lower ratings than the other NPT constructs, suggesting that the primary challenge was not staff motivation or commitment, but the practical work required to embed MIS into everyday school routines. These survey findings were further elaborated by the interview data, which highlighted challenges related to limited resources, inconsistent managerial support, and a reliance on local champions. The interviews also

revealed that participants perceived positive effects of MIS on both children and the school environment, reinforcing the overall acceptability of the initiative.

This interpretation is consistent with NPT, which proposes that interventions may be understood, valued, and supported by respondents, yet struggle to become fully normalized if organizational structures, resources, and leadership do not adequately support implementation processes (Kjellström et al., 2020). Consequently, the findings suggest that organizational conditions play a central role in determining whether MIS can become routinely embedded in school practice.

From an NPT perspective, the findings indicate that barriers to integration were primarily located at the organizational level rather than the individual level. Thus, although staff were motivated to support MIS, practical implementation was constrained by contextual factors influencing the work required to embed the initiative into everyday school routines (May & Finch, 2009).

The qualitative findings helped explain these lower collective action scores. Participants consistently described limited time, insufficient resources, and varying levels of managerial support as barriers to implementation. These challenges affected schools' ability to prioritize, coordinate, and sustain movement-related activities over time. Previous implementation research has similarly demonstrated that organizational capacity, leadership support, resource availability, implementation climate, and access to knowledge are critical prerequisites for the successful implementation and sustainability of school-based physical activity initiatives (Craig et al., 2024; Nielsen et al., 2022; Wendt et al., 2023). The findings therefore support NPT's proposition that normalization depends not only on respondents commitment but also on their capacity to operationalize interventions within existing organizational structures (May & Finch, 2009; May et al., 2018)

Leadership emerged as a particularly important factor. Participants emphasized in the interviews that supportive and engaged school leaders contributed to the legitimacy and sustainability of MIS by allocating time, encouraging participation, and maintaining focus on physical activity as a school-wide priority. Conversely, weak leadership support was perceived to threaten continuity and increase implementation burdens for individual staff members. From an NPT perspective, leadership can be understood as facilitating collective action by creating the organizational conditions necessary for routine implementation and ongoing engagement (May & Finch, 2009). Previous implementation research has similarly highlighted leadership engagement as a key determinant of implementation success and sustainability (Lundqvist et al., 2023).

Another important finding from the interviews concerned participants' descriptions of dependence on 'local champions.' Although these highly committed individuals played a crucial role in initiating and maintaining MIS activities, participants expressed concerns regarding sustainability if such individuals changed roles or left the school. This finding suggests that cognitive participation may be concentrated among a limited number of actors rather than distributed across the wider school organization. While local champions can play an important role during the early stages of implementation, long-term normalization may require broader ownership, shared responsibility, and organizational routines that are less dependent on individual commitment (Bunce et al., 2020; Miech et al., 2018).

The findings also highlight the importance of systematic information sharing and competence development. Participants described in the interviews professional development opportunities, networking activities, and support from RF-SISU as important mechanisms for maintaining motivation and strengthening implementation capacity. Access to both theoretical knowledge and practical examples appeared to facilitate a shared understanding of the purpose and value of MIS, thereby supporting both coherence and reflexive monitoring. These activities may therefore contribute to the continued normalization of physical activity promotion within schools (Craig et al., 2024; May et al., 2018; Wendt et al., 2023).

An additional consideration relates to the age groups represented in the study. Most participants worked in preschool class to grade 6, while relatively few worked in grades 7–9. Previous research suggests that implementing physical activity initiatives may be more challenging among older pupils due to differences in motivation, participation patterns, and school contexts. Consequently, the substantial normalization observed in the present study may partly reflect the predominance of staff working with younger age groups, where movement-based activities may be more readily integrated into everyday school practice (Karlander & Geidne, 2025). Moreover, as physical activity levels tend to

decline during adolescence and mental health concerns become increasingly prevalent ((Badura et al., 2024), grades 7–9 should be considered an important priority for both practice and future research to adress.

Taken together, the findings suggest that MIS has been integrated to some extent into participating schools. However, the comparatively lower levels of collective action indicate that long-term sustainability remains dependent on adequate organizational support. While participants generally perceived MIS as valuable and beneficial, further efforts may be needed to strengthen leadership engagement, resource allocation, knowledge transfer, and shared ownership of activities. To achieve sustainable integration, schools may need to move beyond reliance on individual champions and establish organizational structures that support collaborative learning, competence development, and collective responsibility for physical activity promotion. Such efforts may help transform individual commitment into sustainable organizational practice and facilitate the long-term normalization of physical activity promotion within schools (Lundqvist et al., 2023; Ospina et al., 2020).

This study has several limitations. First, only one or two particpants from each school participated, which may not fully capture the perspectives of all staff involved in MIS. However, participants were purposively selected because of their direct involvement in MIS and were therefore well positioned to provide informed reflections on integration processes. Second, participating schools had voluntarily enrolled in MIS, which may have resulted in a sample characterized by having a higher than average interest in physical activity promotion. Consequently, the findings should be interpreted within the context of schools already engaged in the initiative.

Conclusion

Taken together, the quantitative and qualitative findings suggest that while individual engagement and perceived psychosocial benefits of MIS are strong, integration depends on school-level capacity and organizational support. Key barriers include limited and unevenly distributed resources, inconsistent leadership support, and gaps in both theoretical and practical knowledge transfer, which are needed to build consensus and clarify roles. Furthermore, the reliance on local champions highlights the vulnerability of implementation efforts that depend on individual commitment rather than shared ownership and established organizational routines. From an NPT perspective, the primary challenge for MIS is not achieving staff commitment, but translating that commitment into sustained collective action embedded within everyday school practice.

Ethics statement

This study was conducted in accordance with the Declaration of Helsinki (updated 2024). According to the Swedish Ethical Review Authority, the study does not fall under the Swedish Ethical Review Act (2003:460) and therefore does not require formal ethical review (advisory opinion received, reference number: 2025-00001-01).

Author contributions

CRediT: **Marina Arkkukangas**: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing; **Helena Bellardini**: Data curation, Formal analysis, Investigation, Resources, Writing – review & editing; **Michail Tonkonogi**: Conceptualization, Methodology, Project administration, Supervision, Writing – review & editing.

Disclosure statement

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Data availability statement

The quantitative data that support the findings of this study are available from the corresponding author (MA) upon reasonable request.

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