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Understanding implementation strategies to support classroom-based physical activity approaches in elementary schools: a qualitative study

Timothy J. Walker, PhD [Assistant Professor],
University of Texas Health Science Center at Houston School of Public Health, Department of Health Promotion & Behavioral Sciences, Center for Health Promotion and Prevention Research, 7000 Fannin St., Houston, TX 77030

Jacob Szeszulski, PhD [Postdoctoral Research Fellow],
University of Texas Health Science Center at Houston School of Public Health, Department of Health Promotion & Behavioral Sciences, Center for Health Promotion and Prevention Research, 7000 Fannin St., Houston, TX 77030

Michael C. Robertson, MPH [Doctoral Candidate],
University of Texas Health Science Center at Houston School of Public Health, Department of Health Promotion & Behavioral Sciences, Center for Health Promotion and Prevention Research, 7000 Fannin St., Houston TX 77030, MD Anderson Cancer Center, Center for Energy Balance, Department of Behavioral Science, Houston, TX, 77030

Paula M. Cuccaro, PhD [Assistant Professor],
University of Texas Health Science Center at Houston School of Public Health, Department of Health Promotion & Behavioral Sciences, Center for Health Promotion and Prevention Research, 7000 Fannin St., Houston, TX 77030

Maria E. Fernandez [Professor]
University of Texas Health Science Center at Houston School of Public Health, Department of Health Promotion & Behavioral Sciences, Center for Health Promotion and Prevention Research, 7000 Fannin St., Houston, TX 77030

Abstract

BACKGROUND: Classroom-based physical activity approaches can improve children's physical activity levels during school. However, the implementation of these approaches remains a challenge. The purpose of this study was to examine implementation strategies to support the

Corresponding Author: Phone: 713-500-9664, Fax: 713-500-9750, Timothy.J.Walker@uth.tmc.edu.

Author Statement

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delivery of classroom-based physical activity approaches from the perspectives of elementary school staff.

METHODS: We conducted individual interviews with elementary school staff from a mid-sized school district in Texas. Interviews lasted approximately 60 minutes and were audio recorded and transcribed for analyses. We used directed content analysis and an iterative categorization approach to identify emerging themes related to implementation strategies.

RESULTS: We interviewed 15 participants (4 classroom teachers, 4 physical education teachers, 3 assistant principals, and 4 principals) about implementation strategies supporting classroom-based physical activity approaches. Four prominent themes related to implementation strategies emerged: 1) the role of program champions, 2) the use and function of staff training, 3) the importance of strategic planning, and 4) the use of positive reinforcements to support implementation.

CONCLUSIONS: Results highlight the need for multiple implementation strategies to support the delivery of classroom-based physical activity approaches. Results also highlight potential mechanisms through which the implementation strategies operate. This information is valuable to future planning efforts for classroom-based physical activity approaches.

Keywords

physical activity; school; implementation strategy; implementation

INTRODUCTION

Regular physical activity is important for children's health, well-being, and academic performance (Kohl & Cook, 2013). Schools play a key role in providing physical activity opportunities, given that children spend the majority of their waking hours in school (Carson, Castelli, Beighle, & Erwin, 2014; Szeszulski, Lanza, et al., 2021). Over the past 20 years, the educational landscape has shifted towards devoting more time to reading and math and less time to physical education and recess (Kohl & Cook, 2013). This shift has contributed to less physical activity and increased time spent in sedentary behavior at school. One way educators are introducing more physical activity back into the school day is through classroom-based physical activity approaches. Classroom-based physical activity approaches are an effective way to improve children's physical activity levels (Bartholomew et al., 2017; Daly-Smith et al., 2018; Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015) and can add up to almost 20 minutes of moderate-to-vigorous physical activity per day for children (Bassett et al., 2013).

Classroom-based physical activity approaches are delivered during standard classroom instruction time and primarily take one of three different forms (Watson, Timperio, Brown, Best, & Hesketh, 2017). The first form is through physically active lessons (i.e., active learning), which are lessons developed to incorporate physical movements into the teaching of course content (Bartholomew & Jowers, 2011; Riley, Lubans, Holmes, & Morgan, 2016). A second form is through curriculum-focused activity breaks. These are usually short physical activity bouts that include academic content but are done as a break to the standard academic lesson (Mahar et al., 2006). A third form is through non-curriculum

focused activity breaks. These are short physical activity bouts that do not include course content and are used as a break from academic instruction (Ma, Le Mare, & Gurd, 2014). A common theme between all three classroom-based physical activity approaches is that classroom teachers are often the primary implementers.

Despite the effectiveness of classroom-based approaches for increasing children's physical activity, implementation remains a challenge. In a nationally representative sample, classroom-based physical activity approaches were used by 75% of schools surveyed (Turner & Chaloupka, 2017). However, of the schools using these approaches, only 46% of teachers reported using them regularly. Studies have identified barriers to implementation at multiple levels. At the individual level, these include a lack of time, knowledge, skills, motivation, and perceived benefits. At the school level, barriers include a poor implementation climate, competing priorities, lack of space, lack of administrative support, and lack of professional development opportunities (Carlson et al., 2017; Dyrstad, Kvalø, Alstveit, & Skage, 2018; Lau, Wandersman, & Pate, 2016; van den Berg et al., 2017; Webster et al., 2017). Given the well-documented implementation challenges, there is an important need to better understand current implementation strategies that are being used in schools, and perspectives from different stakeholders' as to why they are effective.

Implementation strategies have been defined as methods or techniques to enhance the adoption, implementation, and sustainability of a program or practice (Cook, Lyon, Locke, Waltz, & Powell, 2019; Powell et al., 2015; Proctor, Powell, & McMillen, 2013). Studies have examined the effectiveness of strategies to improve the implementation of school-based approaches targeting children's health and health behaviors (Wolfenden et al., 2017). However, less is known about how specific strategies may address implementation barriers to classroom-based physical activity approaches (Turner, Calvert, & Carlson, 2019). Studies suggest professional development or teacher trainings can be effective if they provide ongoing support (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Other promising strategies that need additional testing include establishing professional learning communities and identifying physical activity leaders or champions (Calvert, Wenner, & Turner, 2019; Turner et al., 2019). Given the many potential implementation strategies identified in the literature (Powell et al., 2015), it is important to understand how they are used in schools and what barriers they may target to improve implementation of classroom-based physical activity approaches.

Classroom-based approaches present unique challenges because consistent implementation (with some level of fidelity and adaptation) at the classroom level is necessary to maximize program impact. Many of the existing classroom-based physical activity programs do not provide adequate guidance about ways to address implementation barriers (Calvert et al., 2020). A better understanding of implementation strategies from the stakeholder perspective is critical to support planning efforts and ensure resources are used effectively. In addition, this information is important for developing comprehensive implementation strategies that can effectively integrate classroom-based physical activity approaches into schools. The purpose of this study was to use a qualitative approach to better understand implementation strategies for classroom-based physical activity approaches used in elementary schools.

METHODS

Participants

This study was conducted in collaboration with a mid-size school district in Texas. The district serves an economically, racially, and ethnically diverse community. More than half the elementary schools are Title 1, meaning at least 40% of a respective school's students are enrolled in the free and reduced lunch program. District employees were eligible to participate in this study if they were currently working at one of the district's elementary schools. The University's Committee for the Protection of Human Subjects and the district's Research and Evaluation Department approved all study procedures. Written consent was obtained from all study participants.

Procedure

We used a purposeful sampling approach to recruit participants from different job types throughout elementary schools in the district. At the start of recruitment, district wellness staff identified elementary school employees who would be knowledgeable about physical activity opportunities (e.g. policies, programs, and approaches). Wellness staff initially contacted these employees and provided research staff with contact information if they were interested in study participation. Research staff emailed these employees to explain the study and schedule individual interviews. After completing each interview, the interviewer asked participants to recommend a colleague within the district who would be good to speak with based on the interview questions. The interviewer specified that colleagues were eligible regardless of their opinions about physical activity in schools or their experience implementing physical activity approaches as long as they worked at an elementary school. As we completed interviews, we began to focus recruitment to balance the number of participants across the following job types: principals, assistant principals, physical education teachers, and classroom teachers. The choice to include these specific job types was based on feedback from the interviewed participants that these positions would be important for providing a comprehensive understanding about implementation of school-based physical activity approaches. The determination of the final sample size was based on study goals, the quality of the data, and whether additional participants were generating new information (Guest, Bunce, & Johnson, 2006).

The lead author conducted all interviews in person and audio recorded the sessions. Interviews were semi-structured and covered topics related to physical activity opportunities provided to students and how they were implemented. The interviews included questions and probes about the amount of physical activity students were participating in, the types of opportunities provided, and the adoption and implementation of those physical activity opportunities. Interviews also included questions about how different job types played a role in the adoption, implementation, and maintenance of physical activity approaches. Interviews were scheduled for 45–60 minutes and transcribed verbatim. Participants received a $30 gift card for their participation. We completed all interviews in the spring of 2018.

Data Analysis

We used directed content analysis (Hsieh & Shannon, 2005) and an iterative categorization (Neale, 2016) approach to systematically code and analyze the qualitative data. The audio files were professionally transcribed verbatim. Three researchers coded the interview transcripts. The coding process began with analysts independently reviewing and coding three interview transcripts to gain an initial understanding of the information discussed and drafting an initial codebook. Coders then began a consensus coding process, which consisted of meeting on a regular basis to review the coded material and discuss discrepancies. Once coders established consensus, remaining transcripts (12) were divided up for individual coding. The lead author coded all 12 remaining transcripts, and the two other researchers each coded six transcripts. The coding team met regularly throughout the coding process to discuss new codes and discrepancies. This process resulted in final coded transcripts based on the consensus of the coding team.

Consistent with the iterative categorization approach (Neale, 2016), the codebook consisted of deductive codes that were derived from the semi-structured interview guides and inductive codes that emerged from participant responses. Within the codebook, there was a series of codes related to the implementation of physical activity programs in schools. Researchers independently reviewed the excerpts from the implementation codes, first noting general topics. Next, they took a more focused approach to independently review each coding excerpt and systematically summarize the key points from each participant. The researchers then met to discuss the key points and emerging themes. We used Dedoose to conduct the coding and analysis for this study (Dedoose version 8.0.35)

RESULTS

Participant Characteristics

We interviewed 15 participants from 10 different elementary schools across the district. There were four principals, three assistant principals, four physical education teachers, and four classroom teachers included in the sample. In the final set of interviews, repetition of concepts was occurring, indicating an adequate sample for this work. Fourteen (93%) of the participants were female and most participants were between the ages of 36–45 (33%) or 46–55 (40%). Participants had an average of 8.5 years of experience in their current position. Of the 10 represented schools, nine were Title 1 during the 2017–2018 school year. The schools in the sample had an average of 70% of students who were economically disadvantaged. On average, schools served 6.8% Black, 58.0% Hispanic, 20.2% white, and 15% of students of another race.

Physical Activity Opportunities in Schools

Participants discussed the different types of physical activity opportunities provided to students including physical education, recess, before- and after-school programs, and classroom-based activities. When discussing implementation, participants primarily talked about classroom-based physical activity approaches with an emphasis on active learning. The interview discussions revealed district wellness staff and many elementary schools were in the process of trying to expand the use of active learning approaches throughout

the district. As a feature of active learning, schools were in the process of creating motorlabs (a designated space inside a school with ready-to-use equipment for active learning lessons) and implementing curriculum focused and non-curriculum focused activity breaks. Schools were in different implementation stages for the different classroom-based physical activity approaches, allowing for discussions about adoption, implementation, and maintenance. Four prominent themes about implementation strategies for classroom-based physical activity emerged. These were related to 1) program champions; 2) training; 3) strategic planning; and 4) positive reinforcements.

Implementation of Classroom-based Physical Activity Approaches

Having multiple program champions was important for adoption, implementation, and maintenance—Participants discussed the importance of having people in the school who could lead efforts to adopt, implement, and maintain classroom-based physical activity approaches. Often, schools used multiple champions to lead implementation efforts. Multiple champions shared responsibilities (e.g. motivating and training others) and helped improve program visibility. For example, one principal (Participant 16) said,

> …because I know I have a lot of advocates for that exercise time and those brain breaks and all that, on my campus. So how do I leverage those people to really be the ones, also, to reinforce the message, as opposed to it just being me and one of my ideas?

Program champions were often physical education teachers, classroom teachers, and/or interventionists (an instructional coach for classroom teachers). Champions usually had a personal interest in physical activity and health along with a passion for promoting classroom-based activity. For instance, a principal (Participant 12) said, "…but they're runners, they're active participants in their own personal life with physical fitness, and they just see the need to have that in the schools to parallel with the academics." Overall, participants felt that program champions needed to have knowledge about and exposure to what they were championing. Specific to active learning, champions often obtained knowledge and exposure through offsite training or by visiting other schools within the district that were using classroom-based physical activity approaches.

At some schools, the principal identified a person (or multiple people) to learn more about active learning and lead implementation efforts. One principal (Participant 13) noted,

> "I have a teacher, actually, a coach that I just – a coach-like, an instructional coach I just hired who's going to that training this summer - and, so, when she comes on next year, she's going to work with us on – you know – maybe putting that into classrooms."

At other schools, a staff member (or multiple staff members) with an interest in classroom-based physical activity would advocate to school leadership for these approaches and subsequently assume the role(s) of program champion(s). Another principal (Participant 16) noted, "And so that was something that they came to me and asked. 'Hey, can we have this training? Can we go to this training? We'd like to train the staff.' And so that

happened about two years ago." Program champions had many different responsibilities, which included: obtaining materials for a motorlab or classrooms using active learning approaches; helping train teachers and staff for implementation; helping motivate staff for adoption and implementation, checking and replacing equipment used in motorlabs or classrooms; providing new ideas for active learning lessons; attending teacher meetings to demonstrate active learning approaches; and tracking data about using active learning approaches to share with teachers and staff. For example, an assistant principal (Participant 15) described the role of the champion as,

> "…just checking the equipment [in the motorlab], making sure it's still safe, if we need to replace anything, and just providing ideas, or even—you know—just the stations for us to change them out. Like, 'Oh, we've had this one for two months. Let's replace it with this one.' Teaching the teachers how to use it [motorlab] with the students and retiring the next one [referring to stations within the motorlab]. So more of that kind of person to train the staff."

Training was a key implementation strategy for all schools—Participants commonly reported training as a key implementation strategy to support the delivery of active learning approaches. Training took different forms, including offsite training. Offsite training consisted of schools sending about 1–3 staff members to an out-of-state training to learn more about a specific active learning approach. Offsite training sessions typically lasted a couple days and were offered during the summer break. Classroom teachers or support staff (instructional coaches or physical education teachers) who were interested in active learning attended the trainings. Costs for offsite trainings were paid for by the district and/or by schools. For example, the district would sometimes support one staff member while the school would support additional staff who wanted to attend.

Participants highly valued offsite trainings because they provided important information about active learning, motivated staff for implementation, and improved staff skills to use active learning approaches. One principal (Participant 10) commented, "I sent a couple of teachers to training, they came back fired up and said 'absolutely, there's research behind it, let's get it going, our kids need to do it.'" School leaders sent staff to offsite trainings to bring skills and information back to inform adoption decisions. Schools also used the offsite trainings as part of a Train-the-Trainer model (Pearce et al., 2012). In this model, a staff member would attend an offsite training and bring the information back to then train other staff members as a method to improve school-wide implementation efforts. A teacher (Participant 11) commented, "I went to the training from…outside the state and then when I came back it was my responsibility to train my staff and show them all the positive effects of using active learning at our school."

Participants also discussed onsite trainings, which were usually offered by schools interested in active learning. On occasion, district wellness staff provided support to schools by helping lead training sessions. The district also offered an optional training that teachers across the district could attend during end-of-summer preparation sessions. Commonly, a previously trained school staff member would organize internal training sessions with his/her school to

inform and educate fellow staff about active learning. One of the physical education teachers (Participant 1) explained,

> "So, the training, it was just at my school, and it was really just for our teachers. Of course, anybody else could have come. But we really promoted it in our school, because we wanted to teach you, this is what we have at our school. And that's what our teachers asked for."

Onsite trainings typically happened at the beginning of the school year and throughout the school year as professional development sessions or refresher trainings. Onsite trainings were usually conducted for groups of staff but they sometimes occurred on an individual basis. Participants felt the onsite trainings were a good way to get "buy-in" from other staff members. However, participants commonly reported less-than-ideal attendance (often less than half of the targeted classroom teachers), and believed that some staff did not see the value of using active learning for their students. For example, one principal (Participant 16) said, "And so that—so if you think about a staff of about forty-something…And there's only, like, ten that come to that training [referring to in-school active learning training]. So, it's like, how do you reach (laughs) everybody else?".

Onsite trainings were not required or mandated by the district or school leaders. School leaders were reluctant to require attendance at training sessions because they felt staff members needed to make the choice on their own, otherwise the approaches would likely not be used. Some participants felt the onsite trainings could be improved by making them more formal, having more regular refresher trainings, and targeting newly hired staff. Other recommendations were to emphasize how the approach aligned with student needs and to use testimonials from teachers who were originally skeptical about the approach. For example, one assistant principal (Participant 5) commented,

> "…have the naysayers to speak up and tell their experience with it [active learning] because the teacher that I had, they came and said, 'That was really cool. Can we do that during the year?' If you lined up 100 of my teachers and said that's the one who's going to like it, she would have been at the end of the line."

Participants also felt that onsite trainings were not sufficient because some staff were still hesitant to use active learning after having attended the training sessions.

Schools used strategic planning to initiate, implement, and maintain approaches—Strategic planning efforts supported adoption, implementation, and maintenance of classroom-based physical activity approaches. This planning usually involved acquiring resources, small-scale testing, and scheduling. Once a school decided to adopt or expand the use of an approach, leaders and program champions identified and acquired resources. Advanced planning was important because it often took time for schools to get the materials they needed. A common step was to identify a location, often an empty classroom, to set up a designated active learning space (also known as a motorlab). Schools initially borrowed existing equipment from physical education supplies or reached out to the district for unused equipment. One physical education teacher (Participant 1) explained,

> "So, for us, fortunately or unfortunately, our enrollment went down, which left us some empty classrooms. And then it's all, how do you get the equipment for it? Well, you can take some of the physical education stuff, but then, you know, you need other things, and back and forth. So then when I got that grant…"

Principals also used money from the school's budget to purchase supplies. Program champions sometimes wrote and received internal grants (from the district) to fund the purchase of new equipment for motorlabs or supplies to support other classroom-based activity (e.g., wobble chairs, stability balls). For physical activity breaks, fewer resources were needed because teachers used existing online websites or platforms.

When schools began a new approach, they often started efforts on a small scale. For example, they would pilot test the use of an approach (e.g., activity break or a motorlab) with just kindergarten classes. This pilot activity would provide schools with the opportunity to gain experience and work through initial challenges. A classroom teacher (Participant 6) described:

> "So, seeing it, having somebody guinea pig and—I'm guinea pig and it's fun—and go through the—that didn't work, that didn't work—the trials of it, and then saying, 'Okay, we've narrowed it down these three things we think work really well.' And having people or us like group of people that are willing to do that, I think is beneficial."

Schools strategically chose to begin working with lower grade levels that were not required to complete state tests (kindergarten-second grade). This decision took some pressure off schools because they could gain more experience with an approach without the risk of directly influencing high-stakes testing. Staff also felt teachers who taught the lower grades were easier to engage because their students had more trouble sitting still during class compared to the older students. A physical education teacher (Participant 4) said,

> "Some of the older kids—it's hard—harder to get their teachers bought in because they expect them to be able to sit for so long. And when they're unfocused they're not necessarily behavior-ish – they just get sleepy and tired. Whereas the little kids you see them jumping out of their seats."

Another feature of the small-scale testing was making the approach visible to other staff. This observation was thought to help stimulate interest so other staff members would be motivated to adopt the approach for their students. If the approach was successful during the testing phase, schools would try to expand the use among multiple grades. For example, schools using motorlabs commonly expanded use to the lower grades (kindergarten-2). They also had intentions to create a second lab designed for grades 3–5. However, few schools had more than one motorlab or a lab that was specifically designed for higher-level grades.

Once they established a motorlab, schools tried to support implementation in various ways. One common strategy was to use a centralized board or a shared online document to reserve time in the lab, as one principal (Participant 10) described:.

> "The teachers sign—there's like a board—we had a board—I think they have it online now—but they sign-up for when they would like to go [to the motorlab]. It's

> like a Google Doc and they can all see. So as long as it's open. Anytime in their day if they want to take the kids over there for thirty minutes, they take them and they do the activities."

Some schools made the motorlab part of their schedule rotation so students would rotate through active learning sessions in the motorlab, similar to how they would rotate through a music class or art class. For example, a principal (Participant 12) stated,

> "This year it was just we decided to make it [motorlab] part of the rotation so that she [program champion] had control over it, and then all the kids would eventually get through that in that rotational thing that we have."

Using these scheduling strategies helped ensure participating teachers and students had access to the motorlab and that the lab was being used regularly.

The importance of positive reinforcements to support implementation— Schools primarily used positive reinforcement from school leaders and peers to support the implementation and maintenance of classroom-based physical activity approaches. For example, school leaders motivated staff implementing the approaches by staying positive and encouraging teachers to incorporate activity breaks into their schedules. They also motivated staff during faculty meetings by creating positive dialogue around classroom-based physical activity approaches and by letting staff know they would be looking for them during classroom observations. One assistant principal (Participant 3) mentioned that if their school leaders saw an activity break during a classroom observation, the leaders would participate with the students to get people excited:

> "So, we started out by just kind of energizing them within a faculty meeting. And we have different leadership now, so this is kind of different, but then we told them, we're going to be looking for it when we come to do your observations or walk around the building. And then one of the things that we would do is we would actually get in and kind of play with—if we saw it going on, we would kind of go do with the kids just to create havoc—no—just to get people excited about it, and then we just kind of spotlight it."

There were generally no stated consequences for teachers when they chose not to use classroom-based physical activity approaches or attend related trainings. Some participants acknowledged that a mandate could be used to established consequences for teachers not implementing classroom-based approaches. However, several participants mentioned that schools were reluctant to use mandates because they felt a key to success was having strong teacher support, which could be lost if teachers felt forced. The alternative was to allow for approaches to spread through positive reinforcement and by establishing a strong core of users. A core group of users was thought to improve visibility and create more interest among students and staff, which would help spread the use of classroom-based physical activity approaches. One classroom teacher (Participant 8) explained:

> "So a group of—again, that nucleus of people who believe and that just—and if you're excited, and if you're like that part of that—we have our fellowship, then the people would buy-into it, but if you are just mandating—okay, everyone got to do forty-five minutes circle time talking about our feelings, people are going to be like,

> ‘Ahh, I’m going to—’. Even if it sounds like a great idea, people would mandate it, people don’t want to do it—this—old people, adults, even young people, they don’t want to do it.”

School leaders and program champions also reinforced the use of approaches by providing general reminders at meetings, in emails, and during hallway conversations.

Participants also acknowledged that classroom-based physical activity approaches were challenging to monitor because they occurred on a daily basis. Participants expressed an interest in collecting data or having more access to data for tracking purposes. One assistant principal (Participant 15) stated,

> “I feel like, if we had some sort of tracking system, as well, to just figure out, like, how many kids use it, how many teachers are really rotating it, and even just get their feedback at predetermined times, maybe every three months—I don’t know. The easiest one I can think of is maybe a Google Doc.”

Participants felt data would help schools understand staff perceptions, implementation trends, and potential programmatic improvements. They also felt the district was data-driven, so data could be used to garner more support from district and school leaders.

DISCUSSION

This study set out to gain a better understanding of implementation strategies for classroom-based physical activity approaches in elementary schools. Study findings are helpful for understanding why strategies are useful and for linking strategies to common implementation barriers to classroom-based physical activity approaches. Our findings revealed schools and staff were using a combination of strategies (program champions, training, strategic planning, and reinforcements) throughout the implementation process and the different strategies appeared to address common implementation barriers.

The use of program champions has been previously reported to enhance physical activity opportunities in schools (Economos et al., 2018). In a study examining best practices for school districts, district-level champions were important for developing and advocating for physical activity approaches (Economos et al., 2018). Other studies suggest classroom teachers value support from champions and peers when implementing classroom-based physical activity approaches (Calvert et al., 2019). A key role of champions is to help change perceived norms and build social capital, which can be valuable when establishing sustainable change (Turner et al., 2019). Our results are consistent with previous studies and highlight champions target common implementation barriers by motivating staff, improving program visibility, securing resources, and supporting ongoing training efforts. Multiple champions within a school are also valuable because they can share responsibilities, have a greater impact as a group, and provide sustainable support even if one champion changes positions or leaves the school.

Our findings indicate that some champions naturally assume their role because they advocate for classroom-based approaches to school leaders while other champions are identified by school leaders interested in establishing classroom-based physical activity

approaches in their schools. For schools and principals trying to develop champions, it is likely beneficial to identify staff members who are interested in health and who appreciate the connections between health and learning. Principals can empower these potential champions by funding professional development opportunities and/or networking them with other schools and staff that are successfully using classroom-based approaches. Providing professional development opportunities for champions is important given they need expertise and credibility to be successful (Turner et al., 2019). Further, principals should establish a group of champions to broaden the reach of the support and reduce the impact of a single champion leaving the school.

Past studies have also indicated training is a central component of school-based implementation strategies (Wolfenden et al., 2017). However, the impact of trainings on implementation outcomes is unclear, likely in part because of the variation in training format, content, and approaches. In our study, we found that offsite trainings increased perceptions of staff knowledge and motivation. They also served as a basis for a Train-the-Trainer approach (Pearce et al., 2012). However, school personnel need to consider the cost of offsite trainings, because they may not be accessible with limited funds. Schools also offered onsite trainings; although, they struggled to reach the majority of teachers and these trainings did not always sufficiently prepare teachers to use classroom-based physical activity approaches.

Schools will likely continue using staff trainings as an implementation strategy for classroom-based physical activity approaches. One way to improve trainings, is to design and tailor them to better meet staff needs (Szeszulski, Walker, Robertson, & Fernandez, 2021). For example, providing knowledge and motivation is likely necessary, but not sufficient to prepare staff for implementation. Confidence and skills also need to be developed and maintained to ensure the continued use of classroom-based approaches (Walker, Craig, Robertson, Szeszulski, & Fernandez, 2021). Stakeholders should also consider positive ways (e.g. incentives and reinforcement) to ensure staff attend trainings, which can be important for establishing and maintaining a supportive implementation climate. Other features that may improve trainings include leveraging existing staff experiences and developing ongoing trainings through learning collaboratives (Turner et al., 2019).

Previous research also indicates obtaining additional funding/supplies through grants or partnerships is important for physical activity promotion in schools (Economos et al., 2018). For active learning programs, teachers often need supplies for active lessons. Thus, identifying sources of funding through the district or external partnerships can provide schools with the necessary supplies to launch active learning approaches. Starting on a small scale can also be beneficial by reducing the amount of supplies needed when initiating an approach. Small scale testing can also allow teachers to work through implementation challenges and showcase the program to increase interests among fellow teachers. Initially restricting a program to a select group of teachers may sound counterproductive when the overall goal is to reach all students. However, this approach may be an effective strategy during the early stages of implementation because people are motivated to avoid loss (Cialdini & Sagarin, 2005). Teachers who are not using a new approach may become

even more interested when they see other teachers using it because they do not want to miss out on providing a unique learning opportunity for their students. Another aspect of strategic planning is scheduling the use of classroom-based physical activity approaches. Previous research indicates regularly scheduling activity breaks into a daily routine can help overcome implementation barriers (Webster et al., 2017). Schools operate on structured schedules, so whether teachers are trying to incorporate activity breaks into daily routines or regularly use a motorlab, scheduling may help with accountability.

Positive reinforcements appeared to improve the implementation climate, demonstrate leadership support, and encourage teacher buy-in. However, holding teachers accountable when they chose not to attend trainings or use classroom-based physical activity approaches remained a challenge. One way to hold teachers accountable is through mandates. Our results indicated both teachers and school leaders had mixed feelings about mandating classroom-based physical activity approaches. The belief voiced was if teachers did not support an approach, then they would likely not implement it. Given the challenges to monitor classroom-based physical activity, and the potential to upset staff, strict mandates too early in the implementation process should be used cautiously. Schools may benefit by first using positive reinforcements to help establish a supportive implementation climate and increase buy-in among teachers. As support grows, mandates could then be used to further solidify the school's commitment to implementation and maintenance.

Limitations and Strengths

This study has limitations that need to be considered. First, we used a recruitment approach that relied on participant recommendations. This approach likely led to a sample of participants who were supportive of classroom-based physical activity and the associated implementation strategies. Therefore, we could have missed perspectives of staff who were not as supportive of these approaches. Second, we interviewed participants from multiple schools within a district. Even though we gained perspectives from staff at different schools, the information pertains to a single district. Third, we did not collect information about participant's race/ethnicity so we cannot report on the diversity of the sample. Fourth, the recruitment approach was designed to reach people in different job types. This decision prevented us from wholly focusing on implementation strategies through the lens of implementers (classroom teachers) or support staff (school leaders). As a result, we may have missed granular details of the implementation challenges teachers face when integrating movement into curriculum. However, our approach allowed us to obtain an integrated and contextualized understanding of how people in different positions view implementation of classroom-based physical activity approaches. Notably, we found that even though participants were in different positions, they spoke consistently about topics and themes (e.g. both leaders and staff discussed the challenges of mandates and key aspects of trainings).

A strength of this study was the broad range of stages schools were in for implementing classroom-based approaches, and in particular, active learning approaches. The collaborating district has been supporting the use of classroom-based physical activity approaches since 2007. However, some schools have yet to adopt these approaches whereas other schools

have been implementing them for over ten years. This diversity led to rich discussions about implementation that spanned the different stages (adoption, implementation, and maintenance). As a result, our findings illustrate many different implementation strategies schools used for classroom-based activity and potential mechanisms through which they operate. More recently, researchers have been developing ways to link discrete implementation strategies to specific barriers (Waltz, Powell, Fernández, Abadie, & Damschroder, 2019). This recent work has further highlighted the need for using systematic approaches, such as Implementation Mapping (Fernandez et al., 2019), which integrate existing evidence, theory, and stakeholder input to select and develop implementation strategies.

Conclusion

Classroom-based physical activity approaches are effective for increasing physical activity, yet they are challenging to implement. Gaining a better understanding of the implementation strategies schools use is a critical step for improving the delivery of classroom-based approaches. Our findings highlight the importance of program champions, training, strategic planning, and reinforcements to support implementation efforts. However, more research is needed to test the impact of these strategies on implementation outcomes. Further, schools are unlikely to use a single discrete strategy to implement classroom-based physical activity approaches. Therefore, understanding how strategies can be used together and in what stage of implementation they are most valuable will help to move the field forward.

Lessons Learned

This qualitative study provides useful information about implementing classroom-based physical activity programs in elementary schools. Results suggest multiple implementation strategies are needed to support the delivery of classroom-based approaches. Schools should identify multiple people who are willing to serve as program champions for classroom-based physical activity approaches. Training can also be a good way to educate and motivate staff, but additional strategies are likely necessary. Schools should consider small scale testing of an approach to work through initial implementation challenges and improve the visibility to other staff. Lastly, schools should use positive reinforcements to improve implementation climate and demonstrate leadership support, which is critical during the early stages of implementation. Mandates could then be used in the later stages of the implementation process to support maintenance.

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Highlights

- Implementation strategies are key for classroom-based physical activity approaches
- Training alone is likely not sufficient to support implementation efforts
- Multiple program champions can help implementation efforts in schools
- Positive reinforcements can help motivate school staff for implementation