

The three-year evolution of a preschool physical activity intervention through a collaborative partnership between research interventionists and preschool teachers

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Abstract:

Despite evidence that preschoolers spend the majority of their time in sedentary activities, few physical activity interventions have focused on preschool-age children. Health promotion interventions that can be integrated into the daily routines of a school or other setting are more likely to be implemented. The Study of Health and Activity in Preschool Environments (SHAPES) employed a flexible approach to increasing physical activity opportunities in preschools' daily schedules through recess, indoor physical activity and physical activity integrated into academic lessons. Eight preschools were randomly assigned to receive the study's physical activity intervention. Teachers in these schools partnered with university-based interventionists across three years to design and implement a flexible and adaptive intervention. The intervention approach included trainings and workshops, site visits and feedback from intervention personnel, newsletters, and physical activity equipment and materials. Teachers reported a high acceptability of the intervention. The purpose of this paper is to describe the evolution of a multi-component physical activity intervention in preschools, including (a) a description of the intervention components, (b) an explanation of the intervention process and approach, and (c) a report of teachers' perceptions of barriers to implementation.

Introduction

Recent guidelines recommend that preschool-age children participate in 2 to 3 hours of physical activity per day[1-3]. Despite a widespread belief that young children are very physically active, the majority are not meeting these guidelines[4;5]. A large percentage of young children attend childcare centers or preschools[6], and these programs may play an important role in providing opportunities for children to be physically active. Best-practice guidelines recommend that preschool programs provide multiple opportunities for children to be physically active throughout the day[7]. However, it is difficult for preschool teachers to provide sufficient opportunities for physical activity[8;9].

Few studies have examined interventions to increase physical activity in preschools[10-12]. Some of those studies reported increases in physical activity, but overall the results have been inconsistent[13-15]. Most physical activity interventions to date have used structured curricula and were implemented by trained research personnel[13]. This approach is ideal for efficacy studies, but a 'real-world' approach to increasing physical activity will require that preschool teachers implement the interventions.

A small number of interventions have focused on training preschool teachers to implement physical activity opportunities[16-18]. These interventions typically used structured curricula and provided one type of physical activity opportunity during the preschool day. A more flexible approach may be able to accommodate differences in preschool settings and preschool teachers' philosophies and practices for sustainable implementation[19;20]. Interventions that can be adapted to individual circumstances while maintaining overall fidelity are more likely to be successful[19]. The Study of Health and Activity in Preschool Environments (SHAPES) used a flexible, adaptive intervention that was designed to add additional physical activity opportunities to the preschool day. In this approach, the university-based intervention team (hereafter referred to as the interventionists) guided teachers to use a flexible, adaptive intervention to achieve physical activity goals within diverse contexts, rather than

prescribing a standard set of activities[21;22]. The overall goal was to maximize all physical activity opportunities throughout preschoolers' daily schedules, including opportunities during recess, indoor physical activity and physical activity integrated within academic lessons. The interventionists worked in partnership with teachers over a three-year period to adapt the intervention implementation process and components. This paper provides a detailed account of the development and process evaluation of a complex intervention in complex environments.[23]The purpose is to describe the evolution of a multi-component physical activity intervention in preschools across three years.

Methods & Results

Participants

Sixteen preschools in the Columbia, South Carolina area agreed to participate in the study:8 were randomized to receive a physical activity intervention from September 2008 through May 2011 while the remaining 8 served as pair-matched controls. Four of the intervention schools were religiously-affiliated, private preschools, and 4 were 4-year-old pre-kindergartens located within public schools. Of the 4 public school programs, the average percent of students receiving free and reduced lunch in Year 1 was 67 percent (range: 47 to 87 percent). Three of the preschools were half-day programs that operated 3 to 4 hours per day, and the remaining 5 preschools were full-day programs that operated for at least 6 hours. The number of classrooms per school ranged from 1 to 4, with a total of 17 to 19 classrooms in the intervention each year. Of the 24 lead teachers who participated throughout the 3 years, 63 percent were black and 2 were first-year teachers. Eighty-six percent of the classrooms had at least one teacher with a bachelor's degree or higher. Schools and teachers received gift card incentives, and teachers received professional development credits for participating in workshops. [Pfeiffer et al. provides a detailed description of the larger study design.](#) [\(CITE Karin's BMC Protocol paper\)](#)

Intervention Overview

The SHAPES intervention was designed to be flexible and adaptive through a collaborative partnership between interventionists and preschool personnel. Interventionists provided examples and targets for overall physical activity, while preschool teachers modified intervention strategies for their classrooms. Hence, SHAPES was not a curriculum, but a framework for increasing physical activity during the preschool day. The SHAPES intervention included the intervention components and the approach used to help teachers implement those components. While the intervention components and the intervention approach were modified over the 3 years, the overall goal to increase children's physical activity and the basic components remained throughout the three-year intervention.

Process of Adapting the Intervention

Interventionists worked closely and collaboratively with the preschool teachers to develop strategies and materials to address barriers that occurred during implementation. During the summers following Year 1 and Year 2, interventionists and study investigators extensively reviewed intervention activities, identified teachers' perceived barriers, and modified the intervention as necessary. As a result, the intervention was modified and enhanced across the three-year period to increase effectiveness.

Process Measures

Process evaluation included multiple sources of data. Interventionists collected detailed field notes of observations and interactions with teachers. Teachers completed workshop evaluations, surveys twice per year, and interviews to formally assess perceived barriers and responses to the intervention.

Independent observers conducted two types of observations during the intervention: The Observation System for Recording Physical Activity in Children-Preschool Version, (OSRAC-P), which is a validated momentary time sampling observation system[24] as well as a standardized checklist for classroom physical activity opportunities and additional contextual information. A complete description of the process evaluation is [currently under development.](#)

Intervention Components

The components of the intervention were based on a social ecological model, targeting the instructional, social, and physical environments within the preschools[25]. While at the child level, the intervention targeted social and environmental influences at the child level, several behaviour change strategies were used at the teacher level. These behavioral strategies, including increasing self-efficacy, modelling, and goal setting. As shown in TABLE 1, the components of the intervention evolved over the three years based on collaboration between the interventionists and teachers. After Year 1 the original 5 components (Recess, Learning on the Move, Skill SHAPeRS, Gross Motor Centers, and TV Turnoff) were simplified and combined into 3 components (Move Inside, Move Outside, Move to Learn). Teachers were unable to remember the names of the 5 components, and had difficulty identifying examples of each. To focus on components with the highest probability for high-quality, wide-reaching physical activity and reduce teacher confusion, the components were reduced and renamed.

Move Inside (originally Skill SHAPeRS)

Several of the intervention schools did not have access to formal, high-quality physical education. Thus, interventionists encouraged teachers to provide daily opportunities that focused on fundamental movement patterns. The initial goal was 60 minutes of skill-based physical activity per week. During Year 1, teachers received examples of structured, skill-based activities and games that were similar to those used in physical education classes. Following Year 1, teachers expressed concern that they had limited training and skills to lead elaborate skill-based activities similar to formal physical education classes. Therefore, the research team and interventionists changed the goal from providing skill-based activity (Year 1) to providing 10 minutes per day of indoor activities that did not include academic content (Years 2 and 3). Teachers could break the 10 minutes into two bouts of at least 5 continuous minutes. Activities included dancing, calisthenics, and obstacle courses.

Move Outside (originally Recess)

While all of the preschools had recess policies based on the length of the instructional day, some were vague or rarely enforced. Because children are more active when outdoors[26], interventionists encouraged teachers to provide outdoor recesses when possible or to provide an equal duration and intensity of indoor activities during inclement weather. The initial goal was 60 minutes of recess every day. Based on teachers' feedback and interventionists' observations that 60 minutes was an unrealistic time goal, the time goal was modified to two, 20-minute recesses per day after Year 1. In addition, teachers were encouraged to provide at least two 5-minute structured activity opportunities at each recess (i.e., teacher-led physical activities). Structured recess activities included organized races and games such as soccer or follow the leader.

Move to Learn (originally Learning on the Move)

To accommodate the schools' emphasis on pre-academic and academic lessons, 'Move to Learn' integrated physical activity into preschool lessons, which previous studies have shown to be successful[17;27]. Different preschools operate with different early learning standards; thus, teachers were encouraged to incorporate physical activity into their typical daily lessons. The initial goal was 20 minutes of activity-based lessons per day. However, interventionists and measurement staff observed teachers implementing low-intensity active lessons that were very short in duration. This component was not eliminated from the intervention, because it was highly valued by the teachers and added to their overall buy-in to the program. To make the goal more realistic and achievable, the time goal was modified after Year 1. Through Years 2 and 3, teachers were encouraged to conduct two, 5-minute active lessons per day for a total of 10 minutes. This included activities such as moving during story time, calendar time and other large group tasks.

Gross Motor Centers

In many preschools, a large percentage of the daily schedule involves center time, where students select individual or small group activities, such as playing with blocks, making arts and crafts, or

participating in sociodramatic play. These activities typically involve sedentary or light activity. During Year 1, teachers were encouraged to create active movement centers that focused on gross motor skills, often set to a theme. For example, the March-themed Leprechaun center guided children to *crawl* through a field of ‘shamrocks’, follow the rainbow (*step* on multicolored dome cones), and *throw* ‘gold’ in the pot (practice object control by throwing beanbags to a target). After the first year, based on teachers’ feedback and observations, the interventionists determined that this component had lower reach and feasibility compared to the other components. Thus, this component was excluded from Years 2 and 3.

Reducing TV Watching at Home

A four-lesson unit on reducing television (TV) viewing was adapted from previous research[28] and delivered to each classroom once per year for all three years of the intervention. Interventionists provided teachers with lesson descriptions and materials in early spring to coincide with National TV Turnoff Week (currently Screen-Free Week). Teachers chose how to implement the lessons, either once per week for four weeks or four days during one week. This component was a single time point activity and had limited impact on preschoolers’ classroom physical activity. After Year 1, intervention efforts were reduced for this component, but the interventionists continued to supply materials based on teachers’ requests.

Social Environment

Interventionists focused on promoting both teachers’ participation in physical activities and their verbal encouragement for preschoolers to be active. Interventionists first encouraged teachers to be physically active with the children, as studies have shown that modelling is important for children’s physical activity[16]. ~~Teacher~~Initial teacher feedback and process evaluation data showed that many teachers were unlikely to participate actively with the children-, though this improved throughout the

intervention. Thus, interventionists also encouraged teachers to provide positive, specific verbal encouragement of children’s physical activity. This verbal encouragement included recognizing healthy physical activity behaviors (e.g., “you’re building strong muscles,” “feel your heart beat, that’s a healthy heart”), promoting additional active movements, and not discouraging safe, appropriate physical activity.

Physical Environment

Because portable play equipment and materials have been shown to increase physical activity levels among preschoolers[29-31], intervention staff supplied the participating classrooms with a variety of physical activity equipment and materials. Teachers received initial resource kits and additional supplies throughout the 3 years. They also selected classroom-specific equipment as part of the self-assessment process during Year 3. Examples of materials the teachers selected included stethoscopes for listening to increased heart rates during physical activity, physical activity-centered games, and sack race bags.

In addition to equipment and materials, the interventionists provided activity ideas to the teachers throughout the intervention. They also encouraged teachers to develop their own SHAPES activities and to share them with other teachers through newsletters and at SHAPES trainings. Throughout implementation, the interventionists increased the emphasis on teacher-developed activities to increase teachers’ ownership of SHAPES activities, materials, and procedures. Interventionists publically recognized specific teachers and schools as the source of activities and materials that were developed. Examples of resources developed during the SHAPES intervention are provided in TABLE 2.

Policy Environment

In an effort to increase the sustainability of the SHAPES intervention, interventionists attempted to involve directors at the program policy and organizational level. Despite several efforts to involve

directors, the intervention was unsuccessful at engaging them. Final interviews with directors and teachers suggested that organizational support might be necessary but not sufficient for sustainability of the SHAPES intervention. For example, teachers described barriers such as limited access to playgrounds or multipurpose rooms that would need director engagement to ameliorate. However, future research is needed to better understand the policy and organizational structure of this setting and how to influence it.

Implementation Approach

SHAPES used a facilitative, as opposed to directive approach, which previous studies have shown to be effective[32-34]. Interventionists interacted with the teachers in multiple ways to increase teachers' capacity to implement the intervention components. The partnership included five types of technical assistance interactions between interventionists and teachers: initial trainings, group workshops, site visits, self-assessment, and newsletters and website. The evolution of the intervention approach is described in FIGURE 1.

Initial Trainings

Interventionists conducted initial, on-site trainings with teachers during Year 1. The 2- to 3-hour introductory trainings were scheduled at a convenient time and held with teachers at their schools. Interventionists provided background information about physical activity, described the intervention components and provided examples, discussed perceived barriers, and distributed physical activity supplies and materials. Interventionists met with new teachers for similar introductory trainings throughout the three years.

Group Workshops

In addition to the initial site-based trainings, the interventionists conducted seven group workshops throughout the intervention. Workshops were held in the evenings or on Saturdays, by

teacher request. Most workshops offered two training date options to accommodate teachers' schedules. Workshop participants received a healthy meal, a gift card incentive, and childcare. The goal of the workshops was to deliver physical activity knowledge and skills so that teachers could create their own physical activity opportunities in their classrooms. Training topics were developed based on interactions with and feedback from teachers and reports from formative process observations that identified skill areas that needed further development. After the first year, through observations and feedback, interventionists recognized that teachers lacked understanding of high-quality physical activity, especially moderate-to-vigorous physical activity (MVPA). Year 2 and 3 workshops focused on changing teachers' perceptions of physical activity. Open-ended responses on anonymous evaluations indicated that teachers enjoyed the workshops, valued learning from other teachers (e.g., "Sharing is what it's all about") and appreciated receiving new activities and strategies (e.g., "I learn something new every time").

Workshops were designed to be fun and interactive and served as an opportunity for teachers and interventionists to share ideas and build relationships. Workshops included demonstrations, group discussion, and activities to address teacher barriers. During the first two years, staff sent multiple reminders and RSVP requests to teachers through email, post mail, and in-person visits. Reminders were reduced in Year 3; however, attendance remained consistent. Attendance ranged from 6 to 30 participants, with an average of 22 participants per workshop, representing the majority of schools. The directors of 4 of the 8 intervention schools attended at least one group training over the three years. Additional participants included assistant teachers, aftercare teachers, and other community members invited by the participants.

Teacher Site Visits

Interventionists regularly visited teachers in their classrooms. Intervention team members made 859 classroom site visits (343 during Year 1, 351 during Year 2, 343 during Year 3). The number of site

visits directly supporting teachers in intervention activities decreased from Year 1 (12.5, range from 9-18) to Year 3 (4.2 (0-17)). Overall, site visits averaged approximately 40 minutes each.

During Year 1, interventionists often led example physical activities for the class and responded to teachers' concerns. During Year 2, visits were structured to include two visits per month. Based on teachers' requests, one of the two visits involved active participation by the interventionist during teacher-led classroom activities. The second visit was a collaborative planning meeting that occurred at a mutually convenient time (e.g., nap, lunch, after school), where interventionists and teachers could discuss, plan and solve challenges related to enhancing preschoolers' physical activity. To increase teachers' independence during Year 3, interventionists purposefully limited their onsite activities with participating teachers and made site-visits optional. Teachers could request either type of site visit (i.e., planning or feedback on implementation of physical activities), but were limited to seven visits during Year 3. During Year 3, 31 (average of 1.8 visits per classroom) of the visits were requested by teachers and an additional 42 were interventionist-initiated direct implementation assistance. The remainder of visits during Year 3 included indirect assistance, such as monthly material and supply deliveries, and other administrative visits. Hence, across the three years of implementation the team systematically reduced direct support to teachers.

Self-Assessment

The intervention staff encouraged self-monitoring during all three years of intervention, since it has been shown to be an effective part of behavior change[35;36]. At the initial trainings, each lead teacher received a poster-sized calendar to use to track activities daily. Interventionists emphasized that the teachers would not be assessed on how many activities they performed. Several teachers began to use the calendar to track activities, but did not sustain its use. During Year 2 teachers received a 'SHAPES Jar' to use to monitor classroom physical activities by adding blocks to the jar. A clear jar was selected because it did not require teachers to complete additional paperwork, and both teachers and

preschoolers could easily self-monitor physical activities using the jar. While some teachers involved their students in tracking physical activities by incorporating use of the jar into daily activities, such as circle time or large group activities, continued use was not widespread. During Year 3, a paper assessment was developed to help teachers conduct the assessment on their own as part of usual practice. The self-assessment tool focused on four high-quality targets: *time, intensity, reach, and encouragement (TIRE)*. Teachers were encouraged to provide sufficient time for physical activity opportunities, focus on higher intensity activities that promoted MVPA, involve as many children as possible, not withhold physical activity as punishment, encourage physical activity verbally, and physically participate with the children. To encourage use of the self-assessment during Year 3, teachers who identified barriers or challenges could select additional equipment and materials to address the challenges. Teachers were allotted a small 'Move It Money' account to purchase physical activity equipment and materials identified from their self-assessments.

Newsletters

To communicate regularly with teachers and develop a community of practice, the interventionists distributed newsletters, paper and electronic, to intervention classrooms. Initially, parents and teachers received separate newsletters. The teachers' newsletter included tips and activity suggestions from interventionists and other intervention teachers. In response to teachers' requests, a parent newsletter was distributed to classes to send home with students. This newsletter included family activities and a general description of the intervention. During Year 2, the parent and teacher newsletters were combined into a single entity to be distributed to both parents and teachers. In Year 3, parent newsletters were discontinued based on teacher feedback about their limited effectiveness- [\(e.g. newsletters returned in backpacks\)](#). The teacher newsletter component was further developed in the third year, with teacher-created activities featured each month. Interventionists collaborated with volunteer teachers to share favorite physical activities with other SHAPES teachers each month. The

monthly newsletter package included activity descriptions, supplies if necessary, and photographs of the featured teachers' classes performing highlighted activities. Interventionists also created, in Year 1, a password-protected website as a resource to share materials and create a networking community. Due to low participation, the website was discontinued for subsequent implementation years.

Teacher Perceptions and Barriers

Overall, teachers responded positively to the SHAPES partnership and program (e.g., *"I love SHAPES. I really do - and you know how I was kind of negative to it in the beginning, but I love it. And the kids love it. We love to move."*). Teachers particularly enjoyed sharing ideas and learning new activities in workshops (e.g., *"Y'all have taught us a lot. Y'all really taught us a lot"*), interventionists' support, and acquiring a new awareness of the importance of physical activity.

Before SHAPES we probably did things [physical activity], but the awareness that SHAPES brought makes what we do more meaningful.

What you have taught us helps the children.

Teachers did not find the activities to be difficult to implement (e.g., *"Well, it [SHAPES] worked. And, it wasn't hard."*). In addition, they perceived that the children enjoyed them. Teachers enjoyed receiving activities and feedback from other teachers through newsletters and workshops and incorporated these shared activities into daily lessons, special activities such as field days, and graduation performances.

The barriers teachers reported most frequently were lack of time and limited space. Overall, teachers reported fewer barriers during Spring of Year 3 than during Spring of Year 1. Several schools experienced significant site-related barriers during the three-year intervention. See TABLE3 for a summary of site changes by school. As one teacher who had limited playground access described during SHAPES collaborative planning:

We're cramped. Construction has been going on all year long! However, I find ways to get the students their exercise [. . .]. There are things we can do when there is not enough room, [for example] we go behind our classroom and race.

In surveys, the teachers reported that they felt supported by school administrators and interventionists.

They also reported being prepared and that the intervention was a worthwhile endeavor.

Discussion

The SHAPES intervention evolved over a three-year period through a collaborative partnership between interventionists and preschool teachers. A strong asset of the SHAPES program was the positive relationships that developed across time between interventionists and teachers. These relationships fostered productive development and assessment of the final SHAPES intervention. Efforts to build and sustain the partnership between interventionists and teachers promoted 'buy-in', gave the participants a 'sense of ownership' of activity planning, and encouraged teachers to give honest feedback on intervention components and activities. As a result of these partnerships, the research team made critical adaptations to enhance the acceptability and feasibility of SHAPES, without changing the fundamentals of the intervention.

The process of developing and adapting effective materials and intervention strategies through a collaborative partnership required intensive effort by research personnel. Initially, the research team needed to understand the preschool context and build partnerships with teachers. For example, during Year 1, interventionists learned that the teachers lacked physical activity knowledge and skills and needed additional resources to build their capacity. The final SHAPES approach and procedures were designed to be sustainable and easily disseminated[37]. The final components of the SHAPES intervention can be implemented by existing teachers through additional training and capacity development with minimal upfront cost, compared to hiring additional personnel

The SHAPES intervention was acceptable to teachers. Teachers greatly appreciated the flexible approach and reported that it was easy to implement within their preschool classrooms. While SHAPES was not directly compared to a structured curriculum, the flexibility was key to implementation across diverse preschools and unique preschool contexts which is essential for successful implementation [cite HAWE 2009]. Teachers valued and enjoyed the partnership with interventionists and relationships with other participating teachers, which have been shown previously to increase the relevance and success of

interventions[38;39]. Teachers did report some barriers to implementing SHAPES, including lack of time, which is similar to previous research findings[40-42]. Reporting a lack of time may be the result of actual or perceived competing priorities to physical activity within the preschool environment. More research is needed on how to make physical activity a priority in preschools. SHAPES was conducted in preschools which may have a larger number of teachers with higher education when compared to childcare centers. Thus future efforts are needed to test if the approach will work in the broader environment of childcare centers.

This study did not evaluate which component of the SHAPES intervention was the most acceptable or feasible. 'Move to Learn' was initially viewed by most teachers as the favorite SHAPES component due to its link to academics. However, extensive process measures indicated that 'Move to Learn' physical activity opportunities were the least frequent, lowest in PA intensity and the shortest in duration compared to 'Move Inside' and 'Move Outside' activities. While integrating physical activity with academics was beneficial in selling physical activity interventions to teachers, other opportunities may be more effective at increasing physical activity of young children. ~~will be published~~

~~elsewhere. Additionally, while many behaviour change strategies were used throughout the intervention (e.g. modelling and goal setting), there was not a structured *a priori* plan for implementing these strategies. Future studies should examine which specific techniques were most effective for changing teacher behaviours. The intervention was part of a randomized control trial to assess its effectiveness. (CITE Craig 2013) A final analysis of the effect of the SHAPES program on children's physical activity will be published elsewhere.~~

Conclusions

The research staff-preschool teacher relationship was critical for establishing an effective partnership and intervention. SHAPES used a flexible and adaptable approach, which was highly acceptable to preschool teachers. Future interventions need to be willing to adapt based on staff and

participant feedback within a systematic framework [cite Craig again], while maintaining the essential elements and goals of the intervention. Investigators and practitioners should develop an ongoing system to incorporate formative feedback from participants and staff to make adaptations throughout the intervention.

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TABLE 1: Evolution of the SHAPES Intervention Components

| Original Intervention | Intervention Feedback | Final Intervention |
|---|--|---|
| Skill SHAPeRS (Physical Education) → Move Inside | | |
| <ul style="list-style-type: none"> • Provided 20 minutes per day, 3 days per week | <ul style="list-style-type: none"> • Many schools did not have access to formal PE • Teachers lacked capacity for leading PE activities | <ul style="list-style-type: none"> • Provided at least 10 minutes each day |
| Recess → Move Outside | | |
| <ul style="list-style-type: none"> • Two 30 minute sessions of recess are provided daily • Teachers provide active game choices during recess | <ul style="list-style-type: none"> • 60 minutes was an unrealistic goal with many schools' current schedules | <ul style="list-style-type: none"> • At least 2, 20 min sessions of recess provided daily • Structured activity provided at least 5 minutes each day |
| Learning on the Move → Move to Learn | | |
| <ul style="list-style-type: none"> • PA is integrated into academic lessons for 20 minutes each day | <ul style="list-style-type: none"> • Activity during lessons was brief (less than a minute) • Teachers reported this as favorite component | <ul style="list-style-type: none"> • Provided at least two 5 minute activities daily |
| Physical Activity Centers | | |
| <ul style="list-style-type: none"> • Classroom activity center is used by all children at least twice a week | <ul style="list-style-type: none"> • Low overall reach • Low classroom participation | <ul style="list-style-type: none"> • Not included |
| Tv Turnoff | | |
| <ul style="list-style-type: none"> • Lessons are delivered in school • Homework assignments and materials are assigned and distributed. | <ul style="list-style-type: none"> • Negligible influence on classroom activity • Select teachers did like the attempt to involve parents | <ul style="list-style-type: none"> • Not Included • (unless requested) |
| Social Environment | | |
| <ul style="list-style-type: none"> • Teachers verbally encourage PA in children during PE, recess, and other PA time • Teachers actively participate in PA with children during PE, recess, and other PA time | <ul style="list-style-type: none"> • Some teachers unable to physically participate due to health or other issues • Some teachers reported their own increase in physical activity as a benefit of the program | <ul style="list-style-type: none"> • Teachers verbally encourage PA in children during PE, recess, and other PA time • Teachers actively participate in PA with children during PE, recess, and other PA time |
| Physical Environment | | |
| <ul style="list-style-type: none"> • Teachers and administrators, assess environment using checklist • Teachers and administrators, change environment to enhance PA and safety | <ul style="list-style-type: none"> • Teachers appreciated provision of physical activity supplies | <ul style="list-style-type: none"> • Teachers and administrators, assess environment using checklist • Teachers and administrators, change environment to enhance PA and safety |
| School Policy and Practice | | |
| <ul style="list-style-type: none"> • Administrator supports policies & practices for PE, recess, and PA and other policies & practices that affect PA and sedentary time | <ul style="list-style-type: none"> • Directors were difficult to engage due to competing priorities and time commitments | <ul style="list-style-type: none"> • Not included |

**Half day programs were encouraged to provide as many physical activity opportunities as possible (at least 150 minutes per week) as best fit into their schedule.*

TABLE 2: Sample Resources

| Resource | Brief Description |
|--|---|
| Training Manual | Example activities for each of five components including active lessons, skill lessons, recess, gross motor centers, and TV Turnoff |
| SHAPES Top 10 Activities (examples) <i>Track Team</i> <i>Dance Party</i> <i>Counting on Calendar</i> | The top 10 teacher and staff developed activities Organized races on the playground Provided music and encouraged dancing Physical activities for calendar time such as jumping to the days of the month |
| Featured Teacher Activities (examples) | Activities developed by intervention teachers to be distributed and shared with other intervention teachers. One teacher or school was featured per month 6 stations based on favorite nursery rhymes |
| <i>Nursery Rhyme Olympics</i> | |
| <i>Moving through the Environment</i> | Multimedia physical activity videos with varied settings |
| <i>Move to Math</i> | Active songs for pre-k mathematics standards |
| <i>100 Healthy Hearts</i> | 100 physically active ways to count to 100 |
| <i>SHAPE-up Circus</i> | 8 circus acts for learning about the circus, moving during center time, and practicing on the playground |
| <i>Physical Activity Around the World</i> | A poster-size map with physical activities from around the world (e.g., African drum dance, futbol, Olympics) |
| <i>Recess Recipe Cards</i> | Index cards with teacher tips for making the most of recess |
| Physical Activity Equipment | Music CDs, scarves, dome cones, beanbags, assorted balls and portable air inflator, parachute, jump ropes, DVDs, and staff developed activity ideas (e.g., mission impossible) |

TABLE 3: Site Changes and organizational characteristics

| | School 1 | School 2 | School 3 | School 4 | School 5 | School 6 | School 7 | School 8 |
|--|----------|----------|----------|----------|----------|----------|----------|----------|
| <i>Max number of classrooms</i> | <u>3</u> | <u>3</u> | <u>3</u> | <u>4</u> | <u>2</u> | <u>2</u> | <u>2</u> | <u>1</u> |
| Decrease in Classroom Number | X | | X | X | | | X | |
| Teacher Turnover | X | X | X | X | X | | X | X |
| Lead | | X | X | X | | | X | X |
| Assistant | X | X | X | X | X | | X | X |
| Administrative Issues^a | X | | | | | X | | |
| Limited Playground Access^b | | X | X | X | | | | X |
| New Curriculum^c | | X | | | X | X | | X |

X=occurrence of situation in classroom over the duration of the intervention

^a Conflict between teacher and administrator

^b Limited playground access due to construction or other uses of playground/gymnasium

^c School or district changed academic curriculum, altering teacher lessons and schedule

Fig. 1: Evolution of the SHAPES implementation approach over 3 years

