



PACES

Partnerships for Active Children
in Elementary Schools

Introduction

With youth overweight and obesity rates at nearly 40% in South Carolina, there is a pressing need for strategies to combat childhood obesity.¹ A key strategy for reducing obesity in children is to increase their accumulation of moderate-to-vigorous physical activity (MVPA). Schools play a vital role in promoting MVPA because 98% of children attend school and schools have the infrastructure and staffing to provide students with opportunities to be physically active. Current recommendations call for a whole school approach to physical activity promotion, whereby teachers in both physical education and the classroom contribute to increasing children's MVPA.

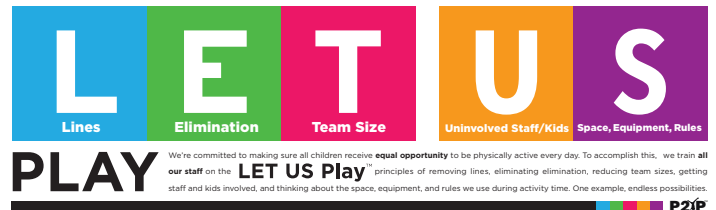
Professional Development Trainings

Recognizing the need to combat childhood obesity in South Carolina, the University of South Carolina's (USC) Arnold School of Public Health and College of Education and the South Carolina Department of Health and Environmental Control (DHEC) partnered with elementary schools in one local school district to provide professional development opportunities for physical education and classroom teachers in an effort to increase children's physical activity throughout the school day. From January 2016 to May 2017, university researchers worked collaboratively with the school district to develop, deliver and evaluate the professional development opportunities. DHEC provided technical support and served in an advisory role. The professional development opportunities were integrated into regularly scheduled trainings and were guided by a **teacher-driven** professional development approach that ensures trainings and ongoing support are authentic, timely and relevant.

Physical Education Professional Development Training

During the 2015/16 school year, our collaborative team developed and delivered a professional development training for physical education teachers. The training was developed in conjunction with three physical education teachers in the local school district in the

fall of 2015. The training revolved around the LET US Play physical education principles of removing **Lines**; eliminating **Elimination**; reducing **Team size**; and getting **Uninvolved** students involved; by modifying **Space**, equipment and rules. These are no-cost strategies that align with state physical education standards and can be integrated into daily physical education lessons. Then, during the spring of 2016, USC delivered a 90-minute professional development training, along with two follow-up booster trainings to all elementary physical education teachers in the local school district. At the conclusion of the spring of 2016 physical education teachers were asked to identify target areas for professional development during the next school year (2016/17). A revised professional development workshop was developed that expanded upon the original training. Following the previous year's schedule, another 90-minute training was delivered in the fall of 2016. An additional two follow-up booster trainings were delivered in the fall and spring of the 2016/17 school year.



Classroom Teacher Professional Development Training

During the spring of 2016, our team also collaborated with 10 elementary classroom teachers to develop professional development training for integrating movement opportunities into general education classrooms. Movement integration has been shown to increase academic test scores, time on task and children's physical activity. This training was delivered to all elementary classroom teachers in the local school district prior to the fall of 2016. The training was experiential and iterative in nature. It took place in a third grade teacher's classroom and was delivered by USC personnel alongside a teacher from the local school district. The professional development lasted approximately one hour and focused on seven

strategies that teachers could use to integrate physical activity into general education classrooms. Strategies included 1) activity-infused transitions, 2) activity breaks, 3) academic integrated movement, 4) movement as a reward or incentive, 5) movement as an opening activity, 6) special equipment to facilitate movement, 7) and teaching lessons outdoors. Strategies were presented to teachers as a menu of options to create an active classroom environment.

Program Evaluation

Our collaborative team undertook an extensive evaluation to measure children’s physical activity and teachers’ implementation of the physical activity promotion strategies during physical education and classroom time. This was accomplished using two evaluation techniques. **First**, children attending elementary schools wore accelerometers for up to three days in the fall and spring of the 2015/16 school year (a total of six days). Accelerometers measured the amount of physical activity children accumulated during regular school hours.

The collected physical activity data are compared to recommendations calling for children to accumulate a minimum of 30 minutes of MVPA during school hours and to spend 50% of physical education lesson time in MVPA. **Second**, trained observers systematically coded instances of physical activity promotion during physical education and classroom time.

Partnership Accomplishments

Children’s Activity Levels During Physical Education Lessons

A total of 617 children’s (315 girls/302 boys) activity levels were measured during 301 physical education lessons.

Activity levels during physical education are displayed in **Table 1**. In the fall of 2015, boys accumulated an average of 3.3 minutes in MVPA during physical education classes. This increased to 5.4 minutes in the spring of 2016, and 6.4 minutes in the fall of 2016, before settling at 4.6 minutes in the spring of 2017. A similar trend was observed for girls over the four measured semesters. In the fall of 2015 girls spent 1.5 minutes in MVPA during physical education. This climbed to 2.3 minutes in the spring of 2016, and rose again to 7.1 minutes in the fall of 2016. In the spring of 2017 girls accumulated 4.2 minutes in MVPA during physical education lessons. Similar patterns were noted for total physical activity.

Table 1. Changes in activity levels during physical education over time

		Fall 2015	Spring 2016	Fall 2016	Spring 2017	Δ	(95% Conf. Interval)
Girls	MVPA	1.5	2.3	7.1	4.2	2.8	(0.3, 5.2)
	Total Physical Activity	11.5	14.0	19.4	15.6	4.1	(-0.0, 8.2)
	Percent Meeting 50% Guideline	0.0%	0.0%	3.4%	0.0%	0.0%	(-0.0, 0.0)
Boys	MVPA	3.3	5.4	6.4	4.6	1.3	(-1.6, 4.2)
	Total Physical Activity	14.3	17.4	18.5	16.2	2.0	(-2.0, 6.0)
	Percent Meeting 50% Guideline	0.0%	3.8%	3.7%	2.6%	2.6%	(-0.0, 0.1)

Note: means estimated from mixed effects linear regression models controlling for day of the week, race, and grade

Physical Education Lesson Environment

Findings from the System for Observing Fitness Instruction Time+ observations are presented in **Figures 1 and 2**.

Figure 1. Changes in PE Class Context from Fall 2015 to Spring 2017

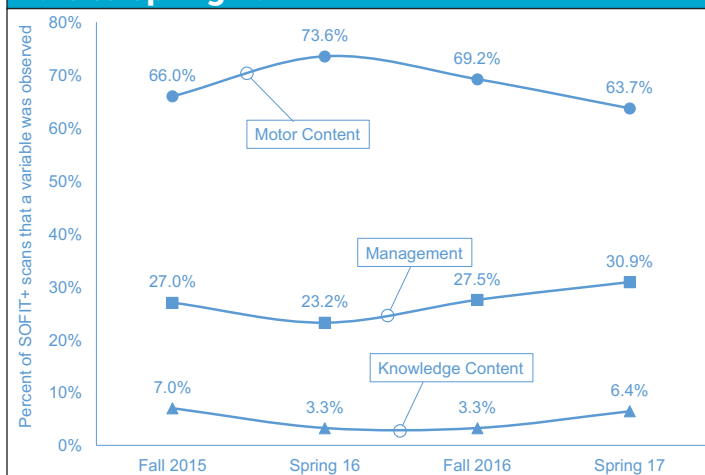
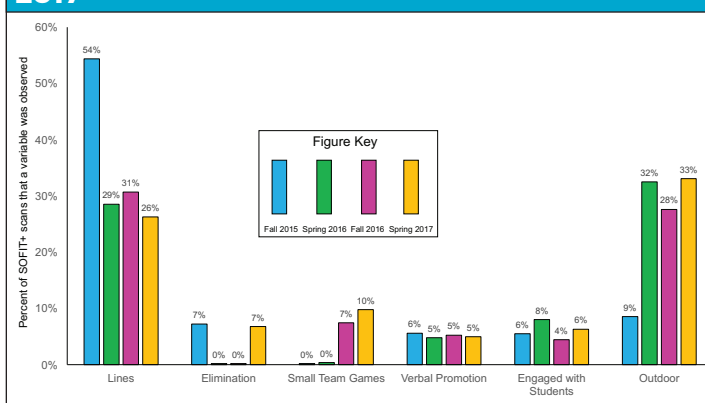


Figure 2. Changes in Teacher Behaviors and Activity Structure from Fall 2015 to Spring 2017



Overall, three of seven teacher behavior and activity structure variables moved in the desired direction following delivery of the professional development training. The largest change was in removing lines (54.4% of lesson time at baseline vs. 26.3% of lesson time at outcome). Conversely, small-team games increased from 0.2% to 9.8% of lesson time while teachers took their physical education classes outdoors much more often in the spring than in the fall (8.6% vs. 33.1%). Motor content in lessons, teachers' verbal promotion of physical activity, the use of elimination games, and teachers' engagement with children remained stable from fall of 2015 to the spring of 2017.

Children's Activity Levels During Classroom Lessons

A total of 55 classroom teachers were observed across 74 school days. Activity data were collected from 1,547 students (770 girls/777 boys) during classroom lessons. Children's activity during these lessons are presented in **Table 2**.

Table 2. Changes in activity levels during general education classroom lessons over time

		Fall 2015	Spring 2016	Fall 2016	Spring 2017	Δ	(95% Conf. Interval)
Girls	MVPA	13.6	14.6	14.2	15.7	2.1	(0.9, 3.4)
	Total Physical Activity	77.6	83.4	78.2	82.4	4.9	(0.8, 9.0)
Boys	MVPA	15.8	18.1	16.7	19.1	3.3	(1.8, 4.7)
	Total Physical Activity	82.1	91.9	83.2	88.3	6.3	(1.9, 10.6)

Note: means estimated from mixed effects linear regression models controlling for day of the week, race, and grade

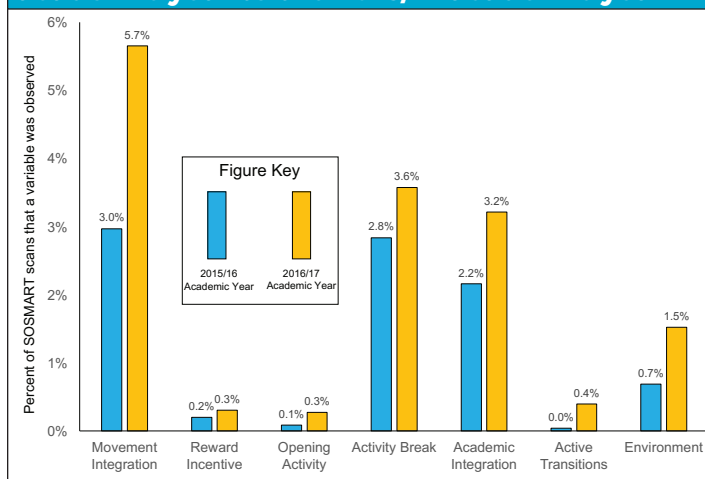
Girls' activity and MVPA increased during classroom lessons from fall of 2015 to the spring of 2017 by 4.9 and 2.1 minutes, respectively. Boys experienced a similar increase in total activity and MVPA with total activity rising by 6.3 minutes and MVPA rising by 3.3 minutes.

Classroom Lesson Environment

Findings from the classroom observations are presented in **Figure 3**.

Overall use of movement integration strategies increased by 2.7% from the 2015/16 school year to the 2016/17 school year. A 1.2% increase was observed in teachers using the environment to integrate movement into lessons. There was also a 1.0% increase in academic integration and a 0.8% increase in teachers using activity breaks. Increases were also observed in all other strategies, though these increases were minimal.

Figure 3. Changes in General Education Classroom Teacher Use of Movement Integration Strategies from the 2015/16 academic year to the 2016/17 academic year

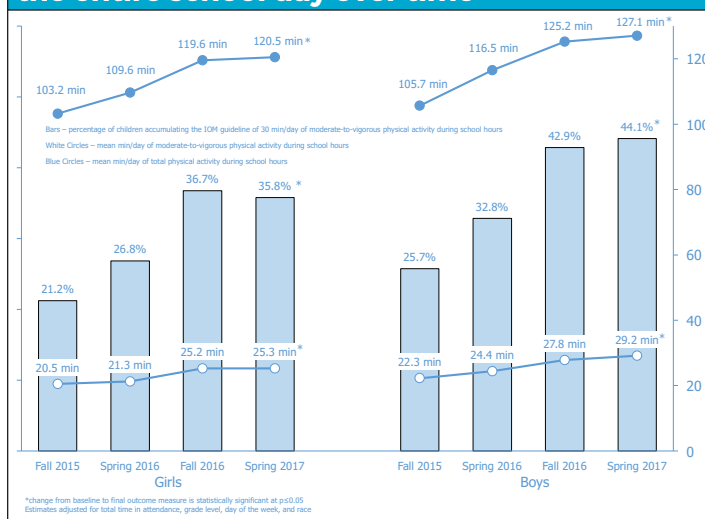


Children's Activity Levels During the Entire School Day

Children's activity levels during the school day are presented in **Figure 4**.

Activity levels steadily increased from baseline (fall of 2015) to the final semester in the spring of 2017. Girls' total activity increased from 103.2 to 120.5 min/day, while their MVPA increased from 20.5 to 25.3 min/day. For boys, total activity increased from 105.7 to 127.1 min/day and MVPA increased from 22.3 to 29.2 min/day. These increases also translated to a 14.6% (35.8% vs. 21.2%) and 18.4% (44.1% vs. 25.7%) increase in the percent of girls and boys accumulating recommended 30 min/day of MVPA during school hours.

Figure 4. Changes in activity levels throughout the entire school day over time



Next Steps

Our collaborative team will continue to deliver the professional development training to the elementary physical education and classroom teachers in the local school district as requested. Furthermore, our team is applying the lessons learned during this project to an additional pilot project in three school districts in the Pee Dee region beginning in the 2017/18 school year. One of the challenges identified by the current project was a lack of administrator buy-in at the school level. On three of the four follow-up booster trainings for classroom teachers, no teachers were present. According to district and school level administrators, this is because school administrators scheduled competing professional development opportunities at the same time as the follow-up boosters. The goal of the new pilot is to understand how to garner greater administrator buy-in in order to increase teacher attendance at the follow-up booster sessions.

Summary of Findings

Physical Activity in Physical Education

- A total of 301 physical education lessons were observed and 617 children's activity levels during physical education were measured.
- Boys' MVPA increased by 1.3 minutes from baseline (fall of 2015) to final outcome (spring of 2017).
- Girls' MVPA increased by 2.8 minutes from baseline (fall of 2015) to final outcome (spring of 2017).
- Overall, three of seven teacher behavior and activity structure variables moved in the desired direction following delivery of the professional development training.

Physical Activity in General Education Classrooms

- A total of 55 classroom teachers were observed across 74 school days and 1,547 children's activity levels were measured during general education classroom lessons.
- Boys' MVPA increased by 3.3 minutes from baseline (fall of 2015) to final outcome (spring of 2017) and total activity (any level of physical activity) increased by 6.3 minutes.
- Girls MVPA increased by 2.1 minutes from baseline (fall of 2015) to final outcome (spring of 2017) and total activity (any level of physical activity) increased by 4.9 minutes.
- On average, teachers' use of movement integration strategies increased by 2.7% from baseline to outcome.

Physical Activity during the Entire School Day

- Across the entire school day boys' MVPA increased by 6.9 minutes from baseline (fall of 2015) to final outcome (spring of 2017) and total activity increased by 21.4 minutes.
- Across the entire school day girls' MVPA increased by 4.7 minutes from baseline (fall of 2015) to final outcome (spring of 2017) and total activity increased by 17.3 minutes.

Reference

1. Children's Health Assessment Survey (2015). Division of Surveillance, Bureau of Public Health Statistics. SC DHEC.