The Walking Classroom | Oak Foundation

Physical Activity & Health Literacy Study | 2018-2019

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THE walking classroom
walk. listen. learn.

OAK FOUNDATION

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

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Students demonstrated significantly higher levels of health literacy after one year of participation in the Walking Classroom program with average end-of-year mean literacy test score improvements of 10.7%.

The Impact of The Walking Classroom on Student Physical Activity

Students demonstrated significantly higher levels of physical activity after one year of participation in the Walking Classroom program. Students on average walked 84.5 more minutes, participated in 66.8 more minutes of vigorous physical activity, and participated in 35.3 more minutes of moderate activity per week at the end of the year compared with beginning-of-year activity measures.

II. Study Purpose

Physical Activity and Health Literacy Study Overview

Previous Walking Classroom program assessment facilitated by The Oak Foundation has demonstrated significant positive impacts of The Walking Classroom on student short and long-term learning retention, post-activity cognitive performance, and mood (See Classroom Testing Report). The Physical Activity and Health Literacy Study adds to this research on the impact of The Walking Classroom through analysis of student physical activity and health literacy before and after a school year of Walking Classroom programming.

The purpose of the Physical Activity and Health Literacy Study was to analyze pre and post Walking Classroom student physical activity and health literacy.

The Walking Classroom Podcasts and Health Literacy Messages

The Walking Classroom is a national education program that provides students and teachers with an innovative way to get exercise without sacrificing instructional time. The method is simple: students take brisk walks (preferably outside) while listening to specially written and recorded podcasts that are 15-18 minutes in length with content aligned to the Common Core State Standards in topics of social studies, science and language arts. National survey responses indicate that teachers use the program on average 1.76 times per week. Detailed lesson plans contain objectives, discussion questions, and comprehension quizzes for each podcast, so that when students return from their walk, the content can be reviewed and synthesized. At the beginning of each podcast, there is a brief health literacy message (generally < 1 minute in length).

This study tests the effectiveness of this health literacy messaging in combination with the physical activity enabled through the Walking Classroom's *Walk. Listen. and Learn.* Program on student physical activity and health literacy.

III. METHODOLOGY

In order to explore the impact of the Walking Classroom on student physical activity and health literacy, a survey was sent to teacher-users that received donated class sets at back-to-school time in August/September of 2018 (n = 153). Teachers distributed beginning-of-year surveys to students in August/September, 2018, and end-of-year surveys to students in April/May, 2019.

Participants

One hundred thirty-seven teachers distributed the pre-test (n = 2062), and one hundred ten distributed the post-test (n = 1607), yielding teacher-response rates of 89.5%, and 71.9%, respectively. Teacher-adopters were given the choice between distributing a survey electronically or via a paper copy and the vast majority (92.7%) chose to distribute the survey electronically. After data-matching of pre and post-test students and data cleaning for complete surveys, the total student sample was (n = 1062) children. Ninety percent of the student-respondents were in grades 3-5, with the remaining 10% in middle school. There were also three high school student respondents representing less than 0.3% of the sample. The average percentage of students eligible for subsidized lunch was 64.37% with a range between 5% and 100%. The percentage of students with End of Grade-measured reading proficiency within the sample schools ranged from 4% to 94% with an average of 48.79%.

The sample was somewhat representative of the population of Walking Classroom users in that many lower-socioeconomic status school districts have been provided WalkKits through grant funding, however, there is a bimodal distribution of Walking Classroom users divided primarily by purchasers and grantees. This sample comprised entirely of a grantee population as The Walking Classroom prioritizes schools that are high poverty and low-performing when it donates WalkKits.

Instrument

Physical Activity was tested utilizing the International Physical Activity Questionnaire – Short Form (IPAQ-S), the most common instrument utilized to obtain internationally comparable data on health-related physical activity (Booth, 2000). The IPAQ measures utilized included vigorous and moderate physical activity and walking wherein respondents indicate during the last seven days, how many days they participated in the activity for at least 10 minutes at a time, and then how much time they usually spent doing the activity on those days. Vigorous activity was defined as "activities that made you breathe much harder than normal like running, heavy lifting, digging, aerobics, or fast bicycling". Moderate activities were defined as "activities that make you breathe somewhat harder than normal like carrying light loads, bicycling at a regular pace, playing an active game, or jogging". Measures of sedentary behavior were also included in the same format. Students were asked during the last seven days how much time did you usually spend sitting or looking at a screen.

Health literacy was measured utilizing questions from the established Walking Classroom podcast quizzes. Questions were selected after a thorough review of Walking Classroom health literacy messages within the 167 podcasts. Health literacy topic areas that were covered in five or more podcasts were flagged as key literacy areas and the corresponding Walking Classroom quiz questions from the topic areas were reviewed. Based upon this initial review, a list of 17 questions was reviewed for clarity and content validity by a panel of experts including an internationally renowned exercise physiologist, a learning specialist, and an expert in survey methodology. The initial list was reduced to twelve questions which were added to the IPAQ-S to complete the survey. Upon review of the data, one question emerged as an outlier (Q12) with only 17% answering the question correctly in the pre-test, and 14% answering correctly in the post-test. This question was discarded based on analysis of correlation of the item score with the average score across all questions as recommended in test theory (e.g. DeChamplain, 2010). Thus, health literacy analysis included only 11 items from the original 12-item scale.

Data Analysis

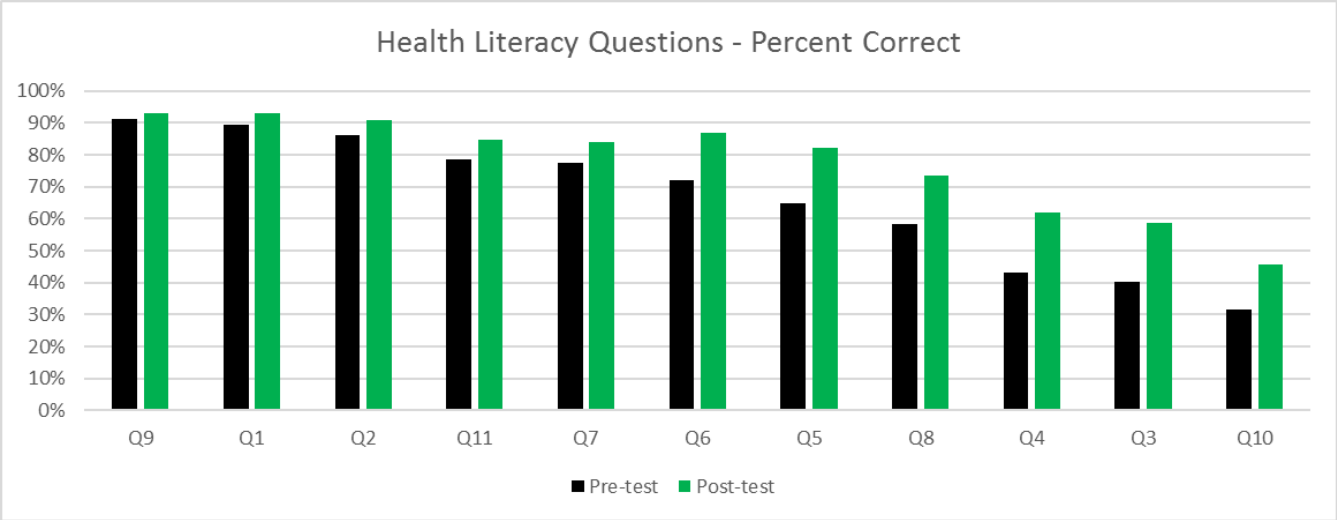
To investigate the potential effects of Walking Classroom Programming on physical activity and health literacy, a repeated measures analysis of variance with covariates (rANCOVA) was utilized. This approach is recommended as it controls for potential Type I errors (false significant results) and allows analysis of participants behavior over time. Covariates of interest included school-based measures of poverty (measured by the percentage of students eligible for subsidized lunch) and academic performance (measured by End-of-Year reading proficiency scores), in order to explore whether these factors influenced the impact of The Walking Classroom program. Repeated measures (or within-subjects) ANOVA is ideal for a longitudinal study with repeated measures as was done in this study wherein students were tested on their health literacy knowledge and physical activity twice, at the beginning of the school year, and again at the end of the school year after utilizing the Walking Classroom.

IV. Testing Results

Impact of The Walking Classroom on Student Health Literacy

Students demonstrated significantly higher levels of health literacy after one year of participation in the Walking Classroom program with end-of-year mean literacy test scores of 77.6% (SD = 1.61) compared with beginning-of-year test scores of 66.9% (SD = 1.72), $F(1, 1046) = 293.96$, $p < .001$. Positive increases in the percent of students who answered questions correctly were evident in every question with percent increases ranging from 2% - 19% (see Figure 1). The 10.7% overall increase in health literacy is particularly impressive given that health literacy messages are generally less than one minute, most students listen to podcasts only one time, and although themes were selected that appeared in multiple podcasts, the likelihood of a student hearing the message multiple times is slight as most teachers do not have their students listen to every podcast throughout the year. Figure 1 presents a visual illustration of the pre-test/post-test change in mean percentage correct by question.

Figure 1. Student Pre and Post Health Literacy Knowledge



Impact of The Walking Classroom on Physical Activity

Students demonstrated significantly higher levels of physical activity after one year of participation in the Walking Classroom program with end-of-year minutes per week significantly higher than beginning-of-year measures in walking $F(1, 1046) = 22.55$, $p < .001$, vigorous activity $F(1, 1046) = 24.12$, $p < .001$, and moderate activity $F(1, 1046) = 19.57$, $p < .001$. Changes in activity levels based on minutes per week are represented visually in Figure 2. Students on average walked 84.5 more minutes, participated in 66.8 more minutes of vigorous physical activity, and participated in 35.3 more minutes of moderate activity per week. Specific measures of minutes per day, days students engaged in 10 or more minutes of physical activity, and rANOVA figures are presented in Table 1.

Figure 2. Student Pre and Post Minutes per Week of Physical Activity

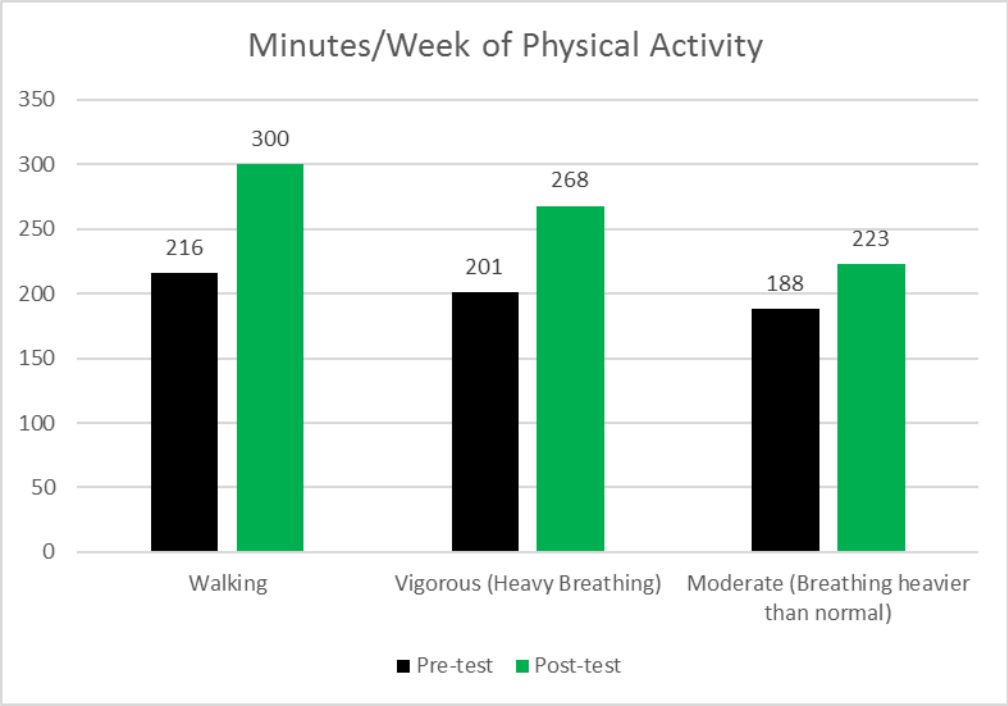


Table 1: Repeated Measures Analysis of Variance: Student Physical and Sedentary Activity Before and After Participation in The Walking Classroom

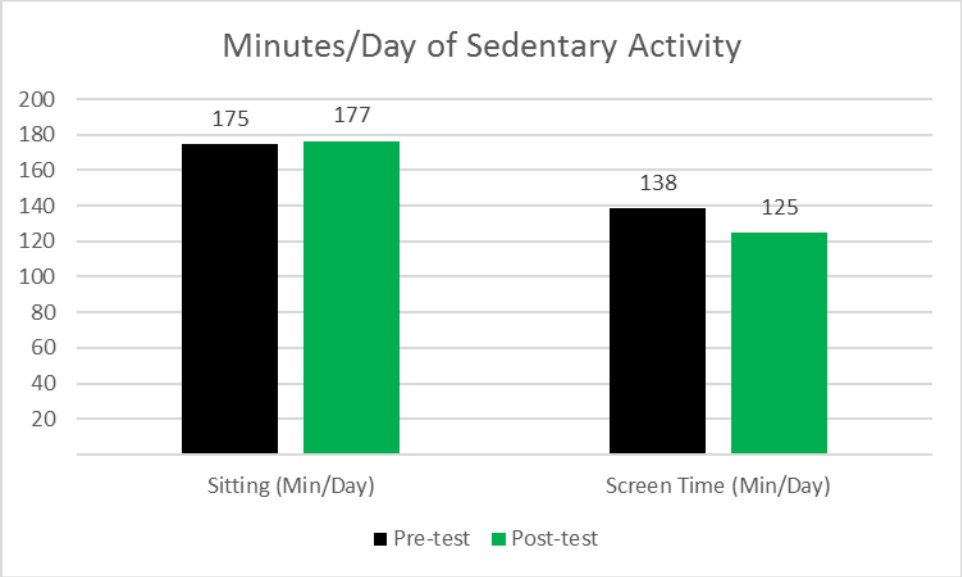
	Range		Pre-test		Post-test		*F*	*p*
			Mean	*SD*	*Mean*	*SD*		
Walking								
Minutes per week	0	2520	215.9	160.0	300.4	155.6	22.55	0.000
Days of 10+ minutes	0	7	4.4	2.4	5.2	2.1	70.96	0.000
Minutes per day	0	360	48.5	66.9	57.6	73.6	12.68	0.000
Vigorous Activity								
Minutes per week	0	2520	201.1	121.0	267.9	122.7	24.12	0.000
Days of 10+ minutes	0	7	3.9	2.2	4.4	2.0	39.74	0.000
Minutes per day	0	360	52.0	54.2	61.3	60.5	10.67	0.001
Moderate Activity								
Minutes per week	0	2170	187.8	49.2	223.1	118.4	19.57	0.000
Days of 10+ minutes	0	7	3.6	2.2	4.3	2.2	56.35	0.000
Minutes per day	0	360	51.6	22.2	52.1	55.0	1.05	0.306
Sitting								
Minutes per day	0	840	175.0	176.5	179.5	169.3	1.84	0.176
Screen Time								
Minutes per day	0	840	138.4	172.8	125.8	145.0	0.90	0.344

n = 1062

Impact of The Walking Classroom on Sedentary Behavior

Student sedentary behavior was not significantly impacted by participation in the Walking Classroom. The average time students reported sitting per day increased by two minutes, and the amount of screen time decreased by 13 minutes, but neither measure was significantly different in the rANOVA analysis indicating that mean differences within subjects observed are likely due to chance and not true behavioral changes in the students over time.

Figure 3. Student Pre and Post Minutes per Week of Sedentary Activity



School Poverty and Academic Performance Effects

The levels of improvement in physical activity and health literacy was examined with covariates of school academic performance and poverty levels (measured by End of Grade (EOG) reading scores and by percentage of students on subsidized lunch). There were no significant effects based upon these covariates in rANCOVA or correlation analyses. Given the grantee population of this study which is skewed toward high-poverty and low academic performance schools, it may be interesting to explore these factors in a more representative population in future research.

V. References

Booth, M.L. (2000). Assessment of Physical Activity: An International Perspective. *Research Quarterly for Exercise and Sport*, 71 (2): s114-20.

De Champlain, A.F. (2010) A Primer on Classical Test Theory and Item Response Theory for Assessments in Medical Education. *Medical Education, 44*(1): 109–17.

VI. Exhibit A: Physical Activity & Health Literacy Survey

We are interested in finding out about the kinds of physical activities that you do as part of your everyday life. Please think about the activities you do at school, as part of your jobs at home, to get from place to place, and in your spare time for recreation, exercise or sport.

Sitting

1. During the last 7 days, how much time did you usually spend sitting (at a desk, reading, talking)? If you usually sit for about 5 ½ hours per day, put 5 under hours and 30 under minutes.

   _____ hours per day

   _____ minutes per day

Screen Time

2. During the last 7 days, how much time did you usually spend looking at a screen to watch a show (television, computer, tablet, phone)?

   _____ hours per day

   _____ minutes per day

Walking

3. During the last 7 days, on how many days did you do walk for at least 10 minutes at a time (including at school and at home, walking to travel from place to place, and any other walking that you have done)?

   _____ **days per week**

   ☐ No walking → ***Skip to question 5***

4. How much time did you usually spend doing **walking** on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Vigorous activities

5. During **the last 7 days**, on how many days did you do vigorous physical activities that made you breathe much harder than normal like running, heavy lifting, digging, aerobics, or fast bicycling for at least 10 minutes at a time?

   _____ **days per week**

   ☐ No vigorous physical activities → ***Skip to question 7***

6. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Moderate activities

7. During the last 7 days, on how many days did you do moderate physical activities that make you breathe somewhat harder than normal like carrying light loads, bicycling at a regular pace, playing an active game, or jogging for at least 10 minutes at a time?

   _____ **days per week**

   ☐ No moderate physical activities → ***Skip to next page***

8. How much time did you usually spend doing **moderate** physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

HEALTH KNOWLEDGE QUESTIONS

We are interested in measuring your knowledge about general health. Please circle whether each statement is True (T) or False (F).

1. Exercise is important for maintaining a strong heart and preventing disease.
    a. True
    b. False
2. Exercise improves blood circulation and brings oxygen to your organs.
    a. True
    b. False
3. Walking can improve immune function and reduce your risk of getting colds.
    a. True
    b. False
4. Exercise decreases energy levels.
    a. True
    b. False
5. Research suggests that physical activity increases performance in school.
    a. True
    b. False
6. Exercise helps improve focus and concentration.
    a. True
    b. False
7. People that regularly exercise are more likely to feel stressed and depressed.
    a. True
    b. False
8. Endorphins are mood-boosting chemicals released when we exercise.
    a. True
    b. False
9. The human body is primarily water, so it is important to stay hydrated.
    a. True
    b. False
10. Our bodies only burn calories when we are moving.
    a. True
    b. False
11. Research shows that breakfast can improve concentration during school.
    a. True
    b. False
12. Vitamins and minerals help heal wounds, and build muscle.
    a. True
    b. False