BROWARD COLLEGE

HOLCOMBE INSTITUTE FOR TEACHING & LEARNING EXCELLENCE
CLASSROOM RESEARCH AWARD EVALUATION

Human Resources – Holcombe Institute • 225 East Las Olas Boulevard • Fort Lauderdale, Florida 33301 • 954-201-7339

Please complete this form for the research project that you conducted for the Classroom Research Award. This information will be reviewed in order to evaluate the effectiveness of your research. Your evaluation and supporting documentation will be posted on the HI Website. Use additional paper where necessary.

Note: Please submit this form and supporting documentation within 30 days of the completion of your project to Office of Professional Development & Training, B31 - R605, WHC. In addition, you will need to attach an electronic copy of the evaluation to an EMAIL and forward to ProfDevTrng@broward.edu.

MUST BE WORD PROCESSED

Name:	**Henry J. Allen**	Date:	**May 29, 2009**
Signature:			
Title of Research Project:	**"Pedometers in the Curriculum"**		
Project Completion Date:	**May 5, 2009**		

1. **State the problem to be researched.**

   According to the Centers for Disease Control and Prevention (CDC), an estimated 66 percent of U.S. adults are either overweight or obese; the prevalence of obesity is 32 percent. *Healthy Campus 2010* identifies physical inactivity as 1 of the 6 priority health risk behaviors for college populations. Unfortunately, in addition to the same prevalence of obesity, research shows that approximately 40 to 50 percent of college students are physically inactive, the same percentage as in the general population.

   One way to address the increasing prevalence of obesity that is present or becoming established in the college population is to add pedometers to the existing health curriculum. Broward College's Total Wellness course, HLP 1081, an Area 4D Wellness requirement for graduation, provides students a personalized introduction to Wellness and teaches them how to apply this information to lead healthy lives that contribute to the welfare of the community and the environment. Adding pedometers to the curriculum reinforces this knowledge and pedometer-based programs have proven to be both cost-effective and straightforward to implement. This meets the HLP 1081 course outcome, "plan and implement an exercise prescription specific to the needs of the student."

   During this research, students will wear pedometers to quantify their increase in physical activity as measured by average daily step count. This self-monitoring will serve as a feedback mechanism toward reaching an individualized goal and should improve student self-efficacy; defined as a person's belief about his or her ability and capacity to accomplish a task or to deal with the challenges of life. These improvements in physical activity and self-efficacy should carry also carry over into other areas of student accomplishment.

Given that pedometers have been shown to increase health outcomes in a variety of populations, and Florida's obesity rate is at 23.3 percent, this research will evaluate whether health improvements can be achieved at the college level within Broward College's diverse community of learners.

Therefore, if students use pedometers as an integral part of the existing Wellness curriculum, then students will increase their levels of physical activity and self-efficacy.

2. Summarize the research findings/results. If applicable, attach copies of evaluation forms and a summary of those forms.

Participants

Student participants were recruited from eight of the college's HLP 1081, Total Health, classes. The eight participating Wellness classes – four control and four experimental groups - were blended, web-enhanced courses.

Of the 212 students in the 8 Wellness classes, 157 students participated. 87 students, 23 men and 64 women; BMI = 26.1 ± 6.2, participated in the experimental group. Sixty seven students, 32 men and 35 women; BMI = 24.9 ± 7.3, participated in the control group. Forty percent of participants were 19 to 21 years old.

In the pretest/posttest questionnaire, participants self reported their gender and race/ethnicity. In alignment with the college's 40 percent male and 60 percent female student population, 36 percent of participants were male and 64 percent were female. Also in alignment with the student body composition, participants equally represented the college diversity with 35 percent white/Caucasian/non-Hispanic, 27 percent Black/African-American, and 27 percent Hispanic (Table 1).

	Participant Demographics		College Enrollment	
Gender				
Male	55	36%	26,036	40%
Female	99	64%	39,242	60%
	154	100%	65,278	100%
Race/Ethnicity				
White/Caucasian/ Non-Hispanic	54	35%	18,853	36%
Black / African American	42	27%	15,417	29%
Hispanic	42	27%	15,752	30%
Asian / Pacific Islander	8	5%	2,088	4%
Other	8	5%	169	0%
	154	100%	52,279	100%

Table 1: Participant demographics

Pedometer Data

Participants in the control group were asked to wear the pedometers during the baseline week (T1) and again at week ten (T2). Control group participants were asked to wear the pedometer without trying to increase their steps.

All participants in the experimental group were asked to wear pedometers for the entire ten weeks, both weekdays and weekends. Experimental group participants were asked, after the baseline week, to self select a weekly step increase of three, five, or other self-determined percentage. Actual weekly step percentage increases ranged from one percent below baseline at week six, to six percent above baseline at weeks two, three, and eight (Figure 1). Weekly steps increased by an average of three percent each week. Participants recorded daily step count and submitted their data via the web.

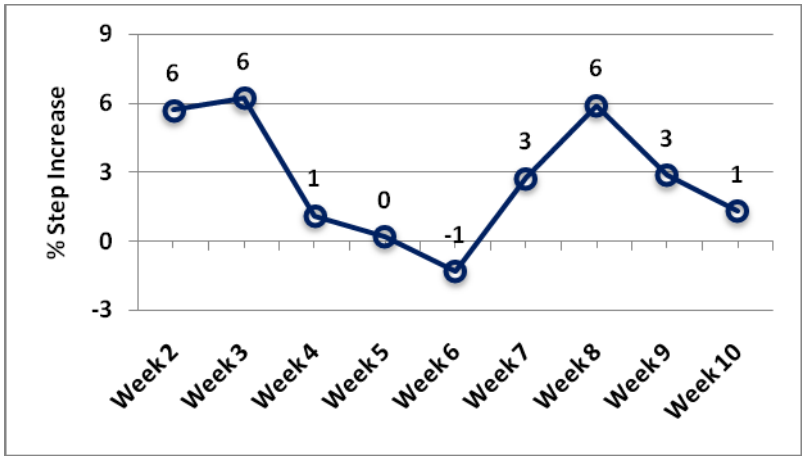

Figure 1: Weekly step increase percentage

The largest change in daily step count for both groups (Figure 2) was during the weekday. The average weekday step count for the experimental group was 6,158 ± 2,939 (range 440 to 15,699) steps at baseline. At week ten, the average weekly step count for the experimental group increased 29 percent to 7,947± 4,289 (range 402 to 27,526) steps. The effect size was 0.61 (medium). The effect sizes (Cohen's "d") are generally defined as small (d=.20), medium (d =.50), and large (d =.80).

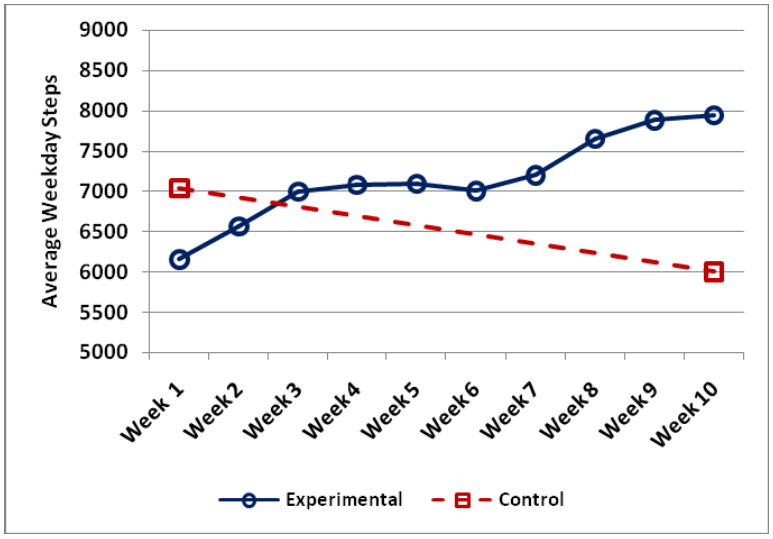

Figure 2: Average weekday step count

In contrast, the average weekly step count for the control group was 7,040 ± 5,546 (range 86 to 33,280) steps at baseline and decreased 16 percent to 6,007 ± 3,467 (range 272 to 13,675) steps at follow up. The effect size was 0.20 (small).

Self-Efficacy

The 10-item General Self-Efficacy Scale (GSES) (Jerusalem & Schwarzer, 1981) was used to determine self-efficacy. Questions measuring self-efficacy include, "When I am confronted with a problem, I can usually find several solutions," and, "I can usually handle whatever comes my way." Potential responses for each item range from exactly true (1) to not at all true (4).

The reliability of this scale has a Cronbach $\alpha = .86$ (Sherer & Adams, 1983). The pretest reliability of this scale for the experimental and control groups had Cronbach $\alpha = .89$ and .90 respectively; and a posttest reliability for the experimental and control groups Cronbach $\alpha = .89$ and .91 respectively.

The mean of the 10-item scale for the experimental group pretest was 1.67, ± 0.57, and 1.60, ± 0.51 for the posttest. The mean of the 10-item scale for the control group pretest was 1.75, ± 0.62, and 1.68, ± 0.57 for the posttest. The mean scores for the 10-item scales fall between the testing instrument responses of "exactly true" (1) and "moderately true" (2). The effect size from T1 to T2 was small; d=0.12 for the experimental group and d=0.11 for the control group (Table 3).

Summary

No significant change was noted in self-efficacy. Increased physical activity was shown in the pedometer-based curriculum.

Given that daily physical activity (as determined by step count) increased 29 per cent for the experimental group and decreased 16 percent for the control group, when both groups received the same Wellness curriculum emphasizing personal health and the need to exercise, adding pedometers to the Wellness curriculum is supported as an effective feedback mechanism to increase daily physical activity.

3. Describe the methods you used to evaluate the effectiveness of your project. Include quantitative and/or qualitative evidence.

Data analysis was performed using Statistical Analysis Systems (SAS).

The height and weight of all participants were measured at baseline (T1) and at week ten (T2). Height and weight were also self-reported along with the weekly pedometer step counts. The correlation between measured and self-reported body weight was 0.992. With such a high correlation between actual and reported weight, it may be logical to assume that other reported measures, such as self-reported daily step count, may be equally valid.

There was no significant change in the measured body weight (Figure 3) from week one to week ten in either the experimental group, 170.0 ± 44.6 (range 91 to 326) pounds at T1 vs. 164.7 ± 42.9 pounds ($p < .0001$) at T2, or the control group, 155.2 ± 44.5 (range 75 to 314) pounds at T1 vs. 155.3 ± 44.5 (range 75 to 314) pounds at T2, ($p < .0001$).

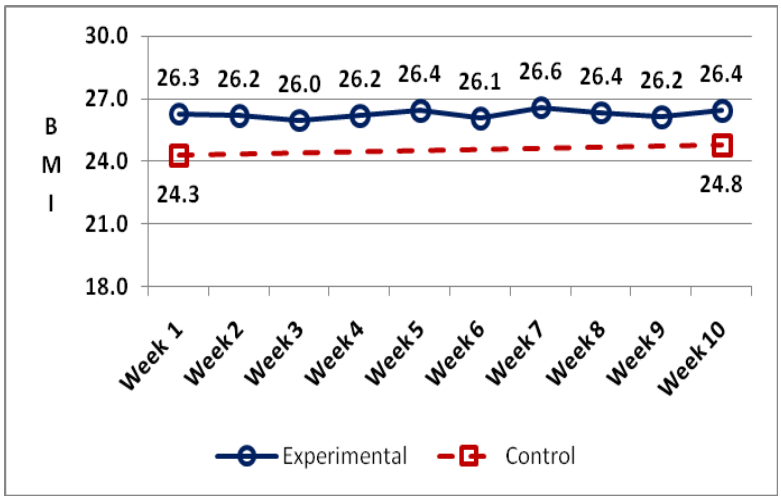

Figure 3: Body mass index

The results from the self-reported physical activity logs are shown below in Table 2.

Measure	T1		T2		Difference	
	M	SD	M	SD	%	ES
Ave Steps/Day Experimental	6,193 (430 to 17,129)	2,979	7,988 (701 to 27,457)	4,187	29%	0.60
Ave Weekday Steps/Day Experimental	6,158 (440 to 15,699)	2,939	7,947 (402 to 27,526)	4,289	29%	0.61
Ave Weekend Steps/Day Experimental	6,286 (403 to 22,284)	3,972	8,095 (115 to 27,283)	4,589	29%	0.46
Ave Steps/Day Control	7,283 (265 to 23,534)	3,988	6,854 (272 to 14,524)	3,483	-6%	-0.11
Ave Weekday Steps/Day Control	7,040 (86 to 33,280)	5,546	6,007 (272 to 13,675)	3,467	-15%	-0.19
Ave Weekend Steps/Day Control	7,329 (267 to 21,784)	3,870	7,277 (273 to 20,776)	4,658	-1%	-0.01

Note. Values are M = mean; SD = standard deviation; (95% CI);ES = effect size
T1=baseline, T2=after 10 week intervention.

Table 2: Treatment mean difference

The small change in participant self-efficacy as well as the reliability of the questionnaire is shown below in Table 3.

Measure	T1			T2			
	α	M	SD	α	M	SD	ES
Experimental - 10-Item GSES	0.89	1.67	0.57	0.89	1.60	0.51	-0.12
Control - 10-Item GSES	0.90	1.75	0.62	0.91	1.68	0.57	-0.11

Note. Values are M = mean; SD = standard deviation; (95% CI);ES = effect size
T1=baseline, T2=after 10 week intervention.

Table 3: GSES mean difference

5. If applicable, identify what prevented you from achieving your original, expected findings.

Although the classroom research demonstrated a physical activity increase of 29 per cent over baseline for students using pedometers in the Wellness curriculum, there was no significant change in self-efficacy.

The lack of significant change in self-efficacy may be attributed to the short duration of the research period.

Overall, the increase in physical activity by students wearing pedometers supports further research in this area.

6. Explain in detail how you intend to share the results of this research with the Broward College community.

I intend to submit a copy of this research evaluation to the Vice President for Academic Affairs, as well as the Central Campus Associate Dean of Physical Science and the Director of Wellness for their consideration to include pedometers into the Wellness curriculum.

In addition, I will share the findings of this research with the Broward College Benefits Office and Office of Professional Development & Training as a basis to implement a pedometer-based employee health program that may increase employee health and thereby reduce College health care costs.

7. Describe ways in which faculty from other disciplines could apply your research and its results in classroom practices, in future studies, and/or for student success?

During this research, students maintained a daily step log, totaled their weekly step count, and averaged their daily step count. Students then reported data via the web. This supported self discipline in record keeping, basic mathematic skills, and use of the internet as a means to submit data.

The study results showed that students who actively maintained a daily step count increased their physical activity as defined by the increase in the average number of daily steps. The pedometer served as a feedback mechanism regarding their daily activity level. Awareness of daily activity has the potential to lead to awareness of other health behaviors such as food intake, exercise levels, and increase overall well-being.

Although the study did not show a significant change in self-efficacy, future research should be conducted with a cohort of students over the course of an academic year.

Student comments regarding pedometer use included:

> "I'm walking more now that I wear my pedometer because I have a goal to walk 10,000 steps per day."
>
> "This course has taught me so much in personal wellness that goes far beyond the gym. While taking this course, my grades in my other class have improved."
>
> "(I learned) how useful a pedometer can be, I was very impressed and delighted on how you can actually use it to your advantage and be able to track how many calories you burn on a regular basis just by walking. I thought it was a lot of fun."
>
> "I really enjoyed the pedometer exercise; I had a lot of fun. My stepmom wants to borrow it to see her steps. It made me very mindful of how many steps I was taking and it also pushed me to take more steps to hit 20,000 steps in a day (during a double shift at work)... that was great!!"
>
> "Professor Allen showed us that that wellness comes from within and you can only be well if you allow yourself to be well. This course was more than a credit; it helped me to balance my life accordingly to my surroundings. Wellness starts from me!"

Finally, comments from students validate the efficacy of pedometer use as a feedback mechanism to increase physical activity and as a means to improve self-efficacy. This validation of increased physical activity and student success warrants future consideration of pedometer use in the classroom environment.

Submit this evaluation via EMAIL to ProfDevTrng@broward.edu
AND
Send the ORIGINAL (HARD COPY with signatures) to

Holcombe Institute for Teaching & Learning Excellence: HR - Office of Professional Development & Training - Bldg. 31/605 WHC - Phone 954-201-7339