



The Impact of Two Curricular Models on Motivation, Engagement and Achievement in Physical Education

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ABSTRACT: The purpose of this study was to compare motivation, engagement and achievement in two teaching conditions; one focusing on a skill-drill-game approach, and the second using Sport Education. Forty high school students were randomly selected to participate in either a Sport Education season or a Skill-Drill-Game unit. Post intervention measures of student enjoyment/interest, effort/importance, perceived competence, and pressure/tension were obtained for both groups. A daily gauge of engagement was obtained through pedometry. A pre- and post-intervention measure of aerobic fitness was used to assess achievement. ANOVAs indicated a significant difference between groups for effort/importance ($p = .012$) and enjoyment/interest ($p = .005$), but not for pressure/tension ($p = .762$) or perceived competence ($p = .218$). Three separate one-way ANOVAs indicated that the SEM group took significantly more steps than the SDG group during the introduction and skill practice phase of the season/unit, during the preseason/modified games phase, and also during the regular season/game play phase. ANOVAs indicated a significant difference between groups on both engagement ($p = .005$) and aerobic fitness ($p = .048$). The results of this study provide initial, but cautious support for the notion that participation in Sport Education moves students towards more autonomous forms of motivation, which in turn results in greater levels of engagement in classes. The results support Sport Education as a viable curricular model for teachers in order to promote engagement in physical education. The challenge now is to plan studies that formally test this notion, and also use more sophisticated measures of engagement that use both the dimensions of active involvement as well as emotional intensity and effort.

Keywords: sport education: physical activity: aerobic fitness; motivation

INTRODUCTION

In providing critique of the practice of secondary physical education, there is strong evidence that the subject is typically “no sweat,” in both literal and symbolic senses. That is, there is a significant lacking of both physical and academic intensity in most [1]. Locke (1992) was perhaps more critical when he went as far as to suggest that “the nature of these problems is such that neither improving instruction nor upgrading the present curriculum will suffice” (p. 361) whence he argued that the only course of action that could save physical education was to replace it altogether [2]. Siedentop (1992) also encouraged a different mindset about secondary physical education, and provided four guidelines for restructuring these programs [3]. He suggested that we must think differently about school time, provide program experiences that focus on longer term mastery rather than coverage in a smorgasbord curriculum, no longer be satisfied with compliance as the operating relationship between students and teachers, and continue to be aware that sport and fitness are sought and valued in our culture partially because of their social outcomes. Of particular interest, however, is that the underlying reasons for poor secondary physical education are not unidentified. Contextual and workplace factors such as



administrative policies and the lack of professional support for teaching, teacher/coach role conflict, and the disconnect between teachers' and students' agendas have all been suggested as factors contributing to the general malaise of the subject [4-6].

One of the manifestations of what seems to be a particularly unenticing curriculum and instruction in physical education within high schools would be what is considered low levels of engagement by students. In contrast to visions of "no sweat," Reeve, Jang, Carrell, Jeon, and Barch (2004) envisioned classes in which students are highly engaged and show significant behavioral intensity and emotional quality in their active involvement during a task [7]. These authors characterize classes in which students are highly engaged as those in which autonomy-supportive (rather than controlling) teachers facilitate the congruence between students' self-determined inner motives and their classroom activity. One would hypothesize that these conditions match much of what Siedentop conceived as guidelines for restructuring. In addition, one might also suggest that these conditions are evident in very few high school physical education settings, which seem more characterized by disaffection.

In this study, we examine the implementation of a Sport Education curricular model on measures of student engagement. Throughout its history, Sport Education has been seen by many students in many countries as an attractive alternative to the skills and drills focus on more multi-activity curriculum organizations. In interviews and questionnaires, students suggest they "work harder than normal" in Sport Education seasons [8-9]. However, we have minimal empirical evidence of whether this is indeed a fact. While Hastie and Trost (2002) suggest that participation in specifically structured Sport Education seasons can deliver recommended levels of moderate-to-vigorous physical activity, and Hastie (1998a) reports favorable "opportunities to respond," there is still a dearth of controlled comparisons between units conducted under more traditional, teacher-directed pedagogies, and seasons of Sport Education [10-11]. Consequently, one of the purposes of this study was to determine the effects of the implementation of a Sport Education model on students' engagement compared to a traditional approach to teaching high school physical education.

According to Reeve et al. (2004), engagement refers to the behavioral intensity and emotional quality of a person's active involvement during a task, and is considered as a broad construct reflecting not only enthusiastic participation but also positive emotion and initiative [7]. Reeve et al. continue to note that the idea of engagement also subsumes many dimensions of motivation, including intrinsically motivated behavior, self-determined extrinsic motivation, work orientation, and mastery motivation [7]. These last notions have an interesting corollary with motivational research on Sport Education, whereby the explanation for the attraction of Sport Education appears to lie in the motivational climate presented to students in which they perceive it to be particularly autonomy supportive [12]. That is, the persisting, small-sided team in which students are responsible for many decisions allows for some level of choice in selecting goals and the means for achieving them. This in turn can lead to having a positive impact on enjoyment, perceived effort, and perceived competence. A second purpose of this study then, is to compare motivational outcomes of a Sport Education season with those realized by students taught using a more traditional skills-drills based approach to teaching high school physical education.

The natural consequence of measuring motivation and engagement concurrently is to attempt to link these in an explanatory model. As Reeve et al. (2004) note, "in school settings, engagement is important because it functions as a behavioral pathway by which students' motivational processes contribute to their subsequent learning and development" [7]. Indeed, it has been known to predict student achievement [13]. What we do not have however,

is any systematic research that has attempted to link the components of motivation, engagement and student achievement within physical education.



In essence then, it was the purpose of this study to examine these features in an experimental study of Sport Education. Specifically, we postulated that students in Sport Education will be more intrinsically motivated by their experiences, which will subsequently lead them to become more engaged in lessons. This increased engagement may then result in improvements in fitness. To achieve this, we needed a valid measure of engagement as it relates to participation in physical education, as well as legitimate measures of motivation and fitness.

Reeve et al. (2004) included a rating scale which measures students' active task involvement in classroom based lessons [7]. In this scale, the items of attention, effort, verbally participating, persistence and emotional tone are scored in a bipolar format with the engagement indicators on the right side of the page (scored as 7) and the disaffected indicators on the left side (scored as 1). Unique to physical education is physical activity as component of engagement. For the purposes of this study, engagement was measured through the use of pedometers. While not a complete measure of engagement in classes, it must be remembered that as an exploratory study, there needs to be at the very least, some proxy measure that has validity.

Measurements of the other variables (motivation and fitness) are less problematic. Previous research on the Intrinsic Motivation Inventory (IMI) has established validity and reliability of the scale when used with adolescents in physical education [14]. Likewise, the Progressive Aerobic Cardiovascular Endurance Run (PACER) test 20-m multistage shuttle run has been reported as reliable and valid in measuring cardiovascular fitness of children [15]. ask that authors follow some simple guidelines. In essence, ask you to make your paper look exactly like this document. The easiest way to do this is simply to download the template, and replace the content with your own material.

METHODS

Participants and Setting

The participants in this study were 40 (30 male and 10 female) high school students (M age = 15.9 years, SD = 1.1) from two physical education classes in a rural public high school in the United States and their two physical education teachers. The school enrolled students in the ninth through twelfth grades, with a racial composition of 88% White, 8% Native American, 2% Latino and 2% Black. At the time of the study, 54% of students enrolled were eligible for free or reduced lunch.

The two teachers in the study were male, and both had seven years of experience teaching Sport Education seasons and units adopting the skill-drill-game approach. The research protocol was approved by an institutional human subjects review board. All of the participants signed an assent form and the participants' parents signed a consent form prior to data collection.

Procedure

Both classes were scheduled to meet at the same time and day in a 5 day per week block schedule, which allowed for randomly allocating the teachers and students to the different units. Following the random assignment of the teachers, the students were stratified by gender and grade, then randomly selected to participate in either the SEM season (n = 20) or the SDG unit (n= 20).

Physical education classes met five days each week with each one lasting 90 minutes. Students were given 10 minutes before and after class to change clothes and thus 70 minutes were allotted for each lesson. Over a 5-week period, students in both groups participated in a 19-lesson season/unit of Disc Lacrosse. A modified version of Ultimate®, the sport was selected by the teachers. A checklist



similar to one used by was used to benchmark the instructional approach and lesson focus for each group [16].and is shown in Table 1.

Table 1. Disc lacrosse unit plan for teaching approaches

Lesson	SEM	SDG	SEM games	SGD games
1	Catching Forehand, backhand, and hammer throws	Catching Forehand throws	none	none
2	Forehand, backhand, and hammer throws Election and description of team roles Decorate team shirts Introduce game Scoring	Backhand throws Introduce game Keys to scoring	none	none
3	Forehand, backhand, and hammer throws Basic defensive strategy Review game rules	Hammer throws Keys to scoring	2 vs. 2	none
4	Forehand, backhand, and hammer throws Basic offensive and defensive strategy Practice games Practice duty team roles	Review of catching, throws, scoring, and rules	4 vs. 4	none
5	Forehand, backhand, and hammer throws Basic offensive and defensive strategies Practice games independent of teacher Practice duty team roles	Basic offensive and defensive strategies	4 vs. 4	none
6-9	Preseason games Practice duty team roles	Modified games	4 vs. 4	2 vs. 2
10-17	Regular season Formal competition	Game play	4 vs. 4	4 vs. 4
18-19	Tournament Championship game	Game play	4 vs. 4	4 vs. 4
20	Festivity Awards ceremony	No awards ceremony		

The instructional focus was, in essence, the independent variable of this study and thus every effort was made to keep the instructional tasks as similar as possible to allow for a strong comparison between conditions. During lesson two, the SEM group elected team roles and decorated team shirts while the SDG group learned about rules/scoring. During lessons three through five, the SEM group played small-sided games while the SDG group participated in equally small-sided drills. The team



captains in the SEM group were allowed to stop play during these games and, although not formally evaluated, the investigators monitored the instructional and activity time spent by each group. During lessons six through eight, modified games were played for the same duration of time for each condition.

Sport Education Intervention. In the experimental condition, the teacher implemented a Sport Education teaching model during a three-phase season. Students elected team captains, coaches, referees, and statisticians. They designed colored shirts to designate team members and remained on the same team during the entire season. Student-coaches were responsible for designing and implementing team warm-ups each day. During the introductory phase of the season, the teacher directed skill development and the students practiced throwing and catching skills with their team members. During the preseason phase, students practiced duty team roles by refereeing games and keeping statistics, however, no formal statistics were posted. During the regular season/tournament phase, students participated in a round robin competition format followed by a non-elimination tournament. Student referees and statisticians collected formal team and individual statistics that were compiled by the teacher and posted on a bulletin board daily.

Skill-Drill-Game Approach. The format of each lesson in the SDG group was similar to that of the SEM group. Each lesson consisted of a teacher-directed warm-up to the entire group. During the introductory phase of the unit, the teacher directed skill development and the students practiced throwing and catching skills in small groups. During the modified games phase, small sided teams were selected each day by the teacher and the students practiced basic offensive and defensive strategies. During the game play phase, students played 4-on-4 games. Students were not responsible for coaching, refereeing, or compiling statistics. No records were kept, and there was no formal competition format.

Data Collection

Motivation. To assess student motivational responses to the different teaching approaches, students completed the post-experimental version of the IMI reworded for sport settings by McCauley, [17]. Participants responded to 18 items intended to assess four dimensions of intrinsic motivation: Enjoyment/Interest, Effort/Importance, Perceived Competence, and Pressure/Tension. Each item was answered on a 7-point scale ranging from 1= "very strongly disagree" to 7= "very strongly agree." The students were assured that the results of the IMI would not affect their grades in physical education. The scores for each of the subscales were calculated as the mean for each item of the respective subscale. Previous research has demonstrated validity and reliability of the scale when used with adolescents in a physical education setting [14-18].

Physical Activity. During each lesson day, excluding the last day of the season which was set aside for festivity, each student in both groups wore a Walk4Life Inc. model LS 2525 pedometer for the duration of the class. The LS 2525 pedometer provides an indication of the number of steps taken during a given period of physical activity and has been shown to be a valid and reliable tool for assessing physical activity [19]. The students put on the pedometers when they arrived at class, wore them irrespective of their playing or non-playing roles and returned them as they left the gymnasium. Research assistants checked that each student was



properly wearing the pedometer each day. Each student wore the same numbered pedometer throughout the study and the number of steps was recorded each day.

Aerobic Fitness. The Progressive Aerobic Cardiovascular Endurance Run (PACER) test was administered to measure each student's aerobic fitness by the principle investigator. The PACER test involves running continuously between two points that are 20 meters apart. The objective of this maximal test is to run as many laps as possible. The students, teachers and the principle investigator had previous experience with the PACER test. Students in both groups completed the PACER test 72 hours before and after the season/unit. They were informed that the purpose of the test was to "measure how fit you are" and assured that the results would not affect their grades in physical education. The students were not informed of the lap target that would place them in their healthy fitness zone (HFZ). The principle investigator administered the PACER test according to the protocols in the FITNESSGRAM Test Administration Manual [20]. No words of encouragement were given during the pre- or posttest.

Data Analysis

To determine potential differences between the groups on the different dimensions of intrinsic motivation, a multiple analysis of variance (MANOVA) was conducted. To determine differences in teams of physical activity, a 2 (group) x 3 (phase) repeated measures ANOVA was conducted. Separate one-way ANOVAs were also conducted for each phase of the season/unit. In terms of fitness, a 2 (group) x 2 (pre/posttest) repeated measures ANOVA was conducted to determine if either group improved at a significantly higher rate than the other. Two separate one-way ANOVAs on the pre- and post-PACER tests were also conducted.

RESULTS

Motivation

The means, standard deviations, effect sizes and Cronbach alpha coefficients on the post-experimental IMI for the SEM and SDG groups are outlined in Table 2. A MANOVA on the IMI data indicated a significant difference between the groups for Effort/Importance and Enjoyment/Interest, but not for Pressure/Tension or Perceived Competence. The SEM group scored higher on measures of Effort/Importance (5.52 vs. 4.30) and significantly higher on measures of Enjoyment/Interest (4.95 vs. 3.69). The alpha coefficients were deemed acceptable based on the a cutoff criteria of .70 in the psychological domain [21].

Table 2. Group scores for intrinsic motivation inventory subscales

Subscale	SEM	SDG	F (1,38)	p	η^2	α
	M (SD)	M (SD)				
Effort	5.52 (1.17)	4.30 (1.41)	6.95	.012	.154	.72
Enjoyment	4.95 (1.14)	3.69 (1.81)	8.73	.005	.186	.73
Tension	3.69 (1.07)	3.51 (1.52)	0.09	.762	.002	.71
Competence	5.14 (0.99)	4.73 (1.55)	1.57	.218	.039	.70

Physical Activity

The number of steps taken during class by the SEM and SDG groups during the 19 lesson days are shown in Figure 1. A 2 (group) x 3 (phase) repeated measures ANOVA yielded a significant effect for phase ($F(1, 38) = 78.56, p < .005, \eta^2 = .674$) but not a significant group by phase interaction ($F(1,$



38) = .386, $p = .681$, $\eta^2 = .10$). Three separate one-way ANOVAs indicated that the SEM group took significantly more steps than the SDG group during all three phases (see Table 3).

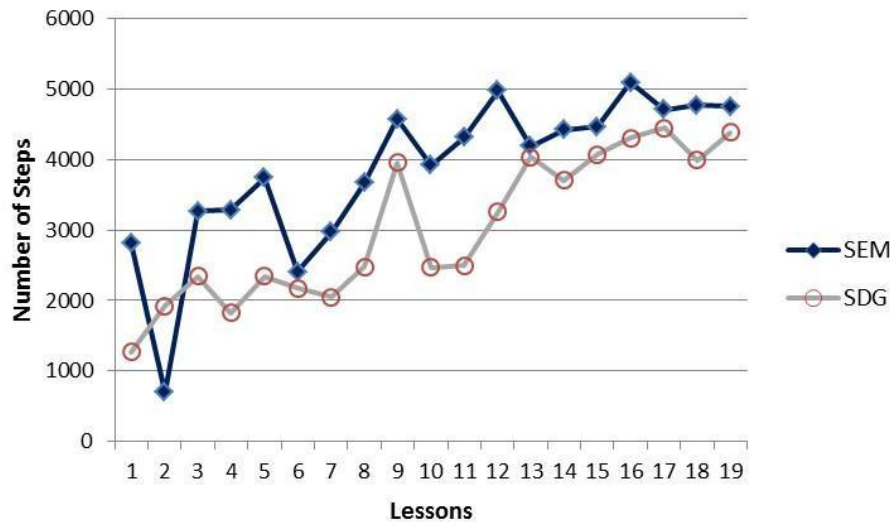


Fig 1: Mean number of steps for both groups during lessons

Table 3. Number of steps during each phase of the season/unit

Group	Phase	Lessons	<i>M</i>	<i>SD</i>	<i>F</i> (1,39)	<i>p</i>	η^2
SEM	Intro & Skill practice	1 -5	2875	892	17.58	<.001	.316
SDG	Intro & Skill practice	1 -5	1801	716			
SEM	Preseason	6 – 9	3367	1066	7.87	.007	.171
SDG	Modified Games	6 – 9	2486	913			
SEM	Regular season & Tournament	10 – 19	4484	1365	7.94	<.001	.172
SDG	Game Play	10 – 19	3402	1041			

Aerobic Fitness

A 2 (group) x 2 (pre/posttest) repeated measures ANOVA with a Greenhouse-Geisser correction yielded a significant main effect for time ($F(1, 38) = 19.60$, $p < .005$, $\eta^2 = .340$) and a significant group by pre/posttest interaction ($F(1, 38) = 9.73$, $p = .003$, $\eta^2 = .204$). A one-way ANOVA did not indicate a significant difference between the groups on the pre-test. However, after the curricular intervention there was a significant difference between the groups on the number of laps run (SEM; 53.05 vs. SDG; 33.70). The mean number of laps run on the PACER during pre- and posttest for both groups are illustrated in Table 4.

Table 4. Student performance on the PACER test

Group	Criterion	<i>M</i>	<i>SD</i>	<i>F</i> (1,39)	<i>p</i>	η^2
SEM	Pretest laps	36.60	32.86	0.39	.537	.010
SDG	Pretest laps	30.85	24.47			
SEM	Posttest laps	53.05	32.68	4.17	.048	.090
SDG	Posttest laps	33.70	27.01			



DISCUSSION

The results of this study provide initial, but cautious support for the notion that participation in Sport Education moves students towards more autonomous forms of motivation, which in turn results in greater levels of engagement in classes. At a more specific level, the results of the IMI suggested that Sport Education yields greater interest/enjoyment and effort/ importance than a traditional teacher-centered teaching style, and that there was a significant increase in the number of steps taken by the students in the Sport Education group when compared with those in the traditional teaching style group.

It is important to note that the Sport Education students' steps were being counted even if they were in non-playing roles such as statistician or referee. It should be noted however, that it is not possible to state with certainty whether the greater number of PACER laps run by the Sport Education group was a result of increased aerobic fitness or increased motivation. Five weeks of the levels of physical activity that occur in most physical education classes is usually considered to be too short a time period to see significant increases in aerobic capacity, so the increase may be attributable to an increase in student motivation to run longer and faster when completing the PACER test. Nonetheless, secondary physical education classes will be better situated if the students are either more motivated or more physically fit.

The structure of Sport Education supports previous work on student engagement in student-centered learning environments in that a recurring theme of the research is that of choice [7]. This does not mean that students have the choice of whether to participate, but rather that the organizing structure of Sport Education can provide choices of how students are active during class time. In this study, students in the Sport Education class were provided many choices on how to implement team practice, officiate games, assess the affective domain, and design team shirts. In contrast, students in the traditional teaching group were not afforded many opportunities to make decisions on how to implement the curriculum.

One mediating variable that may be in place here, however, is the initial level of autonomous self-regulation. In a study with college chemistry students, it was the students low in autonomous self-regulation whose performance benefited from most from autonomy support [22]. In the case of Black and Deci, instructor autonomy support predicted course performance directly, although differences in the initial level of students' autonomous self-regulation moderated that effect, with autonomy support relating strongly to academic performance for students initially low in autonomous self-regulation but not for students initially high in autonomous self-regulation. While the participants in this study were high school students, they were perceived by teachers prior to the intervention as non-responsive and not motivated (i.e., low on autonomous self-regulation), and the context of higher autonomy afforded by Sport Education matched the conditions of high autonomy instruction in the college setting. This finding provides further support for the attractiveness of Sport Education for students who are low on motivation [23-24].

In this study, the students in the Sport Education group enjoyed physical education more and were more effortful than their counterparts. These results are consistent with those of Wallhead and Ntoumanis (2004) who showed significant increases in student enjoyment and perceived effort in their Sport Education group (compared with students taught using a more traditional style) [25]. Nonetheless, the results are inconsistent with those of Spittle and Byrne (2009) who found no significant differences between Sport Education and traditional style teaching on changes in interest/enjoyment and effort/importance. Perhaps the infrequent number of class sessions per week



in the Spittle and Byrne study (one, 100 minute session) was not enough to extract differences in measures of interest/enjoyment and effort/importance [26].

The results of the study provide support for Sport Education as a viable curricular model for teachers in order to promote engagement in physical education. Although the design of this study does not allow for causal inferences to be made about the findings, the results do support the notion that the autonomy supportive environments that can be produced by Sport Education can result in higher levels of student engagement in physical education. The challenge now is to plan studies that formally test this notion, and also use more sophisticated measures of engagement that use both the dimensions of active involvement as well as emotional intensity and effort. The development of designs in which regression analysis is used to empirically test these relationships, and to estimate the conditional expectation of that engagement given the fixed levels of motivation is warranted. In addition, a more expanded measure of engagement may allow for the examination of other outcome variables such as skill development and quality game play. These goals are significant to the development of competent sports players which is central to Sport Education. For now, however, physical education lessons that are conducted under the auspices of Sport Education give teachers an option for providing students with new experiences and access to a healthy lifestyle as a part of the school physical education curriculum.

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