Integrated, Articulated Fitness and Health Curriculum and Methods of Evaluation

Wendy E. S. Repovich, Associate Professor and Director, Exercise Science, Eastern Washington University

Abstract

Physical Education programs have monitored physical fitness and sport skills since the 1950's when the President's Council on Physical Fitness was formed. Unfortunately we have seen two divergent paths, the first is a dramatic decline in physical activity time often accompanied by a decline in fitness, and an equally dramatic increase in overweight and obesity. In the mid 1990's educators in Washington State realized there was a significant problem and set about creating change. Standards were set for programs and school districts began redesigning curriculum. Spokane Public Schools completely redesigned their curriculum to address both problems. The result of three years of work was an integrated, articulated, progressive curriculum designed to educate students on both why and how they can be active throughout life and the expected benefit of a healthier, more fit population. Five years of Carol M. White PEP grant funds helped the district implement and evaluate the curricular change. Some may consider the results a "failure" because fitness scores have not changed (including body composition), but to others it may be seen as finally stopping the decline and just maybe we will be able to head our students back on the path to lifelong health and wellness.

Introduction

Physical education (PE) programs have been under siege for years. As reported in the National Conference of State Legislatures, the number of states mandating daily physical education for grades K-12 remains low with only two states requiring K-12 PE in 2005. In 2007 it was reported that only 4% of elementary schools, 8% of middle schools and 2% of high schools required daily physical education for all students for the entire year (Pangrazi 2010). One of the backlashes of these policies is an increase in the number of students who are physically inactive with a concomitant increase in the number of children who are overweight and obese (Booth and Chakravarthy 2002; Pangrazi 2010; Weiss 2000).

A syndrome named Sedentary Death Syndrome (SeDS) by Researchers against Inactivity related Diseases' (RID) suggests sedentary behavior has become the second greatest risk to public health behind cigarettes and tobacco (Booth and Chakravarthy 2002). Effective physical education programs may be part of the solution. A review article by Strong et al. (2005) concluded that physical education classes should be daily with at least 60 minutes of moderate to vigorous physical activity that is developmentally appropriate. Effective physical education programs designed to teach and encourage lifelong activity, as well as an understanding of the consequences of inactivity might make a difference (Carrel et al. 2005; Pangrazi 2010). Research is needed that shows this can be accomplished in our schools and at the same time effective evaluation that is able to identify intension for activity throughout life must be developed.

Physical Education in the Twenty-first Century

One barrier to effective physical education in schools is competition for limited funding. With the advent of the Carol M. White PEP (Physical Education Programs) grants in 2001 school districts found at least one focused avenue for much needed support. Curriculums are being reinvented, teachers are working together and receiving additional training, and the equipment everyone so desperately needs is being provided. To maintain this momentum it is essential that those receiving the funds include evaluation of the programs to determine effectiveness (Wirszyla 2002). If that does not occur we know that legislators will not be convinced that requiring quality physical education programs makes fiscal sense and they will continue to deplete the already meager funds available to support the programs.

When most states were requiring daily physical education in the 1950s many curricula followed the multi-sport model at high school benefiting those students interested in competitive sports (Pangrazi 2010). For students interested in mastery of non-competitive, lifetime activities, training was either non-existent or inadequate. The curricula were not comprehensive and lacked the articulation necessary to graduate students with proficient skill levels to be active for a lifetime (Corbin 2002; Pangrazi 2003; Pangrazi 2010). Fortunately, curricula are changing and "New PE" is becoming a reality. State and federal agencies have set standards and physical education teachers are trying to reverse the trends we are seeing of physical inactivity and obesity in our youth.

Spokane Public School's Solution

In 1998 a cohort of Spokane physical education teachers began writing a developmentally appropriate curriculum designed to meet the benchmarks of Washington State standards (See Appendix A). Following three years of partial implementation and re-evaluation thanks to PEP grant funding the complete written curriculum, "Fit for the Future," was implemented during the 2004-2005 school year. The curriculum framework is divided into three major components to meet the Washington State assessment standards. These areas are fitness content (50% of curriculum time); health promotion and maintenance (30% of curriculum time); and structure and function of movement (20% of curriculum time). The content is delivered in an activity-based setting using short focused lessons.

Most researchers agree the goal of any physical education curriculum must be to develop a connected, holistic program (Pangrazi 2010; Siedentop 1999). The unique design of the Spokane curriculum model takes recommended components of a coordinated health program and blends them into an activity-based physical education setting. Experts agree the weapons to combat sedentary behaviors must be delivered to the students in an articulated program, which moves them from dependence to independence (Booth and Chakravarthy 2002; Corbin 2002).

The stair-step model developed by Corbin and Lindsey (1997) fits the goal of "Fit for the Future" to enable all students to be successful in meeting minimum standards for health-related fitness and to help students realize the relationship between fitness activity and future wellness. Tenth grade is the last grade of required physical education in Washington State. The goal of the Spokane curriculum is for 10^{th} grade students to have achieved the final step of the stairway—

mastery, learned problem-solving skills to become lifelong learners. Spokane's developmentally appropriate curriculum is a blending of fitness and health units. It is articulated across the K-10 curriculum. The content is delivered with a common teaching timeline for elementary, middle, and high school to assure concepts are not missed by students who move within the district.

Behavioral Components of Effective Physical Education Programs

Research on motivation in physical education is evolving (Chen 2001). Early research determined that the ultimate need for students is to make decisions based on their personal choices rather than extrinsic pressure (Deci and Ryan 1985). This led to a body of research questioning how self-efficacy impacted students' decisions and how achievement goals have affected motivation to succeed (Dweck and Leggett 1988; Nicholls 1990; Urdan 1997). In turn, this led to research on goal orientation to determine whether task goal orientation or ego goal orientation has the greater effect on success (Chen 2001; Standage, Duda and Ntoumanis 2003; Treasure and Roberts 2001; Xiang, McBride and Guan 2004).

Achievement goal theory is based on the assumption that individuals are goal-directed, and these achievement goals guide decision-making and behavior within the context of achievement (Treasure and Roberts 2001). If the goal in fitness and health classes is to have students demonstrate competence in both physical and cognitive skills then goal theory suggests the perception of ability becomes a central variable. Students have to be able to differentiate the concepts of luck, task difficulty, and effort from ability (Treasure and Roberts 2001; Xiang, McBride and Guan 2004). The terms used by the researchers to suggest this orientation is either task or ego.

When a student is task-oriented all actions are aimed at achieving mastery, learning or perfecting a task. When students follow an ego goal orientation, they perceive success when they can perform better than peers and when natural ability, not effort, is deemed responsible for that success. Research further suggests that goal orientation is truly orthogonal meaning a student could be high or low in either or both orientations (Treasure and Roberts 2001).

Program Articulation and Lifelong Physical Activity Behaviors

Three areas have been designated as having the greatest impact on motivation; they include linking to the learning setting, linking to the curriculum, and linking to the socioeconomic and cultural environment (Chen 2001; Kohl and Hobbs 1998). Burke (1995) stated much of the research to date has separated the study of the person (motivation) from the study of the content (pedagogy) to the detriment of the field. It is crucial to link motivation to content, and in reverse to design curricula that motivates the learner (Burke 1995; Chen 2001; Kohl and Hobbs 1998). The students most in need of learning healthy habits have for too long been forced by their PE teacher to participate in activities they dislike rather than taught and encouraged how to be active and healthy through an articulated, integrated curriculum (Pangrazi 2010). In-depth knowledge and skill are necessary (Newmann, Marks and Gamoran 1996) as is personal meaningfulness to achieve lifelong participation in activity and personal health and wellness (Baranowski and Jago 2005; Pangrazi 2010). The curriculum is the framework that students use to define and

determine the level of personal success they will achieve (Burke 1995; Newmann, Marks and Gamoran 1996).

When the initial PEP grants were offered, Spokane Public Schools saw an opportunity to institutionalize this new comprehensive, articulated curriculum rather than having to settle for slow, incomplete implementation. The district was one of the first eighteen grantees in 2001, and was funded again in the second year, 2002 allowing the developing curriculum to be put into use in two thirds of the district schools over two years. Following one year with no funding the district received a three-year longitudinal grant for 2004-2007. Over the six years the curriculum was implemented and evaluation done to determine its effect on students and their behaviors as well as create instruments that could be used to assess the success of the program in creating intension for activity in the students.

The program coordinator and project director wanted to be sure the new curriculum would provide the desired student outcome. An evaluation team from the Physical Education, Health, and Recreation department at Eastern Washington University was contracted. Using the action research method of planning, acting, observing and reflecting (Stringer 2007), all the parties affected by the curriculum from students, to teachers, to administrators were involved in the evaluation process. Both quantitative and qualitative methods were used for assessing student satisfaction and motivation relative to the curriculum to answer the larger social question of whether the program was effective in creating intrinsically motivated students who have the knowledge and desire to remain healthy and active for a lifetime.

While the goal of action research for this curriculum evaluation was to determine whether student behaviors changed over time (Baranowski and Jago 2005) that was only possible using longitudinal research. Since the initial PEP grants were one year grants the intent of those two years was to set the stage for a longitudinal project by determining two things. First, what was the perceived goal orientation of the students who participated in classes where the "Fit for the Future" curriculum was implemented; and second, what was the relationship between task orientation and other program outcomes such as knowledge, beliefs, and desire for activity? When the district was funded for a three year PEP grant in 2004 the researchers were prepared to implement the longitudinal research to assess effectiveness of the curriculum and identify an instrument or instruments which could be used to identify students' intension for activity following graduation.

Methods

Participants

The total numbers of participants over the five years of grants was about 10% of the student population of the district. By the end of the three-year grant 398 students (37% of the students from the first year) had completed surveys in all three years.

Intervention

Elementary curriculum. The focus at the elementary level is on developing fundamental fitness, motor, and health skills using functional equipment. For fitness, circuit training using a variety

of equipment introduces students to beginning skills needed to improve or maintain their fitness. Stability balls, weight bars made for elementary students, step boxes, heart rate monitors, pedometers, and jump ropes are a few examples of equipment introduced in this fun and motivating fitness environment. All equipment is designed to be age-appropriate in both size and weight; in this way, students experience success without fear of injury. Technique is closely monitored and corrected by the teacher to ensure that when students move to middle school and are using heavier weights or other equipment they know how to use them correctly (American College of Sports Medicine 2006). Technology like the heart rate monitors are used to tie the health curriculum to activity. It is also tied with basic skills such as math lessons learning to graph their heart rates during an activity session.

The health lessons and vocabulary are taught through activity. Games about nutritional information and anatomy and physiology were created. The result is that students receive information but are also active for 85% to 95% of a class period. Teaching the health content through games also provides time to teach and perfect the motor skills all students must have for lifelong activity. Running, jumping, skipping, etc., are all intentionally used and regularly evaluated by the teachers as the students progress from kindergarten to sixth grade to assure the highest skills possible for every student.

Middle and high school curricula. At the middle school, students learn application of the curricular content. They build on the information learned in elementary school and connect it to advanced fitness measurements, personal goal setting and their everyday behaviors of diet, hydration, sleep, and activity. This builds the connection between their daily choices and their personal health. Each school has a fitness center with selectorized equipment, which students use twice a week. The other three days are activity days consisting of a variety of lifetime activities, team and individual sports.

When students reach high school the focus is on the concepts of self-responsibility for maintaining health by combining content knowledge with a variety of activities to give them functional application. The focus is application to life after high school. Students identify their own specific risk factors and create a personal portfolio for lifetime fitness and wellness. It is the goal of the curriculum to intrinsically motivate the students to pursue a wellness lifestyle based on the rigorous content each has learned over the ten years of required fitness and health.

Articulation of the curricula. An example of how the articulation from kindergarten to 10th grade works is the cardiovascular health component. Elementary students learn the functional vocabulary and ways to measure the cardiovascular system. Students are given the opportunity to wear a heart rate monitor during a variety of classes and activities to understand the relationship between heart rate and activity. Additionally, this approach has several advantages, two of the most important are: it accomplishes several learning objectives at once, including student mastery of the HR monitors and when students transition to middle school they have a working knowledge of the equipment and know the purpose as well as the anatomy of the cardiovascular system.

In middle school, teachers immediately move to the higher order content of assigning an appropriate personal target heart rate zone for their students since the students are already knowledgeable about equipment and understand the necessary concepts. The health content the students learn at this level emphasizes the association between regular exercise and changes in heart rate. Students experience this when they measure resting, exercise and recovery heart rate (HR) during their pre and post fitness assessment of the cardiovascular system - the step test.

When students have completed their state mandated health and fitness requirement at tenth grade they have received four years of instruction on cardiovascular health and its relationship to physical activity. They understand the relationship to long-term health outcomes; they know they must stress the cardiovascular system regularly to achieve optimum health and fitness; and they have learned a variety of ways to monitor the effectiveness of the lifelong program they have personally designed.

Assessments

Goal Setting

Being able to write reasonable, obtainable goals is included as an important part of the curriculum. The components of fitness were used for the content focus for setting goals because pre and post fitness testing was already part of the curriculum. At the elementary level students participate in the President's Challenge, including a mile run, curl ups, push ups and the sit-and-reach test. The middle and high school test battery included: a resting HR and blood pressure, a step test, body composition by bioelectrical impedance, the sit-and-reach, and a 1-repetition maximum (1RM) for a chest press and leg press.

Along with the new curriculum, the district developed a software program to track the students through their student ID. Fitness test results, cognitive test results and fitness goals are all included and the information is available to all teachers as well as the students and their parents. For the curriculum, once the fitness pre-test is completed the teachers work with the students to select appropriate goals to either improves or maintain fitness in each component. The goals are recorded with the pre-test fitness results. After the posttest, the summary report sent to parents shows which goals were achieved. If any goals were not reached, the student has to determine whether the original goal was reasonable or whether it was set too high or too low? Students then reset their goals for the next test. Students in 10^{th} grade have to develop a health and fitness portfolio using all their data and develop a plan for lifelong fitness and wellness.

Student Instruments for Behavioral Assessments

Numerous assessment tools were found to measure all the components the research suggested should or could impact students' behaviors around activity and health (Ames and Archer 1988; Chase 2001; Roberts, Treasure and Balague 1998; Weinstein and Palmer 1990). The instruments measure task and ego behaviors, self efficacy, enjoyment, and the students' perception of success for activity. All needed to be modified slightly to fit a physical education classroom so in year one the combined instrument was validated and in year two the results from the instrument were used in combination with qualitative interviews with students to begin crafting a model for

prediction of activity behavior that could be studied longitudinally. Unless otherwise noted, all instruments were rated on a five-point Likert scale where "1" represents strongly disagree and "5" represents strongly agree. The students' ability to set realistic goals around fitness was used as an outcome variable.

Modified Perception of Success Questionnaire (children's version).

Student dispositional achievement goal orientation was assessed using the Perception of Success Questionnaire (POSQ) (Roberts, Treasure and Balague 1998). The POSQ was designed to be used with sports. It was modified to reflect the goal orientation of the students in fitness and health classes. The students were asked to respond to the stem, "During the fitness and health class, I feel most successful when…" The twelve items from the original questionnaire language measuring individual differences in proneness for task or ego were included with slight modification when necessary to fit a class rather than sports.

Adjunct Questions Developed for the Survey.

Fifteen knowledge/feeling questions drawn from the curriculum were created and two perception questions were added, to see whether students had perceived a difference in the class after implementation of the curriculum compared with previous physical education classes. In addition to comparisons with individual questions, four of the questions were combined to create a knowledge variable, which included whether students felt they had learned activities they wanted to do outside of class, whether they had learned enough skills to be active, whether they learned the importance of being active for life, and whether students had increased their activity since they had learned these things.

A Physical Self Efficacy scale was used to see how confident they were that they could be active outside of their class. The scale was modified from one developed by Chase (2001) using the types of activities taught in the fitness curriculum. Chase determined the best scale used activities which the students do regularly; to be sure the scale is relating the qualities of self efficacy to the activities being assessed.

A Causal Attribution scale and a Physical Activity Enjoyment scale drawn from research by Ames and Archer (1988) were used to determine whether students were intrinsically or extrinsically motivated in class and whether they enjoyed the class. The Casual Attribution and Physical Activity Enjoyment scales were both ranged on a five point scale from positive to negative, and the student could decide where they fell along the continuum. For causal attribution, the stem was, "When I do very well in my fitness & health class it is because"… and a possible response ranged from, "I found ways to be successful" to "I couldn't find ways to be successful." For enjoyment the stem was, "When I am being active"… and a possible response ranged from, "It gives me a strong sense of accomplishment" to "It doesn't give me any sense of accomplishment."

Student learning strategies also impact the climate. With permission of the authors, 26 questions from the College Success Questionnaire (LASSI-HS) (Weinstein and Palmer 1990) were adapted to the fitness and health setting, and a survey instrument for gauging the perception

of success was created. The stem used was "After my fitness and health class," and examples of questions include, "Even though I do not like physical activity I keep participating anyway because I know it is good for me," "I feel confused and undecided as to what my goals should be for fitness and health," and "I am often unprepared to participate in spontaneous activity." By using factor analysis with varimax rotation and reliability analysis two factors were identified, potential for success or potential for lack of success.

There were four questions each on knowledge and feelings about physical activity and healthy nutrition, and one question on how they are connected. The last three questions were self-report behaviors. The first asked how many days during school is the student active for at least 30 minutes before or after school (PE time does not count). The second question was how close the students are coming to the NASPE standards of a minimum of 60 minutes of physical activity most days of the week. Finally, we asked how many days the student includes a wide variety of healthy foods in his or her diet. The purpose of this extensive survey was to create a model for regular physical activity behavior and to see whether a simplified instrument to assess success of the program could be identified.

Data Collection

The Institutional Review Board of Eastern Washington University prior to any data being collected approved the research. Following the action research method, the grant research was designed to be longitudinal to determine if the district's mandated, reformed curriculum can successfully guide students into becoming lifelong, healthy, and physically active citizens.

The entire curriculum was the same across all schools though each teacher modified the delivery. Elementary health and fitness classes met twice a week for thirty minutes each. The middle and high school five days a week curricula remain divided into fitness days (two days) and traditional physical education days (three days) playing games and sports. Content knowledge was delivered on fitness days because they were common across all programs. When completing the surveys, middle and high school students were directed to consider their experience during fitness days.

Surveys

The first two years surveys were given at the beginning and end of the school year and were analyzed only for that year. Starting in 2004 surveys were given once each year to the same students identified by their student ID beginning in either fifth, eighth or tenth grade and were analyzed for change over time.

Quantitative Analysis

Various statistical analyses were done for each survey instrument based on the limiting factors of the sample, which included: individual, class, and grade-level score identification pre and post and the size of the sub-sample for demographic factors used for comparisons. All analysis was done using the Statistical Package for the Social Sciences (SPSS 16.0). Descriptive and

reliability statistics were calculated for all variables. All data with missing information for the type of survey and grade level were deleted from the analysis.

Student Assessments

Survey analysis. Each year the POSQ with adjunct questions and the LASSI were analyzed descriptively by individual question and for the POSQ, by a combined variable for either task or ego. Independent student's t-tests were used to determine whether there were significant differences between pre and post data annually in the longitudinal research. Significance was set at $p \leq .05$ for all analyses. A Bonferroni adjustment was made to the alpha level to accommodate for multiple comparisons (.05/2, alpha = .025). The orthogonal variable of high low task and ego orientation was created using the median score for each variable and assigning a score of one, two, three, or four if they were high in both, high task low ego, high ego low task, or low in both respectively. All analyses were separated by grade level. Core variables were analyzed across all grades, and the unique variables were only analyzed at the specific grade level.

Comparing means. When comparing scores, a paired sample t-test was used if the distribution of the scores was normal, and a Wilcoxon Signed Ranks test was used if the distribution of scores was abnormal. To determine if there were differences in posttest scores by orthogonal goal orientation for task and ego or grade level, a Kruskal Wallis non-parametric test of analysis of variance (ANOVA) was used to determine differences. A chi-square was used to determine differences in students' pre to post goal orientation.

Linear relationships. To determine the strength of linear relationships among scales, bivariate correlations were used. The choice of either a Pearson Product Moment correlation or a Spearman Rank Order correlation was again based on the distribution of the scores. To explore the linear relationship between variables, while controlling the effects of other variables, partial correlations were run. To determine if scales could predict outcomes, a multiple step-wise linear regression was used. ANOVA was conducted on each regression equation to determine if the equation was significant.

Repeated measure ANOVA was also conducted on each normally distributed scaled variable, with time as the repeated measures factor. This analysis allowed the posttest scores to be analyzed controlling for the variations in the pre-test. The second variable of interest for interaction was the variable knowledge, whether the students knew the importance of physical activity. Four questions from the knowledge/feeling set that asked students their perceptions of their knowledge and their ability to be active were combined and recoded to create the variable to be used in the analysis as a dichotomous variable using the median score to determine if outcomes differed between those who knew the importance of physical activity and those who did not. The overall experiment-wise error rate was accepted at $p \leq .05$.

Results

Student evaluations

The survey evaluation was used to determine whether task and ego orientation changed over time as a result of the implementation of the new curriculum. It also examined the relationship between task orientation and other program outcomes such as knowledge, beliefs, and fitness scores goal setting. The final question asked whether it was possible to use the modified LASSI-HS to predict students who would remain active after high school?

An independent samples t-test was used to see whether there were differences between grade levels or between boys and girls. Between the sexes through all years of the grants, there were significant differences for ego, high/low task and ego, both positive and negative self-efficacy, mastery and performance, causal attribution - self, causal attribution - class, enjoyment and all three behaviors. The girls were consistently lower on each variable except healthy eating where girls were slightly higher.

In the final longitudinal grant, between the grades, there were significant differences for task, ego, knowledge and desire for PA, knowledge and desire for healthy eating, the connection between eating and activity, causal attribution - self, causal attribution - teacher, able to predict success, and healthy eating behaviors. The middle school students' scores were consistently higher except for ego. This agrees with the first two one-year grants which suggested middle school students still have an inflated sense of their ability.

Many correlations were evident between the variables, so in the last year of the longitudinal grant a linear regression with all variables entered step-wise was run with just the high school students to see whether it is possible to predict regular physical activity (the correlation between activity before and after school and daily activity of more than 60 minutes was significantly correlated ($r = .698$, $p = .0001$). The decision was made to only use one variable and daily activity was selected. The strongest predictors for all students combined were positive self-efficacy, unable to predict success, and healthy eating. This suggests that those students who have the greatest potential for success have a positive self-efficacy, know the negative behaviors that can be potential barriers and tend to eat well most days of the week.

When the data for the regression were separated by sex the variables also changed. For males four variables were identified positive self-efficacy, healthy eating, negative self-efficacy, and enjoyment of physical activity. Interestingly for females only positive self-efficacy was identified.

Goal setting

The majority of students regardless of grade were able to set and meet health and fitness goals in the components of fitness. Among exercise physiologists, it is widely accepted that cardiovascular fitness is the best marker for overall fitness and is the most complex to achieve change because so many physiological systems are involved. For cardiovascular fitness, 68% of elementary students met or exceeded their mile run goals to reduce their times, and 58% of

middle and high school students met or exceeded their goal for reducing resting heart rate measured during the step test.

Discussion

Student Perceptions

The mission of the curriculum developed by Spokane School District, "Fit for the Future," is to develop lifelong, physically active, healthy adults. The research was done to see if it is possible to develop a means to predict these desired results. Results indicated that dependent variables differed by grade level thus any prediction model can only be applied to individual grade levels. In the analysis it was revealed that several of the variables shifted in importance and impact from elementary to middle to high school.

A multiple linear regression was used to determine the variables with the greatest impact on the prediction of success for regular activity, and the findings indicated that enjoyment in the class was the highest predictor of physical activity at all grade levels, agreeing with other's research (Dishman et al. 2005; Pangrazi 2003). In the early years of grants at the high school level, the predictors and their order were: post task orientation and post mastery, when controlling for class enjoyment and eliminating it from the analysis. Because the format of the class at the high school is independence for the students with teacher monitoring, it is not surprising that task and mastery would be important. Once the curriculum had been in place for six years, positive self-efficacy, unable to predict success, and healthy eating became the strongest predictors in 11^{th} and 12^{th} grade students who were no longer in required physical education classes suggesting they had become independent of their teachers and the program which was the overall goal toward lifelong wellness behaviors.

At the middle school the primary predictor was enjoyment followed by post task, post ego, and positive causal attribution. The strengths and order of these behaviors suggest that students are interested in performing well, and in learning the importance of remaining active. Middle school students still compete to perform better than their peers—the ego orientation coming through, but they also are beginning to understand that the teacher, the environment, and curriculum all play an important role in improvement (Chen 2001; Kohl and Hobbs 1998; Pangrazi 2010).

Curriculum Effectiveness

Regular physical activity has a strong association with overall health (Booth and Chakravarthy 2002). Previous research has found sport participation but not fitness to be a significant predictor for tracking fitness (Malina 2001; Pate et al. 1996; Rowland 1998) on long-term physical activity behaviors. A possible reason for this may be how fitness testing and physical education classes have been presented to students (Pangrazi 2010). Following the sport model, students are not taught the relationship of fitness to long-term health only to performance. A curriculum which is articulated and integrated from kindergarten to tenth grade using goal setting to teach the association of activity and fitness to long-term health may have a very different outcome and relationship as a marker to track activity behavior over time.

The limited time allotted to physical education and the lack of articulation has become a self-perpetuating failure of less active and heavier children who are becoming less active and heavier adults with earlier onset of type 2 diabetes and no drop in the incidence of heart disease (Pangrazi 2010). If physical education were expanded to daily classes K-12 the students would have time to understand and practice fitness and wellness behaviors (Pangrazi 2010; Strong et al. 2005). The additional time could be spent achieving a level of competence in the lifetime sports and activities the students want to use to remain active throughout life (Pangrazi 2003; 2010), and the self-efficacy to continue trying new activities to prevent burn-out and boredom.

In addition, it will be impossible to determine whether the curriculum has a long-term impact with only limited cross-sectional and longitudinal data to analyze. It is essential that students be followed throughout their time in the fitness and health program and then followed up after they graduate before definitive statements about effectiveness are made (Baranowski and Jago 2005; Kohl and Hobbs 1998).

Each year the analysis compared student responses on the individual variables to see how they changed over time. The first two one-year PEP grants used pre and post analysis, and for the three-year grant surveys were completed once each year to see the change over the three years of the grant. Each year a regression equation was computed to see which of the variables influenced activity behavior. The evaluation of how many days per week the students were active for at least 60 minutes—the NASPE standard for health was used as the dependent variable. Until the second to last year the first predictor variable entered in the stepwise regression was always enjoyment. That year it switched to positive self-efficacy, but enjoyment was still in the equation. This is in agreement with the literature that says students will not be active, especially in their PE class if they are not enjoying what they are doing (Dishman et al. 2005; Dweck and Leggett 1988). Students reported they liked 90% of the new curriculum. They liked the changes they were seeing in themselves and that they were able to take what they have learned and apply it outside of school to keep active. They also reported seeing changes in the teachers—participating in the classes rather than observing. They did not just "roll out the ball".

The final year the stepwise regression results were different and suggest that the articulated curriculum is providing the results expected from the beginning that it is possible to make the desire for and doing activity intrinsic in the students, which is essential if they are truly going to remain active and eating healthy for the rest of their lives. The first predictor variable entered in the stepwise regression was positive self-efficacy and the second was Causal Attribution Self and combined they accounted for 67% of the results—how many days they were physically active for at least 60 minutes. Separated by sex, there were changes. The males had the same two and added enjoyment to bring the prediction up to 75%. Females had Causal Attribution Self as the first predictor explaining 66% of the variance and their second predictor was Causal Attribution Class, which brought the prediction up to 74%. This suggests that the females may still be relying on having a place to go to be active, i.e., they may prefer group activities to individual, but as long as they realize there are places to go where they can be active in a group setting they can still remain active once they leave school.

The final year there were almost half of the students in the high school cohort who were in 11th or 12th grade, which means they are no longer, taking a PE class unless it was an elective. Comparing a regression on the 8th, 9th and 10 graders (n = 209) with one on the 11th and 12 graders (n=93) to see what the differences might be showed interesting results. Both groups had positive self-efficacy as the first predictor. For those still in a class, positive self-efficacy accounted for 45% of the prediction. For those no longer in PE it was 56% of the prediction. Interestingly they both only had two predictors included but they were directly opposite for the second variable. For those still in class being able to predict activity was the second predictor but overall the second variable only brought the prediction up to 50% so half the time there was no way to predict behavior. The fact that about 160 of that group was 8th graders may have been the cause—the high school portion of the curriculum is where the students really begin relating everything to the future. For the 11th and 12th graders the second variable was being unable to predict success increasing the prediction to 60%. It is possible these are the students who are much less active. If so, that also agrees with current literature that between 5% and 8% of the population will continue to be inactive no matter what incentives are given or what negative effects are experienced (Booth and Chakravarthy 2002; Pangrazi 2003; 2010).

Conclusion

The literature on self-efficacy and physical activity would suggest that the Spokane School District curriculum is being effective in creating students who not only know how to participate in a PE class, and use goal setting to make improvements in personal fitness and health from the beginning to the end of the year, but are also aware of the long-term impact their activity or lack of activity will have on long-term health and wellness. The fact they have positive self-efficacy also shows they have been taught about overcoming barriers to remaining fit and well. A major recommendation to other school districts is to use behavioral assessments not just fitness assessments to determine program effectiveness. This evaluation of six years of curricular change seems to validate that students are learning to create a plan so they can manage to remain fit and healthy for the lifetime validating that the curriculum is truly designed to help all students be "Fit for the Future."

References

American College of Sports Medicine. (2006). *ACMS's Resource Manual for Guidelines for Exercise Testing and Prescription, 5th Edition.* Philadelphia: Lippincott Williams & Wilkins.

Ames, Carole, and Jennifer Archer. 1988. "Achievement Goals in the Classroom: Students' Learning Strategies and Motivation Processes." *Journal of Educational Psychology* 80: 260-67.

Baranowski, Tom, and Russell Jago. 2005. "Understanding the Mechanisms of Change in Children's Physical Activity Programs. *Exercise and Sport Sciences Reviews,* 33: 163-68.

Booth, Frank W., and Many V. Chakravarth. 2002. "Cost and Consequences of Sedentary Living: New Battleground for an Old Enemy." *President's Council on Physical Fitness and Sports Research Digest* 3: 1-8.

Burke, Daniel J. 1995. "Connecting Content and Motivation: Education's Missing Link." *Peabody Journal of Education,* 70: 66-81.

Carrel, Aaron L., R. Randall Clark, Susan E. Peterson, Blaise A. Nemeth, Jude Sullivan, and David B. Allen. 2005. "Improvement of Fitness, Body Composition, and Insulin Sensitivity in Overweight Children in a School-based Exercise Program. A Randomized, Controlled Study." *Archives of Pediatric and Adolescent Medicine* 159: 963-68.

Chase, Melissa A. 2001. "Children's Self-efficacy, Motivational Intentions, and Attributions in Physical eEucation and Sport." *Research Quarterly for Sport and Exercise* 72: 47-54.

Chen, Ang. 2001. "A Theoretical Conceptualization for Motivation Research in Physical Education: An Integrated Perspective." *Quest* 53: 35-58.

Corbin, Charles B. 2002. "Physical Education as an Agent of Change." *Quest* 54*:* 182-95.

Corbin, Charles B., and Ruth Lindsey. 1997. *Fitness for Life (4th Ed.).* Scott Foresman, Glenview, IL.

Deci, Edward. L., and Richard M. Ryan. 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press

Dishman, Rodney K., Robert W. Motl, Ruth Saunders, Gwen Felton, Dianne S. Ward, Marsha Dowda, and Russell R. Pate. 2005. "Enjoyment Mediates Effects of a School-based Physical-Activity Intervention." *Medicine & Science in Sports & Exercise,* 37: 478-87.

Dweck, Carol S., and Ellen L. Leggett. 1988. "A Social-cognitive Approach to Motivation and Personality." *Psychological Review* 95*:* 256-73.

Kohl, Harold W., and Karen E. Hobbs 1998. Development of Physical Activity Behaviors Among Children and Adolescents. (The Causes and Health Consequences of Obesity in Children and Adolescents." *Pediatrics* 101: 549-54.

Malina, Robert W. 2001) "Tracking of Physical Activity Across the Lifespan." *President's Council on Physical Fitness and Sports, Research Diges,* 3: 1-8.

Newmann, Fred M., Helen M. Marks, and Adam Gamoran. 1996. "Authentic Pedagogy and Student Performance." *American Journal of Education* 104: 280-312

Nicholls, John G. 1990. "What Is Ability and Why Are We Mindful of It? A Developmental Perspective." In *Competence Considered,* edited by Robert J. Sternberg & John Kolligian, 11-40. New Haven, CT: Yale University Press

Pangrazi, Robert P. 2003. "Physical Education K-12: 'All for One and One for All'." *Quest* 55: 105-17.

Pangrazi, Robert P. 2010. "Chasing Unachievable Outcomes." *Quest* 62: 323-33.

Pate, Russell R., Tom Baranowski, Marsha Dowda, and Stewart G. Trost 1996. "Tracking of Physical Activity in Young Children." *Medicine and Science in Sport and Exercise* 28: 92-96.

Roberts, Glyn C., Darren C. Treasure, and Gloria Balague 1998. Achievement Goals in Sport: The Development and Validation of the Perception of Success Questionnaire." *Journal of Sports Science* 16: 337-47.

Rowland, Thomas W. 1998. "The Biological Basis of Physical Activity, *Medicine and Science in Sports and Exercise* 30: 392-99.

Siedentop, Daryl 1999. "Physical Activity Programs and Policies. *Journal of Physical Education, Recreation and Dance,* 70: 32-35.

Standage, Martyn, Joan L. Duda, and Nikos Ntoumanis 2003. "A Model of Contextual Motivation in Physical Education: Using Constructs from Self-determination and Achievement Goal Theories to Predict Physical Activity Intentions." *Journal of Educational Psychology* 95: 97-110.

Stringer, Ernest T. 2007. *Action Research 3rd Edition*. Thousand Oaks, CA: Sage Publications, Inc.

Strong, William B., Robert M. Malina, Cameron J. R. Blimke, Stephen R. Daniels, Rodney K. Dishman, Bernard Gutin, Albert C. Hergenroeder, Aviva Must, Patricia A. Nixon, James M. Pivarnik, Thomas Rowland, Stewart Trost, and Francois Trudeau 2005. "Evidence-based Physical Activity for School-age Youth. *Journal of Pediatrics* 146: 732-37.

Treasure, Darren C., and Glyn C. Roberts 2001. Students' Perceptions of the Motivational Climate, Achievement Beliefs, and Satisfaction in Physical Education, *Research Quarterly for Exercise and Sport 72:* 165-75.

Urdan, Timothy C. 1997. "Achievement Goal Theory: Past Results, Future Direction. In *Advances in Motivation and Achievement Vol. 10*, edited by Martin L. Maehr and Paul R. Pintrich 99-141. Greenwich, CT: JAI Press.

Weinstein, Claire E., and David R. Palmer 1990. *Learning and Study Strategies Inventory—High School Version (LASSI-HS).* (Available from H & H Publishing Company, Inc. 1231 Kapp Drive, Clearwater, FL 33765.

Weiss, Maureen R. 2000. "Motivating Kids in Physical Activity." *President's Council on Physical Fitness and Sports Research Diges*, 3: 1-8.

Wirszyla, Chris 2002. "State-mandated Curriculum Change in Three High School Physical Education Programs." *Journal of Teaching in Physical Education* 22: 4-19.

Xiang, Ping, Ron McBride, and Jianmin Guan 2004. "Children's Motivation in Elementary Physical Education: A Longitudinal Study. *Research Quarterly for Exercise and Sport* 75: 71-80.

1 Published by the Forum on Public Policy

3

Appendix A

Washington Office of Superintendent of Public Instruction
Essential Academic Learning Requirements—Health and Fitness
http://www.k12.wa.us/curriculumInstruct/healthfitness/ealrs.aspx

1. The student acquires the knowledge and skills necessary to maintain an active life: movement, physical fitness, and nutrition.

    To meet this standard, the student will:

    1.1. Develop fundamental and complex movement skills as developmentally appropriate.
    1.2. Safely participate in a variety of developmentally appropriate physical activities.
    1.3. Understand the concepts of health-related physical fitness and develop and monitor progress on personal fitness goals.
    1.4. Understand the relationship of nutrition and food nutrients to physical performance and body composition.

2. The student acquires the knowledge and skills necessary to maintain a healthy life: recognize patterns of growth and development, reduce health risks, and live safely.

    To meet this standard, the student will:

    2.1. Recognize patterns of growth and development.
    2.2. Understand the concept of control and prevention of disease.
    2.3. Acquire skills to live safely and reduce health risks.

3. The student analyzes and evaluates the impact of real-life influences on health

    To meet this standard, the student will:

    3.1. Understand how environmental factors affect one's health (air, water, noise, chemicals).
    3.2. Gather and analyze health information.
    3.3. Use social skills to promote health and safety in a variety of situations.
    3.4. Understand how emotions influence decision-making.

4. The student effectively analyzes health and safety information to develop health and fitness plans based on life goals.

    To meet this standard, the student will:

    4.1. Analyze health and safety information.
    4.2. Develop a health and fitness plan and a monitoring system.