Goals, Interests, and Learning in Physical Education

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Abstract:
Student achievement motivation has become a complex construct in physical education because of the competitive nature of sports and physiological discomfort associated with exercising. With updated national standards, physical education has been undergoing a long-deserved curriculum reform that is expected to enhance student motivation by addressing personal, instructional, and curricular influences on students' intent to continue a physically active lifestyle. In this article, the authors summarized findings from research on 2 major achievement motivation constructs in physical education (rather than sports): achievement goals and interests. The authors also attempted to interpret the findings in relation to students' learning knowledge and skills in physical education. Advances made and issues evolved in the research were conceptualized, critiqued, and interpreted in the dynamics of teaching and learning. During the process, the authors further examined the efficacy of the findings and potential contribution of motivation research to the much-needed curriculum reform in physical education.
Key words: goals, interests, and learning; physical education; student achievement motivation; teaching and learning

Article:
Physical education as a school subject has been undergoing a long-deserved curricular reform. A "new physical education," which emphasizes the development of a healthy, physically active lifestyle rather than the study of traditional team sports (Weir, 2000), has emerged as a curriculum model in many schools. The cornerstone of the reform is an intention to address the critical issue of developing a healthful living style by educating K-12 students with a body of disciplinary knowledge that integrates biological—medical sciences, socio-psychological sciences, and cultural humanities. Despite many constraints in schools, such as constant reduction of instructional time and shrinking resources for physical education, curriculum reform has received overwhelming support. For instance, the U.S. Congress has established the Carol M. White Physical Education for Progress (PEP) program in 2001 to provide $400 million over 5 years to fund local schools in need of curriculum reform. Also, the Centers for Disease Control and Prevention (CDC; 1997) has published guidelines for schools to promote lifelong physical activity among young people.

Curriculum reform is a necessary response to the prevalence of a sedentary lifestyle that some medical researchers (Freedman, Khan, Serdula, Galuksa, & Dietz, 2002) believe has caused a U.S. epidemic of obesity and obesity-related diseases such as coronary heart disease, stroke, and diabetes. According to a recent survey (Freedman et al.), severe obesity among Americans has increased approximately threefold from 1990 to 2000. The data show that obesity is inversely associated with education achievement, implying that obesity prohibits effective learning or that less knowledge leads to a lifestyle resulting in obesity. The crisis calls for a need to strengthen school physical education programs to better educate our children about physical activity and its health benefits (CDC, 1997).

Achieving the goal of helping children develop a healthful, physically active lifestyle relies on the extent to which motivation is enhanced during their engagement in physical activities. As an organized education

experience, physical education is considered a viable avenue that leads to the development of a physically active lifestyle for children. Corbin (2002) argued that physical education may be the only opportunity for all school-aged children to learn about the comprehensive health benefits of physical activity and the necessary motor and behavior management skills to effectively participate in a variety of sports, physical activities, and exercises. Unfortunately, most adolescents choose not to take physical education classes during their high school years after they have met the minimal physical education credit requirement for graduation, usually a half or one credit in most high schools. Enrollment in physical education in secondary schools decreased an average 30% annually from 1988 to 1996 (National Center for Education Statistics [NCES1, 1996), and only 19% of adolescents took physical education classes regularly beyond the graduation requirement (CDC, 1996). If choice is considered an indicator of motivation, it is apparent that students have a motivation problem regarding physical education.

To find effective ways to motivate young Americans to engage in regular physical activity, many intervention studies have been conducted by physiologists and behavioral scientists in the last decade (see review by Stone, McKenzie, Welk, & Booth, 1998). However, despite various motivation approaches adopted (including monetary compensation, T-shirts, etc.) and an emphasis on providing scientific information about the benefits of physical activities and the health hazards of a sedentary life style, less than half of the participants in the intervention studies demonstrated strong motivation to continue their physical activity programs. The "high need, low demand" phenomenon (Ennis, 2001) clearly indicates that the intervention programs did not address the motivational needs of the participants.

It has become apparent that without appropriate motivation strategies, it can be difficult for teachers to engage students in developing a physically active lifestyle. We addressed the student motivation issue by reviewing and critiquing related research findings in physical education. Our purpose was twofold. First, we summarized findings from research on two major achievement motivation constructs in physical education: achievement goals and interests. Second, we attempted to interpret the findings in relation to student knowledge and skills in physical education. We therefore focused on the efficacy of the findings and their potential contribution to the much-needed curriculum reform.

Our examination of achievement motivation research is focused on physical education rather than on sports. Although sports can be a central form of content in physical education, physical education and sports are distinctively different regarding goals, expected outcomes, teaching and learning strategies, and education functions. We defined sports as a type of organized physical activity whose goal is to engage participants in formal competition that takes place in interscholastic and other sporting arenas. Physical education, conversely, is a subject designed to help the learner become physically educated by learning necessary information and skills about physical activity. In sports, mastering specialized motor skills is the goal or the end of learning, whereas in physical education, practicing motor skills can be a means by which students learn concepts and behavior-management strategies as well as develop motor skill proficiency. The distinctions delimit our selection of empirical studies for review and critique. Therefore, our arguments in this article should not be generalized beyond physical education.

Achievement Goals as Motivators in Learning

Since the pioneer work by Duda and Nicholls (1992) comparing student ego and task-goal orientations in sports and academics, researchers have adopted the achievement goal theory as a major theoretical framework for studying learner motivation sources in physical education. In this research context, goals are defined, similar to the definition widely adopted in education research, as why students want to achieve what they achieve (Urdan, 1997). In other words, goals are conceptualized as underlying purposes that a learner may adapt in guiding his or her learning behavior.

Research on Achievement-Goal Construct

Achievement goals have been conceptualized in research either as learner mental disposition or instructional climate. In studies based on the disposition conceptualization, researchers investigated the motivational function

of learner-goal orientations, namely, ego- and task-goal orientation (Papaioannou, 1998; Treasure & Roberts, 1994; Vlachopoulos & Biddle, 1997; Walling & Duda, 1995, Xiang & Lee, 1998). Learners with the task-goal orientation often are concerned about completing tasks and developing competence in the content domain, whereas learners with the ego-goal orientation usually are concerned about demonstrating competence relative to their peers. Researchers who adopt the instructional climate conceptualization attempt to address the extent to which instructional climate in the gymnasium is structured to enhance learning content (mastery climate) and/or demonstrate competence (performance climate; Goudas, Biddle, Fox, & Underwood, 1995; Mitchell, 1996; Papaioannou, 1995; Solmon, 1996; Theeboom, De Knop, & Weiss, 1995; Treasure, 1997). A mastery climate refers to an instructional environment that emphasizes competence development and task completion. A performance climate refers to an instructional environment that emphasizes the demonstration of superior ability through interpersonal comparisons. We used task and ego goal as technical terms to describe the goal construct for the disposition conceptualization, and mastery and performance goal to describe the goal construct for instructional climate conceptualization.

In general, research findings have shown that physical education learners with a high task-oriented goal (a) perceive success and failure in learning as associated with effort, (b) report a high likelihood to select more challenging learning tasks, and (c) frequently enjoy learning experiences. Learners with a high ego orientation tend to avoid difficult learning tasks and attribute success or failure to genetic ability. They are more likely to be motivated when their performance is superior rather than inferior to that of their peers. On the basis of student self-report of goal-orientation and motivation levels, those findings have been observed among learners in elementary schools (Spray & Biddle, 1997; Xiang & Lee, 1998), secondary schools (Walling & Duda, 1995), and colleges (Spray, Biddle, & Fox, 1999).

Conceptually, task and ego goals are not mutually exclusive. It is possible that some students may possess both goals. To examine the robustness of the above findings, Standage and Treasure (2002) compared students' situational motivation and regulation strategies in terms of four identified goal-orientation profiles: (a) high task/high ego, (b) high task/low ego, (c) low task/high ego, and (d) low task/low ego. The researchers found that high task-oriented students (high task/high ego, high task/low ego) demonstrated higher motivation than did those with low task orientations (low task/high ego, low task/low ego). Students with low task-orientation profiles reported a higher tendency to rely on external regulation strategies in learning than did those with high task-orientation profiles. The findings seem to suggest that task-oriented goals may be the decisive factor for increased motivation regardless of the role of ego-oriented goal.

Studies on instructional climate have revealed that mastery involvement is more likely than performance involvement to nurture student intrinsic motivation. Learners in a mastery goal-centered climate are more likely than those in a performance goal-centered climate to choose challenging tasks in practice (Solmon, 1996), perceive themselves as having high intrinsic motivation (Goudas et al., 1995; Mitchell, 1996; Papaioannou, 1995), and report a high level of perceived satisfaction (Treasure, 1997). In a recent study, Todorovich and Curtner-Smith (2003) used a quasi-experimental design to examine the influences of mastery and performance instructional climates on elementary school students' goal orientations. Two experimental groups arid one control group of students were separately taught 10 lessons. The TARGET system (Ames, 1992) was used to structure a mastery-goal climate and a performance-goal climate for the two experimental groups. All students were pre- and post-tested on their achievement-goal orientations. The results indicated that each of the distinctive instructional climates strengthened students' achievement-goal orientation emphasized in the climate. Neither climate showed any positive or negative impact on the other goal orientation.

The findings seem to suggest that the motivational effect of achievement goals may be context dependent and that motivation to learn is enhanced in a mastery instructional climate. In that environment, mastery involvement is central to the instructional structure and organization, whereas performance involvement is minimized (Mitchell, 1996; Papaioannou, 1998; Solmon, 1996; Xiang & Lee, 1998). In general, the findings have indicated a strong motivation potential of a task-centered approach to teaching and learning in physical education.

There has been significant development in the achievement-goal theory in recent years. The task-ego dual-goal construct has been questioned, and motivational functions of additional goals including social goals have been articulated (Urdan, 1997). In addition, recent research has identified performance-approach and performance-avoidance goals as branches of the ego goal. Some evidence suggests that the trichotomous framework (task goal, performance-approach goal, and performance-avoidance goal) can better explain students' motivation and learning outcome (e.g., see Church, Elliot, & Gable, 2001; Elliot, 1999). In a systematic review of empirical evidence, Midgley, Kaplan, and Middleton (2001) concluded that the motivation function of the performance approach-avoidance goals should be understood further in relation to student characteristics (e.g., gender and age), the learning context, and particular learning outcomes.

The recent developments in the achievement goal construct, however, have not been examined specifically in physical education. Nevertheless, evidence from student-learning behavior research does suggest a strong social goal at work. In a study of high school students' interpretation of the purpose of physical activity, Chen (1998) found that social bonding (consisting of reasons for social recognition and acceptance) is an important goal that may mediate learner choice of participation. Also, in a study on middle school students' learning behavior in a dance unit, Hastie and Pickwell (1996) found that gaining social recognition for peer acceptance is an important goal for male students. That social-oriented goal led the students to adopt various approach or avoidance strategies to maximize their socialization needs and minimize their effort to work toward achieving learning goals of the unit. In some instances, the students chose not to achieve academically for social acceptance purposes. Given that goals for learning often are not clearly specified in many physical education programs (Goodlad, 1984; Siedentop, Doutis, Tsangaridou, Ward, & Rauschenbach, 1994), social goals might be a factor that mediates student achievement motivation in physical education.

Effect of Achievement Goals on Learning

Most of the studies in physical education have reported that the task-goal orientation and the mastery instructional climate are predictive of intrinsic motivation. Only in a few studies, however, were learners' actual learning behavior and outcomes measured in an attempt to determine the link between achievement goals and learning outcome (Berlant & Weiss, 1997; Solmon & Boone, 1993; Chen et al., 2002; Solmon, 1996). Results from those studies show that achievement goals may have limited direct impact on learning out-comes in physical education. Berlant and Weiss examined the connection between college students' *(N* = 30) achievement-goal orientations and visual recognition and recall of correct tennis forehand ground stroke skill. Students with different goal orientations viewed several videotaped demonstrations of a correctly performed tennis forehand stroke, then were assessed on the accuracy of visual recognition and verbal recall of key characteristics of the skill. The results of a canonical correlation indicated no correlation between goal orientations and the recognition and recall outcomes. The researchers cautioned that goal orientations may be of little importance in the initial phase (visualization of a skill sequence) of learning a motor skill. Learning at this phase may not be differentiated by the achievement-goal orientations. The findings raised questions about the appropriateness of exclusively using the achievement-goal orientation theory to interpret motivated learning behavior and motivation in motor skill learning settings.

Solmon and Boone (1993) used a pre- and posttests design to investigate the extent to which ego- and task-goal orientations predicted skill acquisition (tennis ground stroke), in-class participation behavior (systematic observation by trained observers), task selection (difficulty in student—teacher contract on learning tasks), and thought processes (student thinking about the tasks in learning). College students *(N* = 90) in beginning tennis classes were assessed on their achievement-goal orientations and completed skill pretests at the beginning of the course. A contract-learning system was used for assessing students' willingness and selection of challenging tasks during learning. In-class learning behavior was assessed with a point-coding system. At the end of the course, the students completed a skill posttest and a cognitive processes questionnaire. Canonical correlation analyses showed that task orientations were associated positively with the selection of more challenging task selection and thought processes, whereas ego orientation was associated negatively with these measures.

However, student learning behavior was not associated with either achievement-goal orientations. In addition, students with different orientations showed similar significant improvement in their tennis ground stroke skills. No differences in skill improvement were observed between students with different goal orientations. A further regression analysis confirmed that achievement-goal orientations were not predictive of skill achievement.

In a recent investigation of the relationship between learner achievement-goal orientations and learning outcomes, Chen, Shen, Tolley, and Scrabis (2002) examined 104 middle school students' learning outcomes in relation to their achievement-goal orientations in various physical education content units, including dancing, volleyball, fitness labs, fencing, and multiple games. Learning outcomes in every unit were measured in two domains to account for the unique learning experiences in physical education. They included (a) learning process outcome measured with the number of steps that students took in lessons (validated using the measure of heart rate as the concurrent criterion) to indicate physical effort in learning and (b) summative skill and knowledge test results from these units to indicate knowledge and skill acquisition. Results showed that students' ego-goal orientation did not correlate with either learning outcome measure. The task-goal orientation had a weak correlation with number of steps taken in the lessons ($r = .21$, $p < .01$) and did not correlate with skill and knowledge acquisition.

To examine the effect of different achievement goal climate on learning, Solmon (1996) randomly assigned middle school students ($N = 109$) in either a mastery or a performance climate to team juggling. In the mastery climate, instructions were focused on task challenge, short-term goals, skill improvement, and self-referenced criteria, whereas in the performance climate, winning various contests, moving up a competition ladder, and demonstrating superior performance were emphasized throughout the learning process. The instructions were videotaped and coded for verification of the motivational climate manipulations. Dependent variables included student thought processes (cause of success measured by a questionnaire) and learning behavior (persistence in learning measured by trials per minute in easy or difficult tasks). Solmon found that students who perceived the learning climate as mastery oriented selected challenging tasks more often than did those who perceived the climate as performance oriented. Students who perceived the climate as performance oriented were more likely to attribute success to ability than were those who perceived the climate as mastery oriented. Regression analyses revealed that actual motivation climates measured by observation coding were valid predictors for the number of trials in challenging tasks. Students' perceived climates, however, did not appear to be a valid predictor. Solomon concluded that actual situational influences rather than perceptions of the learning climate account for major variations in motivated learning.

Results from those studies support Duda's (2001) argument that the achievement goals, conceptualized either as mental dispositions or perceived environmental influences, may have little direct impact on students' learning behavior and their learning outcomes in physical education. In other words, pedagogical significance of the achievement goal theory for physical education seems limited. In their analysis of the limitations of achievement-goal research, Chen (2001) and Pringle (2000) argued that the goal-orientation theory was developed in academic achievement situations in which teachers expected students to achieve various academic, competence-based goals in academic subject content areas. The tenability of the theory has been observed in many classroom studies in which student goal orientations were examined in association with learning behavior on specific tasks and academic achievement. Researchers used specified class assignments and/or homework as reference stimuli to define the achievement setting in the classrooms. However, the reference stimuli are usually absent in physical education.

As conceived in the physical education content, competence-based learning goals are often coupled and implemented with a strong influence of a noncompetence goal such as enjoyment. That combination creates an instructional climate in which students like to engage in a learning process for goals unrelated to competence development. Goodlad (1984) observed that although physical education is a content area that students like the most, it has the lowest perceived value among students, school administrators, and teaching staff. The misconceived value of physical education may create an incoherent curricular context in which neither achievement goal is an integral part of the context because the relevance to learn the content is likely to be

misunderstood by students and teachers. The misunderstanding characterized by perceived low value in the content and mixture of competence-based and noncompetence-based learning goals appears to dramatically reduce the effectiveness of achievement goals as a primary motivator for enhancing student learning in physical education.

Interests as Motivators in Learning

It has long been assumed that interest motivates the learner to pursue the outcome of knowing (Dewey, 1913). Interest, which often yields pleasant emotional outcome, is frequently considered to be associated with noncompetence purposes in the learning process (Sansone & Smith, 2000). Development in education research, however, has helped researchers reconceptualize interest as a dichotomous framework that consists of individual and situational interest. Individual interest refers to a person's psychological disposition concerning the preference of an activity or action. Situational interest is defined as the appealing effect of an activity's characteristics on individuals (Krapp, Hidi, & Renninger, 1992). Both interests have been described as a person—environment (e.g., activity, events, ideas, objects) interactive construct (Hidi & Harackiewicz, 2000). Also, the interests are content specific and have cognitive and affective components. In addition, Alexander, Jetton, and Kulikowich (1995) argued that interests are a key that underlies student motivation in all learning stages with domain specificity.

Research on interest in physical education has been scarce. In some studies, it is assessed as a liking for particular physical activities. For example, Lumpkin and Avery (1986) surveyed university students to determine whether they were interested in specific activity course offerings. They found that college students were interested primarily in taking courses in an individual sport rather than in team sports. Also, Clifton and Gill (1994) reported that because of social influences, male and female students can develop differentiated individual interest in physical activities. At an early age, boys begin to show preferences for team sports, whereas girls begin to favor rhythmic activities (Lee, Fredenburg, Belcher, & Cleveland, 1999). Those findings demonstrate young people's strong individual interest in physical activities but reveal little about motivational effects of interest in physical education.

Research on Interest Construct

Chen (2001) used the individual-situational interest framework in achievement-motivation research in physical education especially to examine motivation effects of situational interest in learning. Chen, Darst, and Pangrazi (1999) conducted a four-stage study to examine the multidimensionality of situational interest in physical education by using a multisample design. Middle school students *(N* =- 674, sampled independently in each of the four stages) were asked to view jogging and gymnastic stunts on video (Stages 1, 2, and 3) and to participate in basketball chest-pass and pass-shoot activities (Stage 4). Immediately following each activity, the researchers assessed the situational interest of the activity by having the students respond to an instrument that measured seven possible dimensions of situational interest: (a) novelty, (b) challenge, (c) exploration opportunity, (d) desire arousal, (e) time alteration, (f) attention demand, and *(g)* sense of delight. Exploratory and confirmatory factor analyses revealed five dimensions of situational interest: (a) novelty, (b) challenge, (c) exploration opportunity, (d) instant enjoyment, and (e) attention demand. The researchers postulated that the dimensions represent features of physical activity tasks that may bring about situational interest.

The preceding study also suggests that situational interest is observable and can be experienced by middle school students in physical education learning tasks. In a follow-up study, Chen, Darst, and Pangrazi (2001) used two middle school student samples *(N* = 281) to further examine the hypothesis that the five task features (dimensions) predict situational interest. Students viewed video-recorded jogging (low situational interest activity) and gymnastic stunts (high situational interest activity) and experienced a basket-ball stationary chest pass drill (low situational interest activity) and a pass-shoot (high situational interest activity). Immediately after completing each task, the students responded to the 24-item Situational Interest Scale that evaluated the situational interest of the task and five task features on a 5-point, Likert-type scale. Path analyses revealed that (a) instant enjoyment and exploration highly contributed positively to situational interest, (b) novelty and attention demand partially contributed positively, and (c) physical challenge contributed little. The data revealed

that high situational interest depends primarily on instant enjoyment during a person-activity interaction. Other task features contribute indirectly to situational interest. An important finding is that challenge contributes little to situational interest in physical activity learning tasks. Thus, teachers should be cautious when they attempt to motivate learners by challenging them with difficult physical activities. In contrast, designing exploration-oriented learning tasks can directly enhance instant enjoyment that leads to a high level of situational interest.

Because individual interest in physical activity is associated strongly with student self-identity, especially gender (Lee et al., 1999), in contexts in which engagement in physical activity occurred, we needed to understand the impact of gender and physical ability on interest to enhance the motivation effects of interest. With a middle school student sample *(N* = 191, 53% boys, 47% girls), Chen and Darst (2002) examined the extent to which individual and situational interests varied in terms of gender and motor skill performance levels. Individual interest was measured by asking students to rate on a 7-point, Likert-type scale their interest in basketball along with seven other physical activities. The students were asked to identify any activity that they liked to do the most as a reference activity and to rate the activity with the highest score (7). Then they were asked to give a rating of individual interest to the eight physical activities in reference to the rating of 7 for their favorite activity. The rating procedure provided that the measure of individual interest was obtained in a relatively stable reference rather than individual students' self-references so that internal validity could be maintained (Tobias, 1994). Situational interest was measured with the Situational Interest Scale immediately after students completed a highly situationally interesting task in basketball. Motor skill was measured with a moving chest-pass test validated for boys and girls by the American Alliance for Health, Physical Education, Recreation, and Dance (1984). Gender information was collected along with the measurements.

Student responses were classified with high and low quartiles into a high situational interest group (n = 51) and a low situational interest group *(n* = 48). A hierarchical log linear model analysis revealed that both groups did not differ in the number of boys and girls *(p* = .93), but they differed *(p* < .01) in motor skill. That finding indicates that boys and girls can be motivated by a highly situationally interesting task. The discrepancy between high and low responses to high situational interest in physical activity was likely caused by lack of skill rather than gender. The result suggests that offering gender-appropriate physical activities for the sake of motivating boys and girls separately may be unfounded.

Although the studies cited in the preceding paragraphs helped clarify the construct of interests in motivation research in physical education, the effects of interests on learning and the relationship between situational interest and the learning-task design remain unknown. The latter issue may have more profound theoretical and practical implications to curriculum designers and teachers. It should not be unrealistic for one to expect that an understanding of the motivational effect of interests should guide curriculum and learning-task design to enhance student learning.

Learning in physical education involves cognitive and physical effort (Schmidt & Lee, 1998). Learning tasks that emphasize one type of effort without the other will not help the learner acquire knowledge and skills. Cognitive demand in physical activities is critical because it leads the learner to a mind—body integrated experience that is optimal for acquiring motor skills and related knowledge (Schmidt & Lee). Interests, when conceptualized as a motivation construct, tap into the cognitive function of the individual (Hidi, 2000). One can hypothesize that the cognitive demand of a physical activity plays a similar "catching" role, as it does in mathematics learning (Mitchell, 1993). To test the hypothesis, Chen and Darst (2001) examined situational interest in association with cognitive and physical demands in physical activity tasks.

In the Chen and Darst (2001) study, middle school students *(n* 242) (a) analyzed dribbling skills by viewing elite players' dribbling on video (high cognitive demand, no physical demand), (b) practiced a pass-shoot task involving two balls and two partners moving simultaneously (high cognitive, high physical), (c) practiced a defensive footwork task (low cognitive, high physical), and (d) practiced a stationary chest-pass task with a partner who stood 20 feet away (low cognitive, low physical). The cognitive and physical demands in the tasks were validated by seven experienced physical education teachers. Results from a repeated measures multivariate

analysis of variance, with individual interest and skill ability controlled, showed that the students rated the two tasks with a high cognitive demand significantly higher *(p* < .01) in situational interest than tasks with a low cognitive demand. In addition, ratings for all five task dimensions were significantly higher *(p* < .01) for the two high cognitive-demand tasks than for tasks with a low cognitive demand. The results indicated that situational interest was a function of learning-task design in physical education. Evidence seemed to show that cognitive demand of a learning task played a critical role in generating situational interest.

Those findings may have significant implications for research and teaching in physical education. First, they imply that situational interest may be influenced directly by the way in which learning tasks are designed. An effective way that teachers can motivate students may be to build motivational components into the course content, such as those that enhance situational interest. Second, teachers need to provide cognitively demanding learning tasks to enhance situational interest for greater student motivation.

Effects on Learning

Although the studies discussed in the previous paragraphs demonstrated promising motivational function of situational interest, little empirical evidence is available to link interests directly with motivated learning behavior and learning achievement. Pedagogical significance of motivational sources apparently lies in the observable purpose of improving learning behavior. Chen (2001) warned that because there is little empirical evidence of that linkage, the results from the descriptive studies may not warrant a conclusion that learning achievement can be accounted for by high individual and/or situational interest.

Student-learning outcomes in physical education take two basic forms. One outcome is the acquisition of knowledge and skill. That outcome usually is measured with achievement tests of motor skills and knowledge. The other outcome is physiological intensity, which produces health benefits from the physical movement in which students engage. That outcome may be measured in heart rate, number of steps, and/or consumed calories using various recording devices.

Chen and colleagues (2002) examined the relationship between situational interest and learning outcomes in a random sample of middle school students *(N* = 104) who studied six physical activity units during 17 weeks. Situational interest was measured as the source of motivation. Individual interest was measured as a control variable to situation-al interest and acquired knowledge/skill. Chen and colleagues used the Yamax DigiwalkerO step-recording devices to measure physiological intensity as a type of learning outcome. They validated physiological intensity by using a concurrent validation procedure with the Polar@ heart rate monitor. Learning achievement was measured with performance scores on summative skill and knowledge assessment. Situational interest and physiological intensity were measured in two randomly selected lessons in each unit unknown to the teachers. Achievement data were collected after each unit. Individual interest was measured with the Situational Interest Scale and the procedure described in the Research on Interest Construct section in this article, in which a common, stable reference was used rather than students' self-references. Correlation analysis revealed that individual interest had a low, positive, and significant relationship with physiological intensity *(r* = .35, *p* < .01) and achievement *(r* = .24, *p* < .01), whereas situational interest had a highly positive correlation with physiological intensity *(r* = 67, *p* < .01). Follow-up regression and path analyses confirmed the relationship, suggesting a low predictability of individual interest for the two outcome measures and a relatively high predictability of situational interest for physiological intensity.

Shen, Chen, Tolley, and Scrabis (in press) examined the relationship between situational interest and learning out-comes in a dance unit. The researchers measured individual interest, physical intensity, situational interest of lessons, and achievement outcome in a random sample of 60 middle school students. The results showed that girls had a higher individual interest in dance than did boys. The correlation between individual interest and achievement outcome measures were higher for girls *(r* = .62, *p* < .01) than for boys *(r* = .26, *p* > .05). Boys and girls considered the lessons to be highly situationally interesting. 'The correlation between situational interest and their physical intensity measures in the lessons were similar *(r* = .69, *p* < .01 for boys; *r* = .73, *p* < .01 for girls). The researchers did not find meaningful correlation between situational interest and achievement

outcomes. The findings also seem to indicate that situational interest may overcome the effect of a gender-biased, low individual interest in dance among boys, indicating a universal effect of situational interest on motivation for all students.

The findings seem to support the assumption that motivation effects of situational interest may be short-lived but can have the immediate effect of engaging students in the learning process (Hidi & Harackiewicz, 2000). In addition, the data suggest a motivation specificity of interests in that each type of interest has the potential to enhance a particular type of learning outcome in physical education. In other words, situational interest may have a profound motivation-al effect on engaging students in the learning process. Conversely, individual interest may help enhance knowledge and skill acquisition. Motivational effects from the two interests, however, are limited to their respective outcome entities, which are learning achievement for individual interest and learning process for situational interest.

Those findings may have significant curricular implication. We now know that for physical activities to be motivating, they should be situationally interesting. To accomplish that outcome, curriculum designers and teachers should emphasize cognitive demand when maintaining a high physical demand in learning tasks. We also know that although situational interest can motivate students to engage actively in the learning process, resulting in high-level physiological responses (for health benefits), it may not lead students to a higher level of knowledge comprehension and skill acquisition. To improve learning achievement, educators should nurture in students a high individual interest in the subject content as a primary motivator (Alexander et al., 1995).

Implication for Curriculum Reform

Research on achievement goals and interests has advanced our understanding of their functions as major motivators in physical education. Findings from those studies have shown repeatedly that students possess preconceived goals when they enter physical education classes (Solmon & Lee, 1996). Those goals may mediate learning behaviors and outcomes (Lee, 2002). As a function of learning-task design, situational interest plays a critical role in motivating students to engage actively in learning (Chen & Darst, 2001; Chen et al., 2002). Taken together, the findings suggest a need to reframe motivational research in physical education. As identified by pedagogical researchers (e.g., Burke, 1995) and educational psychologists (e.g., Anderman & Maehr, 1994), the link between motivational research and curricular research is weak. The weak linkage has limited the theoretical significance and practical impact of motivation research.

There is little doubt that the primary purpose of enhancing student motivation is to advance learning, however perceived or defined in various subject-matter areas. The review of research in the preceding paragraphs has shown that a challenge for achievement-motivation researchers in physical education is the search for optimal motivators that lead to improved learning outcomes.

Motivational research in physical education seems to be based on an assumption that has guided most classroom research. That is, physical education classes provide an unquestionable achievement setting in which the goal to be attained is clearly defined. The achievement setting is defined as a learning environment in which students are expected to reach academic excellence by increasing academic competence, mastering new knowledge and skills, and understanding meanings of life. In short, competence-based goals are assumed to be central in the context. It is also assumed that students understand the context when they come to the gymnasium for physical education, although in reality, this may be a null assumption. It appears that non-competence-based goals (e.g., having fun) may be dominant in physical education. In a large-scale investigation that involved 38 schools in 13 stratified community samples across the country, 8,624 parents, 1,350 teachers, and 17,163 students, Goodlad (1984) found that physical education does not appear to have specified learning goals, although it is the subject content that students enjoy most and participate in most willingly. Although there are encouraging changes, Goodlad's findings may still be relevant (Ennis, 2001; Siedentop et al., 1994).

With increased awareness of the health benefits associated with physical activity and a marginalized physical education curriculum in schools, the "high need, low demand" dilemma seems to have become increasingly

salient in our schools. In reality, almost all schools offer physical education as a subject, with an understanding of its vital need. Yet, the time and resources that are needed for a high-quality physical education curriculum are diminishing rapidly because of low demand. Inadequate instructional resources often result in low instruction quality in schools in which a recreational approach to teaching is often commonplace. In that context, (a) the curriculum tends to become goal-less, (b) lessons become free of learning objectives, (c) teachers teach for the achievement of noncompetence-based goals, and (c) students learn little regardless of their goals and interests (Siedentop et al., 1994).

The public has begun to realize the need for young generations to learn and value the knowledge and skills associated with physical activity. The companion of competence-based and non-competence-based curriculum goals present a unique challenge for motivational researchers. On the one hand, students need to engage in tasks of moderate to vigorous physiological intensity to learn knowledge and skills and to receive health benefits. On the other hand, we hope that the learning experiences can be enjoyable, interesting, and motivating for all students so they overcome de-motivating effects often coupled with physical discomfort. The study of student motivation in such a curricular context may require that researchers take an approach that accounts for student dispositions and curricular goals.

Anderman and Maehr (1994) postulated that motivation results from cognition. In an academic achievement setting such as schools, learner cognition is surrounded, nurtured, and developed by a curriculum-centered environment. In that context, motivation to achieve becomes inseparable from the curriculum. Anderman (1977) argued that for a curriculum to be motivating, the learning tasks should be personally meaningful to the learner. In physical education, several curricular models have been proposed that emphasize the meaningfulness of physical activity to students (Jewett, Bain, & Ennis, 1995). Empirical data (Ennis et al., 1999) have shown that a curriculum designed to provide "situated learning" opportunities enhanced students' understanding of meaning in physical activity and their motivation to learn.

For education researchers and educators, motivation is a curricular issue as well as a student mental disposition issue. Motivation studies in physical education are conceptualized mainly as student psychological disposition of achievement goals or interest. That conceptualization tends to overlook the role that the curriculum plays in motivation.

Burke (1995) noticed that among the six components that define learning outcomes (persons, places, time, content, methods, and materials), pedagogical researchers and psychologists tend to focus on different components. The connection between the study of the person (motivation) and the study of the content (pedagogy) has been missing for too long in education research.

Educational psychologists and curricular researchers seem to agree that the curriculum has a powerful influence on student motivation. Newmann, Marks, and Gamoran (1996) argued that the curriculum forms a context in which students spend most of their daily lives in school, and suggested that this context also provides a reference frame for students to define and determine the level of success in education. The curriculum, therefore, can be viewed as the mechanism that energizes students as well as influences the process of internal energizing. Burke (1995) observed that content that stimulates interest, curiosity, and self-fulfillment serves as an excellent motivator. Thus, research on student motivation can be meaningful only when (a) the motivation is studied with-in the realm of the curriculum for whose goals students are expected to aspire and (b) they are motivated to achieve in the learning process (Burke).

To increase the motivation effect of the curriculum so that the high-need, low-demand status of physical education will change, researchers and curriculum designers should continue to search for a theoretical platform in which the curriculum is designed with built-in motivational components. In other words, motivation and content are no longer separate entities in the gymnasium as well as on schools' curriculum development drawing boards. To accomplish that goal, we included two salient implications from the research findings reviewed previously as useful guidelines. First, physical education curriculum designers should clearly define and

distinguish competence-based goals and non-competence-based goals for the curriculum. A curriculum well balanced with the two types of goals may provide challenging learning tasks with enjoyable experiences through which knowledge, skill, and values needed for a healthy, physically active lifestyle can be acquired effectively. Second, individual and situational interests should be taken into account as primary motivators in learning-task design to create enjoyable and productive learning experiences that lead to the accomplishment of competence-based learning goals.

Conceptual prototypes of such curricular models have been articulated (Ennis, 2001). Several "imaginary" curricula have been outlined to show the potential and possibility to transform physical education to an in-demand subject matter in the schools. The curricula, the Medicinal Curriculum, the Active Curriculum, and the Portfolio Curriculum, are based on the constructivist principles that emphasize linking students' prior experiences to hands-on learning experiences, exploration-centered tasks, and a strong mastery-centered instructional climate. It is not too difficult for one to imagine that in this type of curricula, learning tasks are situated in student life experiences with enhanced situational interest from high cognitive demand and physical demand. With an accumulation of knowledge, skill, and values about physical activity, individual interest should be developed in all students. Enhanced student motivation to learn will be evident because in this curricular context, students are the owners of learning. In learning tasks developed under the traditional philosophy of "no pain, no gain," however, students are merely drilled in learning tasks.

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