

The Efficacy of Using Homework in Physical Education as a Learning Tool

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Abstract

The use of homework in physical education has not historically been a topic of intense study. Relatively few studies have been devoted to the topic, particularly when compared to the use of homework in classroom settings. Nonetheless, some physical educators have suggested the assignment of homework as a way to meet important objectives and standards, especially those related to maintaining an active lifestyle. Homework has also been proposed to allow teachers to allocate more time to skill development in class. The purpose of this paper is to review the literature on the use of homework in physical education settings. Examination of the research could help professionals make difficult choices about whether or not to assign homework and if so, how best to do so.

Keywords: Physical Education, homework

The Efficacy of Using Homework in Physical Education as a Learning Tool

The perceived value of assigning homework in the classroom has fluctuated from one decade to the next. Social and political forces have influenced the amounts and types of homework assigned to students (Gill & Schlossman, 2004; Maltese, Tai, & Fan, 2012). The often contentious debate about homework continues. Some argue that it is a vital learning tool that helps students to master necessary content while fostering interpersonal skills such as time management and self-direction (Bembenutty, 2011). Others, however, maintain that homework leads to a loss of interest and merely forces rote practice rather than helping to develop high-order thinking skills. This group contends that the time that is devoted to homework could be better spent engaging in other activities that interest students without exacerbating the achievement gap observed between students who have a lot of parental support versus those who do not (Kohn, 2006). However, assigning homework for gym classes has not been a subject of controversy, possibly because homework has not generally been used extensively as a significant learning tool in this area (Mitchell, Barton, & Stanne, 2000; Van Sluijs, McMinn, & Griffin, 2007). Consequently, the efficacy of homework for physical education has not received a lot of attention from researchers.

Given the limited amount of time that is set aside for physical education and the increasing need to show evidence of student progress toward meeting national and state standards, some physical educators have proposed an expanded use of homework in this area (Hill, 2009; Novak & Lynott III, 2015; St. Ours & Scrabis-Fletcher, 2013). Experts in health promotion have suggested that many of the characteristics of, and outcomes associated with, homework are likely to increase physical activity levels. For example, levels of physical activity tend to increase when there is parental involvement, choice, encouragement for extracurricular

participation, and the acquisition of motor skills (Baranowski et al., 1997), all of which are characteristics of active homework (Smith & Claxton, 2003).

Physical educators should have as complete an understanding as possible about the current research regarding homework in this area. Most the recent research involves the use of physical activity interventions along with homework and the majority of the studies report on student opinions regarding the use of homework. The data on student opinions are mixed but the research consistently shows that homework completion rates are low in physical education. The literature generally shows that homework in physical education can be effective in promoting acquisition of knowledge and an increase in physical activity time. There appear to be some gaps in the literature regarding the use of homework for motor skill improvement or acquisition of non-fitness related cognitive content. Additionally, few researchers have attempted establish thresholds for the time and effort that should be expected when students complete physical education homework. The aim of this paper is to explore the efficacy of using homework to teach physical education by conducting a review of the current literature. This review seeks to present research about the perceptions and practices that teachers, parents, and students have regarding physical education homework, as well as how homework influences learning across multiple learning domains.

Selection of Literature

Three databases were searched to find primary sources to review. The search terms, "homework AND physical education," were used to explore the Google Scholar, ProQuest, and SPORTDiscus databases between the years 2000 and 2016. The initial plan was to search for relevant studies that have been published within the last 10 years; however, it became evident that not enough articles were available. The search terms were used to look in titles and abstracts

as well as keywords and subjects. GoogleScholar and SPORTDiscus both returned 21 peer reviewed sources when the descriptors were searched in titles and abstracts. ProQuest returned 80 peer reviewed articles when the abstracts were searched for the descriptors. Studies that were not directly related to physical education were not considered. For example, some studies returned by the search engines examined homework in health classes or adult worksite intervention programs. Studies that focused exclusively on homework for students who had specific disabilities were also excluded. Finally, studies of complex interventions or curricula that only made brief mention of homework as just one of many components, such as the SPARK® and CATCH® programs, were also not reviewed. The search ultimately led to 15 primary sources to include in the review of the literature. Table 1 provides a summary of the study characteristics.

The articles selected for review were organized into themes for comparison and discussion. Studies are presented as those evaluating 1) the use of homework for the promotion of knowledge, 2) the use of homework to promote physical activity, 3) attitudes and beliefs about physical education homework.

Physical Education Homework for the Promotion of Knowledge

Two studies that involved university students explored the potential for physical education homework to help in promoting the acquisition and retention of knowledge about health and fitness. A study by Jorgenson & George (2001) had instructors in activity classes, such as tennis and swimming, help students to acquire knowledge about fitness through homework assignments. At the end of the semester, the homework group in this study outperformed the control group on a written test about fitness concepts. When questioned, the students indicated that they would prefer this "infusion method" to a stand-alone lecture course covering fitness

concepts. Jenkins, Jenkins, Collums, and Werhonig (2006) studied the value of homework in promoting knowledge about health and fitness among university students. The students participated in a variety of activity lessons at the same time as they were attending a health concepts lecture class once a week. The homework in the activity classes was intended to reinforce the content covered in the lectures. The students reported generally positive attitudes toward the homework with positive comments outnumbering negative comments by nearly 2 to 1. In a study of high school students, Williams, McGladrey, Silva, and Hannon (2013) separated students in a weight training unit into three treatment groups: lecture only, homework only, and lecture + homework. Following the interventions, the students in all three groups performed equally well on a written test covering muscular strength and endurance. These students were not questioned about their opinions regarding any homework that had been assigned.

Physical Education Homework for the Promotion of Physical Activity

Three similar studies that involved elementary students as participants reported that homework interventions resulted in increased physical activity. Duncan et al. (2011) found that fifth and sixth graders in New Zealand logged more pedometer steps after a school-based intervention that included physical activity logs as the main component for homework. Fairclough et al. (2013) reported similar results from a cross-curricular school-based intervention that included active homework and resulted in self-reported increases in moderate physical activity. This study was unique because the reporting included various subgroups; the authors noted that girls appeared to benefit more than boys and students who were obese seemed to benefit more than those who had normal weights. A third study, which was similar in design, produced comparable results. When first and fifth graders were placed in an intervention group that included active homework, they showed increases in moderate to vigorous physical activity

as measured by accelerometers (Kriemler et al., 2010). Claxton and Wells (2009) evaluated the influence of homework on physical activity in university students involved in a wellness concepts course. The treatment group, which completed the homework, did not report larger increases in total physical activity than did the control group. However, the treatment group did report increases in muscular strength and endurance activities and in physical activity specifically aimed at weight management.

Attitudes toward Homework in Physical Education

Some effort has been made to understand attitudes and beliefs about homework for physical education, which is logical considering the link between attitude and behavior (Ajzen & Fishbein, 2005). Teachers normally make the important decisions about the use of homework as a teaching/learning tool, so it is hardly surprising that several researchers would have attempted to report on teachers' attitudes and practices. Mitchell, Stanne, and Barton (2000) reported that 805 of the teachers surveyed in a physical education in-service program reported using homework in some form, but the majority claimed to use it mainly as make-up work to account for absences. Conversely, when Burt et al. (2013) surveyed physical education teachers (not in an in-service program) they found that only 17% of the teachers said that they assigned homework to students. Michael, Dittus, and Epstein (2007) observed that 31% of the physical education teachers surveyed indicated that they assigning homework; however, this survey specifically asked about homework that involved the rest of the family. Thom and Yun (2012) did not report the percentage of teachers who assigned homework in physical education, but through multiple regression analysis they did identify three factors that can predict homework assignment behavior. Knowledge of how to assign homework, attitudes toward homework, and the

expectations of significant others were identified as the main factors influencing the choice of whether or not to assign homework.

Piech, Nowak, Birontiene, and Bula-Biteniece (2013) assigned physical activity and play homework to Polish preschoolers and their parents. Thirty-two percent of the parents surveyed afterwards admitted that they did not complete the homework with their children. Of those noncompliant parents, 66% gave lack of time as the reason, 25% informed researchers that they were simply unwilling, and 8% reported that they had forgotten. As part of a study that evaluated the effectiveness of homework for physical education among Israeli teens, Pantanowitz, Lidor, Nemet, and Eliakim (2011) observed that 95% of the parents surveyed expressed support for the notion of assigning homework in physical education.

There are more studies that have examined the attitudes of students toward physical education homework. Examination of homework compliance rates is appropriate because attitudes influence behavior. Kinchin and O'Sullivan (2003) reported that the high school students participating in an intervention involving a cultural studies physical education unit had a low compliance rate for homework. The students often refused to complete the homework at all or completed it very quickly, just before the start of the class. Some interview responses revealed beliefs that physical education is not a "real class" and that homework is "unreasonable" for such a class. Smith and Madden (2014) also reported student comments such as "homework in gym is stupid." There too, compliance was not great and students were willing to falsify physical activity logs. Although Barney and Strand (2008) did not examine behavior, but only opinions, they wrote of similar comments from students who regarded homework in physical education as being "unnecessary" and "inappropriate." Studies that recorded and reported actual compliance rates provide even more evidence of poor compliance regarding physical education homework.

One study reported that 32% of the girls and 22% of the boys in an elementary school intervention completed the homework (Smith, Cluph, & O'Connor, 2001), and another involving high school participants reported that only 4% completed all the assignments while 53% completed none of them (Pantanowitz et al., 2011).

Conclusions

Traditionally, homework has not played an important role in physical education (Tannehill, Romar, O'Sullivan, England, & Rosenberg, 1994). Consequently, the topic has not received a lot of attention from researchers. Because of the limited class time devoted to physical education and a mandate to help students maintain a physically active lifestyle, the inclusion of homework is now viewed as a promising teaching/learning tool. Review of the relevant literature may help physical educators to gain a better understanding of some of the important issues to be addressed as decisions are made regarding the use of homework in physical education.

Although the research is limited, it does suggest that knowledge can be improved by homework in physical education. The evidence suggests that using homework to help students acquire knowledge is equal if not superior to lecture-only methods. Limiting the amount of class time devoted to lecture-type instruction should allow more time for physical activity and the acquisition of fitness and motor skills. Of course, physical activity outside of school should also be promoted if students are to lead truly physically active lifestyles. Once again, the research is limited, but it does indicate that active homework can be successful in increasing levels of physical activity. Whether measured by pedometer, accelerometer, or self-report, the majority of the studies that were reviewed showed an increase in physical activity levels as a result of active homework. Finally, the majority of the studies included for review reported on attitudes and behaviors related to homework in physical education. Student attitudes toward physical

education homework vary, but in general it is apparent that many students believe that homework does not belong in physical education, with numerous comments indicating that physical education is not a "real class"; such comments are not surprising given the frequent marginalization of physical education. The poor completion rates reported in virtually all of the studies that were reviewed would further indicate that students do not believe in the importance of homework for learning in physical education. Many of the attitudes and beliefs about homework in physical education may be due to its history or its marginalization in terms of subject matter (Henry, 1964; James, 2011). Perhaps appropriately assigned homework could help to reverse some of the marginalization. Well thought out, intelligently administered homework could help students reinforce what is learned in class and make connections to the real world (St. Ours & Scrabis-Fletcher, 2013).

Clearly, the profession would benefit from more research on this topic. No studies were found where students were specifically assigned homework that involved their motor skills with the goal of reinforcing the skills they had learned in class. By far the most frequently assigned homework in physical education appears to be related to the promotion of physical activity or the reinforcement of knowledge about health and fitness concepts. Promoting physical activity and fitness knowledge are important, but acquiring motor skills is also crucial for producing physically educated citizens (NASPE, 2013).

With respect to methodology and design issues that could add to the body of knowledge, one suggestion that seems obvious is the isolation of homework as an independent variable. Most of the experimental studies detail interventions that involve homework. Some studies in which other factors are better controlled and the inclusion of homework is the only difference between the treatment and control groups would provide useful information. In addition, when examining

physical activity levels, it would be helpful to determine whether there is a difference in compliance when using devices such as pedometers and accelerometers compared to using pen and paper to record/recall physical activity. As noted, compliance rates were poor in most studies; therefore, any means of improving them should be explored. Although most students enjoy being physically active, they do not enjoy taking time to record all the details on paper. Finally, there also has to be research that attempts to establish appropriate amounts of homework. How much time and effort can teachers reasonably expect students to give to this? Is there a point where too much homework becomes counterproductive, when it is too burdensome (Williams & Hannon, 2013)? These are questions that classroom teachers are definitely asking, and that should perhaps be asked by those teaching in the gyms as well.

Experts have supported the use of homework in physical education, but as the research indicates, compliance is an issue and if homework is to be effective physical educators should use research to employ homework practices that are likely to succeed. Particularly in the area of active homework, the practice of giving students choices about the activities they can become engaged in seemed to be beneficial (Novak & Lynott III, 2015; St. Ours & Scrabis-Fletcher, 2013). Also, teachers need to ensure that homework is tied to learning objectives and that students understand the connection. There is some reason to believe that students do not always understand why homework in physical education is being given (Smith & Madden, 2014). If students are not able to make the connection between homework and important standards and objectives, they may be less likely to believe that the homework is not just busy work or an attempt by the teachers to treat physical education like a "real class." If homework is tied to objectives, it will be easier to incorporate it into the class assessment and evaluation plan and for students to be held accountable for its completion.

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Tables

Table 1

Summary of Studies Reviewed

Source	Subjects/Setting	Aims/Goals	Methods/Design
(Barney & Strand, 2008)	U.S. high school students. N=369.	Investigate knowledge of physical education appropriate practices.	Descriptive survey design using an 18 item closed-ended questionnaire.
(Claxton & Wells, 2009)	University students in the U.S. enrolled in a health concepts course. N= 365.	To examine the influence of PA homework on PA levels for university students.	A quantitative intervention study with a pretest-posttest design. IV = treatment (PA homework group vs control group). DV = self-reports of physical activity levels.
(Duncan et al., 2011)	New Zealand school children ages 9 to 11. N=97.	To examine the influence of mandatory homework on physical activity levels and eating habits.	A quantitative intervention pilot study with a pretest-posttest design. IV = treatment ("healthy homework" group vs control group). DV = pedometer step counts, screen time, sports participation, active transport, and consumption of healthy and unhealthy foods.
(Fairclough et al., 2013)	Ten and eleven year olds in the United Kingdom. N=420.	To investigate the effectiveness of a comprehensive school wellness intervention program.	A cluster randomized pre and post-intervention design. IV = treatment (PA and healthy eating intervention group vs control group). DV = BMI, waist circumference, PA time, sedentary time, food intake.
(Jenkins, Jenkins, Collums, & Werhonig, 2006)	U.S. undergraduate students enrolled in a physical education activity class courses with a health concepts lecture component. N=157.	To identify conceptual physical education course characteristics that contributed to student perceptions.	Qualitative, descriptive study that gathered data via a critical incident questionnaire.
(Jorgenson & George, 2001)	College students enrolled in physical activity classes. N=461.	1) Evaluate cognitive changes in students given homework. 2) describe affective and behavior characteristics of students.	Pretest-posttest with control group design. IV = treatment (homework, no homework). DV = Questionnaire (cognitive component, affective and behavioral component). Sixteen intact classes were randomly assigned to treatment or control group.
(Kinchin & O'Sullivan, 2003)	Ninth and tenth grade volunteers in an alternative school in a low SES neighborhood. N=25.	To describe students reactions to a cultural studies unit in PE.	Descriptive study. Qualitative data were gathered via interviews, student journals, direct observation and informal conversations. Quantitative data consisted of number of homework assignments submitted and days of attendance.

(Kriemler et al., 2010)	Grades 1 and 5 students in Switzerland. N=540.	Assess effectiveness of school based physical activity intervention.	Cluster randomized control trial. IV = treatment (2 additional physical education lessons/wk + short daily activity breaks + PA homework vs normal physical education schedule with no homework). DV = fitness outcomes (skinfold measures, shuttle run times, accelerometer results) and quality of life (questionnaire).
(Michael, Dittus, & Epstein, 2007)	Nationally representative sample of PE teachers in the U.S. N=1194.	To describe findings from the School Health Policy Program Study (SHPPS) about family and community involvement.	A descriptive study using phone interviews and/or mail in questionnaires to collect state level, district level, school level and class level data regarding all areas of wellness (including PE).
(Mitchell, Stanne, & Barton, 2000)	High School physical education teachers involved in either the first or second year of in-service training. N=54.	To explore attitudes towards and practices relating to homework in PE.	A descriptive study whereby data was gathered with a one page questionnaire about attitudes towards PE homework and current practices in assigning PE homework.
(Pantanowitz, Lidor, Nemet, & Eliakim, 2011)	Israeli high school students. N=95.	Explore compliance and attitudes towards PE homework.	Pretest-posttest with control group design. IV = intervention (PA homework only, academic homework only, PA + academic homework, no homework). DV = Attitude and PA behavior (questionnaire) and physical fitness (BMI, skinfold measures, 2k/5k run, sit up test, pull up/arm hang test). Students were randomly assigned to the four groups.
(Piech, Nowak, Birontiene, & Bula-Biteniece, 2013)	Parents of preschool children in Poland. N=38.	To examine the effectiveness of homework in promoting common PA (parent and child) and increasing family-wide motor activity.	A descriptive study using a diagnostic survey method to gather information about family response to newly introduces PA homework.
(Smith & Madden, 2014)	Eighth grade students in an urban school located in the Rocky Mountain region. N=83.	To examine the design and delivery of active homework in PE.	Qualitative case study design. Data were gathered through interviews, journals, activity logs and direct observation.
(Smith, Cluph, & O'Connor, 2001)	U.S. 3rd, 4th and 5th grade students. N=607.	To pilot test a research design that would examine the effect of PE homework on physical activity.	Descriptive study whereby homework completion rates were reported and compared by gender and homeroom teacher.
(Williams, McGladrey, Silva, & Hannon, 2013)	High school Fitness for Life class. N=178.	Compare cognitive knowledge retention for homework vs lecture.	Pretest-posttest with control group design. IV = treatment (lecture only, homework only, lecture + homework). DV = 50 question multiple choice test. Three intact classes were randomly assigned to a treatment.