

Research



Αναζητήσεις στη Φυσική Αγωγή & τον Αθλητισμό
Τόμος 18 (2), 78 – 86
Δημοσιεύτηκε: Ιούλιος 2020



Inquiries in Sport & Physical Education
Volume 18 (2), 78 – 86
Released: July 2020

www.pe.uth.gr/emag

ISSN 1790-3041



“After School Exercise”: A Program to Promote Students Physical Activity I. Theoretical Background and Program Development (Short version of a Greek article)

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Abstract

This manuscript presents the theoretical background and structure of an educational program aiming at promoting fifth and sixth graders' participation in after school physical activities (PA). The reason for the development of this program was the reduced participation of children and adolescents in PA. This, combined with the limited time allocated to physical education (PE) in school makes students' participation in after school PA more imperative than ever. According to the World Health Organization (2007), school is the ideal environment for promoting PA. Therefore, a program based on the theory of self-regulated learning was developed. The program integrated 15 ready-made sessions' plans that are included in the teacher's textbook. Additionally, the teacher's textbook contains supplementary material related to the subjects' matters of the lessons. The student's workbook contains information on the subject matter and skills that will be taught during the 15 sessions. It also includes questionnaires and tables that students will be asked to complete during the lesson. Finally, tools for program evaluation were developed.

Keywords: *self-regulated learning, physical education, promotion of physical activity*

This is an extended English summary of the paper «Γυμνάζομαι και Μετά Το Σχολείο»: Ένα Πρόγραμμα για την Αύξηση της Σωματικής Δραστηριότητας Των Μαθητών/τριών. Ι. Θεωρητικό Υπόβαθρο Και Ανάπτυξη Του Προγράμματος. Inquiries in Physical Education and Sport, 18(2), 67-77.

Development of this manuscript was supported by a post-doctoral fellowship to the first author in the context of the program “Post-Doctoral Fellowships- University of Thessaly” which is funded by the Stavros Niarchos Foundation to the University of Thessaly.

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Introduction

Exercise may lead to an array of benefits for peoples' health (Blair & Morris, 2009; Reiner, Niermann et al., 2013). A significant number of studies indicated that regular participation in PA may be beneficial for the immune system, protects the body against cardiovascular diseases, and aids the prevention, treatment, and control of hypertension, diabetes, obesity, osteoporosis, and depression (Hallal et al, 2006; Janssen & LeBlanc, 2010). The World Health Organization (WHO) (2010) taking into consideration the aforementioned findings recommend that children should be involved in moderate to vigorous PA at least one hour per day.

However, the findings of a study articulated that children do not meet WHO's recommendation (Hallal et al., 2012). More specifically, in Greece, only 12% of children over 13 and 14% over 15 meet the WHO's recommendation (WHO, 2018). WHO (2007) in order to address the decline in youth PA participation proposes that PE should play a pivotal role in promoting PA. The time allocated for PE is limited (45-120 minutes per week) and thus is not sufficient to meet WHO's recommendation (2002). Therefore, an action plan is needed, so that PE teachers can adopt the appropriate strategies to promote students' participation in after school PA (WHO, 2007). Factors related to children's participation in a PA must be taken into account when formulating these strategies.

Factors related to children's participation in PA

Several studies indicated that physiological, psychological, socioeconomic, and environmental factors could have a decisive influence on children's participation in PA. For example, psychological factors such as self-efficacy (Dishman et al., 2004), perceived competence (Sallis et al., 2000), satisfaction (Dishman et al., 2005) perceived benefits deriving from the participation of individuals in PA (Zakarian et al., 1994) as well as positive attitudes toward PA (Trost et al., 1997) positively influence participation in PA. In contrast, fatigue is negatively related to PA (Zakarian et al., 1994).

Social factors also such siblings', friends' (Sallis et al., 1988) and parents' involvement in PA (Sherwood et al., 2004) as well as parental support for participation in PA (Sallis et al., 2000) positively influence children's participation in PA. Finally, environmental factors such as pedestrian safety to nearby home destinations, mild intensity and speed of vehicles in the neighbourhood, the proximity of students' residence to destinations such as shops, accommodation in densely populated areas, accessibility or proximity to recreational facilities/sports facilities significantly influence children's participation in PA (Bauman et al., 2012).

School-based interventions aimed at increasing students' participation in PA

According to the WHO (2007), the school is the ideal context for promoting students' participation in PA. A significant number of studies have been conducted in the past aimed at increasing students' engagement in PA (Dobbins et al., 2013). Moreover, an analysis of the findings of 23 studies showed that only ten of them (Araújo-Soares et al., 2009; Barbeau et al., 2007; Donnelly et al., 2009; Kriemler et al., 2010; Luepker et al., 1996; McManus et al., 2008; Salmon et al., 2008; Simon et al., 2004; Stone et al., 2003; Webber et al., 2008) resulted in an increased duration of students' participation in PA. The researchers concluded that the effectiveness of such school-based interventions depends on whether they focus on creating conditions that promote students' positive attitude toward PA. Interestingly, researchers (Dobbins et al., 2013) suggested that the modification or the adoption of a new curriculum and the use of printed educational materials may have a beneficial effect on students' active participation in PA. However, to maintain these beneficial effects, parents' active involvement and social support of students is required (Dobbins et al., 2013). Mainly because children who do not participate daily in structured sports activities, as well as children with limited parental involvement in PA, tend to be less physically active (Yu et al., 2011).

The theoretical framework of the program

The development of the program was based on the socio-cognitive model of self-regulated learning (Zimmerman, 2000). Self-regulated learning is described as a repetitive, multifactorial process in which learners direct their knowledge, feelings, and actions (i.e., set a learning goal and evaluate its achievement) under the influence of interpersonal and socio-cultural factors (Boekaerts et al., 2005). Zimmerman (2000) based on Bandura's (1982) social cognitive theory developed the circular model of self-regulated learning comprises of three phases: the forethought, the performance, and the self-reflection phase. The forethought phase precedes the learning task and involves the analysis of the actions required to achieve the goals and motivational beliefs. Next follows

the performance phase that includes processes such as self-control and self-observation. Self-control includes task-related strategies, self-instructions, imagery, time management, environmental structuring, and help-seeking. Self-monitoring, on the other hand, incorporates processes such as metacognitive monitoring and self-recording. Finally, the self-reflection phase involves processes such as self-judgment and self-reaction. Self-judgment refers to self-assessment of the effectiveness and performance and causal attribution, while self-reaction refers to satisfaction and concluding the performance. The forethought phase affects the performance phase, which in turn affects the self-actuation phase.

This model was chosen because its implementation leads to positive learning outcomes both in the PE domain (Kolovelonis, Goudas et al., 2010; 2011, 2012) and other academic domains (Dermitzaki et al., 2009; Zimmerman, 1998). Additionally, self-regulated learning promotes students' intrinsic motivation, self-efficacy, and satisfaction with the learning process (Kitsantas & Zimmerman, 1998). At the same time, a significant number of successful interventions which aimed at increasing PA (Araújo-Soares et al., 2009; McManus et al., 2008; Stone et al., 2003; Webber et al., 2008) have been conducted based on Bandura's (1982) social cognitive theory. The circular model of self-regulated learning is considered one of the most comprehensive models that interpret the self-regulation process taking place in educational settings (Kostaridou-Efklides, 2005) and can be adapted to specific contexts, such as PE. Furthermore, it emphasizes the use of social support (e.g., demonstration and feedback) and therefore emphasizes the role that the teacher can play in developing the self-regulation of his/her students. This is the main reason that the circular model has been the framework for the implementation of teaching approaches and practical applications for developing self-regulated learning in the PE domain (Goudas, Kolovelonis, & Dermitzaki, 2013; Kitsantas, Kolovelonis, Gorozidis, & Kosmidou, 2018).

Self-regulated learning is not an automatic process, on the contrary, it requires time and effort on behalf of students (Rasku-Puttonen et al., 2003). Although all the processes included in the three phases make a decisive contribution to self-regulated learning, goal setting which is a dominant process in the forethought phase, self-observation and self-recording which are processes used in the performance phase help more effectively in this direction (Kolovelonis, et al., 2010; 2011; Zimmerman & Kitsantas, 2005). These two processes contribute decisively to the self-regulation of behaviour that requires not only students to set goals correctly but also that they monitor and evaluate if those goals have been achieved (Carver & Scheier, 1998). Thus, self-regulated students monitor their performance, compare it to the goals they have set and react accordingly by continuing their efforts or changing methods and strategies (Schunk & Usher, 2013).

There are three types of goals: process, performance, and outcome goals. Process goals refer to the strategies or behaviours a person adopts during the task (Hardy & Jones, 1994). At this point has to be stressed that the process goals in the present study relate to the behaviours that students adopt in order to achieve a goal and resembles the plan of achieving a performance goal (e.g., I will do three sets of ten push-ups on Thursday afternoon after reading). Performance goals, on the other hand, refer to goals accomplishment or failure and emphasize personal improvement based on personal criteria (Hardy & Jones, 1994; Kingston & Hardy, 1997). Finally, outcome goals emphasize the result of performance involving social comparison (Kingston & Hardy, 1997) (e.g., who will make the most push-ups). It should be emphasized that an integral part of the goal-setting process is the creation of a plan that includes all the necessary steps that will help goals achievement. Self-recording is a self-monitoring process and refers to maintaining a learning or performance record (Zimmerman & Paulsen, 1995). Findings of studies in PE context (Kolovelonis & Goudas, 2013; Kolovelonis, et al., 2011) indicated that self-recording has a positive effect on student's learning. Additionally, interventions in PE aimed at developing students' self-regulated learning of motor and sports' skills by adopting goal setting and self-recording as key processes have contributed positively to enhancing their performance (Goudas et al., 2017; Kolovelonis et al., 2012; Kolovelonis et al., 2012). It has to be stressed that there is an interaction between goal setting and self-monitoring as through self-monitoring students monitor and evaluate the achievement and/or failure of their learning and performance goals. (Petlichkoff, 2004) while on the other hand, the results of self-monitoring help the students to set realistic goals. Therefore, setting personal learning and performance goals, creating a plan to achieve those goals, and monitoring learning and/or performance in order to achieve the goals set are key components of enhancing self-regulated learning and performance. Simultaneously, these processes, along with the positive environmental impact (e.g., parental involvement), can be key components of promoting self-regulated behavior (Bandura, 1986), such as the adoption of after school PA. For these reasons, these processes formed the basis of the development of the program described below.

The purpose of the program

Based on the findings of the literature review, the findings of relevant school-based interventions and the theoretical background of the socio-cognitive model of self-regulated learning, the program "After school exercise" was developed. The purpose of the program is to promote the participation of fifth and sixth graders in after school PA.

Description of the program

For the implementation of the program, the researchers took into account the recommendations of Dobbins and his colleagues (2013). Specifically, the structure of the program includes the following strategies.

Modification of the curriculum and use of printed educational materials. The results of the systematic review (Dobbins et al., 2013) indicated that previous studies that were effective in increasing the rate and duration of students' PA modified the curriculum and used printed educational materials. For this reason, a series of 15 sessions have been designed. Respective plans were incorporated into the teacher's textbook, which additionally included information to help PE teachers implement the program more effectively. At the same time, both the teacher's textbook and the student's workbook included information on the goals of the program, the health benefits of the PA, the benefits of goal setting theory and its effective implementation. Finally, both books contained information on what the PA is and what the basic physical qualities are, along with useful practical applications for their practice. In this way, the researchers aimed to motivate students to participate in PA by including not only activities that promote physical fitness (e.g., endurance, strength, etc.) but also cognitive skills to design a simple plan of PA.

Knowledge and awareness of students. Accordingly, the student's workbook included information related to the benefits of exercise in the human body, recommended by the WHO levels of exercise, fitness and its characteristics. The findings of a study (Zakarian et al., 1994) indicated that students' information and awareness of the perceived benefits of PA have a significant impact on their motivation for engaging in PA. Similarly, the incorporation in the PE lesson health-related knowledge foster students' participation in after school PA (Chen et al., 2017; Wang, & Chen, 2019). For this reason, researchers have incorporated information about the beneficial effects of exercise on the human body. The emphasis was also on increasing the time involved in PA by adopting activities of daily living (e.g., walking to and from school, using the stairway at home instead of the elevator, etc.).

Self-regulated learning strategies. Researchers designed the program based on strategies of self-regulated learning. More specifically, process and performance goals, self-monitoring, self-recording strategies, and self-evaluation, and were used. The program included process goals mainly because they help individuals to develop those skills and strategies that are useful to achieve their goals (Taylor & Wilson, 2005). However, performance goals were used as well. An example of a combined application of these strategies in this program is as follows: Students are asked to choose from three differentiated activities for curl-ups and perform one of them. Then they are asked to record their performance on a table. Then based on this performance, they are asked to set a performance goal that they should achieve after two months and record it. In the following sessions, they are prompted to plan activities (set process goals) to strengthen their abdominal muscles. Two months later they repeat the same activity and check whether they have achieved their goal (self-evaluation) and try to give a rational explanation for the main reason that led to that performance (causal attribution). This method has been used successfully in several studies aimed at developing students' life-skills (Goudas et al., 2006; Goudas & Giannoudis, 2008; Papacharisis et al., 2005)

Differentiate the difficulty of activities. Findings of a study indicated that the inclusion in the PE settings activities commensurate with students' skills promotes students' autonomy (Byra, Sanchez, & Wallhead, 2014). Researchers (Hagger & Chatzisarantis, 2007; Theodorakis et al., 2007) also argued that PE teachers deliver their lesson by including activities commensurate with students' skills and promoting their autonomy is likely to help students to develop the sense of success and therefore positive attitudes towards the lesson. It is well-documented that activities promote students' sense of accomplishment foster also their satisfaction. Researchers have also emphasized that students' sense of being able to engage in PA promotes their intrinsic motivation and therefore their positive attitude towards PA (Zhang et al., 2011). Based on all of the above, the researchers designed the lessons so that students could choose an activity commensurate with their skills from a pool of three

activities of varying degrees of difficulty and practice both during class and in their spare time. For example, in order to strengthen their abdominal and back muscles, students can choose from three different activities (for each muscle group) of a progressive degree of difficulty and practice during PE lessons. They are also invited to adopt these activities in their spare time (e.g., practising curl-ups after reading music).

Simple activities. Researchers attempted to include simple activities that they do not need special equipment and space. The main reason was the findings of previous studies which indicated that factors such as the lack and/or the cost of sports equipment as well as the lack of sports facilities in their neighbourhood have been reported as deterrent factors for student participation in PA (Lovell et al., 2010; Moore, 2010). Therefore, students can adopt activities such as stretching, curl-ups, dorsal raise, and push-ups and practice these activities even at home listening to music or at the break of reading. Thus, barriers such as lack of sports facilities in their neighbourhood and parental limited involvement were eliminated. It is worth noting that during the implementation of the program students will be encouraged to engage in daily activities such as walking or cycling to and from school, using the stairway instead of the lift in order to increase the time for aerobic exercise. Because the adoption by students of such healthy habits will be beneficial for their health. After all, WHO (2010) reports that increasing the time allocated for PA, even if the allocated does not meet the WHO's recommendation, may have beneficial effects on their health.

Parental involvement. The program was developed aimed at involving significant others on the implementation of the program. For this reason, at the end of each session, teachers are invited to encourage students to inform their family and/or friends about the knowledge they have gained in the lesson and to read along with them the relevant information from the student's workbook. At the same time, they are prompted to ask their parents, siblings, and friends to try to perform the activities they learned in the lesson. The main reason for this is that the findings of previous studies suggested that parents' and friends' support (Dobbins et al., 2013; Prochaska et al., 2002; Lindqvist et al., 2015) is positively related to children's PA. For example, students are asked to inform their parents about the purpose of the program and the benefits of the exercise to their health and to read along with them the relevant information from the student's workbook. Finally, they are asked to choose one of the proposed in the lesson activities (e.g., walking, running, cycling to and from school, abdominal strengthening, etc.) and practice with their parents, siblings and/or their friends during their spare time.

Conclusion

The present study aimed to describe the rationale of the structure of a program that aims not only to motivate students to engage in after school PA but it will provide them with the relative knowledge to design and evaluate a personal exercise program. Raising students' awareness of the benefits of PA for their health and helping them integrate it into their daily lives may to embrace PA as a lifelong habit. Even if students do not manage to incorporate PA into their daily lives to meet WHO's recommendations and simply increase their time to participate in PA this will be beneficial to their health. In any case, increasing the time students participate in PA will benefit both their health and the community as a whole.

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