



Goran V. Šekeljić¹, Milovan V. Stamatović
University of Kragujevac, Teacher Training Faculty in Užice

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The Volume and Intensity of Motor Activity in the Physical Education Classes²

Extended summary

The realisation of the majority of objectives of physical education classes is based on the motor activity of students. Previous studies showed that the activity of students during classes is very low (Božović, 2011; Đokić, 2014; Marković et al., 2012; McKenzie, 2006; Pavlović, 2016; Petrović, 2010; Simonsmorton et al., 1994), which means that educational technologies must be continually improved to make the quality of teaching better. Measuring physical activity with a stopwatch and measuring the heart rate, followed by creating a physiological load curve based on the obtained data has been the most frequently used method for monitoring physiological load of pupils in classes. In practice, primary school teachers rarely apply this method because a more complicated procedure which such monitoring requires makes it difficult to do the exercises in class. For the purposes of his research, McKenzie (McKenzie, 2006) used the SOFIT system for monitoring children's activities in a physical education class. In more than 2000 schools the activity of children amounted to 37% during a class. Owing to active curricula, improved teacher competencies, and the changed stages in physical education classes, which became possible because of the modern monitoring of class effects, time spent in active exercising increased by 18%. This research showed that, based on the data available during a class, it is *de facto* possible to make an impact on the lesson stages and outcomes.

Three goals were set for our research:

1. To determine how much physical education classes contribute to a necessary daily amount of physical activity of children of 13000-15000 steps for boys and 11000-

1 gsekeljic@sbb.rs

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13000 steps for girls, as recommended by Tudor and Locke and their associates (Tudor-Locke et al., 2011), with the aim of health improvement;

2. To determine if there are any significant differences in the number of steps relative to different disciplines (athletics, gymnastics, elementary games);
3. To determine whether the information on the number of covered steps, available to primary school teachers during and after physical activities, has any influence on the increased active time of pupils during a physical education lesson.

Pupils' activity and the number of realised steps were monitored by applying an operational, longitudinal case study. The monitoring of their activity was conducted by using the OMRON XJ-203-ED pedometer. The monitoring of one male student and one female student of the first grade of primary school, age 8, was carried out over a period of three months and during thirty-five classes of physical education. The lesson contents encompassed different thematic areas. Ten gymnastics, 12 elementary games, and 13 athletics lessons were monitored. All lessons were held in the gym and in the school playground. The boy was 129 cm tall, he had 28 kg and his average length of steps was 65 cm. The girl was 125 cm tall, her body mass was 26 kg, and the average length of her steps was 57 cm.

According to the research results, the respondents realised between 2013 and 4875 steps. They covered the distance ranging between 1309 and 2490 meters. The average intensity of activity during a class was over 80 steps per minute. In performing the activities, they reached the intensity of physical activity in the value of $\cong 2$ MET, which means that the consumption was $\text{ml} \cong 7\text{O}_2/\text{kg}/\text{min}$ or $\cong 2$ kcal/kg/min. The average number of steps in gymnastics class was 2254 steps or 1465 metres for the boy and 2404 steps or 1370 metres for the girl. The average active time expressed in percentage was 51% for the boy and 55% for the girl. The average number of steps in athletics class was 4721 steps or 3068 metres (boy) and 4430 steps or 2525 metres (girl). The average active time expressed in percentage was 75% for the boy and 73% for the girl. The average number of steps in elementary games class was 4545 steps or 2954 metres for the boy and 4302 steps or 2450 metres for the girl. The average active time was 73% for the boy and 70% for the girl. The primary school teachers involved in the research claim that the information obtained by using a pedometer helps them to plan their lessons and that the data on the number of covered steps can help them evaluate the quality of their lessons in terms of students' physiological load.

Keywords: physical education, pedometer, steps, physiological load.

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