# The Restructuring of the Physical Education Class and the Impact of Modern Technology on the Optimization of the Motor Capacity of Students from Rural Areas


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**Abstract**

**Introduction.** The evolution of technology forces us to keep up with the modern and the innovative. That can be used for a practical purpose, namely, to practice physical exercises, thus fulfilling the desire to access modern technology among students. The use of modern equipment in order to carry out some motor actions and improve physical development represents a good way of using technology, not only the one for which he opts, thus attracting the student of the 21st century to combine the use of technology with the practice of physical exercises, both during the physical education class, as well as in free time. The purpose of the research was to identify the impact of physical exercises, taught through modern technology, on the motor capacity of students from rural areas.

**Method.** The research consisted in the introduction, in each physical education class, of some work programs based on interactive technologies depending on the theme of the classes. These were used as aids in the fundamental part of the class and the exercises were projected on a screen. The research subjects (n=37, age 10±1.5) participated twice a week, for 20 weeks, and have been tested before and after applying the work schedules. The tests were focused on reaction and execution speed, segmental flexibility, static balance, and abdominal strength. The statistical analysis of the data was carried out with the SPSS program, v.24. The research results highlighted significant differences between the two tests ($p<0.05$), and the work programs were validated from a statistical point of view.



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**Conclusions.** The development of the programs was carried out to mitigate this tendency by engaging the students and not only in an active lifestyle, which means systematic moderate physical effort, in secondary school students, from rural areas, applied exercises have a positive effect on their motor capacity.

***Keywords***: *motor capacities, physical education, technology, rural.*

## 1. Introduction

The introduction of modern technology in education had a strong impact, even if its manifestations were somewhat different. In the study "Exploring physical education teachers' perceptions and attitudes towards digital technology in outdoor education", in the Swedish educational system, outdoor physical education is of great importance. This study is about what physical education teachers think about modern technology in outdoor physical education. Their perceptions about modern technology in outdoor physical education depend on: what the students need, the gadgets used and what the teachers want to address in the respective class.

These rules are reported as a relationship between the practice of outdoor exercises and the curriculum changes that intervene in the Swedish educational system. (Karlsson et al., 2022). As the Internet is increasingly used and almost indispensable, just like physical education, students are starting to get familiar with it, using it to improve sports results. Also, the results obtained are surprisingly good.

The introduction of modern technology in physical education has many benefits, having a positive role in the evolution of students in physical education class and beyond. (An, 2018). The introduction of modern technology has an extremely important role in the educational system, supporting the evaluation process, increasing sports performances, increasing student motivation, and supporting the physical education teacher, if there is an imbalance in the use of technology and the evaluation of students in physical education class. (Edginton et al., 2016).

Unfortunately, physical activity is not a priority in schools, the priority being the subjects that require an incorrect posture, caused by the multitude of curricular activities, but also extracurricular ones, children being forced to have incorrect postures, both at the table, at school, and also at home, during homework. (Heikinaro-Johansson et al., 2014).

## 2. Method

### *2.1. Experimental design*

The research assumed the introduction in each physical education class of some work programs based on interactive technologies depending on the theme of the classes, these being used as aids in the fundamental part of the class, depending on the themes and objectives. The subjects of the research were 37 students from the rural area who participated twice a week at the physical education class based on interactive technology. They were tested before and after applying the working program (after 20 weeks) with special tests from the Eurofit assessment program (to evaluate some of the motor capacity skills like balance, speed execution, flexibility, strength, and agility). The subjects voluntarily participated in this research and the informed consent of the guardians was signed.

The statistical analysis of the data was carried out through the SPSS program, version 26, the calculated parameters being the arithmetic mean, the standard deviation, the minimum value, the maximum value. To test the null hypothesis, we used the Wilcoxon test for dependent samples, observing whether there are significant differences between the pre- and posttest means.

**Table 2.** Wilcoxon Signed Ranks

| Ranks | | | | |
|---|---|---|---|---|
| | | *N* | *Mean Rank* | *Sum of Ranks* |
| Weight | Negative Ranks | 0[a] | .00 | .00 |
| | Positive Ranks | 0[b] | .00 | .00 |
| | Ties | 37[c] | | |
| | Total | 37 | | |
| Height | Negative Ranks | 0[d] | .00 | .00 |
| | Positive Ranks | 0[e] | .00 | .00 |
| | Ties | 37[f] | | |
| | Total | 37 | | |
| Flamingo balance test | Negative Ranks | 8[g] | 4.50 | 36.00 |

| Ranks | | | | |
|---|---|---|---|---|
| | | *N* | *Mean Rank* | *Sum of Ranks* |
| | Positive Ranks | 0[h] | .00 | .00 |
| | Ties | 29[i] | | |
| | Total | 37 | | |
| Touch the tiles | Negative Ranks | 36[j] | 19.26 | 693.50 |
| | Positive Ranks | 1[k] | 9.50 | 9.50 |
| | Ties | 0[l] | | |
| | Total | 37 | | |
| Flexibility test | Negative Ranks | 2[m] | 9.00 | 18.00 |
| | Positive Ranks | 29[n] | 16.48 | 478.00 |
| | Ties | 6[o] | | |
| | Total | 37 | | |
| Standing long jump | Negative Ranks | 2[p] | 10.25 | 20.50 |
| | Positive Ranks | 33[q] | 18.47 | 609.50 |
| | Ties | 2[r] | | |
| | Total | 37 | | |
| Lifting the trunk from the supine position | Negative Ranks | 1[s] | 8.50 | 8.50 |
| | Positive Ranks | 34[t] | 18.28 | 621.50 |
| | Ties | 2[u] | | |
| | Total | 37 | | |
| Hanging test | Negative Ranks | 3[v] | 12.17 | 36.50 |
| | Positive Ranks | 34[w] | 19.60 | 666.50 |
| | Ties | 0[x] | | |
| | Total | 37 | | |
| Race 10x5 m | Negative Ranks | 32[y] | 20.00 | 640.00 |
| | Positive Ranks | 5[z] | 12.60 | 63.00 |
| | Ties | 0[aa] | | |
| | Total | 37 | | |

**Table 2.** Descriptive statisctic of the results

| | **Pretest (n=24)** | **Posttest (n=24)** | **P** | **Z** |
|---|---|---|---|---|
| Age | 10 (±0.5) | 10.81(±0.5) | 1.00 | 0.000 |
| Weight | 54.22 (±7.53) | 54.21 (±7.54) | 1.00 | 0.000 |
| Height | 1.65 (±0.03) | 1.65 (±0.03) | 1.00 | 0.000 |
| Flamingo test | 0.43 (±0.76) | 0.13 (±0.34) | 0.009 | -2.598 |
| Touch the tiles test | 113.73 (±14.90 ) | 106 (±12.11) | 0.000 | -5.165 |
| Flexibility test | 17.68 (±4,74) | 18.91 (±4.57) | 0.000 | -4.618 |
| Long Jump | 151.27 (±28.35) | 154.81 (±27.83) | 0.000 | -4.853 |
| Abs | 19.54 (±4.65) | 21.43 (±4.49) | 0.000 | -5.089 |
| Hanging Test | 83.14 (±124.64) | 96.00 (±131.99) | 0.000 | -4.757 |
| Race 10x5m | 232.97 (±20.10) | 222.81 (±24.15) | 0.000 | -4.354 |

### *2.2. Part of the working program*

The training programs offered to students are part of various applications downloaded on the mobile phone such as:

“365 games”, where students can enjoy a multitude of games designed for motor skills and qualities, such as:

- games for balance
- games in pairs (football in pairs: in this version of the football game, the players are teamed in pairs, hold hands and play together. It is optimal for each team to be made up of three or four pairs depending on the size of the field play. The rules are the official rules of the football game and may change depending on the situation. The team that scores the most goals wins.
- running games
- games for jumping (sack race: players are put in bags with their feet and hold the edge with their hands, from the beginning of the race to the end. The one who crosses the finish line first wins.
- games for throwing and catching (the ball to the captain: the players are divided into two columns, and in front of each column, a student holding a ball will be seated facing the players. He will throw the ball to each of his players. After the ball it was caught by the first player in the column, he will throw it back to the captain, then squat down as quickly as possible to facilitate throwing the ball as quickly as possible to the next player in the column until the ball reaches the last player When the ball has reached the last student in the column, he will quickly come forward, becoming the captain. The team with the most captains wins.
- games for farming,
- push games
- team games (the players are divided in pairs, a few steps apart, in as many teams as possible. One player from each team will hold a ball and the other a cone. The one holding the ball will have to throw it so that it enters the colleague's cone. When the ball entered the cone, they will move a few meters apart. The team that moved the farthest wins.

- individual games
- games in different work formations
- funny games (hot potato: it is a funny game for children. The players must form a circle and throw the ball from one to the other slowly. At the "hot potato" signal, the players will very quickly throw the ball from one to the other, so that there is very little contact with it. Whoever drops the ball receives the penalty of 5 squats.

**3. Results**

The descriptive and inferential statistics of the data can be found in Table 1. Thus, at the initial testing, an average body mass value of 54.22 (±7.53kg) is observed, with the values oscillating between 39 and 70 kg. After applying the work program, the average value is 54.21 (±7.54Kg), the values being between 40 and 70 kg. A Wilcoxon signed-rank test showed that a 20-week working program did not show a statistically significant change in weight (Z=0.000; p=1.00). The height registers an average value of 1.65 ((±0.3m) and at the final testing this parameter does not register significant changes (Z=0.000, p=1.00).

Unipodal balance testing recorded an average imbalance value of 0.43 (±0.76) at initial testing, with values ranging between 0 and 3 imbalances. After applying the work schedule, the average value is 0.13 (±0.34), the values being between 0 and 1 imbalance. A Wilcoxon signed-rank test showed that a 20-week working program elicited a statistically significant change in balance (Z=-2.598; p=0.00).

Testing the touches of the tiles, recorded in the initial testing a mean value of 113.73 (±14.90touches), the values oscillating between 81 and 140 touches. After applying the working program, the mean value was 106.75 (±12.11), the values being between 80 and 132 touches. The Wilcoxon signed-rank test showed that the applied working program got a statistically significant change in "touch the tiles" test (Z=-5.16; p=0.00).

On the flexibility test (sit and reach test), at the initial testing was recorded a mean value of 17.68 (±4.74 cm), the values oscillating between 6 and 27 cm. The Wilcoxon signed-rank test showed that the applied working program got a statistically significant change in Flexibility (Z=-4.61; p=0.00).

Testing the standing long jump a value of 151.27 (±28.35cm) was recorded during the initial testing. After applying the working program, the mean value was 154.81 (±27.83cm), with the minimum and maximum value between 90 and 202 cm. The Wilcoxon signed-rank test showed that a 20-week working program got a statistically significant change in strength on lower limbs (Z=-4.85; p=0.00).

The trunk lifting test from the lying-dorsal position recorded an average value of the trunk lifting of 19.54 (±4.65) at the initial test. After applying the working program, the average value was 21.43 (±4.49), the values being between 10 and 30 trunk lifts. A Wilcoxon signed-rank test showed that a 20-week working program got a statistically significant change in abdominal strength (Z=-5.08; p=0.00).

The Kept Hanging test recorded a mean value of 83.14 (±124.60) at initial testing. After applying the working program, the average value is 96.00 (±131.99s), the average values being between 5 and 550. The Wilcoxon signed-rank test showed that 20 weeks working program got a statistically significant change in arms strength (Z=- 4.75; p=0.00).

On the 10x5 m shuttle race an average value of 232.97 (±20.10) was recorded in the initial test. After applying the working program, the mean value was 222.81 (±24.15), with the min and maximum between 185 and 315. The Wilcoxon signed-rank test showed that 20-weeks working program got a statistically significant change in students' agility (Z=- 4.35; p=0.00).

## 4. Disscution

Physical exercises contribute to a harmonious physical development, but also to a more efficient access to knowledge, which also contributes to the educational success of students. (Heikinaro-Johansson et al., 2014).

The degree of physical activity in schools is related to the practice of physical education. For years, schools have been trying to highlight the motor level of students through sports competitions. Similar results were also found in the study designed by Dobre et al. (2015), using in the PE lessons the movement games.

As a rule, physical activity is recommended as a benchmark in different sports, but also in school physical activity, in this environment, even children who are usually sedentary, perform physical activities at higher intensities. (McKenzie et al., 2009). Lately, we can see that the reduced physical activity of the population has caused major changes in the quality of life. Since society requires us to have a certain lifestyle, it is necessary to repeatedly carry out physical training and sports activities.

Society obliges us to capitalize on both our personality and mental health by practicing physical exercises. The basic benchmark of humanity is represented by physical health and mental health. (Cristea, 2010). There must be a close relationship between physical exercises performed regularly and mental health, sports offering a multitude of benefits necessary for human health that prevent various diseases and increase the quality of life. (Williams at al., 2012).

Currently, the introduction of modern technology in the educational system increases the academic level, improves the psychological level, the positive effects being numerous. (Mura et al., 2015).

Such systems that can be implemented in schools and have great appreciation in other countries are the HOPsport and Brain Breaks systems, used to keep students active, both physically and mentally during breaks, improving language, creativity and increasing physical performance. (Chin et al., 2013).

In order to be able to implement these systems, you only need the Internet, where students and teachers can access various videos. It can be said, however, that more studies are needed to combat sedentarism and to increase the level of physical activity among young people and students in many countries. (Kueh et al., 2018).

Technology is part of the modern life of students. Sedentarism is associated with the use of technological devices, such as the computer on different games or video clips and less in doing homework. This unhealthy behaviour leads to a sedentary lifestyle if it is not used for purposes that can improve physical and mental performance. Many studies have shown that technology can also be used for useful purposes, growing together with the physical activity and academic performance of young students, promoting a healthy lifestyle and a healthy lifestyle. (Bilgrami et al., 2017).

Interactive video games based on physical exercises arouse the students' interest in the class and in the involvement in the physical act. (Hall et al., 2015). In schools, the implementation of technology can appear as a motivation for practicing physical exercises. Modern technology in schools has a multitude of benefits, positively influences pedagogical strategies, can serve to help the physical education teacher's efforts, and can facilitate the assessment of young students, the positive effects being countless if there is a balance in its use. (Edginton et al., 2016)

Physical activity has a huge impact on children's growth and development. Despite the increasing number of studies emphasizing the positive effects of physical activity in children (Donnelly et al., 2016), this is not consistently practiced by students.

The research results showed that the applied work programs, based on interactive technology, had a positive impact on the development of some components of the motor capacity (balance, flexibility, strength, and speed).

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