

# Wellness Culture Benchmarking at Preliminary School Bulgarian

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**Abstract:** *The School Wellness Division is regulated by legislative changes in school education, in particular the expected competencies. Key Competence No. 9 requires knowledge, skills for sustainable development, implementation of a healthy lifestyle and sports. In response to the regulations and our motivation from the participation in the project "Building and developing the Center of Excellence" Heritage BG, we are developing a dissertation for the degree of "Doctor of Science" on "Benchmarking of Wellness Culture in Bulgarian schools" in within the project.*

**Keywords:** motor potential, indicators of student mobility, functional activity, a lesson in physical education and sports

**Ключови думи:** двигателен потенциал, индикатори за подвижността на учениците, функционална активност, часове по физическо възпитание



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## INTRODUCTION

In each pedagogical activity, students are constantly evaluated and comparative analyzes are made in terms of certain achievements and results<sup>1,2,3,4</sup>. It is important that modern assessment tools are objective and allow the presentation of a standard<sup>5,6,7</sup>. Traditionally, the normative requirements have a dynamic nature, which allows for change according to social conditions<sup>8,9,10</sup>. The current needs are harmonized with legislative changes and normative documents in the field of physical culture of adolescents<sup>11, 12</sup>.<sup>13</sup>. In the field of pedagogy, the assessment of the achievements, for the acquired knowledge and skills of the students, of their behavior of concrete motor results is institutionalised. Such an assessment is given on the basis of normative requirements: the assessment on a regulated scale, with specific knowledge, relevant motor skills and level of motor activity<sup>14,15</sup>. The subject of Physical Education and Sport in school has been repeatedly upgraded, and the positive directions are undoubtedly the result of research activities of sports educators in the field of physical culture<sup>16</sup>. The results of the pedagogical research reflect the real state of motor activity of the studied students. They are a complex indicator of the activity of teachers in the lesson on PES<sup>17</sup>. This will affect the

development of motor skills of students, resulting in changes in their motor capacity. The state of motor activity in sports and pedagogical practice is judged by establishing the level of development of motor capacity<sup>18</sup>. The characteristics of motor fitness are that it is objectively measurable with the help of tools, which determines the control and the culture of quality in management. Based on the results obtained, we make a quantitative and qualitative analysis, according to the tasks in the lesson on PES.

## METHODS

The motor capacity of 300 students was studied, and this report presents a pilot experiment of 125 students, of which 62 girls and 63 boys – 10-11 years old. For the purpose of the study, two groups were formed, evenly distributed by gender – girls (49 %) and boys (51 %).

*Purpose* – to establish and assess the level of physical activity at the beginning of the school year of students from the initial stage of the basic educational degree in the PES lesson and compare with the level of physical fitness of students at the end of the school year by analyzing learning outcomes within the study period. The indicators that allow harmonization and individualization of the differences in the motor potential between the collected empirical data from the beginning-end of the studied period are analyzed. Scientific conclusions will establish the presence or absence of dynamics in motor capacity. Measurement of the motor potential was carried out in the period – 01.09.2020. – 30.06.2021 To establish the relationship between the indicators, an analysis of the dynamics is applied through mathematical and statistical processing to derive coefficients

of variation and correlation<sup>19</sup>. The correlation coefficient of the studied indicators is obtained with the capabilities of the program: Excel-Data – Data Analysis – Correlation. We express the correlation coefficient by the Pearson-Brave index.

## RESULTS

Based on empirical data from Test 1 / entry-level/, it is possible to make reasoned and substantiated conclusions about the degree of motor activity. The obtained results are used to compile a frequency table.

**Table 1.** Frequency table – distribution of results – Test 1

№	X	F	$\bar{f}$	$\bar{F}$
X1	10	2	0.08	0.08
X2	12	3	0.04	0.12
X3	15	4	0.04	0.16
X4	16	5	0.04	0.20
X5	20	6	0.04	0.24
X6	23	7	0.04	0.28
X7	24	10	0.12	0.40
X8	25	13	0.12	0.52
X9	26	15	0.08	0.6
X10	27	19	0.16	0.76
X11	28	25	0.24	1

### Key:

X – Number of points

F – Accumulated absolute frequencies corresponding to the individual values of X

$\bar{f}$  – relative frequencies of the individual values of X

$\bar{F}$  – accumulated relative frequencies corresponding to the individual values of X

<sup>1</sup> Veselinov 2021.

<sup>2</sup> Dimitrova et al. 2021.

<sup>3</sup> Ignatova, Iliev 2020: 16-44.

<sup>4</sup> Dimitrova et al. 2018.

<sup>5</sup> Dimitrova 2020.

<sup>6</sup> Donev et al. 2019.

<sup>7</sup> Kostov et al. 2005: 29-35.

<sup>8</sup> Nesheva 2019: 140.

<sup>9</sup> Ivanova 2019.

<sup>10</sup> Trendafilov 2013.

<sup>11</sup> Dimitrova 2019: 143-149.

<sup>12</sup> Kostov 2013.

<sup>13</sup> Momchilova 2011: 23-29.

<sup>14</sup> Nesheva 2020.

<sup>15</sup> Konchev 2019.

<sup>16</sup> Popov 2003: 33-39.

<sup>17</sup> Subject PES: the subject of physical education and sports in the school curricula of Bulgaria.

<sup>18</sup> Ignatova et al. 2020.

<sup>19</sup> Nikolov 2011.

From the data in the frequency table, the individual groups of students stand out depending on the results for physical activity. With the highest absolute frequency:

- X11 – 25 % of students received a maximum number of points – 28
- X10 – 19 % received 27 points each

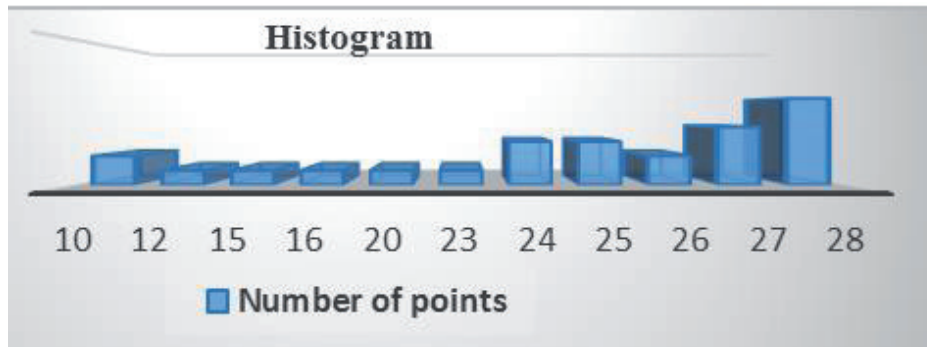


Figure 1. Histogram – Graphical interpretation of the absolute frequency of the quantities

The histogram presents the distribution in each group of points corresponding to the achieved results.

**Percentile analysis** – serves to prepare a standard for performing tests.

Table 2. Three-stage standard – Test battery 1

Norm limits	%	Stages
From 10 to 23 points	28	students which had difficulties
From 24 to 26 points	32	partly coped students
From 27 to 28 points	40	coped students

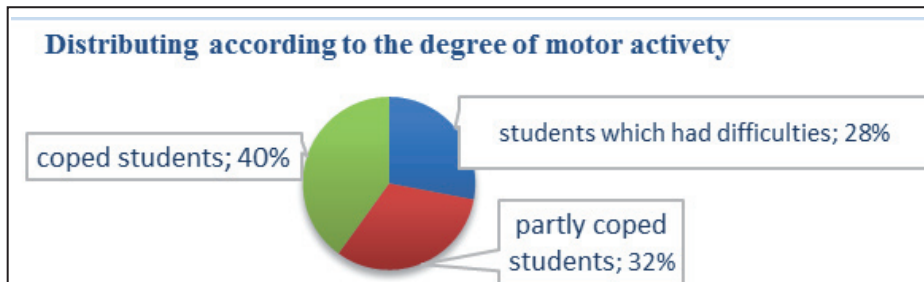


Figure 2. Pie chart according to skill level – Test-battery 1

The research shows the achievements and the main difficulties of the students at the level of motor activity – entry-level.

The poor results and achievements of the other students allow us to draw the following conclusions:

- Students have little difficulty in taking the test due to poor motor capacity.
- A small number of students make mistakes in the technique of performance or poorly mastered technique of motor exercise.

The above achievements and mistakes are based on the following facts: 28 % showed a low level of regulation. These students have gaps in the skills for technical performance and development of motor skills.

**Analysis of results – Test 2**

Based on the collected empirical data from Test 2, the following reasoned and substantiated conclusions were made about the degree of motor activity. The results are used to compile the following frequency table.

**Table 3 .** Frequency table – distribution of results  
– Test 2

<b>N<sub>o</sub></b>	<b>X</b>	<b>F</b>	<b><math>\bar{f}</math></b>	<b><math>\bar{F}</math></b>
<b>X1</b>	<b>16</b>	<b>3</b>	<b>0.12</b>	<b>0.12</b>
<b>X2</b>	<b>22</b>	<b>5</b>	<b>0.08</b>	<b>0.2</b>
<b>X3</b>	<b>23</b>	<b>7</b>	<b>0.08</b>	<b>0.28</b>
<b>X4</b>	<b>24</b>	<b>8</b>	<b>0.04</b>	<b>0.32</b>
<b>X5</b>	<b>26</b>	<b>11</b>	<b>0.12</b>	<b>0.44</b>
<b>X6</b>	<b>27</b>	<b>17</b>	<b>0.24</b>	<b>0.68</b>
<b>X7</b>	<b>28</b>	<b>25</b>	<b>0.32</b>	<b>1</b>

**Key:**  
**X** – Number of points  
**F** – Accumulated absolute frequencies corresponding to the individual values of X  
 $\bar{f}$  – relative frequencies of the individual values of X  
 $\bar{F}$  – accumulated relative frequencies corresponding to the individual values of X

The frequency table shows:  
 • 25 % of students have achieved a maximum number of points 28  
 • 17 % received 27 points each  
 The constructed histogram presents a

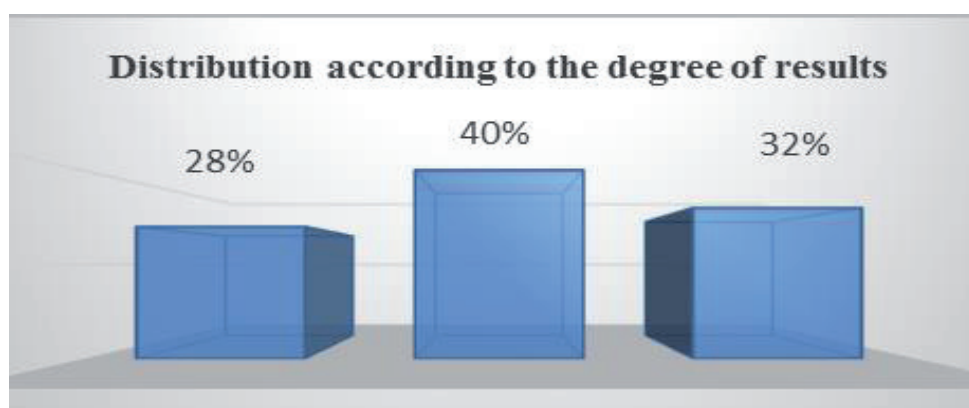
graphical interpretation of the absolute frequency of the quantities.

**Percentile analysis** – Calculating the statistical indicators, the following three-level norm was obtained.

**Table 4.** Three-stage standard – Test battery 2

<b>Norm limits</b>	<b>%</b>	<b>Stages</b>
<b>From 9 to 23 points</b>	<b>28</b>	<b>students which had difficulties</b>
<b>From 24 to 27 points</b>	<b>40</b>	<b>partly coped students</b>
<b>28 points</b>	<b>32</b>	<b>coped students</b>

The bar graph and pie chart illustrate the distribution of students according to the degree of test battery results 2.



**Figure 3.** Bar graph – Test-battery 2

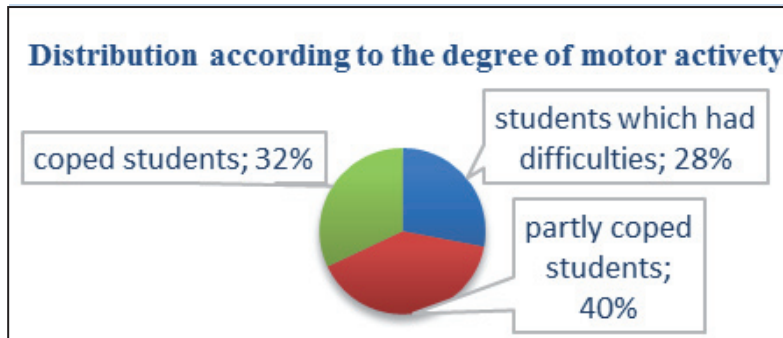


Figure 4. Pie chart – distribution according to the degree of results – Test 2

The results show: 28 % of all students showed a low level of norm. These students have specific gaps in the skills to master the technique of performing a particular exercise and encounter difficulties due to specific deficits. There is hesitation and specific inaccuracies in the implementation of the exercise. 40 % of all students have achieved an average level of norm, and 32 % have allowed only one lower result. The analysis shows that a medium and high degree of motor activity predominates.

The admitted weaker results allow us to draw the following conclusions:

- Students have difficulty running 300 m.
- Difficulty in bouncing with both feet at the same time is reported.

The registered results in the implementation of Test 2 provide guidelines for more in-depth work to achieve a higher level of motor capacity.

**Benchmarking analysis** – determining the three-level normative level of motor activity

Table 5. Benchmarking results

Тест	Висока степен	Средна степен	Ниска степен
1	40 %	32 %	28 %
2	32 %	40 %	28 %

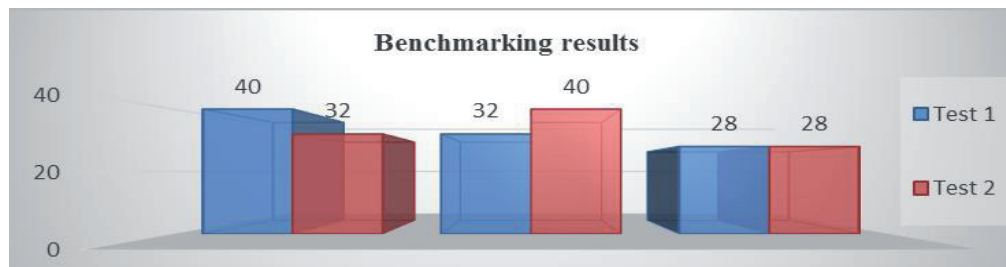


Figure 5. Histogram for the frequency distribution

The highest level of physical activity – 40 % of students have achieved in Test1. 32 % of the students achieved a high level of test 2. This shows that in most cases it is possible to work on the development of motor skills without difficulty. The above facts gave grounds for planning the upcoming work through targeted physical activity to improve motor capacity. Corrective measures to overcome the deficits: increase the daily work with students experiencing difficulties in the discipline PES.

**Correlation between results – Test 1 and Test 2**

It is a statistical method for estimating the forms and dependencies between the individual features. This makes it possible to draw conclusions about the relationships between the individual criteria that are the subject of the study, thus justifying the recommendations for future work.

Table 6. Dependence – Test 1 and Test 2

Xi	Yi	di	di <sup>2</sup>
0.57	0.79	-0.22	0.05
0.89	0.93	-0.04	0.00
1.00	1.00	0.00	0.00
0.86	0.96	-0.10	0.01
0.36	0.57	-0.26	0.07
0.96	0.96	0.00	0.00
0.86	0.93	-0.07	0.00
1.00	0.82	0.18	0.03
0.93	0.96	-0.03	0.00
0.96	1.00	-0.04	0.00
1.00	1.00	0.00	0.00
1.00	1.00	0.00	0.00
0.82	0.82	0.00	0.00
0.96	0.96	0.00	0.00
0.93	0.93	0.00	0.00
0.89	0.86	0.03	0.00
0.71	0.96	-0.25	0.06
1.00	1.00	0.00	0.00
0.89	1.00	-0.11	0.01
0.96	1.00	-0.04	0.00
0.36	0.57	-0.21	0.04
0.43	0.57	-0.14	0.02
0.53	0.79	-0.26	0.06
1.00	0.96	0.04	0.00
0.86	1.00	-0.14	0.02
20.73	22.34	-2.16	4.66
<b>r =</b>	<b>0.9982</b>		

**Key:**

Xi – results obtained from the diagnostic test – Test 1

Yi – results obtained from the diagnostic test – Test 2

di – the difference of the pairs of consecutive places of results

r – Correlation coefficient

From the data presented in Table 6, it can be seen that the Spearman correlation coefficient is 0.9982. Compared to the reference values, it can be said that the correlation dependence is very high.

Empirical data from diagnosing the degree of motor activity at the beginning and end of the conducted pedagogical research were processed using variational-statistical methods. The following characteristics are used:

The **arithmetic mean** –  $\bar{X}$  – is the most commonly used in research practice and is an indicator for the average level.

Calculated by the formula:

$$\bar{X} = \frac{\sum X}{n}, \text{ where:}$$

- $\Sigma x$  – sum of values
- $n$  – number of observations
- **Mode** – **Mo** – the most common assessment

by a group

- **Median** – **Me** – average value halving the ranking order of the values obtained from the measurement; it is most often used in small samples. When the data are distributed normally, the median coincides with the arithmetic mean.

Scattering indices that quantify the magnitude of the deviation from the mean. To measure statistical scatter, the indicators **range (R)**, **standard deviation ( $\sigma$ )** and **coefficient of variation (V%)**. **Standard deviation ( $\sigma$ )** is the most accurate and frequently used scattering indicator. He describes the magnitude of the deviation of the values of the variable from the arithmetic mean. The formula defining the standard deviation is:

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$$

- **N** – Number of students surveyed
- $\sigma = 1.32$  for Test Battery 1 /start/
- $\sigma = 0.70$  for Test Battery 2 /end/

The deviations obtained for both test batteries are low, which means that the data are grouped very close to the mean.

- **The symmetry of the distribution** is described by the asymmetry index (**As**), which in normal distribution is equal to zero (**As=0**).

- **The height of the peak** of the normal distribution is described by the excess indicator (**Ex**).

Table 7. Summary data of variation-statistical indicators

Indicator	Xmin	Xmax	R	$\bar{X}$	Mo	Me	$\sigma$	V $\sigma$	As	Ex
Test 1	2	6	4	5.20	6	6	1.32	25.38	-1.57	1.21
Indicator	Ymin	Ymax	R	$\bar{Y}$	Mo	Me	$\sigma$	V $\sigma$	As	Ex
Test 2	4	6	2	5.60	6	6	0.70	12.5	-1.53	1

After the analysis of the indicators carrying information about the motor activity – beginning/end of the research, the following summaries can be made:

- **Test 1** – results range from grade 2 to grade 6. The average grade is 5.20.

- **Test 2** – grades are from 4 to 6 and the average score is 5.60.

In both cases the coefficient of asymmetry has a negative sign, the arithmetic mean is less than the mode and the median.  $As = -1, 57 < 0$ ;  $Mo = Me > \bar{X}$  and  $As = -1, 53 < 0$ ;  $Mo = Me > \bar{Y}$

In the case of negative asymmetry, there are units with particularly small values of the sign, the curve is with the left shoulder extended. The scattering of individual traits in both studies remained broadly unchanged.

## DISCUSSION

According to the study, it is seen that students received grades in Test 2 – a high level of development of motor skills. The relationship between the two tests is very high, there is a visible improvement in the results at the end of the study. This is especially evident in the endurance test – running 300 m. It follows that in the course of the educational work on physical nutrition in girls

the speed and general support are improved. The values of the speed were measured with the 50 m Running test. remain high, indicating that speed capabilities are maintained at an optimal level. When comparing the results, an improvement was found at the end of the study. The best result was also monitored in the boys when throwing a solid ball, which shows that the strong strength of the body and the shoulder girdle in boys at this age develops best. In the jump test, an increase in the results is also observed.

## CONCLUSIONS

Summarising the analysis in this research the following regularities are revealed:

- The size of the annual growth varies from age to age, not the same for boys and girls.
- The multi-layered motor capacity of 11-year-old students shows uneven but continuous development, albeit at different rates.
- Motor indicators show intense dynamics in 10-12-year-olds, forming motor capacity.
- Specifics in the manifestation of motor indicators and their uneven distribution have been established.

The study was conducted using various methodologies. The standardization of tools and definitions is essential for scientific progress in the field of school wellness, ensuring smart growth.

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## Бенчмаркинг на уелнес култура в българското начално училище

Даринка Игнатова

Това изследване има за цел да установи и оцени съществуването на Wellness в началния етап на основната образователна степен, в рамките на училищното физическо възпитание. **Методи:** Извършен е бенчмаркинг на показателите, който позволява хармонизиране и индивидуализиране на разликите в двигателния потенциал между събраните данни от началото и края. Установено е присъствието на Wellness култура в българското основно училище. **Резултати:** показателите, носещи информация за изследваната двигателна активност от експеримента, са открити следните резултати: и в двата теста 1 и 2 коефициентът на асиметрия е с отрицателен знак, средната аритметична е по-малка от модата и медианата. **Дискусия:** коефициентът на корелация на Спирърман (0,992) е много висок и гарантира взаимозависимостта. **Заключение:** изследването показва по-високи оценки в тест 2, в края на изследвания период.

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