# Floors in the function of safety and manifestation of motor abilities of younger school students

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***Summary:*** *The goal of this research was to study safety influence and eventual differences in manifestation of younger school students speed in the conditions of most often used floors (grass, asphalt and parquet) for the realization of physical education lessons. The speed was evaluated by two standardized movement tasks, and these are: a 30 meter sprint running from a high start and punt running 3x10 meters. For the processing of the data the following methods were used: descriptive statistics, multivariant analysis of variance, discriminative analysis and univariant analysis of variance. The results indicate statistically significant differences between the results in relation to the floors for both studied sub samples. The results indicate their practical application in planning and realization of programme contents of physical education for younger students.*

***Key words:*** *floor, safety, evaluation, speed, younger school students*

## INTRODUCTION

Physical education teaching is essentially different in curricula and extra-curricular process from other subjects, primarily because of students' intensive motor activity, which is theirs [6].

For the security of all students during physical education lessons, for the protection of their physical integrity and health teacher is not only morally but also lawfully (by penal code) responsible. Security measures always have to be preventive, and they are related to the time before starting work with students, during direct body movement-exercise, and stop after all students leave the space where the planned curricula was realized.

Obligatory safety measures during physical education lesson are: health-hygienic measures, control of the technical accuracy of the equipment, exercise apparatus and the place for exercise, keeping and helping and order and discipline during the realization of the exercises [3, 6].

Out of many things that a physical education teacher has to check before starting a lesson is the checking of the gym floor or open court floor [6].

Inadequate floor of school courts is the most common cause for accidents.

Other researchers did the research of this problem using the sample of recreative sportsmen [1,7,9], and sportsmen [2,4,9], and very rarely on school age sample. The goal of the research was to research certain eventual differences in manifestation of speed of younger school age in conditions of most common floors *grass, asphalt, and parquet) for the realization of physical education lessons.

## METHOD OF WORK

The research was realized in primary school "Jovan Jovanovic Zmaj" in Svilajnac, republic of Serbia, in school year 2009/2010.

Two standardized movement tasks were applied for speed evaluation, and these are: a 30 metre high start running (M-30m) – for the evaluation of sprint speed and shuttle run 3x10m (M-3x10m) – for the evaluation of speed- agility (Ivanic, 1996). The evaluation of speed was realized on asphalt, grass and parquet.

In order to test the significance of differences of arithmetic middles for each group the following analysis were done: univariant analysis of variance (Anova), multivariant analysis of variance (Manova) and dicrminitavie analysis.

## RESEARCH RESULTS

By the insight in Table 1. of central and dispersive parameters of the running speed on three different floors, general thinking is that the results are homogeneous and that there are no parameters which recede from expected and possible values.

**Table 1**

**Central and dispersive parameters of the running speed of examinees on three different floors**

| Variables | M | SD | Error. | Min | Mah. | CV | Int. | pov. | Skj. | Kur. | KS-p |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M-30 m A | 62.12 | 4.55 | .70 | 55.0 | 72.00 | 7.32 | 60.70 | 63.54 | .69 | -.66 | .026 |
| M-30 m T | 62.93 | 10.06 | 1.55 | 60.0 | 73.00 | 5.79 | 59.79 | 66.06 | .35 | 2.76 | .023 |
| M-30 m P | 63.55 | 4.55 | .70 | 56.0 | 72.00 | 7.17 | 62.13 | 64.97 | .48 | -1.00 | .206 |
| M-3x10 m A | 89.98 | 4.26 | .66 | 83.0 | 100.00 | 4.73 | 88.65 | 91.30 | .68 | -.03 | .102 |
| M-3x10 m T | 91.86 | 4.59 | .71 | 84.0 | 102.00 | 5.00 | 90.43 | 93.29 | .42 | -.33 | .956 |
| M-3x10 m P | 95.79 | 5.73 | .88 | 86.0 | 110.00 | 5.98 | 94.00 | 97.57 | .45 | -.34 | .673 |

For a 30 metre running on three different floors the best time is for asphalt with 62,12 seconds. In shuttle run 3x10m the best time is also on asphalt with the time 89.98 seconds (Table 2).

**Table 2**

**Central and dispersive parameters of the running speed of female examinees on three different floors**

| Variables | M | SD | Error | Min. | Mah. | CV | Int. | pov. | Skj. | Kur. | KS-p |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M-30 m A | 66.38 | 2.82 | .42 | 62.00 | 75.00 | 4.24 | 65.53 | 67.22 | .87 | .48 | .059 |
| M-30 m T | 69.68 | 3.33 | .50 | 64.00 | 77.00 | 4.82 | 67.98 | 69.98 | .41 | -.71 | .465 |
| M-30 m P | 68.49 | 2.93 | .44 | 63.00 | 76.00 | 4.28 | 67.61 | 69.37 | .50 | -.37 | .193 |
| M-3x10 m A | 96.36 | 5.77 | .86 | 87.00 | 107.00 | 5.99 | 94.62 | 98.09 | .27 | -1.08 | .622 |
| M-3x10 m T | 98.49 | 6.08 | .91 | 89.00 | 112.00 | 6.17 | 96.66 | 100.32 | .38 | -.79 | .413 |
| M-3x10 m P | 102.09 | 7.00 | 1.04 | 91.00 | 116.00 | 6.85 | 99.99 | 104.19 | .29 | -.96 | .690 |

For a 30m running on three different floors the best time is on asphalt 66.38 seconds, and the worst result is on grass 69.68 seconds. In shuttle run 3x10m the best time is on asphalt 96.36 seconds and the worst result is on parquet 102.09 seconds.

**Table 3**

**Significance of differences in running speed of male and female examinees in relation to the floor**

| Analysis | n | F | p |
|---|---|---|---|
| Manova - 1 | 2 | 7.645 | .000 |
| Manova- 2 | 2 | 9.325 | .000 |
| Discriminative - 1 | 2 | 8.053 | .000 |
| Discriminative - 2 | 2 | 9.182 | .000 |

Multivariant analysis of variance indicates that between the results in running speed of male and female examinees, for two evaluated variables, in relation to floor there is statistically significant difference with the level of statistical significance of p=.000.

On the basis of the value of discriminative analysis for two evaluated variables there is statistically significant difference and clearly defined border between the running speed results of male and female examinees in relation to floor (Table 3.).

**Table 4**

**Significance of differences of running speed of male and female examinees in relation to the floor by variables**

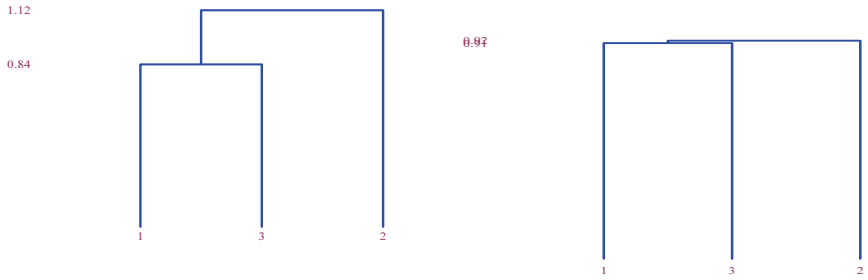
| Anova | F | p |
|---|---|---|
| A 30m running - 1 | .453 | .637 |
| A 30m running - 2 | 9.351 | .000 |
| Shuttle run3x10 м - 1 | 15.361 | .000 |
| Shuttle run 3x10 м - 2 | 9.513 | .000 |

On the basis of the value of univariant analysis of variance it can be stated that there is no statistically significant difference between the results of male examinees in a 30 meter running in relation to the floor. In shuttle run 3x10m, there is statistically significant difference with a level of statistical significance p=.000.

It can be stated that there is statistically significant difference for female examinees between running speed in a 30m running and shuttle run 3x10m in relation to the floor, with a level of statistical significance p=.000 (Table 4.).

**Dendogram 1 and 2**

**Grouping of the running speed results of male and female examinees in relation to the floor**

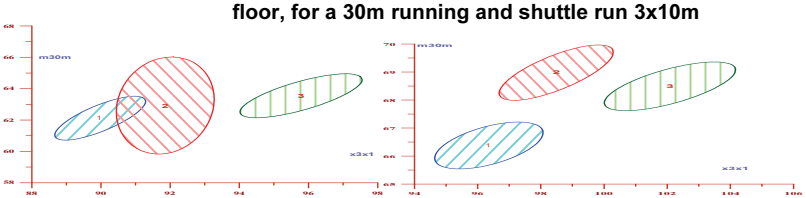



*Legend:* asphalt (1), grass(2), parquet (3).

On the basis of dendograms it can be seen that the closest result of running were realized on asphalt and parquet with a distance .84 for male examinees and .91 for female examinees. The biggest difference of running speed is between the results on asphalt and grass with a distance 1.12 for male examinees and .92 for female examinees.

**Graph 1 and 2**

**Elypsis (interval of trust), of running speed of male and female examinees in relation to floor, for a 30m running and shuttle run 3x10m**




*Legend:* asphalt (1), grass (2) and parquet (3); - shuttle run 3x10m (*m3xl)* and a 30m running (*m30m*).

On Graph 1. and 2. apcis (horizontal axis) is shuttle run 3x10m (m3x1), and ordinate (vertical axis) is a 30 m running (m30m).

It is possible to notice that for shuttle run 3x10m the fastest result is on asphalt both for male and female examinees. For a 30m run the fastest result is also on asphalt both for male and female examinees, and the lowest result was on parquet for male examinees and on grass for female examinees.

## CONCLUSION

The best results were achieved on asphalt for both sub samples in a 30m run and the weakest results were achieved on parquet.

The best results were achieved in a shuttle run 3x10m for both sub samples. The weakest results were achieved on parquet for male examinees and foe female examinees on grass. The results indicate that students use to spend more free time activities on grass.

Sand floor is becoming usual floor for school and sport courts which is irreplaceable for mini handball and volleyball. A study [9] compared energy consumption during running on the grass and during running on dry sand. Sand offers stronger energetic stimulus, i.e. demands higher level of energy consumption. Positive effects of sand floor as a way of energy stimulus can be seen in a study [4]

Different floors have also influence on loco motor apparatus, especially on feet curve. Load which is directed to feet curve is differently placed depending on the floors [2] Different hardness on the floors influence economy of running [1].

General statement is that the knowledge about different floors,. their hardness, the level of acceptance from students, should be used for prevention and total safety of students and as a factor during the testing of motor abilities, which results in adequate planning and realization of physical education lessons.

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**The report has been reviewed.**