

## **DEVELOPING AGILITY USING THE BLAZEPOD SYSTEM IN UNIVERSITY FOOTBALL TEAM PLAYERS**

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### **Abstract**

This study aims to investigate the effects of a training program on agility in students who make up the university soccer team by applying a training program based on the BlazePod intelligent interactive light training system.

The subjects studied are 40 students from the Faculty of Physical Education and Sports in Galați, divided into two groups of 20, the experimental group and the control group, all selected to form the student football team. To evaluate the subjects, we applied the following standard agility tests: the Illinois test (seconds); the 10x5 meter shuttle run (seconds); the T test (seconds). To perform the statistical analysis of the data, we used the IBM SPSS Statistics software package, version 28. For all statistical tests used, we chose a significance threshold of  $\alpha = 0.05$ .

Based on the results obtained, the findings show that the use of the BlazePod system to develop agility in students who make up the university football team showed superior performance of the students in the experimental group compared to the students in the control group ( $p < 0.05$ ) in all tests performed.

### **Introduction**

Agility is a fundamental component of motor performance, defined as the ability to rapidly change the direction and speed of body movements in response to external stimuli, while maintaining postural control and efficiency of execution [7]. In soccer, agility is closely related to the success of technical and tactical actions, influencing players' ability to react promptly to game situations, overcome opponents, and quickly adapt to the dynamics of competition [1].

The literature emphasizes that the development of agility does not depend exclusively on speed of movement, but also on perceptual processes, reaction time, and neuromuscular coordination [8]. Sports discipline ultimately has an effect in the formation of sports skills [3]. Thus, modern training methods place an increasing

emphasis on integrating visual and cognitive stimuli into specific exercises in order to optimize motor response in conditions similar to real play [4].

Motor games are considered in the literature to be a very important means of developing motor qualities, skills and abilities [5]. The evolution of technology applied in the field of sports has facilitated the emergence of interactive training systems, such as BlazePod, which use light visual stimuli to develop athletes' reaction speed, coordination, and agility. Recent studies highlight the effectiveness of using these technologies in improving motor performance, as a result of immediate feedback and the possibility of objectively quantifying progress [2].

In this context, this article aims to analyze the influence of using the BlazePod system on the development of agility in students who are members of the university football team. The research aims to highlight the effectiveness of this modern training method in relation to traditional methods and to provide useful methodological guidelines for optimizing sports training at the university level [6].

### **Material- Method**

The purpose of this paper is to develop agility in students who are members of the university football team by applying a training program based on the BlazePod intelligent interactive light training system.

BlazePod is an intelligent interactive light training system used to improve reaction time, agility, coordination, decision-making, and cognitive functions in sports, fitness, therapy, and physical education.

BlazePod consists of small, wireless devices with colored LEDs-called "pods"- that light up and react to movement. They are controlled via Bluetooth from a mobile app (iOS/Android) where the application allows users to:

- Choose from hundreds of prepared exercises.
- Create personalized workouts.
- Track progress in real time with data such as reaction time and accuracy.

How does it work?

- The pods light up in different patterns.
- Players must respond as quickly and accurately as possible to the signals, either by touching, moving, sprinting, changing direction with the ball at their feet, etc.

- The app analyzes your performance and shows you your progress.

The subjects studied are 40 students from the Faculty of Physical Education and Sports in Galați, divided into two groups of 20, the experimental group and the control group, all selected to form the student football team. The experimental research was conducted on the faculty's Portu Roșu field, with similar training conditions. The training program was implemented in the first semester of the 2025-2026 academic year. The research was divided into the following stages: stage 1 -

initial assessment; stage 2 - application of the training program based on the BlazePod interactive light training system for the experimental group, with the control group applying a program specific to athletics; stage 3 - final assessment; stage 4 - interpreting the results and drawing conclusions.

To evaluate the subjects, we applied the following tests specific to the educational cycle:

### **1. Illinois Test**

A rectangle measuring 10 m long and 5 m wide is drawn on the ground. Four markers are used to mark the start, finish, and two turning points. Another 4 markers are placed in the center, at equal distances from each other (3.33 m). The athlete starts from the marker at the bottom left, runs at full speed along the route in the indicated directions, without knocking over the markers. The stopwatch is started when the athlete makes their first move and stopped when they pass the finish marker. If the athlete knocks over a marker, the course can be repeated once. [7]

**2. 10x5 m shuttle run** - the test is performed with a standing start, the student stands behind the starting line. After the sound signal, the student runs to the marked line 5 m away, crosses it with both feet, and returns to the starting line. This route is repeated 5 times. The time taken from the first movement to the completion of the route is timed. The result is recorded in seconds. [8]

### **3. T Test**

Setup: Four cones are used to form the letter "T" (one central cone, one cone 10 m ahead, and two cones 5 m to the left/right of the central cone).

Task: The athlete leaves the starting block, runs forward, performs a crossover to one cone, then crosses over to the other cone, runs sideways back, performs a crossover back to the center cone, and runs back to the starting point. [9]

Measurement: The total time required to complete the course (from start to finish) is recorded.

The research methods used are as follows: analysis of specialized literature, observation, experimentation, measurement and testing methods, statistical-mathematical methods, graphical methods, and tabular representation methods. For statistical analysis, we used IBM SPSS Statistics, version 28. The paper aims to compare the results obtained in agility testing of two groups of students who had to take two tests (initial and final). Thus, we created a database with numerical information obtained from testing the students. For all statistical tests used, we chose a significance threshold of  $\alpha = 0.05$ .

The differences between the initial and final tests were evaluated using the t-test for paired samples. After confirming the assumption of homogeneity of variances using the Levene test, comparisons between groups were performed using the t-test for two independent samples.

Correlations between variables were examined using Pearson's test. The threshold for statistical significance was set at  $\alpha = 0.05$ .

## Results

### Control Group

**Table 1. Descriptive Statistics – control group**

	Minimum		Maximum		Mean		Std. Deviation		Variance	
	Initial testing	Final testing								
Illinois Test (seconds)	16.66	15.98	18.28	17.96	17.806 5	17.289 5	0.4661 9	0.5561 6	0.217	0.309
Shuttle run 10x5 meters (seconds)	12.60	11.70	13.66	12.85	13.004 5	12.146 5	0.2614 4	0.3175 8	0.068	0.101
T-test (seconds)	10.66	10.10	11.50	10.95	11.031 5	10.543 5	0.2509 4	0.2808 5	0.063	0.079

Analysis of the data in the descriptive statistics table for the control group leads to the following conclusions:

Performance on the Illinois agility test shows a slight improvement on the final test, evidenced by a decrease in the average value obtained by athletes from 17.8065 seconds to 17.22895 seconds. There is also greater variability in the test results at the final test, which means an increase in standard deviation and variance.

The Illinois agility test shows a slight improvement in performance in the final test, evidenced by a decrease in the average value from 17.8065 seconds to 17.22895 seconds. At the same time, the increase in standard deviation and variance indicates greater variability in the final test results.

For the 10×5 meter shuttle test, a reduction in average time from 13.0045 seconds to 12.1465 seconds was observed. The standard deviation showed a slight increase in dispersion.

The average time for the T test was reduced from 11.0315 seconds to 10.5435 seconds, showing an overall improvement in results. In the final test, the variance and standard deviation increased slightly.

In the overall performance comparison, the control group shows improvements for all tests analyzed, although there are some slight increases in variability or relatively constant improvements in the various tests considered, suggesting limited effects or uneven adaptations.

**Table 2. Paired Samples Statistics**

		Mean	Std. Deviation	Std. Error Mean
Pair 1	Illinois Test (seconds) T.I.	17.8065	0.46619	0.10424
	Illinois Test (seconds) T.F.	17.2895	0.55616	0.12436
Pair 2	Shuttle run 10x5 meters (seconds) T.I.	13.0045	0.26144	0.05846
	Shuttle run 10x5 meters (seconds) T.F.	12.1465	0.31758	0.07101
Pair 3	T-test (seconds) T.I.	11.0315	0.25094	0.05611
	T-test (seconds) T.F.	10.5435	0.28085	0.06280

**Table3 . Paired Samples Correlations**

		Correlation	Sig.
Pair 1	Illinois Test (seconds) T.I. & Illinois Test (seconds) T.F.	0.907	0.000
	Pair 2	Shuttle run 10x5 meters (seconds) T.I. & Shuttle run 10x5 meters (seconds) T.F.	0.783
Pair 3	T-test (seconds) T.I. & T-test (seconds) T.F.	0.941	0.000

For the control group, Pearson correlation tests showed that there were very strong positive correlations between the initial results and the final results of the physical tests. The correlations for the Illinois test ( $r = 0.907$ ,  $p < 0.001$ ), the 10×5 m shuttle run ( $r = 0.783$ ,  $p < 0.001$ ), and the T test ( $r = 0.941$ ,  $p < 0.001$ ) are significant. The results reflect that individual performances are consistent between testing periods, supporting the idea of stable performance over time.

**Table 4. Paired Samples Test**

Mean	Std. Deviation	Std. Error Mean	Paired Differences		t	df	Sig. (2-tailed)
			95% Confidence Interval of the Difference Lower	Upper			

Pair 1	Illinois Test (seconds) T.I. & Illinois Test (seconds) T.F.	0.51700	0.23705	0.05300	0.40606	0.62794	9.754	19	0.000
Pair 2	Shuttle run 10x5 meters (seconds) T.I. & Shuttle run 10x5 meters (seconds) T.F.	0.85800	0.19790	0.04425	0.76538	0.95062	19.389	19	0.000
Pair 3	T-test (seconds) T.I. & T-test (seconds) T.F.	0.48800	0.09595	0.02145	0.44309	0.53291	22.745	19	0.000

The t-test for paired samples was applied to examine differences between the initial and final test results of the physical tests for the control group. The analysis revealed statistically significant improvements in all tests evaluated. A significant reduction in time was observed for the Illinois test ( $t = 9.754$ ,  $p < 0.001$ ), indicating improved performance in the final assessment. Similarly, a statistically significant improvement in time was observed in the 10×5 m shuttle test ( $t = 19.389$ ,  $p < 0.001$ ). Furthermore, a significant difference between test sessions was also observed in the T-test ( $t = 22.745$ ,  $p < 0.001$ ). In conclusion, these results indicate that the control group achieved performance improvements from the initial to the final test in all tests.

## Experimental Group

**Table 5. Descriptive Statistics– experimental group**

	Minimum		Maximum		Mean		Std. Deviation		Variance	
	Initial testing	Final testing								
Illinois Test (seconds)	16.95	15.25	18.50	16.90	17.9585	16.1505	0.38767	0.43557	0.150	0.190
Shuttle run 10x5 meters (seconds)	12.70	11.05	13.84	11.90	13.2115	11.3735	0.35430	0.23342	0.126	0.054
T-test (seconds)	10.80	9.25	11.48	10.20	11.1170	9.7065	0.19884	0.25539	0.040	0.065

Analysis of the results provided by descriptive statistics for the experimental group leads to the following conclusions:

For the Illinois test (seconds), there is a clear decrease in the average time from 17.9585 seconds in the initial test to 16.1505 seconds in the final test, which represents a performance improvement of approximately 10.1%. The reduction in

minimum and maximum values confirms the overall progress of the athletes, and the slight increase in standard deviation shows moderate variability in the final results.

In the case of the 10×5 m speed test (seconds), the average value decreased from 13.2115 to 11.3735 seconds, which means an improvement of approximately 13.9%. The decrease in standard deviation and variance in the final test indicates greater homogeneity of performance within the control group.

In the T-test (seconds), the average time decreased from 11.1170 seconds to 9.7065 seconds, which represents an improvement of approximately 12.7%. Even though the variability of the results increased slightly in the final test, the average progress indicates a clear improvement in the athletes' performance.

The conclusion is that the experimental group showed significant improvements in performance in all the tests analyzed, with progress percentages ranging from 10.1% to 13.9%. These results show significant progress by the athletes in the experimental group as a result of the training process.

**Table 6. Paired Samples Statistics**

		Mean	Std. Deviation	Std. Error Mean
Pair 1	Illinois Test (seconds) T.I.	17.9585	0.38767	0.08669
	Illinois Test (seconds) T.F.	16.1505	0.43557	0.09740
Pair 2	Shuttle run 10x5 meters (seconds) T.I.	13.2115	0.35430	0.07922
	Shuttle run 10x5 meters (seconds) T.F.	11.3735	0.23342	0.05220
Pair 3	T-test (seconds) T.I.	11.1170	0.19884	0.04446
	T-test (seconds) T.F.	9.7065	0.25539	0.05711

**Table 7. Paired Samples Correlations**

Pair 1	Illinois Test (seconds) T.I. & Illinois Test (seconds) T.F.	0.749	0.000
	Shuttle run 10x5 meters (seconds) T.I. & Shuttle run 10x5 meters (seconds) T.F.	0.683	0.001
Pair 3	T-test (seconds) T.I. & T-test (seconds) T.F.	0.705	0.001

After performing the Pearson correlation test for the experimental group, very strong positive correlations were found between the initial and final test values for all tests performed. A strong correlation was observed for the Illinois test ( $r = 0.749$ ,  $p < 0.001$ ), 10×5 m shuttle run ( $r = 0.683$ ,  $p = 0.001$ ), and T test ( $r = 0.705$ ,  $p < 0.001$ ).

These results show consistency between testing sessions, indicating the existence of stable performance patterns over time.

**Table 8. Paired Samples Test**

	Mean	Std. Deviation	Std. Error Mean	Paired Differences		t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference Lower	Upper			
Pair 1 Illinois Test (seconds) <b>T.I.</b> & Illinois Test (seconds) <b>T.F.</b>	1.808	0.29532	0.06604	1.66978	1.94622	27.379	19	0.000
Pair 2 Shuttle run 10x5 meters (seconds) <b>T.I.</b> & Shuttle run 10x5 meters (seconds) <b>T.F.</b>	1.838	0.25908	0.05793	1.71675	1.95925	31.727	19	0.000
Pair 3 T-test (seconds) <b>T.I.</b> & T-test (seconds) <b>T.F.</b>	1.4105	0.18196	0.04069	1.32534	1.49566	34.666	19	0.000

The results obtained from the t-test for paired samples show significant differences between the initial and final tests for all physical samples analyzed, highlighting the effectiveness of the training process applied to the experimental group. For the Illinois test, the analysis showed an average difference of 1.808 seconds between the initial and final assessments, with a 95% confidence interval between 1.66978 and 1.94622 seconds. The high value of the t statistic = 27.379 and the p value < 0.001 confirm the existence of a statistically significant difference, indicating a clear improvement in performance. In the case of the 10×5 m shuttle test, the average difference recorded was 1.838 seconds, with a 95% confidence interval between 1.71675 and 1.95925 seconds. The test results (t = 31.727, p < 0.001) indicate significant progress in this sports test as well. For the T test, the average difference between the two moments of the test was 1.4105 seconds, and the 95% confidence interval was between 1.32534 and 1.49566 seconds. The very high value of the t statistic = 34.666, together with the significance level p < 0.001, suggests a significant improvement in this test from the initial to the final test for the experimental group.

## Discussions

### Comparison between the experimental group and the control group

The t-test for independent samples compares the results obtained by the experimental group with those obtained by the control group in the three tests that assess agility development.

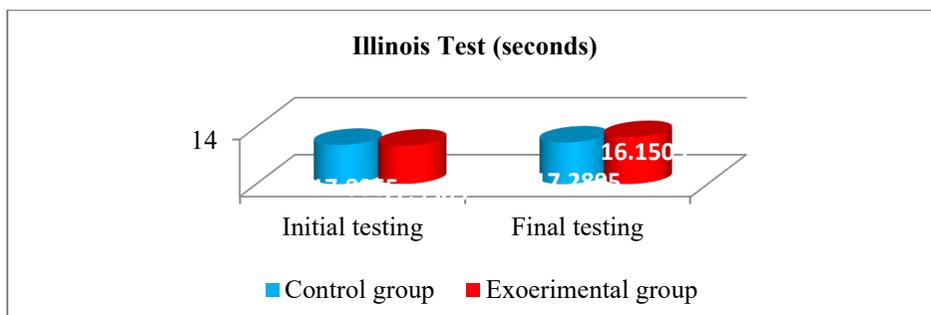
**Table 9. Group Statistics**

	Group	Mean	Std. Deviation	Std. Error Mean
Illinois Test (seconds) T.I.	Control group	17.8065	0.46619	0.10424
	Experimental group	17.9585	0.38767	0.08669
Illinois Test (seconds) T.F.	Control group	17.2895	0.55616	0.12436
	Experimental group	16.1505	0.43557	0.09740
Shuttle run 10x5 meters (seconds) T.I.	Control group	13.0045	0.26144	0.05846
	Experimental group	13.2115	0.35430	0.07922
Shuttle run 10x5 meters (seconds) T.F.	Control group	12.1465	0.31758	0.07101
	Experimental group	11.3735	0.23342	0.05220
T-test (seconds) T.I.	Control group	11.0315	0.25094	0.05611
	Experimental group	11.1170	0.19884	0.04446
T-test (seconds) T.F.	Control group	10.5435	0.28085	0.06280
	Experimental group	9.7065	0.25539	0.05711

**Table 10. Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Testul Illinois (sec.) T.I.	Equal variances assumed	0.882	0.354	-1.121	38	0.269	-0.15200	0.13558	-0.42646	0.12246
	Equal variances not assumed			-1.121	36.777	0.269	-0.15200	0.13558	-0.42676	0.12276
Testul Illinois (sec.) T.F.	Equal variances assumed	1.211	0.278	7.211	38	0.000	1.13900	0.15796	0.81923	1.45877
	Equal variances not assumed			7.211	35.936	0.000	1.13900	0.15796	0.81862	1.45938
Shuttle run 10x5 meters 10x5 metri	Equal variances assumed	2.801	0.102	-2.102	38	0.042	-0.20700	0.09846	-0.40632	-0.00768
	Equal variances not assumed			-2.102	34.960	0.043	-0.20700	0.09846	-0.40689	-0.00711
Shuttle run 10x5 meters 10x5 metri	Equal variances assumed	1.527	0.224	8.771	38	0.000	0.77300	0.08813	0.59459	0.95141
	Equal variances not assumed			8.771	34.891	0.000	0.77300	0.08813	0.59406	0.95194
T-test (sec.) T.I.	Equal variances assumed	1.425	0.240	-1.194	38	0.240	-0.08550	0.07159	-0.23043	0.05943
	Equal variances not assumed			-1.194	36.113	0.240	-0.08550	0.07159	-0.23068	0.05968
T-test (sec.) T.F.	Equal variances assumed	.741	0.395	9.861	38	0.000	0.83700	0.08488	0.66516	1.00884
	Equal variances not assumed			9.861	37.662	0.000	0.83700	0.08488	0.66511	1.00889

**Illinois test**



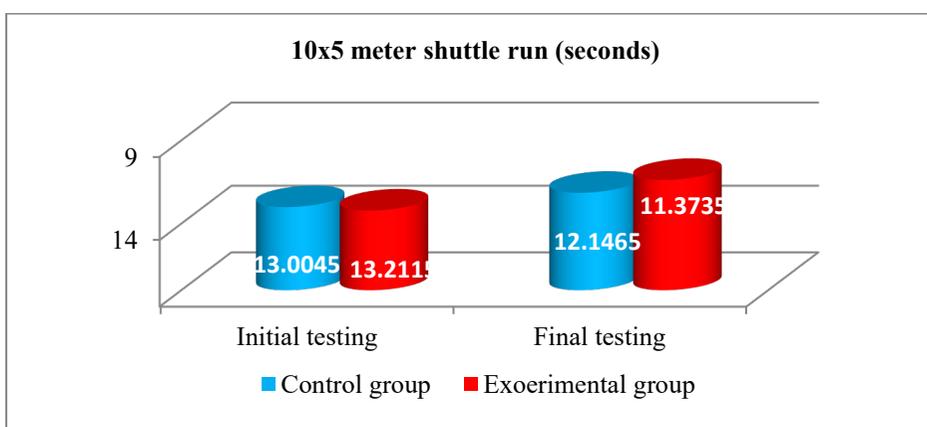
Graph 1. Arithmetic mean for test one, initial and final testing

In the case of the Illinois test, the t-test for independent samples did not reveal any statistically significant differences between the control group and the

experimental group ( $t = -1.121$ ,  $p = 0.269$ ) in the initial test. The mean difference was  $-0.15200$  seconds, and the 95% confidence interval was between  $-0.42646$  and  $0.12246$  seconds. Since the confidence interval contains zero, it can be said that the groups' performances are practically comparable at baseline.

For the final test, the analysis showed that there were statistically significant differences between the groups ( $t = 7.211$ ,  $p < 0.000$ ) on the Illinois test. The mean difference was  $1.13900$  seconds, and the 95% confidence interval was between  $0.81923$  and  $1.45877$  seconds. The positive confidence interval confirms the existence of a clear advantage for the experimental group.

### Test – 10x5 meter shuttle run

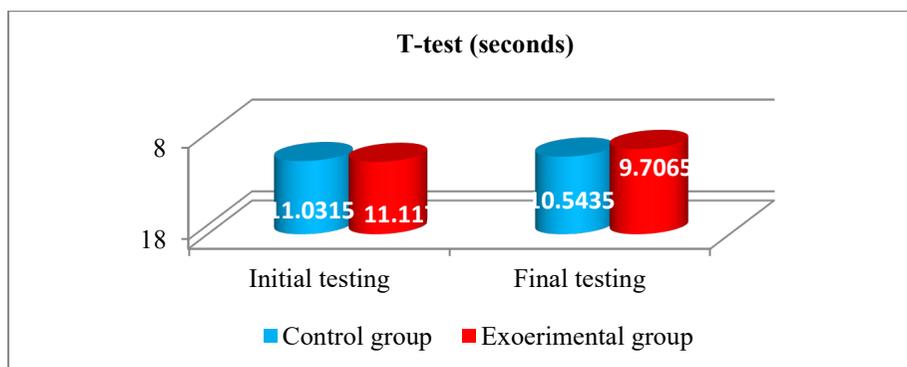


Graph.2 Arithmetic mean for test two, initial and final testing

In the case of the 10x5 meter shuttle run, statistically significant differences were identified between the control group and the experimental group in the initial test ( $t = -2.102$ ,  $p = 0.042$ ). The mean difference was  $-0.207$  seconds, and the 95% confidence interval was between  $-0.40632$  and  $-0.00768$  seconds. The fact that the confidence interval does not include zero indicates a real difference in performance in favor of the control group.

For the 10x5 meter shuttle test, at the final test, the differences between groups were statistically significant ( $t = 8.771$ ,  $p = 0.000$ ). The mean difference was  $0.773$  seconds, and the 95% confidence interval was between  $0.59459$  and  $0.95141$  seconds. This result highlights a substantial advantage for one of the groups, reflecting the superior efficiency of the experimental group.

### T-test



Graph.3 Arithmetic mean for test three, initial and final testing

For the T-test – the final test – statistically significant differences were found between the control group and the experimental group ( $t = 9.861$ ,  $p = 0.000$ ). The mean difference was 0.83700 seconds, and the 95% confidence interval was between 0.66516 and 1.00884 seconds. The positive confidence interval confirms the existence of a clear advantage for the experimental group.

The results show that, in the initial test, the differences between the groups are statistically insignificant, with 95% confidence intervals including zero, indicating a lack of practically relevant differences. In contrast, in the final test, all samples analyzed revealed statistically significant and practically relevant differences in favor of the experimental group.

## Conclusion

The research conducted allows us to draw conclusions regarding the application of the training program based on the BlazePod interactive light training system.

The use of the BlazePod system contributes significantly to the development of agility in student football players by stimulating reaction speed, coordination, and motor adaptability.

The integration of modern technologies into training provides objective feedback and the possibility of individualizing exercises, increasing the efficiency of sports training.

The combination of traditional methods and interactive systems, such as BlazePod, can optimize athletic performance and be successfully applied at the university level.

Future studies should investigate the applicability of the system in different age groups and performance levels, as well as its long-term impact on motor skills.

We can conclude that BlazePod transforms traditional training into an interactive, digital, and engaging experience that is effective in improving agility, reflexes, and performance.

The downside of the research is that the number of students participating in the study is limited, but this was beyond our control, as the university soccer team has 20 players. The ability to develop agility in conjunction with technical and tactical training makes the use of the BlazePod intelligent light system an attractive proposition for both players and coaches.

### References

- [1] Bloomfield, J., Polman, R., & O'Donoghue, P. (2007), Physical demands of different positions in FA Premier League soccer. *Journal of Sports Science and Medicine*.
- [2] Borysiuk, Z., & Waskiewicz, Z. (2008), Information processes, stimulation and perceptual training in fencing, *Journal of Human Kinetics*.
- [3] Gheorghiu A.,(2014), Metodica implementării mijloacelor din fitness în procesul de integrare socială a femeilor de 35-45 ani, *Știința culturii fizice*, nr. 20/4, Chișinău, p. 81-88.
- [4] PC Moiescu, LD Ciocoiu, C Parvu, CV Savu, A Gheorghiu, N Harabagiu (2023), The Socialization of Primary School Pupils through Motor Games, *Bulletin of the Transilvania University of Brașov. Series IX: Sciences of Human Kinetics*
- [5] Paul, D. J., Gabbett, T. J., & Nassis, G. P. (2016), Agility in team sports: Testing, training and factors affecting performance, *Sports Medicine*.
- [6] Rumpf, M. C., Lockie, R. G., Cronin, J. B., & Jalilvand, F. (2015), Effect of different sprint training methods on sprint performance, *Journal of Strength and Conditioning Research*.
- [7] Sheppard, J. M., & Young, W. B. (2006), Agility literature review: Classifications, training and testing, *Journal of Sports Sciences*.
- [8] Young, W. B., James, R., & Montgomery, I. (2002), Is muscle power related to running speed with changes of direction? *Journal of Sports Medicine and Physical Fitness*.
- [9] <https://frh.ro/dezvoltare/Teste%20de%20evaluare%202004-2005%20.pdf>
- [10] [https://www.isj.tm.edu.ro/public/data\\_files/specializari/fisier-3263.pdf](https://www.isj.tm.edu.ro/public/data_files/specializari/fisier-3263.pdf)
- [11] <https://ro.professionalsoccercoaching.com/exerci%C8%9Bii-de-agilitate/testeaz%C4%83-agilitatea>