



Correlation Structures of Sport Preparation with Futsal Players from the University of National and World Economy

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Abstract

Successful practicing of futsal depends on various indices directly connected to the different sides of preparation of futsal players – physical, technical, psychological and theoretical. Between these indices, of course there are a number of links and interdependences existing and manifesting. We have reached this aim using Pearson's coefficient (r) for common per appearance, linear per form and quantitatively measurable indications upon the following levels of correlation dependencies: weak ($r = 0$ up to $0,3$), moderate ($r = 0,3$ up to $0,5$), significant ($r = 0,5$ up to $0,7$), big ($r = 0,7$ up to $0,9$), and very big ($r =$ over $0,9$). Correlation analysis has been made in the following direction: investigation of correlation dependencies of indices with the experimental group (UNWE – Futsal) – initial, medial and final one for finding out the level and dynamics in the links between the main indices of physical and technical preparation. We notice a moderate trend of increasing of the existing dependences from weak to moderate and from moderate to significant in the course of the experiment. The basic conclusion we could make is that there is a big number of significant and great correlations between the indices giving information regarding the speed, explosive force, ability for sharp change of direction and also of the technical skills (controlling the ball at a high speed mostly).

Keywords: *methods, correlation structure, players, futsal;*

1. Introduction

Futsal is a sport distributed on a mass scale, both all over Europe and the whole world. Development of the game has brought to a situation for discussions of the appearance of futsal in the schedule of the Olympic Games. It is a fact that since 2018, futsal will be a part of the Youth Olympic Games in Buenos Aires [3].

Thanks to its spectacularity, futsal is developing in parallel to the development of the society and attracts more and more people from various strata of population. This, along with the permanent insufficiency of spaces for conducting of sport initiatives in a number of towns, and the unfavourable climatic peculiarities for the most part of the year, make futsal so attractive for practicing, additionally stimulating its development. Practicing of futsal game helps developing of all motive qualities, hardens the will and psyche, increases the work capacity and spirits. The exclusive dynamics of the game and the permanently changing play situations improve the speed of thinking processes and connected with them following actions. Futsal gives opportunity of those practicing it to play with the ball between 10-12 times more frequently than in football. Futsal gains great popularity among students community in Bulgaria, there are developed and confirmed educational curriculums in a number of higher schools, as well as regular competitions and tournaments for students [9, 12].

It is of extreme importance for each trainer to prepare his players as well as possible for the challenges of the forthcoming contestants. Training methods represent a system of consecutive actions connected with the organization of the training and contesting activity for a sport-contestant year. Training plans are of separate groups containing: training hours, weekly microcycles, monthly mesocycles, yearly macrocycles that are interrelated and subordinated to one purpose: maximum improvement of technical-tactical preparation and functional preparation with the aim of optimum readiness for big sport achievements and successful presentation at the town's and country futsal competition, as well as at an international scene.

Interrelation between the indices of physical and technical preparation, character of links and their dynamics give important information to the trainer regarding the organization and planning of educational-training process.

On similar matters have worked [1, 2, 5, 8, 12] too.

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2. Aim, organization and methods of investigation

2.1 Aim of the investigation

The aim of investigation is to establish the character of links and level of dependencies between the indices on sport preparation, after applying of complex methods for preparation with futsal players from the team of UNWE.

2.2 Object of investigation

Object of investigation have been the players from the team of UNWE, who are a part of the representative team on futsal of the university, taking part in the town and country championship on futsal in Bulgaria. 15 contestants have participated, and in the course of the experiment one of them dropped off due to objective reasons.

2.3 Organization of the investigation

All tests have been conducted in a sport complex „Bonsist” - Students town, hall 3 „Football and futsal”. The initial investigation has been carried out as per the schedule prepared in advance (August 2011), basic one (January 2012) and final one (April 2012). Compared to the control norms for assessment (Table 1) of the technical and physical preparation, 16 indices have been established of physical and technical preparation, subject of the carried out investigation.

List of tests used with the control checks - Table 1

Test No.	Name of the test	Measure units	Accuracy
1	20 m shuttle run (Beep test)	Level and step	1 step
2	5m sprinting in place	sec	0,01sec
3	Standing long jump	m cm	1 cm
4	15m sprint in place	sec	0,01sec
5	Combined test – dribble between stands, shooting at door 3m/2m, sprint	sec	0,01 sec
6	Arrowhead agility	sec	0,01 sec
7	Arrowhead agility with ball	sec	0,01 sec

2.4 Mathematical-statistical methods

Data received has been subjected to mathematical-statistical processing, through the specialized computer programme SPSS and Excel. Variation and correlation analysis have been applied. We have used the coefficient of Pearson (r) for common per appearance, linear per form and quantitatively measurable indications upon the following levels of correlation dependencies: weak ($r = 0$ up to 0,3), moderate ($r = 0,3$ up to 0,5), significant ($r = 0,5$ up to 0,7), big ($r = 0,7$ up to 0,9), and very big ($r = \text{over } 0,9$). Correlation analysis has been made in the following direction: investigation of correlation dependencies of indices with the experimental group (UNWE – Futsal) – initial, medial and final one for finding out the level and dynamics in the links between the main indices of physical and technical preparation.

3. Analysis of the results

3.1 Correlation structure of physical and technical preparation with players on futsal from UNWE

On Table 2, 3, 4 are noted the correlation dependencies with the players from UNWE for initial, second and final investigation. From the data received in the initial investigation for UNWE (Table 2) we have established a very great dependency between the indices „Arrowhead agility with ball” and „Arrowhead agility with ball right”; „Arrowhead agility” and „Arrowhead agility with ball left”. What makes impression is that the very big dependencies with the players from the experimental group are between the indices carrying information of the speed and accuracy with fulfillment of the technical tricks (speed ball controlling). We observe a big dependency between the following indices: „VO2max” and „5 m sprint”; „VO2max” and „15 m sprint”; „5 m sprint” and „15 m sprint”; „5 m sprint” and „Target strikes”; „Arrowhead agility” and „Arrowhead agility right”; „Arrowhead agility” and „Arrowhead agility left”; „Arrowhead agility with ball left” and „Arrowhead agility with ball right”. We could note that the big

dependencies are mainly between the indices of the physical preparation, when some of the correlations seem illogic at first sight as those between the indices „VO2max” and „5 m sprint”; „VO2max” and „15 m sprint”, but we ascribe it to the fact that the investigation has been carried out prior the preparation period and simply the players who are with better indices in the beep test, i.e. are more tenacious, are faster and with better strength capabilities, i.e. they have better potential for manifestation in the sport.

Considerable dependency has been established in the initial investigation between the induces: „10 m flying start” and „Long jump”; „15 m sprint” and „Left leg long jump ”; „15 m sprint” and „Target strikes”; „Accurate hits ” and „Arrowhead agility left”; „Accurate hits” and „Arrowhead agility”; „Accurate hits” and „Arrowhead agility with ball left”; „Arrowhead agility left” and „Arrowhead agility with ball left”; „Arrowhead agility” and „Arrowhead agility with ball left”.

We have established 30 moderate dependencies between the indices of physical and technical preparation. „Long jump” establishes moderate dependencies with the indices „Left leg long jump”, „Combines test”, „Arrowhead agility with ball left”, „Arrowhead agility with ball right” and „Arrowhead agility with ball”.

Inter-correlation matrix – UNWE, I investigation - Table 2

Index	VO2max	Test 5m sprint	10m flying start	15m sprint	Long jump	Left leg long jump	Right leg long jump	Target hits	Combined test - time	Combined test - hits	Arrowhead agility right	Arrowhead agility left	Arrowhead agility	Arrowhead agility right with the ball	Arrowhead agility left with the ball	Arrowhead agility with the ball
VO2max	1															
5m sprint	-,751	1														
10m flying start	-,144	-,105	1													
15m sprint	-,743	,819	,481	1												
Long jump	-,064	,155	-,583	-,187	1											
Left leg long jump	,459	-,488	-,272	-,559	,439	1										
Right leg long jump	-,318	,151	,000	,156	,207	,307	1									
Target hits	,471	-,709	-,018	-,646	,188	,413	-,165	1								
Combined test - time	-,136	,136	,229	,228	,358	,076	,206	,006	1							
Combined test - hits	,290	-,362	,039	-,292	-,120	,114	-,025	-,115	,164	1						
Arrowhead agility right	-,369	,245	,085	,280	,152	,129	,128	-,105	-,237	-,321	1					
Arrowhead agility left	-,393	,141	,397	,365	,103	,012	,388	,166	,056	-,532	,263	1				
Arrowhead agility	-,478	,246	,293	,403	,162	,093	,317	,030	-,123	-,530	,817	,772	1			
Arrowhead agility with ball right	-,227	,337	-,436	,033	,345	-,087	-,292	-,127	-,210	-,291	,241	,204	,281	1		
Arrowhead agility with ball left	-,395	,364	-,243	,184	,305	-,001	,229	-,190	-,160	-,527	,230	,614	,519	,771	1	
Arrowhead agility with ball	-,328	,372	-,364	,113	,346	-,048	-,041	-,167	-,197	-,431	,250	,429	,422	,944	,937	1
Legend																
>0,9			Very big straight dependency					>0,3		Moderate straight dependency						
>0,7			Big straight dependency					>0,5		Considerable straight dependency						
>0,5			Considerable straight dependency					>0,7		Big straight dependency						
>0,3			Moderate straight dependency					>0,9		Very big straight dependency						

On Table 3 are noted the dependencies between the indices of physical and technical preparation, established in the second investigation. Very big dependencies are preserved, observed with the first investigation. Less big dependencies are observed between the indices in comparison with the first investigation, here quite logically there are no big dependencies between the indices „VO2max” and „5 m sprint”; „VO2max” and „15 m sprint”. What makes impression is the increased number of considerable dependencies compared to the initial investigation. The dependencies between the indices: „15 m sprint” and „Arrowhead agility left”; „15 m sprint” and „10 m flying start”; „5 m sprint” and „Right leg long jump” have increased from moderate to considerable. Also, we have to note that the number of the moderate dependences is preserved.

Inter-correlation matrix – UNWE, II investigation - Table 3

Index	VO2max	Test 5m sprint	10m flying start	15m sprint	Long jump	Left leg long jump	Right leg long jump	Target hits	Combined test - time	Combined test - hits	Arrowhead agility right	Arrowhead agility left	Arrowhead agility	Arrowhead agility right with the ball	Arrowhead agility left with the ball	Arrowhead agility with the ball
VO2max	1															
5m sprint	-,173	1														
10m flying start	-,321	-,290	1													
15m sprint	-,420	,543	,646	1												
Long jump	-,021	,456	-,479	-,057	1											
Left leg long jump	,235	,336	-,239	,059	,474	1										
Right leg long jump	,377	,507	-,092	,323	,268	,496	1									
Target huts	,483	-,332	-,263	-,496	-,030	,333	,033	1								
Combined test - time	-,253	,105	,268	,318	,027	,058	,465	,050	1							
Combined test - hits	,474	-,050	-,289	-,293	,195	-,054	,141	,092	-,055	1						
Arrowhead agility right	-,490	,231	-,049	,141	-,043	,125	-,038	-,168	,376	,050	1					
Arrowhead agility left	-,333	,226	,375	,509	-,253	,170	,356	,057	,758	-,138	,555	1				
Arrowhead agility	-,468	,259	,180	,365	-,166	,167	,176	-,065	,639	-,048	,887	,877	1			
Arrowhead agility with ball right	-,531	,175	-,136	,020	-,194	-,232	-,593	-,273	-,199	-,145	,507	,079	,337	1		
Arrowhead agility with ball left	-,374	,169	-,052	,089	-,279	-,164	-,421	-,171	,042	-,113	,466	,317	,446	,830	1	
Arrowhead agility with ball	-,459	,179	-,091	,062	-,254	-,202	-,515	-,224	-,062	-,132	,505	,226	,418	,941	,969	1

Inter-correlation matrix – UNWE, III investigation - Table 4

Index	VO2max	Test 5m sprint	10m flying start	15m sprint	Long jump	Left leg long jump	Right leg long jump	Target hits	Combined test - time	Combined test - hits	Arrowhead agility right	Arrowhead agility left	Arrowhead agility	Arrowhead agility right with the ball	Arrowhead agility left with the ball	Arrowhead agility with the ball
VO2max	1															
5m sprint	,099	1														
10m flying start	-,133	-,420	1													
15m sprint	-,031	,538	,539	1												
Long jump	-,231	,200	-,463	-,244	1											
Left leg long jump	,481	,229	-,167	,057	,290	1										
Right leg long jump	,132	,525	-,057	,435	,305	,348	1									
Target huts	,771	,300	-,399	-,093	-,090	,391	,096	1								
Combined test - time	-,087	,251	,332	,541	,323	,290	,203	-,164	1							
Combined test - hits	,436	,145	-,183	-,035	,210	,278	,470	,509	,189	1						
Arrowhead agility right	-,366	,046	,311	,332	,149	-,045	,342	-,087	,397	,209	1					
Arrowhead agility left	-,491	-,304	,410	,098	-,003	-,250	-,224	-,600	,461	-,314	,495	1				
Arrowhead agility	-,497	-,153	,418	,246	,083	-,173	,062	-,403	,496	-,067	,859	,871	1			
Arrowhead agility with ball right	-,555	-,453	,165	-,267	-,211	-,441	-,172	-,465	-,487	-,216	,254	,202	,263	1		
Arrowhead agility with ball left	-,415	-,368	,074	-,273	-,149	-,208	-,071	-,476	-,418	-,183	,081	,155	,137	,874	1	
Arrowhead agility with ball	-,497	-,422	,121	-,279	-,185	-,329	-,123	-,486	-,466	-,205	,168	,183	,203	,965	,971	1

On Table 4 the correlation dependencies between the players on futsal from UNWE are noted with the final investigation. Comparing the results with those of the second investigation, we could note preserving of very big dependencies and increasing of the number of the big dependencies from 3 to 4. Big dependencies with the players on futsal are with the indices, carrying information of the basic qualities necessary for practicing the game: speed, explosive force, capability of sharp change of the direction („Arrowhead agility” and „Arrowhead agility right”, „Arrowhead agility” and „Arrowhead agility

left”, „Arrowhead agility with ball left” and „Arrowhead agility with ball right”). With the third investigation, we have observed considerable increasing of the number of the moderate dependencies compared to the picture with the second investigation – as many as 41 moderate dependencies between the indices of physical and technical preparation.

4. Conclusions and recommendations

Test battery used for control and assessment of students practicing futsal includes 7 tests evaluating the physical and technical preparation. Indices characterizing the endurance are „VO2 max” and „Combined test - time”. Idea of the speed qualities is given by the indices „5 m sprint”, „10m flying start”, „15m sprint”, „Arrowhead agility left”, „Arrowhead agility right”, „Arrowhead agility”. Strength (force) qualities characterized by the indices „Long jump”, „Left leg long jump”, „Right leg long jump”. Idea of the technical preparation is given by the indices „Target hits”, „Combined test – hits”, „Arrowhead agility with ball”, „Arrowhead agility with ball left”, „Arrowhead agility with ball right”.

We observe a moderate trend of increasing of the existing dependencies from weak to moderate and from moderate to considerable in the course of the experiment. The small number of the investigated persons and the close values of the results of the investigated persons from the Experimental group exert their influence on the number and size of the correlation dependencies in the Experimental group. Despite of this, from the analysis made up to now, we could deem that the methods used exert a positive influence on the existing links in the indices of physical and technical preparation with futsal players.

The main conclusion we could make is that there is a big number of considerable and big correlations between the indices giving information of the speed, explosive force, capability for sharp change of the direction, and also of the technical skills (controlling of the ball at high speed mostly).

Basing the conclusions made, we could recommend the methods used by us for preparation of futsal players. It is directed and exerts a positive influence on the specific physical and technical capabilities for the successful practicing of futsal.

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