IMPLEMENTATION OF THE ALGORITHM METHOD IN THE TECHNICAL PREPARATION OF BEGINNER BASKETBALL PLAYERS

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Abstract: *The enforcement of the algorithm method in the technical preparation process of beginner basketball players must represent a basic fundament for the initial learning stage of the technical elements and procedures, to prove to all trainers that by enforcing this methodology, the whole feature of the technical component is qualitative and brings the technical elements and procedures close to the optimum execution model.*

Key words: *basketball, technical preparation, algorithmization, algorithms.*

1. Introduction

Algorithmization is a method to rationalize learning and teaching based on algorithms. It consists in a generally valid configuration which can be applied in standard situations, frequently met in physical education, as well.

Algorithmization is shown in the specialty literature as an algorithm elaboration process, an operation or sequence of logical operations carried out in standard situations, according to programs typical to the training process.

As asserted by the speciality literature, the training process in sports is based on the learning algorithms of the motor acts, on training the motor capabilities and habits, on developing the motor skills.

Sports training, in its various forming stages, approaches algorithmization as an activity which elaborates special solutions for solving standardized situations or typical to the training process.

The same specialists in the field argue the hypothesis that any algorithm involves a sequence of "operations through which the typical situation or issue is solved" (carried out anywhere, anytime and by anyone under the same conditions). For the contents of the sports training, as a continuous and durable complex process, there are many algorithms in consistency with the training factors specific to some sports branches and sports trials, with the support of which the final, intermediary and operational objectives of the sports training are reached [2-5], [11].

2. The Experimental Research

The purpose of the experiment consists in increasing the efficiency in acquiring the technical elements and procedures of the

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basketball game through the importance and predominance of applying algorithmization within the technical preparation during the initial learning stage.

During preparation, the experimental group worked with means in which algorithmisation is highly predominant, while the witness group trained using traditional methods and means.

The results obtained by the experimental and witness groups shall be compared to one another in order to bring forward the effects of the predominant enforcement of algorithmisation within the technical preparation during the initial training stage. We mention that the groups were examined during the research throughout an entire competition year (Aug. 2010 – June 2011).

Both the initial results as well as the final results have been analysed from a statistical viewpoint and compared among the above-mentioned groups, considering the following parameters: *morphological, motor, technical* under training conditions.

The dynamics of progress among the groups was then highlighted and compared at the final test with the model provide by the specialty literature, i.e. with the model of the Romanian Basketball Federation.

The research results are presented under the following sub-chapters.

In order to verify the efficiency of algorithmization within the technical preparation during the initial learning stage, our first focus was put on the dynamics of the specific motor skills indicators of beginner basketball players with the age between 8-12 years old.

In our pedagogical experiment, we tested a number of 8 trials for specific motor skills, described in detail under chapter 2, and listed here: the **"**movement in the field**"** trial, "pass execution**"** trial, shots to the basket from dribbling, shots to the basket from jump, dribbling appropriation, speed trial involving a change of direction, defense trial.

In order to prove that the technical preparation performed by applying algorithmization will qualitatively influence the increased efficiency in the technical preparation appropriation, we tested the investigated subject both in the beginning, as well as at the end of the pedagogical experiment.

Below, we will present the evolution of the 8 trials, which indicate the level of the basketball players' technical preparation during the initial preparation stage (Table no.1)

Table 1

Dynamics of the basketball players' technical preparation indicators in the pedagogical experiment (n=52)

No. crt.	Control trials		Sample	Initial test			Final test			t	P
				$\overline{X} \pm m$	S	Cv%	$\overline{X} \pm m$	S	Cv%		
1.	*Movement in the field, Sec.*		E	29.90±2.68	0.52	1.73%	28.21±2.64	0.51	1.80%	2.28	<0.05
			M	29.73±2.65	0.52	1.74%	29.31±2.58	0.50	1.70%	0.56	>0.05
	t; P		E -M	0.23>0.05			1.52>0.05				
2.	*Pass to the wall, no. reps. (15 sec)*		E	25.38±1.55	0.30	1.18%	22.03±1.21	0.23	1.04%	8.65	<0.001
			M	24.65±0.74	0.14	0.58%	26.53±0.70	0.13	0.49%	9.36	<0.001
	t; P		E-M	2.16<0.05			3.31<0.001				
3.	*Shots to the basket against timer*	*Time (sec)*	E	1.05±0.14	0.29	27.6 %	1.01±0.14	0.27	26.73%	0.97	>0.05
			M	1.05±0.10	0.02	1.90%	1.05±0.04	0.00	0.00%	0.03	>0.05
		t; P	E-M	0.14>0.05			1.56>0.05				

No.	Indicator	Parameter		Initial			Final			t	P
		Percentage (pct.)	E	3.61±1.67	0.32	8.86%	5.88±0.86	0.16	2.72%	6.13	<0.001
			M	4.42±1.13	0.22	4.97%	5.26±0.53	0.10	1.90%	3.43	<0.01
		t; P	E-M	2.03>0.05			3.09<0.01				
4.	Shots to the basket from dribbling	Time (sec.)	E	7.57±0.50	0.09	1.18%	7.96±0.19	0.03	0.37%	3.62	<0.001
			M	7.65±0.48	0.95	12.41%	7.96±0.19	0.38	38.79%	2.99	<0.01
		t; P	E-M	0.56>0.05			0.00>0.05				
		Percentage (pct.)	E	6.15±1.25	0.24	3.90%	7.57±0.50	0.09	1.18%	5.36	<0.001
			M	6.61±0.89	0.17	2.57%	7.00±0.63	0.12	1.71%	1.78	>0.05
		t; P	E-M	1.52>0.05			3.63<0.001				
5.	Small marathon while dribbling (sec)		E	31.76±2.13	0.41	1.29%	30.98±2.24	0.43	1.38%	1.27	>0.05
			M	31.63±2.11	0.41	1.29%	31.28±2.15	0.42	1.34%	0.59	>0.05
		t; P	E-M	2.22>0.05			0.48>0.05				
6.	Great marathon while dribbling (sec)		E	35.13±2.50	0.49	1.39%	34.50±2.50	0.49	1.42%	0.90	>0.05
			M	34.99±2.48	0.48	1.37%	34.40±2.63	0.51	1.48%	0.82	>0.05
		t; P	E-M	0.21>0.05			0.14>0.05				
7.	Speed trial involving change of direction (sec)		E	13.60±0.84	0.16	1.17%	13.06±0.85	0.16	1.22%	2.31	<0.001
			M	13.48±0.83	0.16	1.18%	13.21±0.86	0.16	1.21%	1.13	<0.01
		t; P	E-M	0.51>0.05			0.66>0.05				
8.	Defense trial (sec)		E	23.57±2.05	0.40	1.69%	23.03±2.03	0.39	1.69%	0.96	>0.05
			M	23.42±2.00	0.39	1.66%	23.23±2.03	0.39	1.67%	0.34	>0.05
		t; P	E-M	0.27>0.05			0.35>0.05				

Legend

P		0.05	0.01	0.001
t	n=26	2.086	2.845	3.850
	n=52	2.021	2.704	3.551

Thus, after the statistical calculations, the technical preparation indicators' dynamics is graphically shown in Figure 1.
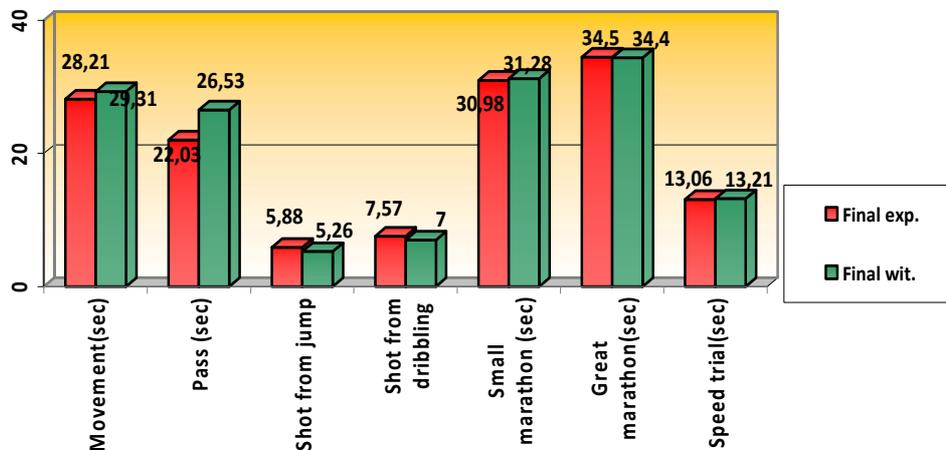
Fig. 1

3. Results and Discussion

3.1. Movement in theField (sec.)

The movements in the field involve a consistent and fundamental framework for succeeding in the appropriation of the technique; they insist on elasticity, which ensures a good balance and they must ensure the settlement of the game tasks and situations and to ease their execution [10].

The statistical processing of the values obtained under this technical trial brings forward the fact that both the experiment group as well as the witness group registered during the initial testing unit values as starting point ($29.90 \pm 2.68/29.73 \pm 2.65$), therefore, a difference of the means $\Delta = 0.17$. The variability coefficient strengthens the integrity among the two groups, thus the experimental group during the initial stage registers a $Cv=1.73\%$ and the witness group during the initial stage registers a $Cv=1.74\%$.

The final test values highlight advancements, thus the experiment group during the final stage advances with a mean of 28.21 ± 2.64, and the witness group during the final test shows a mean of 29.31 ± 2.58, i.e. a mean difference of $\Delta=1.10\%$.

The difference can also be ascertained from the variability coefficient which, for the experiment group during the final test is $Cv=1.80\%$, and for the witness group during the final testing is $Cv=1.70\%$. The difference between the statistical meanings for the experiment group is "t"=2.28 with P<0.05, and for the witness group "t"=0.56 with P>0.05; differences that show an advancement for the experiment group.

3.2. Pass to the Wall (sec.)

This element accounts for "between 60-70% from the range of fundamental elements used in the basketball game" [8],

[9]. The learning of this basic element is approached in our pedagogical experiment and the data presented in chart no. 1 bring information regarding the experiment group which started from the initial values of the mean of 25.38 ± 1.55 sec., reaching at the end of the assessment the value of 22.03 ± 1.21, the difference between the two tests being 3.35 sec.

For the witness group, the mean starting scores were at the level of 24.65 ± 0.74 sec., and the ones in the end were at 26.53 ± 0.70 sec., the difference recorded between the assessment moments being 1.88 sec.

It is noticed from the data analysis that the two groups succeeded in presenting significant improvements of their performance and the statistical information looks like this: "t"=8.65 and P<0.001 (experiment group), respectively "t"=9.36 and P<0.001 (witness group).

We conclude that even though both groups have very significant "t" values at the level of P<0.001, the ones obtained by the subjects from the experiment category are more relevant, translated in a higher advancement rate at the level of this group, with more efficient algorithmic means.

3.3. Shots to the Basket against Timer (sec.)

The success in the correct appropriation of this technical element, during our pedagogical experiment period, is conditioned by the granting of a highest possible number of hours for this main technical element, "by the consistenty exigent attitude of the trainers for the correct execution of all the exercises oriented towards the appropriation of the basic mechanism of the main technical elements and procedures" [4], [6].

The data registered in table no. 1 pertaining to this trial allow the ascertainment of the fact that the mean obtained by the experiment group during

the initial test according to the time factor was 1.05±0.14 sec, and during the final test it was 1.01±0.14 sec. At the level of the witness group, the initial mean scores based on the time factor were 1.05±0.10 sec., and the final ones 1.05±0.04 sec. From a statistical viewpoint, the values obtained under experiment group based on the time factor are "t"=0.97 and P >0.05; and for the witness group "t"=0.03 and P>0.05. From this statistical perspective there are no significant aspects to the value P>0.05.

The percentage factor offers more conclusive values upon advancement, this, the mean obtained by the experiment group during the initial stage was 3.61±1.67, and during the final stage 5.88±0.86. We notice a difference of the variability coefficient of Cv=6,14%.

As the witness group advancement is concerned, with reference to the percentage factor, the mean obtained between the stages is as follows: for the initial stage - 4.42±1.13 and for the final stage 5.26±0.53; with the difference between the variability coefficients of Cv=0.60.

The statistical information is also conclusive, thus, the "t" values are significant through their statistical meaning P<0.001 for the experiment group as compared to the witness group, where P<0.01. Taken horizontally, the statistical information between the two groups offers a comparison of the values, because the "t" value is 2.03 with P>0.05 during the initial stage, and during the final stage "t" is 3.09 with P<0.01.

These differences confirm that, in this trial, the experiment group had much better actuation means, much more diversified and much more consistent applicability on the trainer's behalf.

3.4. Shots to the Basket from Dribbling (sec)

This basket shooting technique is as important as all the other shooting techniques, because the shooting is conditioned by dribbling. The correct appropriation must correspond to the "operational execution model from the viewpoint of the biomechanical laws and of the relevant movement characteristics" [1], [3].

The presented data conclude the results of this trial through the existence of performance between the two tests -initial and final- for both groups of children.

Thus, the registered data pertaining to this trial allow the ascertainment of the fact that the mean obtained by the experiment group during the initial test according to the time factor was 7.57±0.50 sec, and during the final test it was 7.96±0.19 sec. At the level of the witness group, the initial mean scores based on the time factor were 7.65±0.48 sec., and the final ones 7.96±0.19 sec. Thus, mean advancement values of 0.39 for the experiment group and 0.31 for the witness group; these values contour the unity among the two groups.

From the statistical viewpoint, the values obtained under experiment group, for the time factor, are "t"=3.62 and P <0.001; and for the witness group "t"=2.99 and P<0.01, which show a significant progress for both groups, but prevailing for the experiment group, where P <0.001. Taken horizontally, the statistical information between the two groups offers a values' unity degree, because the "t" value is 0.56 with P>0.05 during the initial stage, and during the final stage "t" is 0.00 with P<0.05.

The percentage factor offers more conclusive values upon advancement, this, the mean obtained by the experiment group during the initial stage was 6.15±1.25, and during the final stage 7.57±0.50. We notice

a difference of the variability coefficient of Cv=2,72%.

As the witness group advancement is concerned, with reference to the percentage factor, the mean obtained between the stages is as follows: for the initial stage - 6.61±0.89 and for the final stage 7.00±0.63; with the difference between the variability coefficients of Cv=0.86.

The statistical information is also conclusive, thus, the "t" values are significant through their statistical meaning P<0.001 for the experiment group as compared to the witness group, where P>0.05. Taken horizontally, the statistical information between the two groups offers a comparison of the values, because the "t" value is 1.52 with P>0.05 during the initial stage, and during the final stage "t" is 3.63 with P<0.001.

These differences confirm that, in this trial, the experiment group had much better actuation means, much more diversified and much more consistent applicability on the trainer's behalf.

3.5. Small Marathon while Dribbling (sec.)

One of the most spectacular technical elements of the basketball game requiring perfect control of the ball by handling it is dribbling. Dribbling, under the different forms of exercises emerges in our research as a technical trial, being applied in the small marathon trial [2, 7].

Given the very close values obtained both during the initial test and during the final test between the members of the two groups, no significant aspects were highlighted under this parameter in relation to the statistical factor (P>0,05).

As it may be noted, the difference between the means of the two tests indicate a similar advancement recorded by both categories of athletes, as follows: for the experiment group Δ=0.78 (31.76 ±

2.13/30.98 ± 2.24), and for the witness group Δ=0,35 (31.63 ± 2.11/31.28 ± 2.15).

Likewise, the similarity between the values is also expressed by the variability coefficient value, which indicates unity with scores within: 0.09% - 0.05%. The fact that there is no clear separation signalled between the two groups leads to the idea that the preparation methods for the improvement of this performance had similar effects for all athletes.

3.6. Great Marathon while Dribbling (sec.)

The great marathon, this trial specific to the basketball game, by nature of the resistance factor, brings an additional effort for the dribbling execution under good technical conditions and fast execution throughout the entire track imposed by the trial.

The registered data pertaining to this trial allow the ascertainment of the fact that the mean obtained by the experiment group during the initial test was 35.13±2.50 sec, and during the final test it was 34.50±2.50 sec. The witness group shows means for the initial stage of 34.99±2.48sec., and for the final stage 34.40±2.63sec.; the difference between the means being Δ=0.63 for the experiment group, and for the witness group Δ=0.59. These materialize a slight increase in performance for the experiment group, nevertheless with homogenous advancement valences for both groups. Due to the corresponding statistical factor ("t"=0.90 with P>0.05 / "t"=0.82 with P>0.05), the two groups show unity towards one another and the variability coefficient brings values for the experiment group during the initial stage, of Cv= 1.39%, and for the witness group, during the same stage, Cv=1.37%.

During the final stage, the experiment group changes Cv=1.42% (thus, a difference of only 0.03%), and the witness

group Cv=1.48% (a difference of only 0.11%).

The fact that there is no clear separation signalled between the two groups leads to the idea that the preparation methods for the improvement of this performance had similar effects for all athletes.

3.7. Speed Trial involving Change of Direction (sec.)

The change of direction accounts for one of the important technical elements of the basketball game because it ensures the passage from one running direction to another, without the need to stop during the game stages. Corroborated with speed running, the execution quality and its positive effect during the game stages brings more momentousness in the relations among players.

Thus, important improvements are observed in this trial at the level of both groups, during the gap between the two tests. Thus, for the experiment group, the advancement is highly significant - t"=2.31 and P<0.001 - the initial values of the arithmetic mean being 13.60±0.84, and the final ones - 13.06±0.85, i.e. a difference of 0.54.

The scores recorded for the witness group are significant as well -"t"=1.13 P<0.01-, the difference between the means for the two test moments being 0.27 (13.48±0.83/13.21±0.86).

Treated comparatively based on the same criterion, the two samples show relevant differences during the second test stage, "t"=0.51 with P>0.05/ "t"=0.66 with P >0.05. The advancement rate previously signalled was obtained due to a high homogeneity level, thus, the distribution of the variability coefficient values is separated on the scale of 0.05% for the experiment group and of 0.03% for the witness group.

3.8. Defense trial (sec.)

The defense trial approaches the fundamental position. Conditioned by the time factor, this trial stores a plurality of motor skills that bring a considerable contribution to the trial execution difficulty through its influences upon the balance, stability, possibility to pass within a minimum period of time with maximum performance from defensive actions to attack.

Due to the close values obtained during both tests, no significant aspects were highlighted between the members of the two groups under this parameter in relation to the statistical factor (P>0.05).

Nevertheless, figure no. 1 indicates the advancement from the initial testing to the final testing of the experiment group, through the mean values of 23.57±2.05/23.03±2.03. The witness group also highlights a slight increase between the two tests, thus, during the initial test the mean values are 23.42 ±2.00, and during the final test the mean values are 23.23±2.03.

The mean differences between the two groups are Δ=0.52 for the experiment group and for the witness group - Δ=0.19; these differences confirm a better progress for the experiment group.

The fact that difference of value regarding the advancement between the two groups lead to the idea that the preparation methods and means for the improvement of this trial had multiple effects, that the algorithmization of the means and methods used for the experiment group had been approched much closer during the training.

4. Conclusion

A statistical viewpoint, in the enforcement of algorithmization within the pedagogical experiment, at the final test of

the technical preparation indicators as compared to the initial test, the experiment group records significant advancement under all trials. Thus, the applied method not only contributed to the improvement of the technical preparation indicators towards which the research was directed; it also had a positive transfer upon the physical training.

Algorithmization, through its system of rules that form the basis of the preparation programme, is necessary in order to eliminate and reduce to a minimum the technical mistakes for each important moment of the technical methods' execution.

The enforcement of the algorithm method is recommended for all training components with a special stress on the technical component.

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