INFLUENCE OF TRAINING PROCESS ON DEVELOPMENT OF SITUATIONAL-MOTOR ABILITIES OF THROW PRECISION WITH YOUNG BASKETBALL PLAYERS

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Abstract

The purpose of this research is identification of preparation training process programme impact on the development of situational-motor capabilities for basketball throw precision with young players. The respondent sample accounted for 100 boys aged from 11 through 13 ± 0.5 years divided with two sub samples. The first sub sample was made up of experimental group (E) with 50 boys who were subjected to twelve week preparation training process programme including four trainings a week and a control group (K) with 50 boys having three trainings a week. A set of six variables was implemented aimed to assess situational-motor abilities of basketball throw precision. Inter-group differences between the tested groups of respondents at initial and final testing were determined by a multiple variance and univariate analysis. Differences at initial and final testing were made by discriminative canonical analysis and effects of training preparation programme impact on the improvement of situational-motor skills by a multiple variance and univariate - covariance analysis. The observed difference among the groups when tested is significant when shots at basket are made from small distances in parallel and without the use of the board. The experimental programme influenced better results primarily on shot at basket vertically to the board from dribbling and the shot at basket under 45^0 angle from the right side in regard to the basket. The results of research indicate that respondents differ quantitatively when precision of throwing a ball at the basket is in question and that the training preparation programme made positive changes of the tested abilities.

Key words*: Training preparation process, precision, young basketball players, effects*

Introduction

In a modern basketball that is in a training preparation process great attention is paid to the development of various precision modalities in situations which correspond to the game. Precision of throwing a ball at the basket from different positions in the court is especially characteristic in basketball, since the final match outcome depends on the number of points made by shots. The precision is the ability that is genetically inborn in over 85% (Jovanović, 1999). Such statement is proved by various efficiency (percentage) of throwing a ball at the basket by qualitative players in matches, although all of them have training under the same conditions i.e. that is the optimum required level. The efficiency (percentage) of throwing a ball at the basket directly influences the result of the match that is the team with better percentage of shots by one, two or three points is the one that most often wins. The purpose of this research is to identify the impact of preparation training process programme on the development of situational-motor abilities for basket ball throw precision with young basketball players.

Methods

Respondent sample

The respondent sample accounted for 100 boys aged from 11 through 13 ± 0.5 years divided with two sub samples. The first sub sample was made up of experimental group (E) with 50 boys who were subjected to twelve week preparation training process programme including four trainings a week and a control group (K) with 50 boys having three trainings a week.

Sample of measurement instruments

Situational-motor abilities were assessed by measurement instruments for basket ball throw precision at the basket as follows: Jump shot from stand point D, different distance, the same direction (parallel with the board) and without the use of board (SŠPD), Jump shot from stand point L, with the use of board, different direction and different distance (SŠTL), Jump shot from the stand point M, with the use of board, different directions and different distance (SŠTM), Shot with one hand with the ball in front and above the head from dribbling from point G, without rebounding from the board (ŠJRG), Shot at the basket by “shooting” from the point L from dribbling (ŠPTL) and the Shot at the basket by “shooting” from point N, from dribbling (ŠPTN) (Jovanović, 1994).

Data processing method

Inter-group differences among the tested respondent groups at the initial and final testing were determined by multiple and univariate analyses, the differences of the final in regard to the initial testing by discriminative canonical analysis.

Whereas, the effects of preparation training process programme on the development of situational-motor abilities for basket ball throw precision by multiple and univariate and covariance analysis.

Results

Table 1. Multiple variance analysis for situational-motor ability for basket ball throw precision between (E) and (K) respondent groups at the initial testing

Wilks' Lambda	0.37
F – ratio	12.22
P –level	.00

The Table 1 shows the results of testing related to the significant differences of arithmetical mean level of all variables between the initial testing (E) and (K) of the respondent group sample and the statistical significant difference was determined since Wilk's Lambda is 0.372 that with the value of F-ratio of12.217 gives significant difference at the level of P= .000. Accordingly, statistical significant differences were identified in the applied system of situational-motor abilities of respondents.

Table 2. Univariate analysis for situational-motor abilities for basket ball throws precision between (E) and (K) respondent group at the initial testing

	Grp(I)	N	Mean	Sd	F	p
SŠPD	E	50	6.86	1.99	19.89	.00
	K	50	5.02	2.11		
SŠTL	E	50	6.3	1.62	2.37	.13
	K	50	5.71	1.99		
SŠTM	E	50	6.38	1.88	3.83	.05
	K	50	5.61	1.98		
ŠJRG	E	50	8.86	1.05	11.29	.00
	K	50	7.75	2.14		
ŠPTL	E	50	8.4	1.39	29.04	.00
	K	50	6.73	1.7		
ŠPTN	E	50	8.32	1.45	27.48	.00
	K	50	6.65	1.67		

The Table 2 shows the univariate analysis for situational-motor abilities by comparison of the results of arithmetic means for (E) and (K) groups of respondents at the initial testing. Based on the coefficient F-ratio and its significance P-level, it may be stated that the determined statistical significant difference of situational-motor abilities levels between the sample of tested groups of respondents when the variable Jump shot from stand point D, different distance, the same direction (parallel with the board) and without the use of board (SŠPD .000), was used, Shot with one hand with the ball in front and above the head from dribbling from point G, without rebounding from the board (ŠJRG .001), Shot at the basket by "shooting" from the point L from dribbling (ŠPTL .000) and the Shot at the basket by "shooting" from point N, from dribbling (ŠPTN .000)

Table 3. Multiple variance analysis for situational-motor abilities for basket ball throw precision between (E) and (K) groups of respondents at the final testing

Wilks' Lambda	0.246
F – ratio	22.19
P –level	.00

The analysis of Table 3 which shows the results of testing significant difference at the level of arithmetic means of all variables between the final testing of (E) and (K) groups showed the statistical significant difference since Wilk's Lambda was 0.246 which with F-ratio of 22.190 gives a significant difference at level of P= .000. Accordingly, statistical significant differences were identified in the applied system of situational-motor abilities of respondents.

Table 4. Univariate analysis for situational-motor abilities for basket ball throws precision between (E) and (K) respondent group at the final testing

	Grp(F)	N	Mean	Sd	F	P
SŠPD	E	50	7.30	1.39	28.05	.00
	K	50	5.49	1.94		
SŠTL	E	50	7.56	1.47	67.94	.00
	K	50	5.00	1.61		
SŠTM	E	50	5.72	1.25	16.88	.00
	K	50	4.59	1.46		
ŠJRG	E	50	9.24	.74	45.04	.00
	K	50	7.97	1.15		
ŠPTL	E	50	9.06	1.11	6.44	.01
	K	50	8.57	.83		
ŠPTN	E	50	9.16	.96	34.72	.00
	K	50	8.02	.97		

Table 4 shows the univariate analysis for situational-motor abilities by comparison of the results of arithmetic means for (E) and (K) groups of respondents at the final testing. Based on the coefficient F-ratio and its significance P-level, it may be stated that the determined statistical significant difference of motor abilities levels between the sample of tested groups (E) and (K) of respondents for all variables.

Table 5. Isolated discriminative function for (E) group

F	Eigen	Wilks	Chi	Cor.	df	Sig.
1	.42	.70	33.32	.54	6	.00

The results from the Table 5 show that one significant discriminative function which divides the testing results (initial and final) was isolated. The value of canonical correlation coefficient shows that function discriminative was explained with 54%, indicating that the system of six variables defines the area of situational-motor abilities at a high level. The discriminative strength is .704 and indicates the difference between the results obtained in two testing of situational-motor abilities. Significant difference between the two testing is high (Sig.=.000), since the value square test Hi is high (Chi-square =33.315).

Table 6. Factor structure of isolated discriminative function of situational-motor abilities for basket ball precision throw for (E) group

	Function 1
SŠTL	-.63
ŠPTN	-.53
ŠPTL	.41
ŠJRG	.33
SŠTM	-.32
SŠPD	-.20

The greatest contribution to discriminative function (table 6) is added by the variable Jump shot from the stand point L, with the use of board, of different direction and different distance (SŠTL-634), then Shot at the basket with "shooting" from the point N, from dribbling (ŠPTN-533), while the smallest contribution is added by the Jump shot from the stand point D, of different distance and the same direction (parallel with the board) and without the use of board (SŠPD-200).

Table 7. Group centroids for (E) group

Testing	Function 1
Initial	.64
Final	-.64

The results of group .642 and -642 (Table 7), that were tested through the significance of discriminative function, indicate the significant distance between the initial and final testing of situational-motor abilities with respondents in (E) group. The distance of both testing on the discriminative dimension from the middle is equal, but is diametrically different due to the sign, meaning that the results are in different discriminative areas.

Table 8. Classification results for (E) group

	Initial	Final	Total
Initial	50	3	50
Final	3	47	50
Initial	100%	0%	100%
Final	6%	94%	100%

Table 8 shows the effectiveness in result separation at initial and final testing of situational-motor abilities of group (E) respondents. Homogeneity of the results in two testing is in favour of their differences since the results of all respondents at initial testing have characteristics of the group. On the other hand, results of 47 respondents at the final testing have the features of their group and the results of three respondents do not fall in its group based on the characteristics. Based on this, it may be concluded that homogeneity of the results at the initial testing was 100% and at the final one 94%. The results from the Table 9 show that one significant discriminative function which divides the testing results (initial and final) was isolated.

Table 9. Isolated discriminative function for the group (K)

F	Eigen	Wilks	Chi	Cor.	df	Sig.
1	.99	.50	65.71	.71	6	.00

The value of canonical correlation coefficient shows that function discriminative was explained with 70%, indicating that the system of six variables defines the area of situational-motor abilities at a high level. The discriminative strength is .501 and indicates the difference between the results obtained in two testing of situational-motor abilities. Significant difference between the two testing is high (Sig.=.000), since the value square test Hi is high (Chi-square = 65.710).

Table 10. Factor structure of isolated discriminative function of situational-motor abilities for basket ball precision throw for (K) group

	Function 1
ŠPTL	.69
ŠPTN	.50
SŠTM	-.29
SŠTL	-.21
SŠPD	.12
ŠJRG	.06

The greatest contribution to discriminative function (table 10) is added by the variable Shot at basket by "shooting" from the point L, from dribbling (ŠPTL .690), then Shot at the basket by "shooting" from the point N, from dribbling (ŠPTN .495) while the smallest contribution is added by the Shot with one hand with the ball in front and above the head from dribbling, from the point G, without rebounding from the board (ŠJRG .064).

Table 11. Group centroids for (K) group

Testing	Function 1
Initial	.99
Final	-.99

The results of group .989 and -.989 (Table 11), that were tested through the significance of discriminative function, indicate the significant distance between the initial and final testing of situational-motor abilities with respondents in (K) group. The distance of both testing on the discriminative dimension from the middle is equal, but is diametrically different due to the sign, meaning that the results are in different discriminative areas.

Table 12. Classification results for (K) group

	Initial	Final	Total
Initial	42	8	50
Final	3	47	50
Initial	84%	16%	100%
Final	6%	94%	100%

Table 12 shows the effectiveness in result separation at initial and final testing of situational-motor abilities of group (K) respondents. Homogeneity of the results in two testing is in favour of their differences since the results of 42 respondents at initial testing have characteristics of this group, while 8 do not have. On the other hand, results of 47 respondents at the final testing have the features of their group and the results of three respondents do not fall in its group based on the characteristics. Based on this, it may be concluded that homogeneity of the results at the initial testing was 84% and at the final one 94%.

Table 13. Multiple variance analysis for the group (E) and (K) for situational-motor abilities in ball precision throw at the final testing

Wilks'	Rao's R	df 1	df 2	P-level
.52	5.82	12	75	.000

The Table 13 shows the multiple variance analysis of the applied variable covariance for the assessment of situational-motor abilities aimed at identification of the achieved effects from training induced by the impact of training preparation process programme, respondent groups (E) and (K) at the final testing with the neutralization of the recorded differences between the tested groups at the level of significance of .00 (P-level = .000). The evident difference occurs under the influence of experimental training preparation process programme and it may be concluded that the experimental programme influences the transformation of situational-motor abilities of the tested groups of respondents.

Table 14. Univariate analysis for situational-motor abilities for basket ball throws precision between (E) and (K) respondent group at the final testing

	Grp (F)	N	Adj Means	F	P
SŠPD	E	50	7.30	.14	.71
	K	50	5.50		
SŠTL	E	50	7.56	1.25	.27
	K	50	5.00		
SŠTM	E	50	5.72	.33	.57
	K	50	4.60		
ŠJRG	E	50	9.24	.93	.34
	K	50	7.94		
ŠPTL	E	50	9.06	10.14	.00
	K	50	8.56		
ŠPTN	E	50	9.16	16.47	.00
	K	50	8.02		

The Table 14 shows the univariate analysis differences between the groups (E) and (K) in variables for the assessment of situational-motor abilities in final testing with neutralization and partialization of the results at the initial testing. Significant statistical variable difference was established between Shot at the basket by „shooting“ from the point L, from dribbling (ŠPTL.002) and Shot at the basket by „shooting“ from the point N, from dribbling (ŠPTN .00).

Discussion and Conclusion

Significant differences for ball precision throw were found out between testing (initial and final) of (E) and (K) group of respondents. The observed difference between the testing of the group (E) is significant especially with the shots performed from short distances (so-called safe shots) in parallel and without the use of the board. The mentioned differences refer to the elements performed with the ball that is teh elements which require a constant touch with the ball. It is known that the basketball players of the age that was tested spend a lot of time with the ball (training techniques). A recognizable difference with the group (K) was noticed in situational-motor tasks which were relatively easy to perform since in the teaching methodology they are learnt at the beginning (shots from the right side and vertically to the board from dribbling, in regard to the shots from the left side of the basket). The training preparation process directed towards the development of technical-tactic features with young basketball players made a great impact and significant changes in situational-motor abilities of the tested groups of respondents. It may be concluded that the experimental programme made an impact on the result improvement between teh two testing primarily with the shot at the basket vertically to the board from dribbling and the shot at the basket under the angle of 450 from teh right side to the basket. These are easier tasks compared to the shots performed from teh left side of teh basket and teh are more often performed and trained. The results of this research indicate teh significant quantitative difference between the tested groups (E) and (K) in situational-motor abilities for ball precision throw at teh basket and that teh training preparation programme influenced positive changes of the tested abilities as well as teh obtained differences in favour of teh experimental group (E). Justification of such obtained results is proved by a number of researches (Kocić, 2008; Kocić & Jovanović, 2008; Balciunas et al., 2006; Woolstenhhhulme et al., 2004; Jovanović & Kocić, 2002; Rubin, 1997; Jovanović & Papashali, 1996; Jovanović 1990, 1991, 1994) which point out that methodically and properly tailored training process has impact on the increase of the level of tested abilities. Experimental training programme is absolutely appropriate to the age properties and status of young basketball players of tested respondents. There is a good orientation and selection that is the impact of training preparation process is teh basic generator of differences obtained with the tested abilities. The existence of differences obtained under the influence of preparation training process indicates the good quality work in teh school of basketball starting from teh lowest selection.

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UTJECAJ TRENAŽNOG PROCESA NA RAZVOJ SITUACIJSKO-MOTORIČKE SPOSOBNOSTI PRECIZNOSTI UBACIVANJA LOPTE U KOŠ KOD MLADIH KOŠARKAŠA

Sažetak

Cilj ovog istraživanja je utvrđivanje utjecaja programiranog trenažnog procesa na razvoj situacijsko-motoričke sposobnosti preciznosti ubacivanja lopte u koš kod mladih košarkaša. Uzorak ispitanika činilo je 100 dječaka starosti od 11 do 13 godina ± 0,5 godina, podijeljenih na dva subuzorka. Prvi subuzorak činila je eksperimentalna grupa (E), od 50 dječaka koji su bili podvrgnuti dvanaestotjednom programiranom trenažnom procesu sa četiri treninga tjedno. Drugi subuzorak bila je kontrolna grupa (K), od 50 dječaka sa tri treninga tjedno. Primjenjen je set od šest varijabli za procjenu situacijsko-motoričke sposobnosti preciznosti ubacivanja lopte u koš. Međugrupne razlike između testiranih grupa ispitanika na inicijalnom i finalnom testiranju su utvrđivane multivarijantnom i univarijantnom analizom varijance, razlike finalnog u odnosu na inicijalno testiranje diskriminativnom kanoničkom analizom, a efekti trenažnog programa na razvoj situacijsko-motoričke sposobnosti multivarijantnom i univarijantnom analizom kovarijance. Uočena razlika između testiranja kod grupa je naročita kod šuteva na koš koji se izvode s kratkih udaljenosti paralelno i bez upotrebe table. Eksperimentalni program utjecao je na poboljšanje rezultata prije svega na šut na koš ravno na tablu iz vođenja i šut na koš pod kutom od 45˚ s desne strane u odnosu na koš. Rezultati istraživanja ukazuju da se ispitanici kvantitativno razlikuju u preciznosti ubacivanja lopte u koš i da je trenažni program utjecao na pozitivne promjene analizirane sposobnosti.

Ključne riječi*: trenažni proces, preciznost, mladi košarkaši, efekti*