An Educational Training Program and its Effect on Some Motor Requirements of Junior Karate Performers

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Abstract: The current research aims at designing an integrated (physical - mental - psychological - technical) educational training program for junior karate performers and identifying its effects on the performance level in KATA and KUMITE, the ability for motor adaptation in KATA and the ability for motor fluency in KUMITE. The researchers used the quasi-experimental approach (one-group design with pre-/post-measurements). Sample was purposefully chosen of 10 junior karate performers from AL-Shobban AL-Moslemin sports club in Al-Minia, Egypt who are registered in the Egyptian federation of karate (8-10 years age group) during 2010-2011 season. The researchers concluded that the recommended program has statistically significant positive effect on performance level (20.82%), level and duration of motor adaptation and their means (16.87%, 20.29% and 18.59% respectively) and the ability of motor fluency (22.92%). Integration of all aspects (physical, motor, mental and psychological) in teaching and training, along with gradation, calibration and evaluation of teaching and training are very important factors affecting the program success.

Key words: Karate % Juniors % Educational % Training program % Motor adaptation % Motor fluency

INTRODUCTION

Skill is the core of preparation for competitions. Therefore, it should have some major motor requirements for karate performers like performance accuracy in KATA and utilizing performance in KUMITE. Performance accuracy comes from several factors like the performer's ability for motor adaptation according to performance requirements. In the main time, utilizing performance comes from several factors like the performer's ability to use motor fluency in performing skills according to fight situations. All this depends on good coaching and instruction. Some authors indicated that coaching junior performers begins with providing them with basic skills through three phases: preliminary coordination of the skill, good coordination of the skill and finally mastery to reach and automated response during performance. All this is done through training these skills in game-like situations. Thus, teaching and training become one insuperable integrated process [1].

Karate has an excellent variety in skills. It has four major types (fight - competitive - health - show). We are here concerned with competitive karate with its two sub-

categories: KATA (imaginative fight) and KUMITE (real fight). KATA includes more than fifty KATAS with a range of more than 20 to more than 40 movements in each KATA, while KUMITE has more than 200 different styles and techniques. Both sub-categories are divided further into individual and team competitions. There are three main ranks for karate performers. The third rank (white belt) is for beginners. Second rank or KUE includes yellow to brown belts. First rank or DAN includes 10 levels of the black belt. This indicates the wide variety of this sport in skills, styles, techniques ranks and competitions. Through literature review [2-10] and the researchers field observations, they found out that there is a lack in establishing a perspective or concrete plan for the content of the teaching and training processes in preparing junior (KUE) karate performers. The current research aims at designing an integrated (physical - mental - psychological - technical) educational - training program for junior karate performers and identifying its effects on the performance level in KATA and KUMITE, the ability for motor adaptation in KATA and the ability for motor fluency in KUMITE.

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MATERIALS AND METHODS

The researchers used the quasi-experimental approach (one-group design with pre-/post-measurements). Research sample was purposefully chosen from junior karate performers (10) from AL-Shobban AL-Moslemin sports club in Al-Minia, Egypt who are registered in the Egyptian federation of karate (8-10 years age group) during 2010-2011 season.

Data Collection Tools and Equipments: The researchers used the following tools and equipments: A restameter for measuring weights and heights - stop watch - T.V. set (TOSHIBA multi-system) - a video player/recorder (TOSHIBA multi-system) - a measuring tape (20m) - cones (50 cm) sticky tape (5 cm) - data collection form (for personal data and measurements of research variables and tests) - experts opinions form.

The researchers used the following tests
Physical ability tests:

C   Bending trunk forwards and downwards from standing on a graded box to measure flexibility of back body muscles [11].
C   Running in place test for measuring motor speed of legs [11].
C   Shuttle run test from stance to measure agility [11].
C   Wide jump from stance to measure leg muscles power [12].
C   Walking and running (600m) to measure cardio-pulmonary endurance [13].

Technical tests
Performance level test: It is a test for KATA performance. It is measured by three judges who decide the accuracy of performance including facing and looking towards the move, starting, path and end of movement for hands, legs and head, body center of gravity, horizontal movement and vertical position of head and trunk relative to ground and finally motion tempo (one point each with total of 6 points). They also decide muscular ability (2 points), motion repose (2 points). Total points of the test are 10 points.

Ability for Motor Adaptation: Judges decide a motor sequence of two different skills, each is performed in one step and they ask performers to stand in YIWI position and perform it four consecutive times as follows:

Left ready position:

C   Forward (right then left) with initial order of skills.
C   Forward (right then left) with reverse order of skills.

Right Ready Position:

C   Backward (right then left) with initial order of skills.
C   Backward (right then left) with reverse order of skills.

Best level is decided by the minimum duration from the beginning (utterance of HAGIMI from YIWI position) to end (back to YIWI position). Time from informing the performer with the required sequence (verbally or in writing) till real performance should not exceed 10 seconds. 10 points are dedicated for each performance and another 10 are dedicated for each duration with total of 80 points. Standard points for duration are calculated from Table 1.

The following coefficients are calculated: variance in performance - variance in duration - general variance = (sum of variance in performance and variance in duration) / 2 - motor adaptation = 10 - general variance. It is possible to identify the adaptation level from Table 2.

Ability for Motor Fluency: The performer stands in a 6m courtyard divided into 9 small squares (1-9). The performer is asked to perform a certain individual or complex skill in a combat defensive and attack styles (waves or contacts) all over the courtyard during 30 seconds on condition that each style includes no more than three skills. Table 3 shows the way of calculating points for that.

The Recommended Program
The Program Was Prepared According to the Following Steps:
C   Total duration of the program was 27 weeks divided into 17 weeks for general preparation and 10 weeks for specific preparation.
C   Mean load and its distribution: maximum load (90-100% of 1RM) - high load (75-90% of 1RM) - moderate load (50-75% of 1RM). Mean of training units = 4 units per week (90 minutes for each unit). Total weekly duration = 360 minutes. Total program duration = 9720 minutes or 162 hours.
C   Time distribution on program components: physical preparation (1944 minutes) - technical preparation (4860 minutes) - competitive preparation (1944 minutes) - mental preparation (486 minutes) - psychological preparation (486 minutes).

Table 1: Standard points for duration

Points	10	9	8	7	6	5	4	3	2	1	0
Duration (sec)	Less than 15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	More than 60

Table 2: Levels of adaptation ability

Level	Very high	High	Moderate	Weak	Very weak
Coefficient	More than 8	7-8	5-6	3-4	Less than 3

Table 3: Measuring the ability for motor fluency

Styles		Skills				Courtyard		Level	Motor fluency	
Quality or quantity	Point	Quality	Point	Quantity	Point	Quality or quantity	Point	Point	Total score	Level
10 or more	10	10 or more	10	19 or more	10	10 or more	10	Raw	70 or more	1st
9	9	9	9	17-18	9	9	9		65-69	2nd
8	8	8	8	15-16	8	8	8		60-64	3rd
7	7	7	7	13-14	7	7	7		55-59	4th
6	6	6	6	11-12	6	6	6		50-54	5th
5	5	5	5	9-10	5	5	5		45-49	6th
4	4	4	4	7-8	4	4	4		40-44	7th
3	3	3	3	5-6	3	3	3		35-39	8th
2	2	2	2	3-4	2	2	2		30-34	9th
1	1	1	1	1-2	1	1	1		29 and less	10th

Note: final score on all variables is 10, except for the ability for motor fluency as it recorded 70. If the performer does not perform anything, the score should be zero.

Sports motivation scale [13].

Pictured Intelligence test [14].

ℂ Distributing weekly duration on training units.

ℂ Preparing the training units: each unit duration is 90 minutes distributed on the ten components equally (8 minutes each) while the remaining 10 minutes are dedicated for mental and psychological preparation.

First Pilot Study: The researchers performed the first pilot study on 23/1/2010 to train assistants and calculate validity and reliability coefficients of tests. The researchers used difference significance between distinct and non-distinct groups to validate tests. Test/retest procedures were used to calculate tests reliability. Tests were proved valid and reliable.

Second Pilot Study: The researchers performed the second pilot study on 30/1/2010 to insure the suitability of the program components at the same place of the first pilot study.

Pre-measurements: Pre-measurements were taken on 6/2/2010 at AL-SHOBBAN AL-MOSLEMIN sports club in Al-Minia,Egypt on all the research variables.

Main Application: The recommended training program was applied from 14/2/2010 to 21/8/2010 (27 weeks).

Post-Measurements: Following the same protocols of pre-measurements, the researchers performed post-measurements on 22/8/2010.

Statistical Treatments: The researchers used the following statistics: mean-median-standard deviation-sqweness-Mann-Wittny non-parametric test-unidirectional variance analysis - L.S.D. - variance rate percentage.

RESULTS AND DISCUSSION

It is clear from Table 4 that F table value (3.26) is under its calculated values (ranging between 6.60 and 17.04). This led the researchers to perform L.S.D test.

Table 5 shows statistical significant differences among the three measurements in favor of the post-measurements.

The researchers think that these statistically significant differences in variance analysis and the positive variance percentage, as shown in Tables 4- 6 are due to the effectiveness of the recommended training program, characterized by integration of all aspects of performer's preparation. The training content of program was calibrated according to individual differences among performers to suite them. The highest variance and

Table 4: Unidirectional variance analysis among the three measurements (1st, 2nd and 3rd) for the sample (n=10)

Variables		Measurement	Variance source	Sum of squares	Freedom degrees	Mean squares	F
Performance KATA		Point	Inter-groups	10.35	2	5.17	8.64*
			Intra-groups	16.16	27	0.60	
Ability for motor adaptation	Level	Point	Inter-groups	6.57	2	3.28	6.60*
			Intra-groups	13.42	17	0.50	
	Time	Point	Inter-groups	9.87	2	4.94	9.60*
			Intra-groups	13.89	27	0.51	
	Mean	Point	Inter-groups	8.13	2	4.07	9.02*
			Intra-groups	12.17	27	0.45	
Ability for motor fluency		Point	Inter-groups	492.07	2	246.03	17.04*
			Intra-groups	389.80	27	14.44	

F table value on freedom degrees (2 - 27) and p=0.05 = 3.26

Table 5: L.S.D. among the three measurements for the sample (n=10)

Variables		Measurement	Groups	Means	1st measurement	2nd measurement	3rd measurement	L.S.D.
Performance KATA		Point	1st measurement	5.44		0.58	1.43*	0.69
			2nd measurement	6.02			0.85*	
			3rd measurement	6.87				
Ability for motor adaptation	Level	Point	1st measurement	5.57		0.40	1.13*	0.63
			2nd measurement	5.97			0.73*	
			3rd measurement	6.70				
	Time	Point	1st measurement	5.42		0.46	1.38*	0.64
			2nd measurement	5.88			0.92*	
			3rd measurement	6.80				
	Mean	Point	1st measurement	5.50		0.43	1.25*	0.60
			2nd measurement	5.93			0.82*	
			3rd measurement	6.75				
Ability for motor fluency		Point	1st measurement	33.30		4.40*	9.90*	3.42
			2nd measurement	37.70			5.50*	
			3rd measurement	43.20				

Table 6: Percentage of variance among the three measurements

Variables		Measurement	Groups	Means	1st measurement	2nd measurement	3rd measurement
Performance KATA		Point	1st measurement	5.44		9.63	20.82
			2nd measurement	6.02			12.37
			3rd measurement	6.87			
Ability for motor adaptation	Level	Point	1st measurement	5.57		6.70	16.87
			2nd measurement	5.97			10.90
			3rd measurement	6.70			13.53
	Time	Point	1st measurement	5.42		7.82	29.20
			2nd measurement	5.88			13.53
			3rd measurement	6.80			
	Mean	Point	1st measurement	5.50		7.26	18.59
			2nd measurement	5.93			12.22
			3rd measurement	6.75			
Ability for motor fluency	Point		1st measurement	33.30		11.67	22.92
			2nd measurement	37.70			12.73
			3rd measurement	43.20			

differences were on motor fluency due to mental exercises and sensory motor perception exercises. Along with variation and gradation of technical performances and exercises directed to develop the performer's creative ability that help the performer to perform in various styles and combinations in the shortest possible duration of time.

It is clear that the least values of variance and statistical significance was in the ability for motor adaptation, due to the fact that the sample members were of similar IQ and all of them did not participate in any sports activity in general and especially in karate, before the current research. Nevertheless, this variance percentage and good differences are strong indicators on the improvement of performance level with continuous practice. Most non-significant differences occur between the first and second pre-measurements, except for motor fluency, as the time interval between these two measurements represent the preliminary coordination phase. Therefore, improvement was quantitative rather than qualitative in technical performance. This was clear in improving motor adaptation more than any other variable. Other improvements were due to improvements in other aspects of training during that phase. Statistically significant differences between the second and third measurements and consequently between the first and third measurements, are due to general improvement of the sample reaching good coordination phase.

CONCLUSION

The researchers concluded that the recommended program has statistically significant positive effect on performance level (20.82%), level and duration of motor adaptation and their means (16.87%, 20.29% and 18.59% respectively) and the ability of motor fluency (22.92%). Integration of all aspects (physical, motor, mental and psychological) in teaching and training, along with gradation, calibration and evaluation of teaching and training are very important factors affecting the program success.

Recommendation
The Researchers Recommend the Following:

C Applying the recommended program to junior karate performers of the same and other age groups.
C To concentrate on integrated preparation that includes physical, technical, mental and psychological aspects of the performer during teaching and training.

C It is necessary to plan training according to the principles of calibration, gradation and continuous evaluation for performers during teaching and training karate.

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