

Possibilities for optimizing physical training for children through the pilot program: Judo in school from rural areas

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Abstract:

Purpose. The main purpose of the research is to highlight the effects in terms of physical training of an experimental program applied to students aged 8-10, through the hours of physical education with selected content from judo. **Methods.** A number of 24 male subjects, students of Ghioroc Secondary School were tested. For the statistical interpretation of the research results we used in the comparison of the research groups (control and Experimental) the Independent Sample t Test, arithmetic mean, standard deviation and statistical significance through the statistical program IBM SPSS ver. 23, both at the level of the initial test and at the level of the final test. **Results.** From the statistical interpretation of the research results we can draw the following conclusions: at the beginning of the experiment the two research groups present average values without statistically significant differences ($p > 0.05$) at all test samples and at the end of the experiment, the two research groups show significant statistic differences in all test samples as follows: $p < 0.05$ in test samples: long jump from the spot; respectively $p < 0.001$ at the shuttle test, trunk lifts, push-ups and knee bends. **Conclusions.** The experimental hypothesis was confirmed, the results obtained supporting this. At the level of the initial test, the research groups presented similar values, the results of comparing the average values highlighting the lack of significant differences ($p > 0.05$) in all test samples. Based on the data collected at the end of the experiment, it was found that the total physical capacity of the subjects was significantly improved at the thresholds of statistical significance of $p < 0.05$

and $p < 0.001$, demonstrating the superiority of the application of judo sports content compared to classic content, for 1 school year, at the physical education classes of 8-10 year old students from rural areas.

Keywords: - judo, physical training, motor skills, teaching strategy

Introductions

This type of martial arts - judo, was developed in Japan at the end of the 19th century, in few words can be considered: a sport or a form of mental and moral education. Young people have had the chance to discover that judo can be both physical exercise and an opportunity to build a better future (frjudo.ro, Ardelean, 2013).

Training in performance sports is a rather difficult task as each sport, branch or event, requires complex efforts. "During training, the athlete reacts to various stimuli, some of which are more predictable than the others. (Bompa, 2001) Many specialists in the field of sports consider this branch of sport as particularly important and appreciated. "Judo is more than a tatami sport, being the synthesis of knowledge of anatomy, physiology, biomechanics, physiology, psychology, etc., obtained over time through Asian philosophy and thinking as a result of careful study of the surrounding nature. and human resources". (Herlo, 2010) From training technical / tactical skills to physiological and psychological training, the coach or judo teacher must know the requirements of Sports Science and Physical Education, in order to improve the potential of judo practitioners in all these aspects. Bogdan & Telechi (2003) argue that "the development of specific skills contributes to the creation of automation in triggering the execution of technical procedures with maximum efficiency". The father of judo stated that "practicing judo brings many satisfactions: physical exercise produces pleasant states for the individual and gives the body satisfaction" (Kano, 2013).

We also highlight the fact that our city has a rich tradition in practicing performance judo with outstanding results, confirmed by the successes in competitions of legitimate athletes, but also by the number of places where you can practice this noble art. Sta-

tistics and some studies show that more than half of the existing clubs in Arad County (both in cities and communes) have well-knit judo sections (Ardelean, 2013). This fact obliges us to identify the best methods of training, and to take advantage of this openness of young people to this sport, giving them the chance to assert themselves and to obtain very good results as early as possible (judoinfo.com).

For children, it is very important to incorporate exercises for the development of general strength and physical condition, in a pleasant, fun way during the physical education classes in the program or in the hours allocated for „sports” or we can encourage children to perform regularly at home some exercises with body weight that are done during training (Amtmann, Cotton, 2005). Some basic psycho-motor skills such as: agility, technical elements of judo, flexibility, endurance, strength, speed, power, mental skills, tactics, can be variables that condition performance in judo. These skills, controlled and improved, are the key to success in judo. Some authors claim that the decisive factor for success is speed motor quality, which is extremely complex and largely genetically determined; its position is that of king in judo (Galea, Ardelean, Popa, 2015).

In the process of preparing the children in the school, in order to be selected for the performance judo teams, it is very important to act on all the training factors. Among them, it is recommended to act on physical training, even if we use adapted means and methods, consisting in training with our own body weight or with helping objects (Ardelean, 2016).

It is also important to start preparing students for judo early because Judo, as a structured physical activity with the appropriate frequency, intensity and duration of exercise for preschool and school age children can complement the WHO recommendation on the amount of daily exercise needed. This is also important for combating the sedentary lifestyle of this age group and the growing wave of obesity (Kowalczyk, Zgorzalewicz-Stachowiak, Błach, Kostrzewa, 2022).

Material & methods

Research aims

Highlighting the effects in terms of physical training, of an experimental program applied to students aged 8-10, through physical education classes or sports ensemble classes with selected judo content or exercises that are predominantly used in judo gyms. In addition to these proposed exercises that were applied at least twice a week, partially or fully, and are presented in the table below, we also applied a series of dynamic games specific to judo, to develop different motor skills and abilities or to learn specific techniques, like other authors said (Chirazi, 2006). The duration of the experiment was 8 months.

Table 1. Presentation of some means that were applied during the experiment.

Nr.	Exercises performed	Nr. of rep./ time	Nr. of series
1	Shuttle speed running	4x10 m	2
2	Rope climbing, 3 m	2-3	2
3	Push-ups with bench support	15	3
4	Throwing a 1 kg medicine ball	20	3
5	Lifting the torso from dorsal lying	25	3
6	Trunk extensions from face lying	30	3
7	Forward lunges	30	3
8	Squats with jumping	20	3
9	Distance running 800m	1	3
10	Uchikomi (with speed)	20	2
11	Nage- Komi (with speed)	20	2
12	Randori	1,30 min	2

Research hypothesis

If in the physical education classes of 8-10 year old students from rural areas, we apply content collected from judo sports, the physical capacity of the subjects will improve significantly. Participants: Students aged 8-10, boys, from Ghioroc Secondary School, Arad County, n = 24, randomly divided into two groups: the control group (n.m. = 12) and the experimental group (n.e. = 12)

Procedure/ Skill Test protocol

The five applied tests were selected in order to test the main motor qualities involved in judo.

- Shuttle 5 x 7.5 m - assuming movement 5 times, at maximum speed, between two points at 7.5 m, reaching extreme points
- Vertical trunk lifts from supine position - consisting of performing a maximum number of repetitions in 30 ''.
- Push-ups consisting of no. maximum repetitions.
- Knee bends (maximum number of repetitions)
- Length jump from the spot (in m)

Data collection and analysis

For the statistical interpretation of the research results we used the comparison of the research groups (control and Experimental) through the Independent Sample t Test, through the statistical program IBM SPSS ver. 23, both at the level of the initial test and at the level of the final test.

Results and discussions

The test results of the two research groups are presented in Tables 1 and 2 below. In table no. 1, the values obtained by the control group at the initial and final testing at the following verification tests are highlighted: shuttle, trunk flexions, push-ups, knee bends, long jump from the spot.

Table 1. Initial and final test results of control group

Control group (GM) at initial and (TI) final test (TF)												
Initials	Shuttle (sec.)		Trunk flexions (no. rep.)		Push-ups (no rep.)		Knee bends (no rep.)		Long jump (m)			
	TI	TF	TI	TF	TI	TF	TI	TF	TI	TF		
1. A. C.	8.98	8.00	18	20	10	12	16	18	1.60	1.67		
2. D. Ş.A.	8.89	8.01	18	21	10	12	14	16	1.51	1.59		
3. D.M.	9.01	8.50	17	18	10	13	15	17	1.59	1.64		
4. D.G.	9.04	8.05	18	20	15	17	15	18	1.55	1.60		
5. F.C.A.	9.03	8.37	18	20	14	16	14	16	1.47	1.52		
6. F.A.Ş.	9.04	8.26	16	18	15	17	14	16	1.43	1.49		
7. H.V.	10.93	9.45	15	17	13	16	14	17	1.54	1.60		
8. H.G.A.M.	11.04	10.32	14	16	8	10	12	15	1.30	1.40		
9. J.M.N.	10.98	9.45	17	20	11	15	16	18	1.64	1.74		
10. L.C.M.	11.01	10.12	16	18	14	16	14	17	1.53	1.60		
11. I. V.	13.03	12.01	15	17	13	16	14	17	1.59	1.65		
12. M.M.	11.03	10.17	16	18	14	17	15	18	1.67	1.71		

The analysis and statistical interpretation of the differences between the test environments for the control group are presented in table no. 2 below: (Epuran, 2005)

Table 2. Statistical-mathematical interpretation of the results obtained by *control group*

Control group		Shuttle 5x7,5m	Trunk lifting no.rep in 30"	Push-ups (maximum no of repetitions)	Knee bends (maximum no of repetitions in 20")	Long jumps (m)
T.I	\bar{x}	10,16	16,50	12,25	14,41	1,53
	S	1,34	1,38	2,34	1,08	0,10
	Cv%	13,21	8,37	19,10	7,51	6,54
T.F	\bar{x}	9,22	18,58	14,75	16,91	1,60
	S	1,25	1,56	2,37	0,99	0,09
	Cv%	13,59	8,41	16,12	5,88	5,93
D. ($\bar{x}_i - \bar{x}_f$)		-0,94	2,08	2,50	2,50	0,06
t		10,81	14,01	12,84	16,58	11,82
p		<0,001	<0,001	<0,001	<0,001	<0,001

Note: Control group ($n = 12$), $f = n-1 = 11$ For $f = 11$ at the value level of 0.05, the value of $t = 2,201$; at the value level of 0.01 the value of $t = 3.106$ and at the value level of 0.001 = 4.437 (Fisher tab.)

In the 5x7.5m shuttle test, the value of the arithmetic mean at the initial test is 10.16sec, and at the final test at 9.22sec, highlighting an improvement of the average by 0.94sec.

The standard deviation is 1.34 at the initial test and 1.25 at the final test, thus a decrease of the standard deviation values is observed at the end of the preparation period. The coefficient of variability has the value of 13.21% at the initial test and 13.59% at the final test, the dispersion being small, the group presents a high homogeneity, the averages being representative. The comparative analysis of the means between tests highlights the value of "t" calculated 10.81 higher than the tabular "t" (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

In the trunk lifting test no. rep. in 30 '' the value of the arithmetic mean at the initial test is 16.50 repetitions and at the final test it is 18.58. The average progress between the two Ti - Tf tests is 2.08 repetitions.

The standard deviation is 1.38 at the initial test and 1.56 at the final test, so there is an increase in the values of the standard deviation at the end of the preparation period. The coefficient of variability has the value of 8.37% in the initial test and 8.41% in the final test, where the dispersion is small, the group has a high homogeneity, the averages being representative.

The comparative analysis of the means between tests highlights the value of "t" calculated 14.01 higher than the tabular "t" (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

We find out that in the float test the value of the arithmetic mean at the initial test is 12.25 repetitions, and at the final test it is 14.75 repetitions. The average progress between the two Ti - Tf tests is 2.50 repetitions.

The standard deviation is 2.34 at the initial test and 2.37 at the final test, so there is an increase in the values of the standard deviation at the end of the preparation period. The coefficient of variability has the value of 19.10% at the initial testing and 16.12% at the final testing, the community is relatively homogeneous, the averages being sufficiently representative. The comparative analysis of the means between tests highlights the value of "t" calculated 12.84 higher than the tabular "t" (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

Regarding the knee flexion test, the value of the arithmetic mean at the initial test is 14.41 repetitions and at the final test it is 16.91. The average progress between the two Ti - Tf tests is 2.50 repetitions. The standard deviation is 1.08 at the initial test and 0.99 at the final test, thus a decrease in the standard deviation values at the end of the preparation period is observed. The coefficient of variability has the value of 7.51% at the initial test and 5.88% at the final test, the dispersion being small, the group presents a high homogeneity, the averages being representative. The comparative analysis of the means between tests highlights the value of "t" cal-

culated 16.58 higher than the tabular “t” (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%). In the long jump test, the value of the arithmetic mean at the initial test is 1.53 m, and at the final test an average of 1.60 m was recorded. The average progress between the two $T_i - T_f$ tests is 0.06m. The standard deviation of 0.10 at the initial test and 0.09 at the final test, thus showing a decrease in the values of the standard deviation at the end of the preparation period. The coefficient of variability has the value of 6.54% at the initial test and 5.93% at the final test, the dispersion being small, the group presents a high homogeneity, the averages being representative. The comparative analysis of the means between tests highlights the value of “t” calculated 11.82 higher than the tabular “t” (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

In table no. 3 we highlighted the values obtained by the experimental group in the two tests performed, namely: initial and final testing at the following verification tests: shuttle, torso flexions, push-ups, knee bends, long jump on the spot.

Table 3. Initial and final test results of experimental group

Experimental group (GE) initial (TI) and final test results (TF)											
	Initials	Shuttle (sec.)		Trunk flexions (nr. rep.)		Push-ups (nr. rep.)		Knee bends (nr. rep.)		Long jump (m)	
		Ti	Tf	Ti	Tf	Ti	Tf	Ti	Tf	Ti	Tf
1.	A. L.	7.09	6.00	19	30	10	38	12	28	1.55	1.65
2.	B. P.	7.56	6.51	20	30	10	34	13	28	1.70	1.76
3.	B. M.	8.53	7.52	15	28	15	18	16	18	1.10	1.71
4.	V. C.	8.04	7.01	18	20	18	20	12	20	1.50	1.65
5.	C.D.	8.01	7.05	17	22	18	23	15	23	1.54	1.61
6.	P. D.	7.03	6.01	17	30	18	37	12	28	1.65	1.72
7.	D.I.	8.04	7.05	18	29	16	35	12	28	1.69	1.71
8.	H. F.	8.09	7.04	15	27	12	29	11	24	1.36	1.70
9.	M. S.M.	7.97	7.08	18	28	15	27	13	25	1.60	1.77
10.	N. A.	8.06	7.08	16	29	14	28	12	27	1.69	1.80
11.	N.D.A.	8.24	7.56	19	25	11	23	14	23	1.36	1.61
12.	P. I.	7.76	7.05	19	25	15	26	13	25	1.48	1.53

The analysis and statistical interpretation of the differences between the test environments for the experimental group are presented in table no. 4 below: (Epuran, 2005)

Table 4. Statistical-mathematical interpretation of experimental group test results

Exeprimental group		Shuttle 5x7,5m	Trunk lifting no.rep in 30"	Push-ups (maximum no of repetitions)	Knee bends (maximum no of repetitions in 20")	Long jumps (m)
T.I	\bar{x}	7,86	22,25	22,08	19,08	1,51
	S	0,44	3,49	4,69	2,10	0,17
	Cv%	5,64	15,70	21,27	11,05	11,65
T.F	\bar{x}	6,91	26,91	28,16	24,75	1,58
	S	0,49	3,28	6,64	3,33	0,15
	Cv%	7,21	12,21	23,59	13,46	9,80
D. ($\bar{x}(\bar{x}_i - \bar{x}_p)$)		-0,95	4,66	6,08	5,66	0,07
t		6,41	5,56	9,60	11,05	5,33
p		<0,001	<0,001	<0,001	<0,001	<0,001

Note: Experimental Group (n = 12), f = n-1 = 11 For f = 11 at the value level of 0.05, the value of t = 2,201; at the value level of 0.01 the value of t = 3.106 and at the value level of 0.001 = 4.437 (Fisher tab.)

In the 5x7.5m shuttle test, the value of the arithmetic mean at the initial test is 7.86sec, and at the final test at 6.91sec, highlighting an improvement of the average by 0.95sec.

The standard deviation is 0.44 at the initial test and 0.49 at the final test, so there is an increase in the values of the standard deviation at the end of the preparation period. The low values of the coefficient of variation (CvTi = 5.64% and Cv Tf = 7.21%) indicate a high homogeneity, the averages being representative. The comparative analysis of the means between tests highlights the value of "t" calculated 6.41 higher than the tabular "t" (Fisher) at P < 0.001, highlighting highly significant differences between tests (99.9%).

In the trunk lifting test no. rep. in 30 ,’ the value of the arithmetic mean at the initial test is 22.25 repetitions and at the final test it is 26.91. The average progress between the two $T_i - T_f$ tests is 4.66 repetitions.

The standard deviation is 3.49 at the initial test and 3.28 at the final test, thus a decrease of the standard deviation values is observed at the end of the preparation period. The coefficient of variability has the value of 15.70% in the initial testing - the community is relatively homogeneous, the average being sufficiently representative - and 12.21% in the final testing, where the dispersion is small, the group has a high homogeneity, the average being representative. The comparative analysis of the means between tests highlights the value of “t” calculated 5.56 higher than the tabular “t” (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

We find out that in the float test the value of the arithmetic mean at the initial test is 22.08 repetitions, and at the final test it is 28.16 repetitions. The average progress between the two $T_i - T_f$ tests is 6.08 repetitions.

The standard deviation is 4.69 at the initial test and 6.64 at the final test, so there is an increase in the values of the standard deviation at the end of the preparation period. The coefficient of variability has the value of 21.27% at the initial testing and 23.59% at the final testing, the community is relatively homogeneous, the averages being sufficiently representative. The comparative analysis of the means between tests highlights the value of “t” calculated 9.60 higher than the tabular “t” (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

Regarding the knee flexion test, the value of the arithmetic mean at the initial test is 19.08 repetitions and at the final test it is 24.75. The average progress between the two $T_i - T_f$ tests is 5.66 repetitions.

The standard deviation is 2.10 at the initial test and 3.33 at the final test, so there is an increase in the values of the standard deviation at the end of the preparation period. The coefficient of variability has the value of 11.05% at the initial test and 13.46% at

the final test, the dispersion being small, the group presents a high homogeneity, the averages being representative.

The comparative analysis of the means between tests highlights the value of “t” calculated 11.05 higher than the tabular “t” (Fisher) at $P < 0.001$, highlighting highly significant differences between tests (99.9%).

In the long jump test, the value of the arithmetic mean at the initial test is 1.51 m, and at the final test there was an average of 1.58 m. The average progress between the two tests $T_i - T_f$ is 0.07 m.

The standard deviation is 0.17 at the initial test and 0.15 at the final test, so there is a decrease in the standard deviation values at the end of the preparation period. The coefficient of variability has the value of 11.65% at the initial test and 9.80% at the final test, the dispersion being small, the group presents a high homogeneity, the averages being representative. The comparative analysis of the means between tests highlights the value of “t” calculated 5.33 higher than the tabular “t” (Fisher) at $p < 0.001$, highlighting highly significant differences between tests (99.9%).

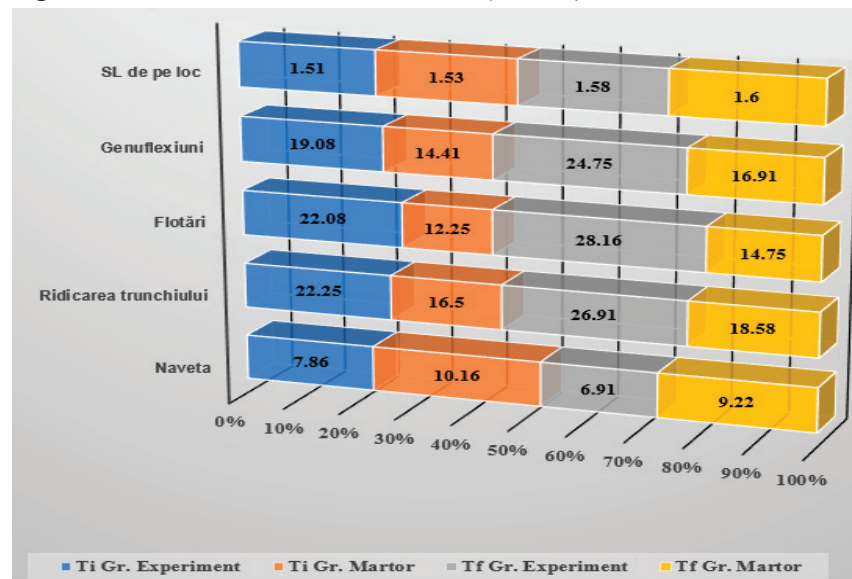


Chart no. 1 Comparative analysis of the average results obtained by the two groups (experimental group and control group)

Interpretations

The statistical interpretation of the research results shows the following:

a. At the beginning of the experiment the two research groups present average values without statistically significant differences ($p > 0.05$) in all test samples

b. At the end of the experiment, the two research groups show statistically significant differences in all test samples as follows:

- $p < 0.05$ in the test samples: long jump from the spot

- $p < 0.001$ in the shuttle test, trunk lifts, push-ups and knee bends. (Gagea, A., 1999)

Conclusions

The experimental hypothesis was confirmed, the results obtained supporting it. In initial test, the research groups presented similar values, the results of comparing the average values highlighting the lack of significant differences ($p > 0.05$) in all test samples. Based on the data collected at the end of the experiment, it was found out that the total physical capacity of the subjects was significantly improved at the thresholds of statistical significance of $p < 0.05$ and $p < 0.001$, demonstrating the superiority of the application of judo sports content compared to classic content, for 1 school year, at the physical education classes of 8-10 year old students from rural areas.

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