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New methodical approach to the assessment of video record which is used when training of judoists

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Purpose: *to offer a new methodical approach for the assessment of video record which is used when training of judoists.*

Material & Methods: *the assessment of video record, which is used in the course of training of judoists, was carried out in the research; the poll of 23 masters of sports of Ukraine and masters of sports of international class.*

Results: *flexibility of a new methodical approach for the video record assessment is proved. Methodical approach assumes the use of unique mathematical apparatus – methods of pair comparisons and arrangement of priorities. It can be used for the assessment of video films for judoists of the various skill level, age, physical parameters for individual training of certain judoists at the correct selection of parameters of comparison.*

Conclusions: *the use of the given methodical approach will promote the increase of efficiency of the competitive activity and coach's work, will allow judoists to reach high levels of individual skill.*

Keywords: *judo, judoist, video record, competitive activity, coach's work.*

Introduction

The outstanding scientists in the branch of sport – G. M. Arzyutov [2], V. S. Dakhnovskyi [3], S. S. Yermakov [4], G. P. Parkhomovich [7], A. I. Trofimov [8], G. S. Tumanyan [9], V. B. Shestakov [10], V. Yagello [11] – consider that physical, mental training of wrestlers is shown in their technical actions, from the measure, the improvement of which, success of sportsmen depends in competitions. It is possible to improve the quality and to increase the efficiency of technical actions of judoists if to use the video record which displays the advanced technique of masters of judo in the course of their preparation and operating time of the leading coaches.

Sport is the open system which exchanges with the external environment technologies, information, materials. If to apply the scientific method of abstraction, it is possible to mark out the most significant lines of the video record, which is used in the course of training of judoists. Also the complexity appears at the selection of certain educational movies, which is that it was necessary to limit, for example, 3–4 video records as sportsmen need the necessary time not only for their understanding, but also for understanding the material that is taught in limited time of preparation prior to important competitions.

The purpose of the research:

to offer a new methodical approach for the assessment of the video record, that is used in training of judoists for the purpose of the improvement of their precompetitive preparation, technical-tactical skill.

Communication of the research with scientific programs, plans, subjects

The research is executed according to the Built plan of the research works of Kharkiv state academy of physical culture for 2011–2015 on the subject "Individualization of the training process of the qualified wrestlers".

Material and Methods of the research

The intuitive survey of 23 masters of sports of Ukraine and masters of sports of international class of the federation of judo of the Kharkiv region was conducted during the research. The duration of carrying out the research – was 2 years (2014–2015). The assessment of the video record, which is used in the course of training of judoists, is carried out. The methodical approach allows use of a unique mathematical apparatus – methods of pair comparisons and arrangement of priorities. It was used for the assessment of videos for judoists of different skill level, age, and physical parameters for individual training of certain judoists by the condition of the correct selection of parameters of comparison.

Results of the research and their discussion

We developed the new scientific method, which can be applied to the assessment of the video record, which is used in the course of training of judoists.

We were faced by the concrete task: to choose four from training films about judo, what as much as possible would answer effective actions of judoists during the competitions. It would be expedient to use them as the main evident material at the stage of training of sportsmen.

The choice was carried out from the following 7 training films

about judo.

1. Training of judo – Judo in Japan. Hirotako Okado (60 min, in 2006).

2. Judo throws – Ippon Super A. The best throws in judo (60 min, in 2004)
3. Judo. Technique of the main methods of fight in stand. Union-sportfilm (30 min, in 1985).

4. Judo lessons. UCHI MATA. Technique. Method. Practice (68 min, in 2014).

5. Training of judo – V. Yelchaninov. Technique of throws in stand (60 min, in 2005).

6. Training of judo – Technique of fight in stand from O. Yatskevich (70 min, in 2003).

7. Judo in Japan. Movie 1. Training. Method. Technique (60 min, in 2001).

The following factors (parameters) were chosen for comparison.

1. Ease, availability of perception.

2. Compliance of technical actions to the skill level of judoists.
3. Compliance of technical actions of style of maintaining duel of judoists.

4. Variety of nuances of performance of technical actions by judoists, their specification.

5. Use of interesting and effective technical actions wgich are borrowed from other types of single combats.

6. Skill level of performance of technical actions which are shown from the point of view of purity.

7. Demonstration of performance of technical actions by judoists which have different physical data (different weight categories, different growth).

We could see the task of the quantitative determination of the listed above qualitative parameters. It would be possible to be carried out also by means of numerical score, however its shortcoming is the subjective way of the determination of weighing coefficients. We offer the techniqume which is based on the use of unique mathematical apparatus, – methods of pair comparisons and arrangement of priorities with use of the personal computer.

When developing the methodical approach to the assessment of the video record, which is used when training judoists, we left the following:

– the solution of tasks from the assessment of the video record is often carried out at total or partial absence of the necessary initial information which predetermines use of expert estimates. The similar tasks can be solved at the insufficient initial information and at its total absence by means of the method of arrangement of priorities;
– in our opinion, it is necessary to consider the application of method of arrangement of priorities perspective when receiving the quantitative assessment of the video record which is used when training judoists.

There is no analog of application of this method in the scientific research in the branch of physical culture and sport now. Our methodical approach is directed to the subsequent development of models of the solution of similar tasks by this method, and also the subsequent distribution of experience of their decision and approbation.

We applied the method of pair comparisons with the purpose of the detection of advantage of experts "in pure form" at the solution of the task of arrangement of priorities. Such approach is caused by the fact that other types of estimates, for example, score, demand transitivity – logicality of advantages (if the video record 1 is better than the video record 2, and the video record 2 is better than the video record 3, then and the video record 1 is better than the video record 3).

Intransitivity of the system of pair comparisons can meet rather often. First, very widespread situation, when the expert-appraiser, is unequally familiar with video records, which are the subject to estimation, and at assessment of some of them can allow inaccuracy. Secondly, several experts can carry out, and each of them estimates only part of objects that can cause some contradictions at rather large number of objects of their estimation on one sign. Thirdly, the expert who estimates all objects can have unequal differential threshold at the assessment of different objects. For example, three video records 1, 2, 3 differ by any indicator a little. The expert badly feels the difference by certain indicator between video records 1 and 2 and the judgment will express as 1=2, however the differences between 1 and 3, 2 and 3 are for it obvious and its judgments will be the following: 1>3 and 2<3 that leads to intransitive system of the relations: 1>3, 2<3, 2=3. And, at last, fourthly, even if several experts of the same video record in the set sign received transitive systems of comparisons at the individual assessment, then the violation of transitivity is possible at their report in group assessment by the rule of the majority. The paired comparison of such transitivity does not assume what is the essential advantage of the approach, which is offered by us.

Because of it, the result of the paired comparison most precisely displays the subjective advantage because the smallest restrictions are imposed on the choice here, and the method does not impose to the expert of aprioristic conditions.

The quantitative assessment of videos, which are used in quality evident material in training of judoists, is calculated by us on the basis of the expert information. The procedure of conducting examination is based on the use of the method of pair comparisons according to which all video records are in pairs compared among themselves by the certain factor, and each following assessment is not connected with th previous. All these pair estimates make the matrix of pair advantages at processing of which the weighing coefficients of the concrete video are received which is used in the quality evident material in the course of training of judoists.

The paired assessment was carried out with the use of symbols: > – better; ≥ – better or equally; = – equally; ≤ – worse or equally; < – worse.

The expert makes the comparison of video records by the assessment factors irrespective of results of other comparisons including wrong, and one mistake which was made not so considerably influences results of calculation of values of priorities of videos in this case the lack of the requirement of transitivity of the system of comparisons.
We applied the approach during the scientific research, in which coefficients of A_{ij} are used at the solution of tasks concerning the arrangment of priorities, which change and are purposefully fixed at the video record assessment by the certain factor of comparison:

$$Aij=\begin{cases} 1+y, & \text{if } Xi>Xj \\ 1+0.5y, & \text{if } Xi>Xj \\ 1, & \text{if } Xi=Xj \\ 1-0.5y, & \text{if } Xi<Xj \\ 1+y, & \text{if } Xi<Xj, \end{cases}$$

where *0<y<1; y – any rational number in the set interval.*

Measures of change of limits of suspension of this factor in the estimated videos, which are fixed in the form of the relation of extremes of the ranged row, were set on the basis of the analysis of the available information or by means of the expert assessment:

$$Kc=\frac{X_{i\,max}}{X_{i\,min}} \qquad (2)$$

where X_i max – the video record with the maximum assessment of factor;
X_i min – the video record with the minimum assessment of factor.

The corresponding coefficients of A_{ij} were selected by the found relation of K_c. Further the square matrix of $A=||A_{ij}||$ was under construction on the basis of system of pair comparisons and with use of the picked-up A_{ij} coefficients.
The calculation of values of priorities of factors of the assessment of $p_i(k)$ is made by the iterative method with the use of formula:

$$p_i(k)=\frac{1}{Q(k)}\ A_p(k-1) \qquad (3)$$

where k=1, 2....;

$Q_k=\sum_{j=1}^{n}\sum_{i=1}^{n}A_{ij}\,p_i(k-1)$ – sum component of vector $A_p(k-1)$;

$p_i(k)$ – the normalized iterated force of K-system.

The actual coefficient of the relation of K_a is compared to the settlement K_c. The task is considered solved at coherence of coefficients. Otherwise the correction of coefficients A_{ij} is carried out and the calculation repeats.

The assessment of limits of change of this factor in the objects (definition of K_c) was the most difficult and responsible moment at the solution of our task. When it is possible to estimate ratio of concrete video records bythis factor, it is necessary to rank the number of videos for definition of its extremes. The method of arrangement of priorities with any coefficients of A_{ij} was applied to this purpose. As it is the only direct quantitative assessment at the solution of task, the receiving of it can be organized more carefully and consequently, and more qualitatively.

We define the necessary coefficients of A_{ij} by the found K_c coefficient:

$$y=\frac{K_{c-1}}{K_{c+1}}+\frac{0.05}{m} \qquad (4)$$

where K_c – calculated coefficient of the relation of extremes of the ranged row;
m – number of the estimated videos which are used in training of judoists.

The procedure of the search of values was following in our case of intransitivity of the system of pair comparisons and existence of the relations of equality in it:

– y_p was defined – the previous value y was also solved the task about arrangement of priorities;
– by the acquired values of priorities estimation factors are ranked;
– the previous actual relation of priorities of K_{PP} of extremes of the ranked row, which was received with use unitary enterprise, was established;
– the final value to corrections of the previous value y_p was defined by the coefficient W:

$$W=\frac{K_c}{K_{pp}} \qquad (5)$$

$$y=y_p\cdot W \qquad (6)$$

In general view the formula for definition y can be presented in the following form:

$$y=\left(\frac{K_{c-1}}{K_{c+1}}+\frac{0.05}{m}\right)\cdot\frac{K_c}{K_{pp}} \qquad (7)$$

It is possible to mark out some more essential advantages of the usable method by us:

– the method allows to use intransitive initial information;

– the procedure of the statement of judgments by experts is almost feasible as the direct quantitative assessment of ratios between videos is not required, which are used in training of judoists, by the certain factors of comparison;

– the possibility of coordination of the settlement quantitative relations appears between factors and the “true” quantitative relations between them by means of selection of coefficients of A_{ij}.

We invited the highly skilled judo coaches of the sports club “Slobozhanets” of Kharkiv, the leading coaches and referees of the federation of judo of the Kharkiv region, Federation of judo of Ukraine before filling of matrixes. Matrixes of comparisons were received during the poll of 32 coaches and referees.

Results of the quantitative assessment of the chosen 7 videos by the parameter “Easeness, availability of perception” are given in table 1.

In the same way results of the quantitative assessment of the chosen 7 videos by the parameters “Compliance of technical

Table 1

The quantitative assessment of the chosen 7 videos by the parameter "Easeness, availability of perception"

Conditional number of the video record	1	2	3	4	5	6	7	Score
1	=							0,13
2	<	=						0,10
3	≤	<	=					0,08
4	>	>	>	=				0,19
5	≥	>	>	=	=			0,18
6	≥	>	>	<	=	=		0,18
7	≥	≥	>	≤	≤	<	=	0,15
X_i max – the maximum assessment behind parameter								0,19
X_j min – the minimum assessment behind parameter								0,08
K_p the set								2,5
K_p the actual								2,375
Number of iterations								3

actions to the skill level of judoists", "Compliance of technical actions of style of maintaining duel of judoists", "Variety of nuances of performance of technical actions by judoists, their specification", "Uses of interesting and effective technical actions which are borrowed from other types of single combats", "Skill level of performance of technical actions which are shown from the point of view of purity", "Demonstration of performance of technical actions by judoists which have different physical data (different weight categories, different growth)" were received.

Further we carried out the comparison of parameters of estimation of videos which are used in training of judoists, among themselves. Its results are given in table 2.

Results of the quantitative assessment of videos, which are used in training of judoists, are generalized in table 3.

From table 3 we can see that the place in rating, which was defined by calculations, coincides with found in the course of intuitive poll of 23 masters of sports of Ukraine and masters of sports of international class of Federation of judo of the Kharkiv region. It speaks about the correctness and the reliability of the technique, which was developed and approved by us.

We scientifically prove the expediency of the choice as the best video record when training judoists of the following movies on the basis of calculations: 1) Judo lessons. UCHI MATA. Method. Technique. Practice (68 min, in 2014); 2) Training of judo – V. Yelchaninov. Technique of throws in stand (60 min, in 2005); 3) Training of judo – Technique of fight in stand from O. Yatskevich (70 min, in 2003); 4) Judo in Japan. Movie 1. Training. Technique. Method (60 min, in 2001).

M. L. Zaytseva suggests to apply the method of arrangement of priorities to the receiving quantitative assessment of works of art, which are used in quality evident material in the course of study of students, when teaching disciplines "Aesthetics", "History of arts" in the publication "Methodical approach to the assessment of the evident material used when teaching disciplines "Aesthetics", "History of arts" [6, p. 43]. However the essential advantage of our approbation is that all calculations are carried out with the use of specially-developed program "PRIORITETS" that allows to carry out the unlimited number of iterations taking into account the expert assessment of coefficient of the relation of extremes of the ranged row.

The method of expert evaluations was used by O. V. Zhirnov and G. A. Bondar [5, p. 25]. This method allowed them to range the studied object by the measure of influence on sports result. Types of sports preparation in academic rowing and rowing on canoes were the objects of the examination: special physical preparation, overall physical fitness, technical training, mental preparation, tactical preparation, theoretical preparation and sports training. However, the authors used the method of pair comparison, where the most powerful object in each couple was estimated in "1", and the second at "0" points [5, p. 26]. Our approach is more precisely and more perspective as coefficients, which are purposefully fixed at the video record assessment by the certain parameter of comparison, are used "floating" (that change). It increases validity and accuracy of assessment significantly which is carried out.

We will note especially that the specially developed program "PRIORITETS" was provided by us to all interested persons, coaches and regional federations of judo of Ukraine free of charge. It allowed us widely not only to approve the offered by us program, but also to finish the expediency of application of the new methodical approach for the assessment of the video record which is used in the course of training of judoists, the improvement of the training process, and the increase in level of technical-tactical training of wrestlers.

Conclusions

The offered methodical approach gives the evidence-based assessment, idle time in application. It can be recommended for the assessment of the video record which is used in the course of training of judoists. It should be noted flexibility of the methodical approach concerning the assessment of the video record which is used in the course of training of judoists. It can be used for the assessment of videos for judoists of different skill level, age, physical parameters for individual training of the certain judoists by the condition of the correct selection of factorial signs [1, p. 102]. It will promote the efficiency of the competitive activity and coach's work, will allow sportsmen to reach high levels of individual skill.

Prospects of the subsequent researches in this direction. The assessment of the video record, which is used in the

Table 2

Comparisons of parameters of estimation of videos which are used in training of judoists, among themselves

Conditional number of the video record	1	2	3	4	5	6	7	Score
1	=							0,18
2	<	=						0,13
3	≤	≥	=					0,16
4	<	<	<	=				0,12
5	<	<	<	≥	=			0,14
6	=	=	=	≥	≥	=		0,11
7	≤	≤	=	≥	>	<	=	0,16
X_i max – the maximum assessment behind parameter								0,18
X_j min – the minimum assessment behind parameter								0,11
K_p the set								1,5
K_p the actual								1,636
Number of iterations								2

Table 3

Quantitative assessment of the video record which is used in training of judoists

Conditional number of factor of comparison	Factor weight F_1 0,18	F_2 0,13	F_3 0,16	F_4 0,12	F_5 0,14	F_6 0,11	F_7 0,16	Assessment of the video, points	The place in rating which was defined in the way by	
	Quantitative assessment of parameters								intuitive poll	calculation
1	0,13	0,13	0,16	0,11	0,13	0,15	0,13	0,13	5	5
2	0,10	0,12	0,16	0,09	0,12	0,14	0,13	0,12	7	6
3	0,08	0,10	0,09	0,09	0,13	0,13	0,11	0,10	6	7
4	0,19	0,17	0,20	0,19	0,16	0,15	0,16	0,18	1	1
5	0,18	0,17	0,16	0,20	0,16	0,15	0,16	0,17	2	2
6	0,18	0,16	0,12	0,16	0,15	0,14	0,15	0,15	4	3
7	0,15	0,16	0,12	0,16	0,15	0,14	0,15	0,15	3	4

course of training of judoists, taking into account their age, sex and skill.

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