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**Abstract of the doctoral thesis:**  
***INCREASING EFFECTIVENESS OF THE EVALUATION  
SYSTEM IN LATIN-AMERICAN DANCES FOR OPEN  
CATEGORY THROUGH THE OBJECTIFICATION OF  
PERFORMANCE BEHAVIOUR***

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## **Introduction**

Dance is a sports discipline extremely complex and vast through the ten types of dance encompassed, namely the standard and Latin-American ones, which uses the body and the range of motion performed on the rhythm of music. Dance starts from the emotional color of gesture and attains the magnitude of deploying it across space. In a slow propagation achieved while becoming aware of the improved kinesthetic perception, the movement of each part of the body entails the next one, according to the “principle of succession”. Thus, the spine becomes the axis and transmission belt of this kinetic contagion. Regardless of the feelings expressed from one dance to another or even from one couple to another, the personal style of each one can create that refinement so specific to dancesport, providing a sense of admiration and perfection which leads to the emergence of the notions of “art” and “harmony”, difficult to assess objectively by the judging panel during a competition.

The evolution of figures and techniques in competitive ballroom dancing also requires improved judging criteria, which must meet all exigencies resulting from the complexity of choreography pieces, on the one hand, and the development of dancers’ motor ability, on the other hand.

Starting from the current scoring system, where each of the five criteria is checked by the judges, if the couple of dancers has an appropriate competitive performance, we aimed to optimize it by finding sub-criteria related to the already existing criteria and awarding a value or points for each of them.

The thesis is structured in three parts, as follows: part I, *the theoretical foundation*, includes *conceptual aspects, topicality of the theme and a critical analysis of its reflection in literature*; part II consists in a *preliminary research* on

*the development/ implementation of a new evaluation system in Latin-American dances for open category*; part III encompasses the **research itself**, which is focused on the *objectification of competitive behavior in Latin-American dances for open category by applying a new evaluation system*.

**Part I** is divided into four chapters aiming *to delimit dance as a sports discipline*, starting from its history, passing through general but mainly particular issues specific to Latin-American dance, and finally making a critical analysis of the current judging system and bringing scientific arguments for the criteria and sub-criteria proposed to be implemented. *Conclusions* of the first part are:

Dancesport has evolved over time beyond the strict boundaries of ballroom dancing, comprising nowadays all basic styles with a sports culture and a competitive structure recognized at the international level.

In the new scoring system, criteria and sub-criteria are the same for all dances; therefore, what will be analyzed in the performance of each couple will be both similar and distinct from one dance to another, because the actions of muscle groups and the biomechanics of motor actions are slightly different to create the specific harmony of each dance; together, the criteria and sub-criteria make a unitary whole allowing to assess quality of the entire artistic act.

We anticipate that in the coming years the evolution of dancesport will keep the same upward trend, developing just as before on several planes - those related to the technique, execution speed and complexity of figures used in choreography pieces.

For this reason, we think that, along with the evolution of dance, the entire infrastructure behind the show presented by dancers on the stage must evolve. An important part of it is represented by the judging system, which in reality is one of the essential elements that rewards directly the quality and validates or not the development directions, hindering or enhancing the future evolution of dancesport.

**Part II**, the *preliminary research*, aims to know the opinions of coaches/ judges on the subjectivity/ objectivity of evaluation using the current judging system, and also to develop and test a new evaluation/ scoring system based on criteria and sub-criteria objectified by points.

### ***Research objectives***

- To know the opinions of specialists in dance sport on the current judging system.
- To identify/ analyze the essential factors enabling to decide between the couples of dancers during competitions.
- To argue the evaluation criteria and sub-criteria and establish the number of points granted for each identified analysis factor, as well as the percentage values corresponding to some subdivisions of the main criterion/ division;

- To establish the optimal number of judges for applying the scoring system.

### ***Research hypothesis***

*Developing an evaluation system that includes quantifiable criteria and sub-criteria for different components of specific actions will increase objectivity in establishing the official rankings.*

### ***Scientific research methods***

Literature review, observation method, questionnaire survey method, measurement and evaluation method, processing and interpretation methods: *statistical and mathematical method, graphical and tabular method.*

### ***The investigated subjects***

The new evaluation system was applied during three competitions: Romanian Cup, Bucharest, attended by *28 couples*; Hobby Dance Cup, *12 couples*; Open Latin - Dance Masters, *38 couples*.

Responses to the questionnaire survey were collected from 35 judges/dancers, both women and men, aged between 22 and 50 years.

### ***Research results***

To emphasize as clearly as possible the similarities or differences between the official ranking and the one obtained after using the evaluation system developed by us, we present, in the following table and graph, a comparative analysis of the places won by the participating dancers.

Table 1. Hierarchy of athletes using the two scoring systems

Place/ round	Official ranking of couples	Ranking of couples according to our own system
<b>FINAL</b>		
1	386	386
2	217	217
3	258	258
4	43	91
5	91	43
6	344	344
<b>SEMIFINAL</b>		
1	386	386
2	217	217
3	258	258
4	43	43
5	91	91
6	344	344
7	61	87
8	151	151
9	87	61

10	311	135
11	366	311
12	135	366

Validity of the judging system developed by us can be attributed to the superposition of values for the first six finalist teams in the official ranking and to the small differences (of one, two places) in the evaluation of semifinalist couples.

Fig. 1. Comparative rankings at the Hobby Dance Cup

### ***Preliminary research conclusions***

#### *Conclusions of study I, the questionnaire survey on changing the judging system*

Analysis and interpretation of information obtained after applying the opinion questionnaire highlight that almost 60% of respondents want the current judging system to be changed, although around 70% have responded in the affirmative to the question regarding their level of satisfaction with the current system.

It is important to note that 60% want each major criterion in the system to be scored separately by a judge – which implicitly involves changing the system.

As directions for changing the current scoring system, the judges/ coaches have also chosen to award separate scores for the technical part and the artistic one, as well as to award bonuses for more difficult elements.

Over 90% of respondents agree to the idea of introducing dancesport into the category of Olympic sports, and an equal percentage of 90% consider it necessary to remove subjectivity from the evaluation system.

All these results confirm that the current judging system can/ should be optimized.

#### *Conclusions of study II regarding the creation and use of the evaluation system based on the quantification of elements to be judged*

Application of the new judging system in the first official competition has proven that, when the number of participants is large, it is difficult to judge the couples because of the great number sub-criteria related to each of the five criteria, even if each criterion is assigned a judge to award points.

Changing the scoring system by reducing the number of sub-criteria provided us the opportunity to use it in the next two official competitions, where the judging panel managed to achieve a full evaluation of participants, whether it was about 12 or 38 couples of dancers.

If both the first and last places in the rankings came to the same couples, regardless of the scoring system used (the official one or ours), the major difference between the two evaluation systems could be noted in the hierarchy of

couples in the mid-ranking, where the value level of dancers was close and their order in the ranking was decided by a few tenths or hundredths of a point.

Conclusions drawn from the second study *confirm the research hypothesis*, according to which *developing an evaluation system that includes quantifiable criteria and sub-criteria for different components of specific actions will increase objectivity in establishing the official rankings.*

**Part III**, entitled ***Objectification of competitive behavior in Latin-American dances for open category by applying a new evaluation system***, aimed to increase effectiveness of the judging system in competitive ballroom dancing by applying a new evaluation system based on quantified criteria/ sub-criteria, which allow the judges to reward objectively the best performances of dancers.

### ***Research objectives***

- ❖ Identification of strengths and weaknesses in the performance of couples, depending on the points obtained for each criterion and each dance.
- ❖ Extrapolation of information from the scoring sheets to the future training of athletes, on the one hand, and evaluation of the progress/stagnation/regression in the dancers' performance, on the other hand.
- ❖ Development of an operational judging system under the form of a web page, which will reduce the time needed to establish rankings, without requiring excessive attention.

### ***Research hypotheses***

- *Using a scoring system based on quantifiable criteria will increase objectivity in the evaluation of dancers, removing the large differences between the places in the ranking obtained by athletes who are off the podium.*
- *The five criteria for the objective evaluation of dancers' performance used in the new scoring system have the same importance in achieving the final result, regardless of the value of participants.*
- *Knowing the criteria and/or sub-criteria, as well as their related scoring, will lead to identification of strengths and weaknesses against the specific requirements of Latin-American dances.*

### ***Scientific research methods***

Literature review, observation method, measurement and evaluation method, processing and interpretation methods: *statistical and mathematical method, graphical and tabular method.*

### ***The investigated subjects***

The investigated subjects were athletes from Italy, Slovakia, Moldova, Hungary, Bulgaria, Greece and, obviously, Romania. Some of them participated in several competitions, while others only in one of the competitions analyzed by us. In the upper rounds, the research was focused on the number of couples remaining in the competitions, namely 12 couples in the semifinals and 6 couples in the final.

Among the participants, there were couples who participated in all competitions analyzed by us and all had access to the semifinals or the final.

### **Research results**

For an accurate analysis of the role played by each criterion in obtaining the final result, we have calculated Pearson's correlation in order to emphasize which of the criteria correlates best with the overall score achieved by the couples of dancers, and calculating the value of Spearman's statistical indicator, we have established whether there is correlation between the ranking positions obtained by the dancers evaluated through the two judging systems (one used by the DanceSport Federation, the other developed by us).

In the final competition, the values of Pearson's correlation coefficient have ranged in the interval [0.834 and 0.969], which highlights that we can talk about a statistically strong correlation between the points obtained for each criterion and the overall points accumulated by athletes, this scoring allowing actually to establish the winners.

The athletes ranked 1<sup>st</sup> to 6<sup>th</sup>, aiming at the best performances, were the same, which was also revealed by the value of Spearman's correlation coefficient.

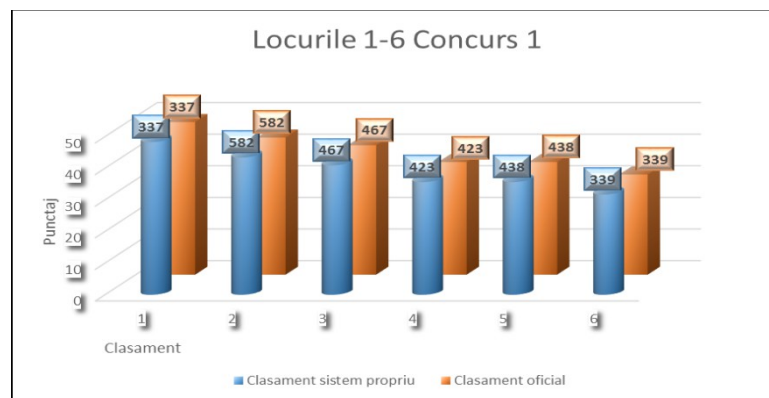


Fig. 2. Final ranking (places 1-6) established using the two judging systems

As regards the semifinal of the competition, the situation is the same, meaning that all criteria are strongly positively correlated with the overall score achieved by the dancers, the values of Pearson's correlation coefficient ranging in the interval [0.82 and 0.96].

The value of Spearman's correlation coefficient [0.6813] has emphasized that, in this round, the hierarchy of athletes made by the judging panel based on

the evaluation system developed by us is more objective, given that the official judges only ticked the couples aspiring to the next phase of the competition.

In the quarter-finals, it can be noted that the dancers show a different level of preparation, highlighted by the scores obtained for each criterion, with very large variations (from 0.2 points to 9.9 points).

The value of Spearman's correlation coefficient [-0.205], calculated in order to establish the correlation between the ranking of athletes achieved through the two judging systems, reveals a lack of correlation between the two scoring systems used in the quarters of this competition, which can be explained by the fact that official judges are concerned only with the evaluation of valuable athletes, whose competitive performances meet the requirements of the federation, the place in the ranking of other couples being established only based on the number of ticks (X) obtained from the 13 judges.

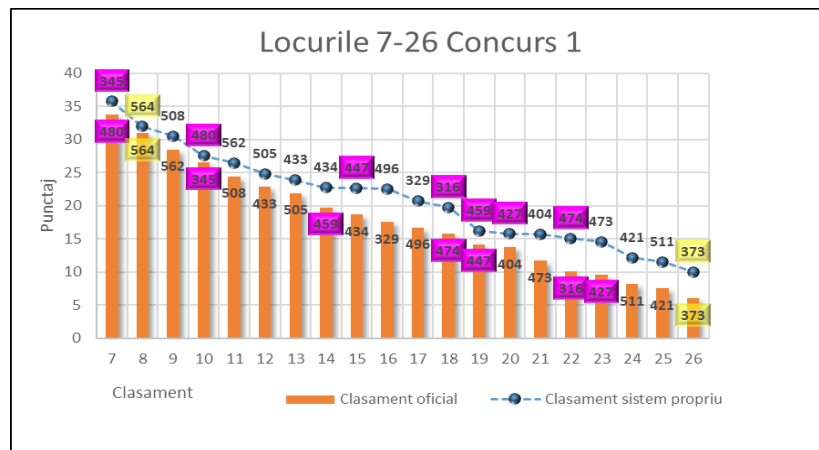


Fig. 3. Final ranking (places 7-26) established using the two judging systems

Evolution of the 6 finalist couples and their scores can be seen in Figure 4.

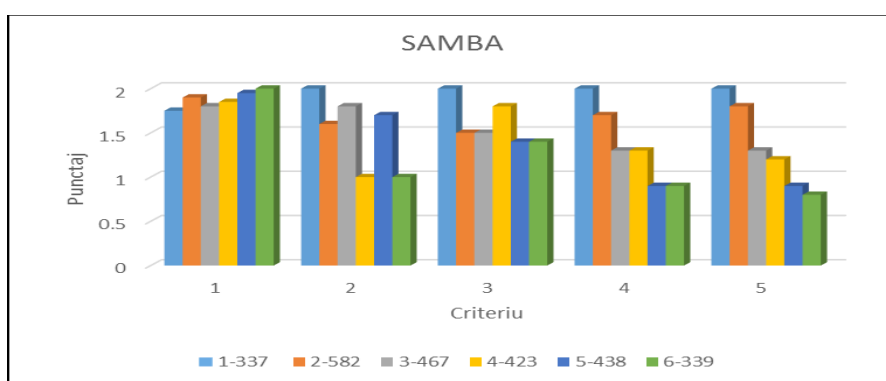


Fig. 4. Points obtained for SAMBA by the dancers ranked 1<sup>st</sup> to 6<sup>th</sup>, for each criterion

The evaluation of dancers' competitive performance using the system created by us provides objective information on the evolution of couples in each dance style.



Fig. 5. Points obtained for all five dance styles and criteria by the couple ranked 1<sup>st</sup>

The analysis of scores achieved for each dance and each criterion provides extremely valuable information for coaches and athletes, because, on the one hand, there are revealed the strengths and/or weaknesses of choreography and dancers' performance, and on the other hand, one can compare the evolution/progress of athletes from one competition to another.

The conducted research ended with the design of a ***computerized judging system for dancesport competitions***, using Web-based technology with extension for tablet, where it was summarized information on organized competitions, users, couples of dancers, dances, classes, age categories, to which each judge can login to access scoring sheets/ per criterion/ dance and tick each sub-criterion for each component, male and woman counterparts.

## **Conclusions**

Dancesport involves a variety of body movements performed to the rhythm of a song that is materialized in a choreography piece where the two partners try to convey emotions in a unique and personal way, which leads us to assert that dance has no boundaries, no barriers, it is simply felt and expressed.

Dancesport provides the necessary framework to transmit a compositional message, trigger certain emotions, present an artistic creation, generate a show, that is why assessing the dancers' performance often has a subjective character as regards technical execution, artistic mastery, plasticity and beauty of movement, in a word, the quality of dance.

The evaluation/ judging system developed and used by us in this research, which included five criteria: ***movement to music, posture and coordination, quality of movement and balance, relationship between partners and leading, choreography and presentation***, and a larger or smaller number of sub-criteria, has proven its effectiveness regarding both the diminution of subjectivity in assessing the dancers' competitive performance and the identification/objectification of strengths and weaknesses related to each of the five dance styles.

The major difference between the two evaluation systems (one used by the DanceSport Federation, the other developed by us) could be noted in the hierarchy of couples in the mid-ranking, where the value level of dancers was close and their order in the ranking was decided by a few tenths or hundredths of a point.

The system developed by us allows extrapolation of information from the scoring sheets to the future training of athletes, on the one hand, and evaluation of the progress/ stagnation/ regression in the dancers' performance, on the other hand.



Transposition of the evaluation/ judging system to a computerized application using Web-based technology with extension for tablet ensures effectiveness for the judging panel, reducing the time needed to establish rankings, facilitating the work of the competition Secretariat and removing the possible human errors.