

**ABSTRACT OF THE DOCTORAL THESIS  
BY MS. RADU ALEXANDRA ELIZA**

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***THESIS ADVISOR: UNIV. PROF. PhD. NEGULESCU C. IOAN***

***THESIS TITLE: OPTIMIZATION OF THE PERFORMANCE CAPACITY  
THROUGH THE COACH-ATHLETE COMMUNICATION SYSTEM AT  
THE HANDBALL JUNIOR FEMALE TEAM LEVEL***

***Key words: optimization (in high performance activity), performance capacity, communicational area, coach, athlete***

In our opinion, communication is a key process for the high performance activity in sports. For this reason getting a high communication skill is a priority for coaches.

As a handball coach of the Scholar Sports Club no 6 Bucharest, during my first years of career, I tried to identify efficient methods to obtain good results with the female athletes I trained. Therefore, the identification of some of the factors conditioning the communication between the coach and the handball team, as well as obtaining higher results in the process of training the junior female handball players represents the subject of our research.

This doctorate thesis is structured in three parts, and contains 13 chapters. Part 1 is the theoretical substantiation of the thesis and includes subjects like: sport, sportive games, performance capacity, communication, coach-athlete relation, cerebral dominance, “whole brain”, verbal abilities, coaching, team spirit.

Part 2 is represented by the exploring research. The tasks of the exploring research consist of: examination of the sociologic and statistical – mathematic components as working tools, examination of the creative-educational component (educational design) and logistic instruments (training venues and duration, research subjects). The objectives of the exploring research are represented by: knowing the manners in which athletes react especially in difficult or critical

situations, the way in which each female player sees the conflicts and the preference of each player for a certain way to settle such conflicts, as well as knowing the preferential relations among female players in view of choosing the team captain and establishing the required team cohesion level.

Part III represents the improving experiment, our own contribution to the optimization of the performance capacity through the coach-athlete communication system in the handball female junior players.

*Experimental Research Hypotheses:*

***1<sup>st</sup> Hypothesis***

*If we use a communication system, there may be significant differences between the performance obtained by the junior female handball players at the beginning of the research period and that obtained at the end of the research period.*

***2<sup>nd</sup> Hypothesis***

*Using a communication programme consisting of exercises and activities designed to develop the “whole brain model”, differences can occur in the activation of the cerebral quadrants less dominant for the players from the experimental group and communication is optimized, positively influencing the athletic performance.*

***3<sup>rd</sup> Hypothesis***

*Activation of the left cortical quadrant – through a proper training – may lead to a better control of emotions and to a higher level of autonomy in thinking and behavior in the junior female handball players.*

***4<sup>th</sup> Hypothesis***

*In terms of number of successful actions to recover the ball, efficient ball passes and scored goals, such number can be increased if there is a player-to-player and player-coach communication system throughout the competition duration.*

***5<sup>th</sup> Hypothesis***

*To the junior female handball players, there is a correlation amongst the logical thinking, the verbal skills and the sportive performance.*

*The experimental research objectives, tasks and used tests are:*

- Identification of the dominant cerebral quadrants by using “The Actional Preferences Questionnaire” (adapted by M. Roco, from the questionnaire of D.Chalvin and N. Herrmann, 2004) and optimization of the communication by adapting it to the cerebral preferences of the female players;
- Activation of the less available cerebral quadrants of the female players under an adequate training, by designing and implementing a communication program that uses exercises and activities intended to the development of the “whole brain model”;
- Assessment of the athlete personality by using the Five Factor Personality Questionnaire (CP5F Questionnaire), component of the computerized platform of psychological evaluation Cognitrom Assessment System (CAS<sup>++</sup>) intended to the assessment of the five suprafactors of the Big Five model (Extraversion, Emotional Stability, Conscientiousness, Agreeableness and Autonomy);
- Identification of a class of perceptual-motor acting programs (designated in the Neuro-linguistic Programming model strategies) for learning the handball game;
- Optimization of the handball game by implementing the aforementioned strategies under the form of a communication information program (including certain verbal formulas that clearly separate the tasks of each player in accordance with the position occupied in the field) which must be applied in the process of training the athletes (personal proposal);
- Identification of the level of oral communication skill of each player that implies the vocabulary ability, the text understanding ability and the syntactic ability (as measured by the tests belonging to the computerized platform of psychological evaluation Cognitrom Assessment System CAS<sup>++</sup>, elaborated by Cognitrom), which can support the handball professionals in their activity;
- Identification of the cognitive flexibility level that represents one of the general learning ability dimensions, by using the “Switch of Attention” test belonging to Cognitrom Assessment System (CAS<sup>++</sup>);
- Carrying out a test to assess the elementary logical thinking (aiming the following aspects of intelligence: ability to establish links at elementary logical level and to correctly understand the meaning of words), namely the “ANALOGY” computerized test from the PSI-SELTEVA testing system made by RQPLUS;

*Research period, place, subjects and logistic:*

The experimental research was carried out between October 2012 and May 2013, during the competing year of the National Handball Championship, on 32 subjects, out of which 16 are female athletes legitimated at the Scolar Sports Club no 6 Bucharest, representing the experimental group, trained by coach Radu Alexandra Eliza, and 16 are female athletes legitimated at the Scolar Sports Club no 2 Bucharest, representing the witness group, trained by coach Stănculescu Claudia.

*Experimental research approach synthesis:*

During the competing period we recorded the number of successful ball recovery actions and of scored goals in each official game, disputed both by the players from the experimental group, as well as by the players from the witness group, during the National Handball Championship 2012-2013. Both teams played 6 tournaments and within each of the tournaments, each team played 5 official games.

For the experimental group, the number of effective passes (correct ball throw and correct ball catch) amongst handball players and the number of errors in catching-passing the ball during the pre-finalization phases have also been recorded.

The data recorded pursuant the use of questionnaires and carrying out of tests were stored, analyzed and statistically processed by using Microsoft Office programs and SPSS for Windows, version 8.0.

*Conclusions*

Knowing the different cerebral preferences of the athletes was useful for our initiative to train a handball team by coaching players able to complete each other and not opposing each to other. Thus, finding out from the specialized literature that the cerebral preferences can evolve according to the life circumstances, depending on training level, and that they can be modified following an adequate training, we worked with the female athletes individualized exercises and programs of activities in order to develop a “whole brain” model which led to the improvement of the interpersonal relationships and inter-human communication correspondingly.

The complex assessment of the personality by investigating the five suprafactors of the Big-Five Model (Extraversion, Emotional Stability, Conscientiousness, Agreeableness and Autonomy), helped us in the process of

knowing the athletes from the experimental group and in pointing out, pursuant the use of Spearman correlation, the fact that there is a significant positive correlation between the athletes' preference for the left cortical quadrant and the scores obtained by the athletes at Emotional Stability and Autonomy scales. The results obtained by means of the Spearman correlation, reveal the importance of activating the left cortical quadrant of the brain by a proper training, such action leading to a better control of emotions and to a higher level of autonomy in thinking and behavior.

With regard to the number of successful actions to recover the ball, we verified the existence of significant differences between the experimental group and the witness group, between the initial test (after the first three tournaments of the National Handball Championship) and the final test (after playing the last three tournaments). Application of Mann-Whitney Test (U) revealed the existence of such difference between the two groups' average values in favor of the witness group upon the initial test, however the relevant difference being insignificant from statistical point of view. The existence of a difference between the group average values upon the final test is in favor of the experimental group. Although the difference observed is still insignificant from statistical point of view, it shows a real progress of the experimental group at the final test (after playing the last three official games of the National Handball Championship) compared to the initial test.

With regard to the number of successful actions to recover the ball, by applying the Wilcoxon Test, it could be revealed the existence of a significant difference from statistical point of view at the final test compared to the initial test. The number of successful ball recovery actions is significant higher compared to the number revealed by the initial test. The magnitude of the effect according to the Cohen criteria from 1988 (acc. Labăr, A. V., 2008, p. 140) shows *a very strong effect of the experimental intervention over the number of successful actions to recover the ball (especially within the defense systems per areas 6:0 and 3:2:1).*

The number of successful passes (passes correctly transmitted and correctly caught) amongst handball female players in the pre-finalization phases, obtained in each official game played, were recorded for the pilot group and it was found out that after the last three tournaments such number increased compared to that recorded in the initial test, *which means an improvement of the technical and tactical level of the athletes and, at the same time, an improvement of the game relations, communication and collaboration amongst the players at level of the handball team.*

The number of errors in catching-passing actions during the pre-finalization phases was also recorded, being found the diminishing of such number at the pilot group during all the 6 tournaments played by the athletes. After our experimental intervention, the average number of errors in catching-passing the ball per match was 10.6 in the last tournament, which is a result close to the average of 8 errors in catching-passing the ball accepted in the game model afferent to the high performance handball.

With regard to the number of goals scored by the handball female players, data obtained following the records carried out during the National Handball Championship for juniors, afferent to the pilot group and the witness group, were analyzed. Following the Mann-Whitney (U) Test, between the average values of the two groups was found a difference in favor of the witness group but also an improvement in the records afferent to the pilot group which means a stronger progress in the evolution of this group. Both groups experienced progress compared to the initial moment, but the pilot group progress was stronger than that of the witness group.

The Wilcoxon test applied with regard to the number of goals scored by the handball players showed that such number is significantly higher at the end of the experiment compared to the initial moment. The magnitude of the effect, according to Cohen criteria of 1988 (acc. Labăr, 2008, p. 140) evidenced a very strong effect of the experimental intervention over the number of goals scored in the attack phase of the handball game.

Using Spearman correlation, I verified whether there are correlations between the oral skills, the logical thinking and the sport performance (number of successful ball recovery actions and number of scored goals) of the players from both groups. The analysis of the results showed that there is a correlation between the logical thinking, the verbal abilities and the sport performance if, through the oral communication, we improve the interpersonal relations amongst the research subjects.

To pinpoint the evolution of the preferential relations amongst the players from the pilot group, after the experimental intervention was applied the sociometric test, as reflected in the second part of this thesis. The value of the group cohesion index (Icg) was calculated, the quality of the sociometric relations at the group level depending on such index. After the experimental intervention on the experimental group, Icg has a higher value than that recorded at the initial moment. Thus, an increase in the number of mutual choices amongst athletes is found out, which indicates an improvement in the relations amongst players.

### *Recommendations*

The training process is essentially a communication process between the coach and athlete, consisting of a continuous messages exchange whose primary goal is reaching some pedagogical objectives under optimal circumstances. The coach cooperates with the athletes, acting together to reach a common goal consisting of an efficient development of the training process, through which, a high performance in sport will be obtained.

Knowing the personality peculiarities of the athletes, the coach can approach them at their level of understanding, using an adequate language to transmit his/her message.

The capacity of learning differs from an athlete to another and for this reason we think useful its practical examination by applying the special psychological tests.

The modern studies on cerebral sectors and teaching-learning activities support the idea that an effective pedagogy is the pedagogy taking into account the cerebral preferences of those who learn, and allowing them to understand according to their special patterns.

To develop the “whole brain” it is required to identify the cerebral preferences and then, to activate the cerebral quadrants less used, by an adequate training. The cerebral preference patterns may be a real guide which can be used in practice to improve the interpersonal communication because all the cerebral preferences are available for any individual.

The psychological tests afferent to the verbal ability, as well as the logical thinking test can offer relevant data on aspects of the intellectual skills of the athletes. These instruments can represent reference elements which can be included in the model intended to the selection of children for practicing the high performance handball.