

Non-Verbal Communication and Volleyball: A New Way to Approach the Phenomenon

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Abstract: Too often in sports the qualitative aspects of performance are addressed with superficially and approximation because it believes that it is not scientifically possible to explain everything that is not easily quantifiable and expressible in the form of numbers. In volleyball, the ball is rejected, both among members of a team and between the two opposing teams, with a frequency significantly greater than in other team sports. For this reason, in volleyball, not immediately quantifiable aspects of the game action are greater than other team sports. The qualitative aspects in volleyball concern technical skills, tactical decisions, strategy and more. Among these, non-verbal communication has not yet been considered as an object of study and thus not yet investigated. This study provides the initiation of an integrated research between social science and sports science to allow technicians, coaches and physical education teachers to learn more about another important aspect of quality for the purposes of training and education. The aim is to identify applications of the principles of nonverbal communication, which has its own epistemological framework, to volleyball through the systematic analysis of specific game situations. The method integrates the theoretical-argumentative and descriptive approach. Communicative events attributable to non-verbal communication were classified into three categories: communication tactics, functional communication and diagnostic communication. The frequency and outcome of these events were investigated in relation to three specific volleyball technical skills related to nonverbal communication: a) the second ball goes to the opposite court instead of setting for attacking; b) the attack as fast as possible in the middle of the net; c) the off speed hit instead of power spike over the block; The results show a significant incidence of communicative events related to non-verbal communication on the final outcome and, therefore, suggest that non-verbal communication is subject of interest to technicians, coaches and physical education teachers

1. Introduction

Nonverbal language, according to major authors such as Shannon, Weaver (1948, 1949), Argyle (1988), Mehrabian (1972), Watzlawick (1967), Hall (1966), Jakobson (1956), Ekman and Friesen (2007), has its own epistemological framework where the message is empirically investigated in its. An Albert Mehrabian study (1972) showed as the 7% of the message content is given by the meaning the word, the 38% by the tones of the voice and the 55% by facial expressions and body movements or kinaesthesia. Communication is the foundation of sociability and socialization, as implies cooperation, exchange of roles (transmitter / receiver), a code-sharing and the sharing of a context and a channel. According to phenomenological theory (Husserl 1936, Merleau Ponty 1945) Communication is sociability because it consists of several behaviours that help socialization through the constant exchanging among individuals, called intersubjectivity, to construct the meanings. The human being, through the natural development and evolution in the interaction with the socio-cultural environment, acquires a set of norms, values and patterns of behaviours characteristic of that certain cultural reality. They are learned and assessed in the variability of contexts. Only from within the context it is possible the decoding of a nonverbal message; this is difficult from the outside because there is no relevant information on specific signs, symbols, signals, attitudes, postures, spaces, distances (Mehrabian 1972).

The knowledge of the factors of communication does not ensure the success of the communication; in case of relations among individuals belonging to different contexts, it is necessary to remove the barriers of separation against which the communication would not be effective. In order to have an effective communication it is necessary being able to identify the message, the transmitter (the one who produces it), and the receiver (the one who has to decode), the context within which the process takes place,

the communication channel and the attributed conventional code. Code means a shared system for the organization of signs that refers to a linguistic and / or body code. Channel means the physical space by which the communicative act takes place. The context, understood as an environmental and psychological scenario in which communicative acts occur, may interfere with the communicative process when, for example, the code of the transmitter is understood by the receiver, but the sense is distorted for ideological reasons (Jakobson 1956). Non-verbal language represent the first real form of communication between individuals.

Some aspects of nonverbal communication are universal, some others are different in different cultures and backgrounds, which is "a major source of antagonism, misunderstanding, and contrast among cultural and ethnic groups (Argyle 1988). The smile, facial expression and symbol in conformity with different contexts, cultures and places, is universally interpreted as a sign of contentment, while in Japan the smile is used as a mask that can hide reticence or embarrassment. Facial expression (Ekman & Friesen 2007) is the first element to be analyzed in a first approach, followed by posture, by movements and kinaesthesia. Facial expressions that communicate emotions are very similar in different cultures and in different contexts. If Ekman and Friesen studies emphasize that facial expressions express emotions, feelings and moods, no less importance must be given to gesture, which " is the aspect that seems to change more in different cultures "(Argyle 1988).

Argyle defines emblems the nonverbal acts that have a direct verbal translation, such as nodding, beckoning and pointing. The origin of these actions is derived from fundamental human experiences or from natural symbols that describe actions or people. If pointing is considered to be universal in all cultures, nodding in many cultures as in Northern Europe is used to indicate "no", while in Greece a rapid backward movement of the head is a sign of denial (this movement is also specific in the Neapolitan body tradition). The same sign with the thumb and the index closed to form a ring is a sign of approval in the U.S.A. and in Northern Europe meaning "OK", but in Southern France indicates something worthless remembering. It should not be neglected the contribution of sign language that in its purest form has been developed by categories of people who cannot use words such as deaf. The visual interaction considerably varies within different cultures. Arabs, South Americans and Southern Europeans in a research conducted in 1970 by Watson on a sample of 110 foreign students of Colorado University, stare more than students from other cultures where physical contact is limited. Just as American blacks stare less than white ones, giving the impression of a little attention or understanding when combined with mild head movements during listening. While for Afro-Americans gazing directly at a senior would be index of equal status, so they are reluctant to do so because their action would be interpreted as a lack of respect (Meharabian 1972). Even the spatial behaviour must be properly considered in the relationship between individuals and groups. The anthropologists often distinguish between cultures with frequent physical contacts and cultures without or very limited physical contacts. Individuals from cultures with a frequent physical contact (Arabs, Latin Americans, Southern Europeans) are closest, are often more opposite of each other, they touch themselves and stare much more at each other, they also speak more loudly than people from cultures of non-contact such as Asians, Indians, Pakistanis and Northern Europeans.

The Arabs, for example, during the salute, shake hands for a certain period of time, or they can embrace and kiss hands, beards or faces on formal occasions; Arab men, during their conversations, touch themselves on the upper arm with their right hand and playfully slap each other with their right hand; Arab women, on the contrary, are in no way touched in public. Most likely the differences of spatial behaviour may result from differences in the structure of the physical environment, such as the dimensions of houses and the degree of crowding. Instead, we are likely to interpret the spatial behaviour in a very simplistic way: who gets too close is considered intrusive as opposed to that who approaches too little that is considered cold and aloof. There are considerable cultural differences regarding the quantity and type of contact. The Arabs also have a stretched forward posture at an angle of the body most directly aimed at contact, while the Japanese bows, even up 45 °, are just a sign of respect. Another characterization of ethnic groups is the use of tone

and vocal intensity, not to associate with verbal communication that is the absolute transmission through content of the word that is the meaning. The inhabitants of the West Indies for example do not point to the end of sentences with a rising tone of the voice appearing rude to the English culture, they also make use of high tones to emphasize what they say, incorrectly interpreted as sudden outbursts of anger. The Arabs use a very high one of voice compared to that of the most part of other cultures that could be seen as assertive while for them talking with a high tone is synonymous of sincerity. Japanese people change their vocal style according to sex and social status of their interlocutor; Morsbach has assumed the distinction of eight separate tones of voice (Argyle 1988). According to Paul Watzlawick, human communication can be divided into three areas: syntax, semantics and pragmatics. The first covers issues related to coding and decoding of information, to channels, to redundancy and to noise, the second is concerned with the meaning of communication for transmitters and finally the third focuses on the effects of communication on the receivers, particularly on the influence it exerts on their behaviour.

The Palo Alto school, where Paul Watzlawick belonged, was the seat of the specific studies of the behaviourist version of communication. Paul Watzlawick, together with Janet Helmick Beavin and Don D. Jackson, publishes "*Pragmatics of Human Communication. A Study of Interactional Patterns, Pathologies, and Paradoxes*" and over the years deals primarily with this third aspect of the communication: pragmatics. He arrives at the conclusion that behaviour is communication, in clear agreement with the Behaviourism.

Proxemics is the field of knowledge that studies the space and the distances within the communication. It has another element of nonverbal communication. The term *proxemics* was introduced by the anthropologist Edward T. Hall in 1963 to indicate the study of neighbourhood relations in communication. Hall noted that the distance among people is related to the physical distance, he has assumed and measured four "distances" among people. The distance defined intimate that passes between 0 and 45 cm for people with special relations, the personal distance between 45 and 120 cm for friends, the social distance is between 1.2 and 3.5 meters for the communication between acquaintances or teacher- student relation and finally the public distance that goes beyond the previous distances for public relations. In the book *The Hidden Dimension*, Hall observed that the distance to which you feel comfortable with other close people depends on the culture and on social contexts and therefore is variable.

This brief analysis provides the backdrop for the study of nonverbal communication in situation sports. It helps to collect a set of empirical factors related to communication and relations during the game and to systematize them in a specific theoretical framework. The confrontation between adversaries also occurs through bodily communication, with effects in the specific context, in a specific time and place.

The body communication is undoubtedly among the qualitative aspects of the movement, ranging from the technical fundamentals of the game tactics, individual and collective (Teodorescu 1985) and the organization of learning and teaching (Pieron & Wauquiepr, 1984). Each context has its elements of communication: a sport is different from another for the dynamics, rules, structures and composition of individuals (Hughes & Franks 2004).

In team sports where the ball continuously runs, there is the maximum of the complexity for the high number of variables and its dynamic as well as volleyball. Currently the processes of training, the organization of it and the methodology of teaching and of the training need more knowledge about every aspects of sport (Wrisberg & Schmidt, 2008). For this view the quantitative aspect of performance is important and it includes the strength and its mechanism to improve the power and it is an unique quantitative and qualitative process. Too often in sports the qualitative aspects of performance are addressed with superficially and approximation because it believes that it is not scientifically possible to explain everything that is not easily quantifiable and expressible in the form of numbers.

In volleyball, the ball is rejected, both among members of a team and between the two opposing teams, with a frequency significantly greater than in other team sports. For this reason, in volleyball, not immediately

quantifiable aspects of the game action are greater than other team sports. The qualitative aspects in volleyball concern technical skills, tactical decisions, strategy and more.

Among these, non-verbal communication has not yet been considered as an object of study and thus not yet investigated.

This study provides the initiation of an integrated research between social science and sports science to allow technicians, coaches and physical education teachers to learn more about another important aspect of quality for the purposes of training and education.

Focus of this work is the study of nonverbal communication in volleyball. The aim is, on the epistemological basis of nonverbal communication, to identify and to systematically argue the incidence of nonverbal communication on volleyball performance through an applied study of selected actions of game. The analysis of the result of sport performance can highlight relationships between score and some technical skills, which in this case are attributable to nonverbal language, among which is included the feint. The coaching approach of *Performance Analysis* can help in the investigation for matters related to the result. The datum can help coaches to re-evaluate some specific aspects of technical skills (Hughes & Bartlett, 2002) depending on bodily communication.

2. Method

The overall methodology of the work was inspired by the ecological trend of the integration of knowledge for the realization of a "well done head" (Morin, 2006) and by the plurality of intellectual forms (Gardner 2002).. The sports research in education requires a plural and integrated approach to enable the competition of different methods in order to offer the widest scientific speculation. The knowledge is derived from fields of knowledge attributable to different scientific traditions that apparently do not seem to communicate.

The method of this study is integrated between a theoretical-argumentative approach and descriptive one.

The theoretical-argumentative approach belonging to the field of human sciences and the applicative one belonging to the field of performance analysis.

It consists of two consecutive steps.

The survey of datum is entrusted to the methodology of *performance analysis* and is gradually carried out with the contribution of experts, coaches, analysts. The identified technical skills of the fundamental of the attack are:

- a) the second ball goes to the opposite court instead of setting for attacking;
- b) the attack as fast as possible in the middle of the net;
- c) the off speed hit instead of power spike over the block; (Raiola 2012)

The analysis takes place during the game always in opposition to the opposite block. Experimental research in sports-education field allows us to analyze the movement through *performance analysis* methodology and *notational analysis* methodology (Hughes & Tavares, 2001). The qualitative research for the study of movement also includes quantitative aspects, highlighting the substantial uniqueness and wholeness of the gesture, of the execution and even the relationship that is established in teaching communication. In approaching to sports-teaching research it is in fact present the simultaneous use of qualitative and quantitative methods, the use of tools and techniques with applications of rigour and consistency to help you analyzing, evaluating, estimating the uniqueness and wholeness of the sport phenomenon.

The activity of investigation of the movement in the educational environment is subject then to bonds that require specific skills of the researchers to functionally integrate methodological approaches used by education sciences with strategies of research peculiar to the movement sciences and to sport sciences.

The theoretical argumentative research, which belongs to human sciences, is complemented by experimental research, by action research or intervention and by descriptive research. It becomes complex

and ecological. Complex because it consists of multiple approaches, ecological because it is opposed to reductionism to contextualize the dynamics in a single process. It is integrated because it combines various theoretical aspects of pure study joining them to the observed data with quantitative models of field observations. The tools are those of *performance analysis* with annotations in real time and also delayed by the use of video-software by experts, coaches and analysts, the latter already specifically trained for operators who, although holders of amateur *status*, are regularly paid within the sports system. In particular, data of the analyst were collected after a specific request of the researcher about what to observe, how to observe and to record as in line with the traditional request action of the coach for each competition. Generally, the evaluation of datum is provided by a team made by the analyst, by the coach and in some cases by the athlete. However, the datum is derived by the analyst which expresses the last assessment, because he plays this function even in the real field. The tools are provided by the *performance analysis* with *hand notation* and delayed with the use of video-software made by the analyst. In this study, the activities are conducted in a research group formed by trainers, technicians, recruiters and performance analysts of the Qualification Centre of Regional Committee of Campania of the Italian Volleyball Federation since 2008. . Observers group analyzes three fast volleyball skills to evaluate the type of phenomenon by the following four steps:

1. specialized literature review
2. observation
3. investigation
4. focus group

The focus group is composed by are three coaches of major level of the observed team and by six athletes of the observed volleyball team .

Theoretical and argumentative approach are addressed to the applicability of the foundations of the theory of nonverbal language to volleyball about attack actions and to look for a possible specific definition of it for typologies of activities. This is aimed to combine and to deduce the elements of knowledge on non-verbal languages with the impact on human behaviours into the competitive activities of volleyball, so to identify some of the technical skills of the fundamental of attack, including the elements of nonverbal communication.

The work develops in stages with the methodology of *focus group* (Albanesi 2004). The first stage is the training by the researcher with the use of knowledge relating to bodily communication and the purpose of the study quoted in the introduction of this work; and the second is about the analysis of specific game phases of 3 league competitions to define some applications of coding and decoding of the message of bodily communication and a possible classification applied to volleyball. The activities were analyzed in real time by three coaches, punctuated by frequent comparisons during numerous suspensions (ball changes, substitutions, rest times, various interruptions) with annotations and written notes. At the end of each of the three competitions, the group meets with the researcher and, with the methodology of *focus group*, they talk about the possible type of nonverbal communication in volleyball. It is defined for activities of the various forms of nonverbal communication connected to the different fundamentals of game.

Finally, the six athletes give their contribution to give the subjective opinion on the evaluation and the type of classification.

3. Results

The results are two types: empirical and descriptive one. The empirical results classify the non-verbal communication in functional, diagnostic and tactical. The descriptive results on the 3 chosen technical skills,

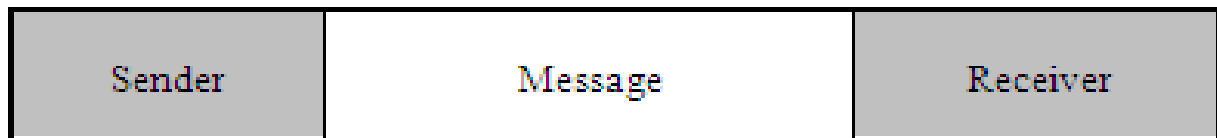
where the nonverbal communication is present, are: the off speed hit 10.32%, 8.70% the first time spike in the middle of the net, 6.10% the second ball of the setter instead of setting; for an total amount of 25.12%.

4. Empirical results

Volleyball is particularly suited to the study of nonverbal communication for the peculiarity of the reduced time that have the neuropsychological processes at their disposal in the mandatory mode of the clearance of the ball, otherwise it is sanctioned the foul (Raiola 2010a). This feature does not happen in any team and situation sport. The technical and tactical aspects assume greater significance in volleyball than those quantitative ones. In addition, particular issues non verbal communication take into account the body feint, manifest intention to achieve a goal through the initial execution of a motor plan with specific signs, postures, attitudes, etc., then is realized in completely different way (Raiola 2010b). In this case the neurophysiological and psychological bases of the movement associated with perception affect the implementation of fundamental and the single technical skills.

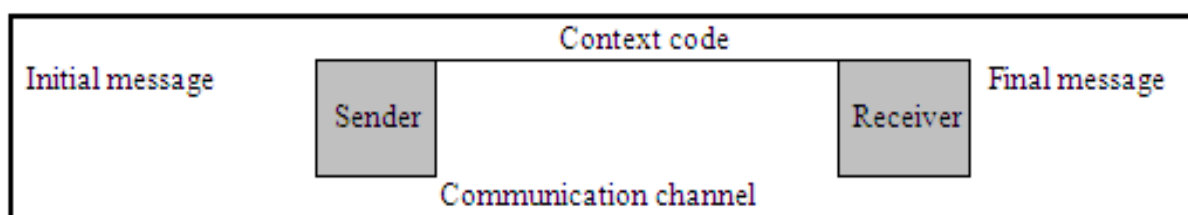
Summary nonverbal communication is made by three steps (fig.1).

Fig. 1: Karl Bühler's communication model, sender-message-receiver



Communicating means to establish a relation between two persons and among people and it implies the transfer of information. However, communication is not only transmission of information through a channel, it is also relation in the sociality where sender and receiver cooperate for a common goal and they exchange roles as the following systematic scheme. The communicative process is a unique and dynamic flow made of several steps: sender, context code, communication channel, and receiver, as the following scheme (Jakobson 1956) (fig. 2).

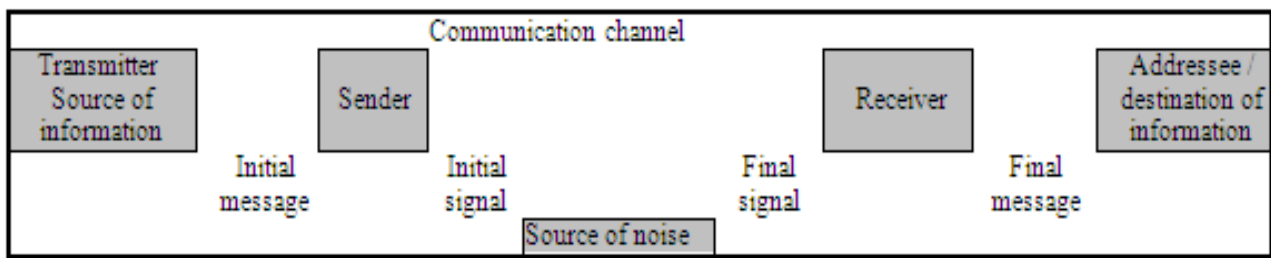
Fig. 2: Reunited model of communication (Karl Bühler - Roman Jakobson)



The whole phenomenon of nonverbal communication is represented by the model in figure no.3 where are visible further specifications and other variables as follow (fig.3):

- Transmitter is also the source of information, he gives an initial message by encoding
- Sender releases and deliveries the initial signal
- It passes throughout the source of noise with modifications
- It becomes the final signal
- Receiver acquires and decodes the final message
- Addressed is also the destination of information, he receive a final message by decoding

Fig. 3: The systemic model of communication (Claude Shannon-Warren Weaver)

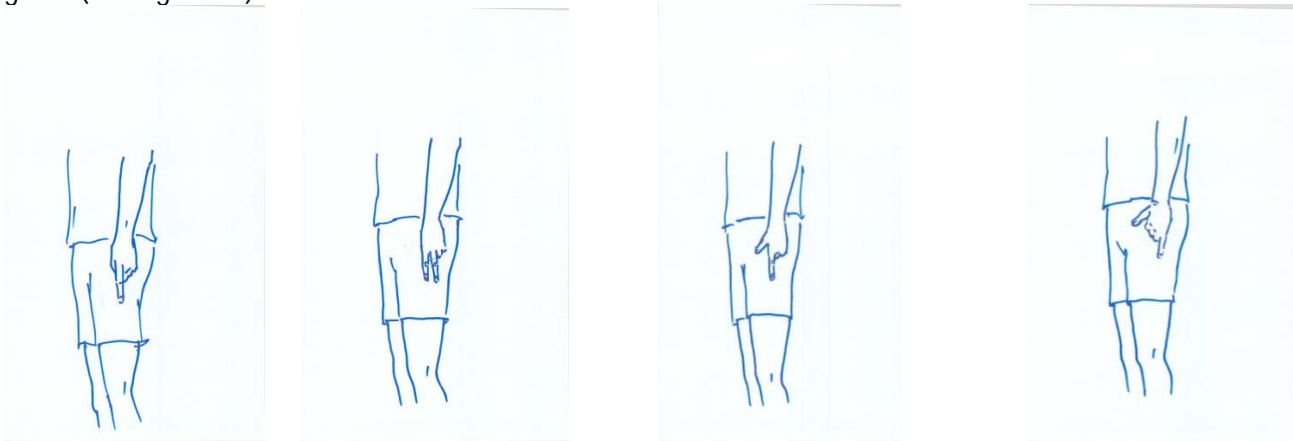


About the classification of decoding the nonverbal message, the result was restricted to three possible types of decoding of behaviour:

1. The decoding of the signs of facial expressions is *functional* when it is done in the same team and it involves communication among teammates or between the coach and the athletes about tactics intentions, strategies and game problems. Examples are the call using the conventional signs by the setter for the actions of attack and by the middle hitter in the wall for the actions of defence. In volleyball, for example, the setter uses conventional prearranged signs to communicate to the other players the plans of the game (hand gesture) fig.4:

- a.index finger meaning the ball will be set (tossed) in front of the player (setter) for a very rapid spike centered on the net by the attacking player;
- b.middle and index finger meaning the ball will be set (tossed) behind the player (setter) for a very rapid spike on the right side of the net by the attacking player;
- c.thumb and index finger meaning the ball will be set (tossed) away and in front of the player (setter) between the left side and the centre of the net for a very rapid spike by the attacking player;
- d.thumb and little finger meaning the ball will be set away and behind the player (setter) between the right side and the centre of the net for a very rapid spike by the attacking player.

Fig. 4 The setter uses conventional prearranged signs to communicate to the other players the plans of the game (hand gesture).



2. Decoding is *diagnostic* when analyzing the various forms of nonverbal communication of the opposing team, the signs of the athletes and of the coach that anticipate or call for game actions. Examples are the actions of opposing attack in the combination of patterns of smash through a reading or options of wall players to choose which shot attack to contrast.

- close contact and a glance (distance between the players of two teams, visual contact through the net);
- expressive ability (facial expressions and corporeal [body] gestures that precede, continue, and follow the actions of play);
- significant difference between signs (difference between corporeal signals, conventionally coded, prearranged, or personal);
- rituals (gestures, facial expressions, or attitudes that mark the behaviour of the athlete);
- symbolic presentation of oneself (utilization of the body and of gestures to express one's own needs or demands).

3. Decoding is *tactics* when the act or the action simulates an action game to stimulate a reaction of the opponent team. Example is the feint in all technical skills of the fundamentals.

- dominate when an athlete dominates the area of game thanks to his high athletic and/or technical ability works.
- hostile or adverse when in the adverse phases, the technical-athletic ability works in conjunction with the facial signs and the body pantomime which communicate aggressiveness).
- friendly (during training when the actions of the game are finalized to improve on the plans of attack and defense. In this case, the players of the same team split into 2 separate [rival] teams).
- subjected or mastered (when the offensive abilities of a team are obviously higher)

5. Descriptive results

Currently the analysis of performance in volleyball shows the relationship between the score and the fundamentals of game: service, attack, counterattack, block, defence, receive through the use of the analysis of video performance with dedicated software (Data Project, Dartfish, Focus Elite). The methodology of the *Performance Analysis* (Hughes & Franks 2004) expands the knowledge on sport performance as it analyzes more deeply performance by seeking possible relationships between the outcome of a part or of the whole performance and the processes associated. The group identifies in the fundamental of the attack the greater number of episodes characterized by bodily communication. the decoding *tactics* is frequent for the following skills: lobs instead of the powerful smash from all the positions of attack, the second direct hits in the opposing field of the setter instead of the lofted ball, the combinations of attack called with fixed schemes, the fast smashes of the first time from the central place, from behind of the setter with the elevation of a leg and of second-line from central place. It identifies three specific technical skills included in the fundamental of the attack: lob instead of a smash on a lofted ball in position 4, smash in the first time in position 3 and the second touch of the setter from position 2 in the opposing field instead of setting. The game positions in the field go from 1 to 6 and leave from the service position and they develop in a counter clockwise sense.

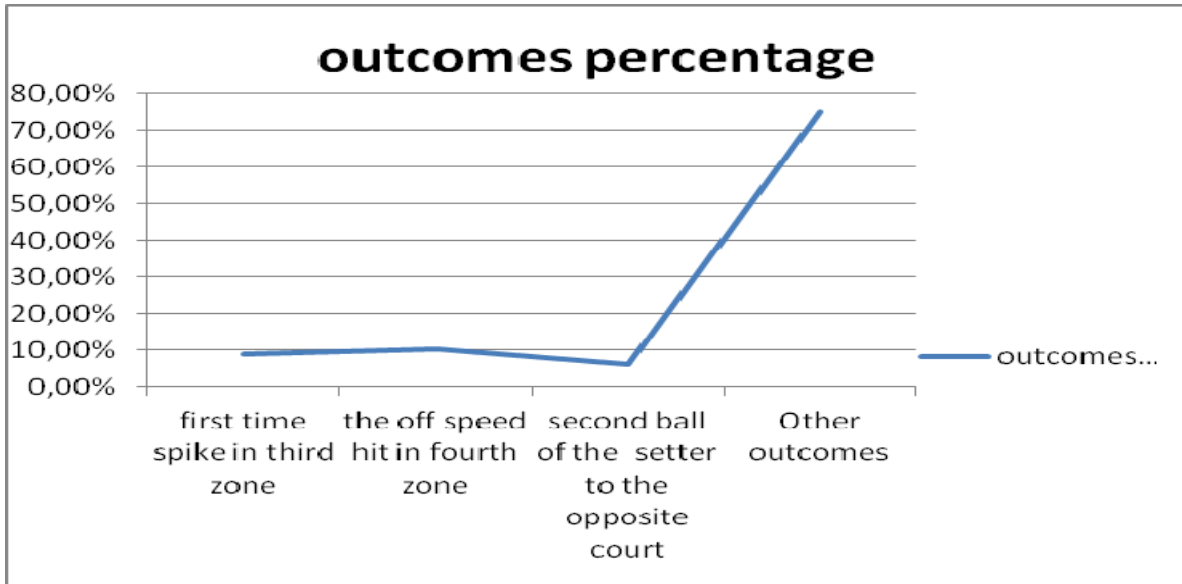
The second part is a pilot study over 10 championship randomly sampled competitions of the team from Naples belonging to female C division.

As a result of the outcome of the first part of the study concerning the identification of 3 technical skills of the attack, it was carried out an analysis of the scores awarded to the 3 technical skills techniques identified and added to the final measurement. The remark was made by hand in real time, *hand notation*, by the researcher that is also the coach of the team. This activity is included in the practice of monitoring the field of competition that is made by the coach, by the second trainer or by the analyst for the usual post-competition deepening in the first following training session.

The results are: 10.32% lob, 8.70% first time smash, 6.10% second touch of the setter for a total of 25.12%

Tab. 1 & graph. 1

first time spike in 3°zone	the off speed hit in 4°zone	second ball of the setter to the opposite court	Other outcomes
8,70%	10,32%	6,10%	74,88%



6. Discussion

The study helps:

- To define a first inventory of signs used more frequently in volleyball according to the principles of bodily communication (Argyle, 1988), the aspects of perceptive senses (Berthoz, 2002) and the neurobiological implications (Rizzolatti & Sinigaglia, 2006)
- To give a general plan for training that includes knowledge about the function of gestures, signs and mimicking, the structure and the mean of nonverbal messages and the effects of bodily communication on behavior in order to build expressive and communicative skills of volleyball coaches. The paths of training for sports game coaches reflect the guidelines of studies and research on the methodology of the training of volleyball focused on the improvement of functional aspects, on the development of conditional abilities and energy mechanisms and on optimization of the bio-mechanical aspects, undervaluing the function of nonverbal communication during the game through the gestures, the signs and the mimicking.

Usually, the phases of game that differentiate the successful from the unsuccessful teams are determined according to the analysis of the situation parameters of matches in sports game (Hughes & Franks., 2004). For that purpose, matches or sets are used as entities inside such as the quality of performances of recorded phases or volleyball elements is analyzed. Nonverbal communication could determine the outcomes for the actions and skills examined (Raiola, 2011a). Furthermore, in volleyball there are six players in one field that, depending on their playing role, are placed in six different zones and they are rotating clockwise during a game always for one zone, that is, it happens for every step of rotation. For this reason, the volleyball is very variable. In order for a team to be successful, it is necessary to achieve the balance of performance in every actions and for every player. The data obtained with the analysis of the situation efficiency of every phase of a game are used as main guidelines in the planning and programming of volleyball training.

Further research and software development will focus on quantifying the critical performance values and expanding the software for other actions and skills.

The aspects of non-verbal communication in volleyball, its codes and the technical and tactical usage of gesture, are the result of the meeting between tacit and implied dimension that comes from experience gained on the range of activities and a theoretical dimension that scientifically characterizes and justifies the expressive and communicative potential of body (Raiola 2011b).

References

- Albanesi, C. (2004), I focus group, Carocci, Roma, Italia
- Argyle, M., (1988), Bodily Communication. Second edition, London: Methuen & Co Ltd. UK
- Berthoz, A. (2002), The Brains Sense of Movement. Boston, USA: Harvard University Press.
- Ekman, P. & Friesen W. V. (2001), Giu la maschera, Los Angeles USA.
- Husserl, D. (1936). Die Krisis der europaischen Wissenschaften und Die transzendente Phenomenologie (The crisis of european science and transcendental Phenomenologie), Philosophia Serbia.
- Gardner, H. (2002). Frame of the mind, the theory of multiple intelligences. Basic Books, New York, USA:
- Hall, T. E. (1966). The Hidden Dimension. Garden City, N.Y.: Doubleday. USA
- Hughes, M., Tavares, F. (2001), Notational Analysis of Sport - IV, Porto: Faculty of Sports Sciences and Education Portugal
- Hughes, M.D. and Franks, I.M. (2004), Notational Analysis of Sport 2nd Edn.-Better Systems for Improving Coaching and Performance. London: E. and F.N. Spon. UK
- Hughes, M.D. and Bartlett, R.M., (2002), The use of performance indicators in performance analysis. J. Sports Sci., 20: 739-754
- Iacoboni M., (2008), Mirroring People. The new science of how we connect with others., L.A. Farrar Straus & Girox USA
- Jakobson R. and Halle, M. (1956). Fundamentals of Language. Gravenhage : Mouton, USA.
- Lewin, K. (1946) Action research and minority problems. J Soc. Issues 2(4): 34-46
- Meharabian, A. (1972), Nonverbal communication, Library of Congress Catalog Number USA.
- Merleau Ponty, M. (1945), Phenomenologie de la perception, Paris: Libraire. France
- Morin, E., (2006), La testa ben fatta, Cortina, Italy
- Pieron M., Wauquier P. (1984), Modification de comportements d'enseignement chez des Etudiants en éducation physique en stage d'agrégation. Revue de l'Éducation Physique, 24, 4 : 29-37.
- Raiola G, 2010a, Tactical choice of volleyball central blocker at the opposing attacks with the help of bodily communication, Scientific Report Series Physical Education and Sport No. 14, Vo.1/2010, 72-76
- Raiola, G, 2010b, Bodily communication performance analysis in volleyball by new way of gathering data system, Scientific Report Series Physical Education and Sport No. 14, Vo.1/2010), 77-81
- Raiola G. (2011a) Bodily Communication in Volleyball and New Data System, Journal of Social Sciences 7 (4): 671-675, Science Publications, USA
- Raiola G. (2011b) Theoretical, argumentative and empirical volleyball study on body communication and its relation to anticipation skills. New perspectives of coaching formation Vol. 5, Issue 2; December 25, Acta Kinesiologica, Bosnia & H.
- Raiola G. (2012) Bodily Communication in Volleyball Between Human and Experimental Sciences, Mediterranean Journal of Social Science, Italy
- Rizzolatti, G. (2006). So quel che fai. Il cervello che agisce e i neuroni specchio (I know what I do. The brain acts and mirror neurons) Raffaello Cortina Editore, Milano, Italia.
- Schmidt, R., A. and Wrisberg, G., A. (2008), Motor Learning and Performance. Champaign, Ill.: Human Kinetics, USA.
- Shannon, C. E. (1948), A mathematical theory of communication, Bell System Technical Journal, 27, pp. 379-423 and 623-656, July and October, 1948
- Shannon, C. E. & Weaver, W., (1949) The Mathematical Theory of Communication. The University of Illinois Press, Urbana, USA
- Watzlawick, P., Beavin, J.H. & Jackson, D.D. (1967). Pragmatics of Human Communication-A Study of Interactional Patterns, Pathologies and Paradoxes. New York: Norton. USA.
- Wrisberg, G. A., (2009). Sport Skills for Coaches. Champaign, Ill.: Human Kinetics USA
- Teodorescu, L. (1984). Problemas de teoria e metodologia nos jogos desportivos (Problems of theory and metodologia in sports games). Lisboa: Livros Horizonte, Portugal