THE CORRELATION OF DIFFERENTIAL LEARNING AND THE STAGE OF COGNITIVE DEVELOPMENT IN FOOTBALL THROUGH A GAME OF THREE AGAINST ONE

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Abstract

Considering the laws in developmental psychology certain tasks at a football training-session can be made in a way that they are not only adapted to children's development, but are also learnt easily and children are keen on doing them. The article is about to present that how differentiated learning, that is based on the dynamic theory of system, can help the development of children's cogitation and how all these can be adopted to an ordinary football training session task in practice.

Key words: *football, developmental psychology, dynamic theory of system, differentiated learning*

Introduction

"A child is not a miniaturized adult" this sentence can be heard at nearly every coach-training course, conference, or any forum that deals with children's football. The idea is true. However, it is not enough to know this fact, but we must understand and use it in practice. Let us come to know the correlations of learning methods and children's developmental psychology through an ordinary football training session task.

During my career as a coach, I have met several children's trainers who wanted to give as much as they could to their trainees. Because of this the kids were handled, as adults, and were required to fulfill certain tasks only an adult is capable of. This way, certain steps in development were missed at the stages when necessary in the development of a children's team. Development is blocked in the long run if children exponent of a sport are trained without the adequate bases.

The article assays to draw the attention to the correlations of differentiated learning and developmental psychology, those that can be adapted effectively in practice.

Dynamic theory of system:

With the dynamic theory of system, the main points of examinations focus on the stable and instable phase-crossovers resulted by reconstructed motion control system. These crossovers can only be described by non-linear equations. The main difference between the two approaches, i.e. the dynamic theory of system vs. everyday approach, is that the former concentrates on the analysis of the changes in the state of the system, instead of examining the system's stable phase. The evolvement of this theory was inspired by non-linear dynamics, synergy, chaos

theory, and the theory of complexity. Interpreting the casual nexus differently is the base of the above described difference in the approach.

In system dynamics by Newton, casual nexus is described by linear equations, meaning there is only one result of the nexus that can be clearly defined by the equations.

If the ordinary theory above is adapted to the field of motion, it will result in the paradox that training-session plans and technique tasks must have the same effect on each and every athlete. That is, in other words (and as a result of the linear way of the casual nexus), similar causing factors have the similar results (Loistl and Betz, 1994). Practical experiences, however, show the complete opposite, i.e. the same task remains ineffective during a training period, whereas a minor interference can work a miracle.

Great results of these minor interferences can be explained by applying the learning of a new theoretical trend. According to catastrophe theory, a minor effect can cause a catastrophe, or even a minor change in the system can bring a totally different result (Thomas, 1972; Haase, 1991).

These phenomena are only possible with the base of non-linear casual nexus. In such an approach a minor cause may result in a great effect or vice versa. According to the 'butterfly-effect' – due to non-linear connections – a wing-flap of a butterfly in South-America may cause a tempest in Europe. It is worth to remark that non-linear effects are more frequent in nature than linear ones, and the more complex a system is, the greater effect it has.

In the figure below the essence of the dynamic theory of system concept is shown, based on Benard's experiment dating back to 1905 (Kelso, 1999). The experiment begins with the step-by-step heating of the thin layer of oil, marked by a red circle. At the beginning, when the temperature both on the top and at the bottom of the layer is about the same, no macro-movements in the liquid can be seen. However, random micro-movements are available in any case which means that without any outer power-supply – with the absence of a central controlling organism – the liquid stands still, i.e. it is STABLE, as shown by the phase-curve.

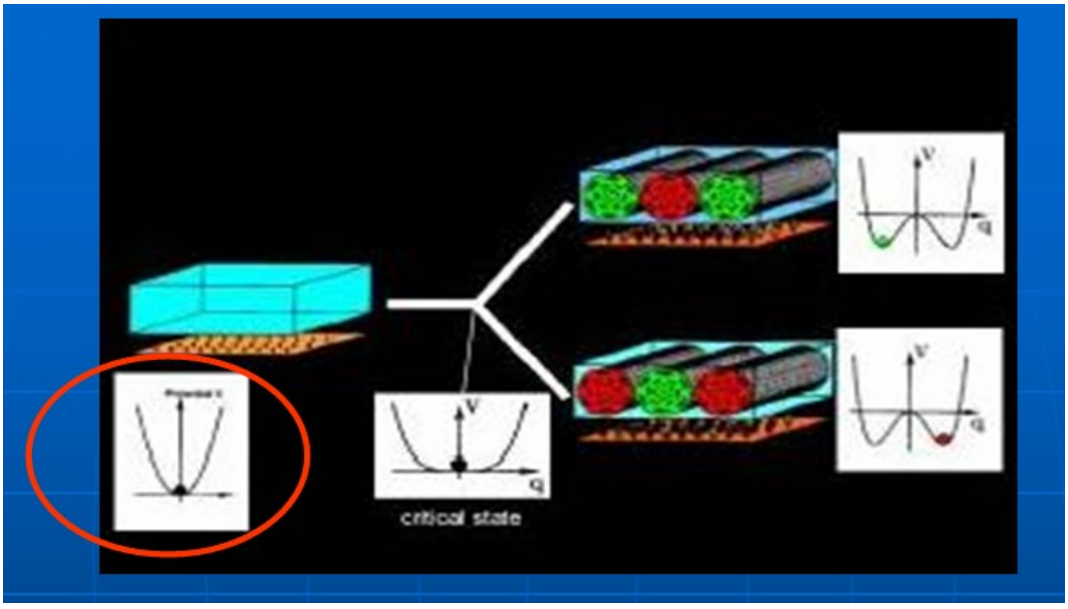

Figure 1. The phase-curve demonstrating the stable state of the oil-layer (Benard's experiment)

In case the temperature of this open system is modified, we notice the phenomenon called INSTABILITY. Due to increasing temperature's effect the random micro-movements of the liquid persist, but at the macro level systematized coordinated movements are formed. That becomes a complex system where temperature is the CONTROLLING PARAMETER, and macro-movement is the ORDER PARAMETER. These spontaneous changes in pattern are called self-organization; although there is the absence of a central controlling system, and a well-organized, coordinated macro-movement is formed. The only way to describe the order parameter is in a range of phases, hence in such a range, time as a dimension disappears, moreover, chaotic micro-level movements show a rational macro-level in the form of an attractor inherent in the phase-range. Last, but not least that is the way the NON-EQUILIBRATORY PHASE-TRANSITION is presented, causing BIFURCATION, according to the modifications of the order parameter joining a critical parameter-rate, after which the system gets to either this or that state.

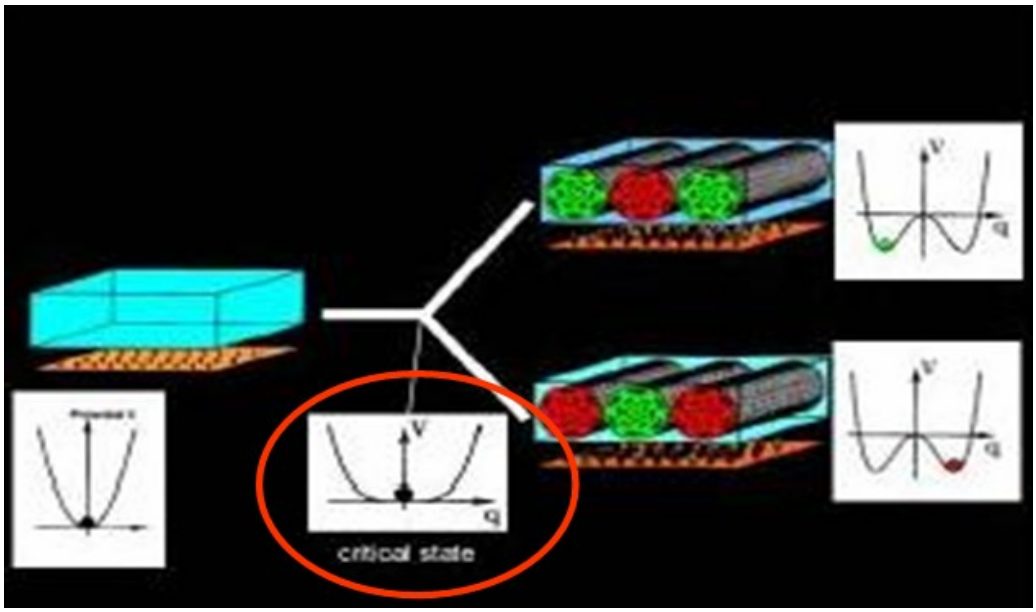

Figure 2. Bifurcation – the phase-curve demonstrating the oil-layer in a critical state (Benard's experience)

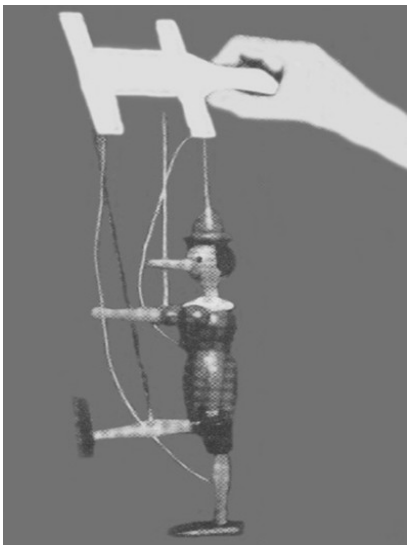

Figure 3. Marionette, analogy to illustrate controlling parameters and order parameters.

Analogizing the example shown about the movements of the oil-elements to muscle groups in the human body, the explanation is the same, that is, the latter ones similar to the former ones induce coordinated macro-movements in a self-organizing way. In the 1960s, similar theories were conceived by Bernstein who introduced the idea of 'synergy' (Bernstein, 1967).
Showing the same, i.e. the correlation of the controlling parameter and the order parameter, with human movements is a well-known example. In this experiment simple hand-movements are the controlling parameters, and complex movements of the limbs are the order parameters.

First experiment based on the dynamic theory of system, using human movements

The first experiment towards human movement based on the above mentioned theory was made by Haken, Kelso and Bunz. It was intended to describe the mathematical ideas of rhythmic and cyclic movements (Schöner and Kelso, 1988).

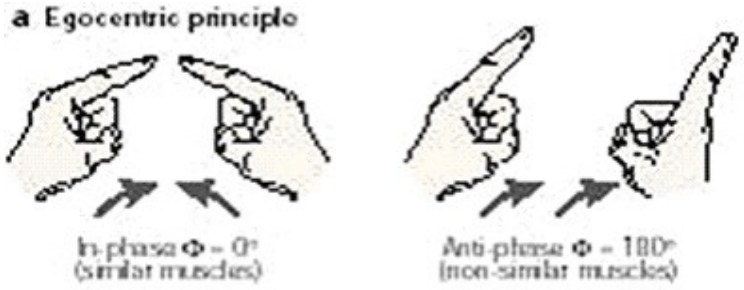

Figure 4. Bimanual coordination task, two points of origin

If moving both our left and right pointers simultaneously from left to right with an increasing frequency, then at the point where a critical frequency-rate is reached parallel movement becomes anti-parallel. (Figure 4)

It occurs to all people; however, they must concentrate on the movement deliberately. The difference is only at the rate of the frequency. Once the critical rate is reached, the original pattern is impossible to have brought back unless the frequency is below the critical rate again.

Qualitative movements can be noticed together with anti-parallel movements. It is a matter of course that there are two stable states in the system until the critical frequency-rate is reached, after that it reduces to one. The result is change in potential possibilities with the increase of movement-frequency.

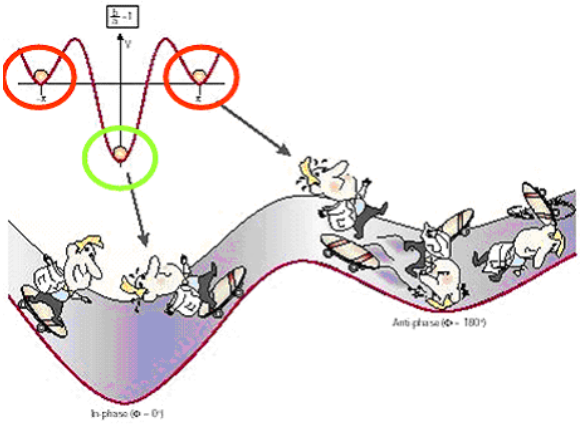

Figure 5. To illustrate the states in the dynamic system

To explore the above mentioned theory in details: in the event of parallel pointer-movements fluctuations are higher than in those of anti-parallel – in this case the latter is more stable. The aim of the experiment is to show how the system gets from one stability to the other.

It can be seen in the figure that in the event of the anti-parallel belonging to a higher frequency the relative phase of 0° is delineated with a wavy-curve. It represents the attrahent feature of the system, calling it 'attractor'. There are two stable points (relative phase of 0° and 180°) in case of lower frequencies, delineated with two waves in the potential curve. The peak-like points between stable points represent the system's instable state. (Figure 5)

Effects of movement-adjusting models in the modern approach on theoretical and practical implementing of movement:

The laws of movement-learning are universal or specific towards a particular movement

There are two main trends in basic science (including psychology). One concentrates on stating universal facts and theories while the other one draws conclusions and builds theories by observing special fields of psychology. In psychology and in different learning theories the tendency is to follow the syntactic (ordinary) way, therefore it is possible to unfold various laws and rules without reference to any of the fields they are applied to. It follows from this that it is worth to combine theories about learning when defining them to understand the phenomenon in the whole. The reason why the theories have not been combined yet is that similar combined theories (showing the way how a complex system works) cannot be formed into an algorithm moreover, the various theories take different motor skills into consideration while defining the complex system.

The complex motor-operations mentioned above have a special position in the fields of psychological research. One reason is that ordinary (linear) statistic models are not adequate to describe how these complicated systems of movement work. Moreover, according to several ideas, a complex movement in sport is nothing else than a chain of simple movements carried out where these simple movements are combined in order to build up a complex system. Some may draw the conclusion that the processes observed while learning simple movements are similar to those learning so called sport-movements. In his experiment, Zimmer (1990) pointed out that the above idea is by no means true, thus an examined person in his experiments acquires the ability through states of stability and instability.

Theoretically, appearance of non-linearity has two important conclusions:

- Learning movements is neither adding up simple elements, nor putting independent elements together.
- Moreover, the presence of two stable states of movement is needed through a learning process. For a beginner, to reach a higher level stable phase starting from a basic level one, the way is through the variability of an instable phase.

Applying dynamic theory of system in the topic of movement-learning; "Differential Learning" (Schöllhorn, 1994)

Considering the ideological bases of the new system of dynamics, within the processes of learning movement and technique, two conclusions can be drawn. One deals with the speed with the movements are carried out, i.e. in the beginning phase of learning the task must be done within the critical frequency or speed. The other deals with making the transition between two stable phases in a way, that the already learnt movements have to be made instable, so that a new, stable movement can become a skill.

It is widely believed that reaching top results in sport needs a great number of long-term training periods. It is manifested in the repetition of a specific movement a great number of times.

According to the general view, the relation between achievements and development, while training, i.e. learning movements perfectly is cause and effect.

The new system of dynamics in opposition to stable state research, concentrates on the examination of stable versus instable phases. The theory called "differential learning" emphasizes the fluctuation of changes while carrying out the different movements. That means doing hundreds of tasks covering the main movements from the chosen sport without repetition, instead of doing the same task all the time. Therefore athletes are compelled to do the substantive part of the task perfectly under any circumstances. The essence of the theory is based on the number of faults (all mended) while moving, and the fluctuation of parameters in the movements. According to the above no matter what skills and qualities the athlete has the place, the speed, the time of his movement can be altered separately or combined

In team-sports, e.g., football, not only individual technique in differential learning, but tactical elements both of the individual and the team can be developed. Moreover, levels of thinking described in developmental psychology must be mentioned as well. Therefore, without reference to the athlete's skills and qualities, not only the place, the speed, the time of his movement can be altered separately or combined, but adjusting to teammates, the ball, and the opponents must be added – considering the athlete's age as well as the features of his particular level of thinking.

1. Four Stages of Cognitive Development by Piaget (1999)

Sensorimotor Stage (from birth to the age of 2)

At 'Sensorimotor Stage' there is no distinction between perception and reaction to anything that is noticed. There are two aspects in Piaget's theory: Figurative and Operative. Figurative Intelligence is static coping with the immediate relations of things and situations. In the state of Operative Intelligence the mind transforms and understands any perception, in accordance with the cognitive structure it developed. Perception is not separate from action; the two aspects are not distinguishable.

Infants are born with non-coordinated, limited-range reflexes. Adaptation begins within the first four months being random at the beginning, but due to continuous repetition either a new scheme is formed or two existing ones coordinate.

Secondary circular reactions occur between months 4th and 8th the period when a child is already capable of instrumental reactions to his environment. If his actions bear any changes in the environment, he himself can reach the noise or the spectacle to occur again or maintain. In the second year infants get to the point when they can get perceptually non-existing events happened.

Also in the second year, a child is about to discover that things, regardless to their actions, exist. The Sensomotoric Stage ends when they are able to develop the ability to use primitive symbols and form enduring mental representations. The world broadens by recalling images about anything that is not present, but has already been or will be. There is a lack of logics and system in cognition. A toddler is immature; however, its cognitive abilities do distinguish him from the world of animals.

Preoperational Stage (between the ages of 2 and 7)

A period for a child when his thinking is wrongly used. Only his viewpoint is accepted, at least it is difficult to distinguish between his own and other person's perspectives. This egocentrism means the incapability of analyzing a situation from two aspects simultaneously. He cannot review any chain of ideas or events. Operation thoughts are intuitive – everything is what it seems to be not what it needs to be. Children of this age group are trained by individual technique tasks as well as playing games where individual skills dominate.

Concrete Operational Stage (between the ages of 7 and 11)

Children's cogitation becomes less egocentric but more diverse and reversible. According to Piaget it is the ability of classification that becomes the base of concrete operations. Logical and illogical classifications are distinguished. The former includes logical classes while the latter includes conditions in the whole, i.e. seriation, sorting objects according to shape, size etc. Researchers have been made in order to explain how a child can understand additive classification (e.g. a class including another class is part of a third). At this stage a child is able to do seriation in a way described by Piaget, but he is unable to deal with abstract, multiple aspects. As for football training, the importance of team-problem-solving is emphasized, later on, tactical elements are thought in order to support abstract thinking.

Formal Operational Stage (from the age of 12)

Children of this age (adolescents) deal with hypothetical thinking as well as reasoning. Transitivity and seriation mentioned in the above stage (then managed separately) are combined. A child notices (with the ability of thinking abstractly) how differences of certain elements (analyzed separately in the previous stage) like weight, speed or time depend on each other. Tasks at training sessions must be focused on the team in terms of movement, action, and also movement without ball-control. Moving towards or passing within free space require abstraction in thinking.

2. The invariant element system of development

The activity of the organism towards environmental objects is called as cognition. In Piaget's opinion the cognitive development is not only influenced by the

maturity of the organism or by the environment, but also as a result of interaction between these two components. Based on the rules of biology the organism adjusts to the environment through its activities and intelligence enlarges the word by creating such mental structures that can be effectively applied to the environmental structures. (Piaget, 1953)

There are invariant functions and variant cognitive structures too. The operation of an invariant structure, so called adaptation, can be divided into two sub-categories „assimilation" and „accommodation". The organism intakes the input from outside, that fits its internal system during assimilation. Obviously, animal fat can be assimilated by the digestive system, but not a huge piece of metal. Referring again to Piaget „intelligence is assimilation to a certain extent that annexes all the experience within its own confines". The accommodation of the organism can be demonstrated so that it can modify its own structure for changes, like the crystalline lens can adapt to different distances.

According to Piaget's opinion the source of recognition is action. Initially, the organism acts only if it gets in touch with its environment. These early actions are sincere and quickly integrated (let us think of suckling). The Piaget's schema is created by these coordinated groups of actions. Consequently, the starting point of improvement cannot be found in reflexes defined isolated reactions, but in spontaneous and comprehensive movements of the organism.

The organism obtains groups of schemas all the time that makes possible being in compliance with the environment. After that a change can clarify having actual schemas cannot lead to solve the new situation. The equilibrium has been lost. But later old schemas are adapted to the new conditions with the help of accommodation, so the balance is restored again. However, accommodation can only be applied, if the structure of the change does not differ too much from the actual schemas.

The definition of balance has strongly connected to the ides of development and to the understanding of cognitive structures. The balance between the organism and its environment has had constantly loosen during growth, but by the use of accommodation and compensation become balanced again. The process of counterbalancing is called by Piaget as equilibrium. The equilibrium is not a statically status, rather an active part of compensation. So we can think of the organism as a self-regulating and an active system.

In the course of development the cognitive structure is becoming from the „automatic" type through form of „sensory motor" towards the operational adult way of thinking. The mentioned three forms of cognitive structures represent the three level of cognition. So the knowledge cannot be taken up by the organism, rather a process, by the help of it the organism can realize its environment. The active adaptation come into existence by use of outside, open or internalized course of activities.

To solve the sport movement challenges under pressure with high quality, it is necessary that the sportsman do the given sport movement masterfully. Balance, adequate flexibility and adaptability are also essential, in case of being removed from the stable equilibrium, becoming balanced again. Differential move study based on dynamic system theory has been in line with the natural study techniques mentioned by developmental psychology. That is the reason why kids can be teaches quite easily and effectively.

In contradiction to Piaget's developmental theory several critics can be defined. Carey (1994) has tried to prove experimentally, that a kid of half a year has its own specific idea about the material word, kinetic energy, gravitation, law of inertia. However, it is just a special naive physics. Beside this, infants' age of 9-12 months acquire an early and also an abstract form of psychological experiment that was proved by researcher. Furthermore babies can realize the aim of a simple behavior. (Gergely et al., 1995)

Another important field of researches – also contradictory to Piaget's – has disclosed that the cognitive development is not identical, so not locally general. The different fields of mind in case of the typically growing kids are not collectively and not homogenous developing step by step.

According to neo-constructivists, contrast with Piaget, the cognitional development has inborn basics, which cannot been meant as perfect knowledge system, rather a primary cognitive action. On one hand, representatives of this ideology consider the development as field specific. Modules that have not been evolved thanks to nervous system or to mind, but have been built up mainly the impact of gaining experience. (Karmiloff-Smith, 1992). This approach is the closest to our conception. At a special field like football game, based on our practice each developmental stage is coming earlier for those children who were expertly cared for. However, it cannot be adjusted to all the other area of life.

Piaget admits in his answer given to his critics that the developmental phases defined by him are not statutory, rather has an informative nature. Although the sequence cannot be changed (Piaget, 1970).

During a team sport training the trainer always has to make efforts on acquiring of individual techniques and tactics could be somehow connected to the team's collective operation. That is the reason how the study methodology can be effectively applied. A basic technical element can be built up by constantly changing into thought - demanding and team exercises. Enhancing further the workout a tactical exercise suit to the age-group that has been defined by the differential learning theory can be realized. In order to keep the training intensity on a high level the coach has to always keep his eyes opened and at the appropriate moment should make the tasks changing. So like constant attention and steady adaptability pressure gives the intensively of the training. The players cannot laze „it was done well, so no attention has to be paid on it", since something is always made changed. Thanks to the challenging trainings the well-prepared players can concentrate and adapt well to changes under pressure, too.

The easiest way of learning is the habituation that includes the automatic identification of simple impulses. Repetitive stimulus becomes routine the kid will not react in case of its new occurrence (Baillargeon, 1985; Spelke, 1984). Children left unrewarded in series arriving identical impulses. The evolving customs can make the players inflexible in new and unexpected situations (Robbins, 2003). However the football sport requires high standard of flexibility and adaptability. Those teams who are playing fixed and commonplace figures can be easily understood. They are less successful than those who have flexibility.

In the next part by means of a football training exercise „3 against 1" will be demonstrated the use of practical purposes of relationship between the differential learning theory and thinking level. To reach fast and good results at a children training, let us take into consideration the developmental psychology characteristics, its suitability in case of differential learning theory. The training tasks should be structured in an enjoyable and easily understandable way for the children.

For the first time a 10x10 square meter quadrate was pointed out, where the four players were standing right next to the four buoy, all having balls. The four balls have to be bowl at the same time in accordance to direction course, in such way, that the ball let's stop exactly right to the next one. It should be done by internal foot. Make the necessary corrections! Call the attention to the correct fulfillment, only in case if the ball stops next to the buoy. Let them make this task in the opposite direction too. (Figure 6)

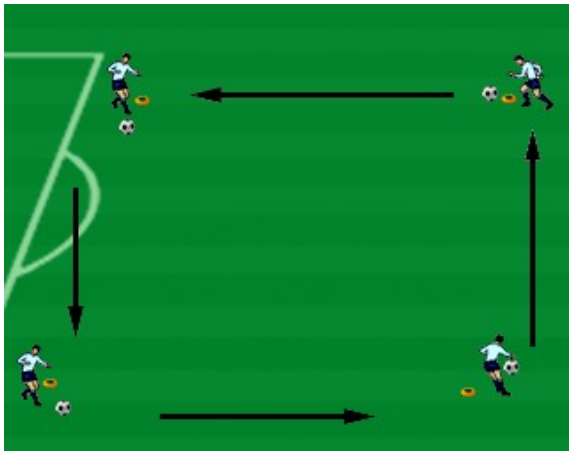

Figure 6. Pass control exercise 1

The next exercise is just the same like the previous one with a slight difference. Make an abnormal figure, whatever you like. (Figure 7)

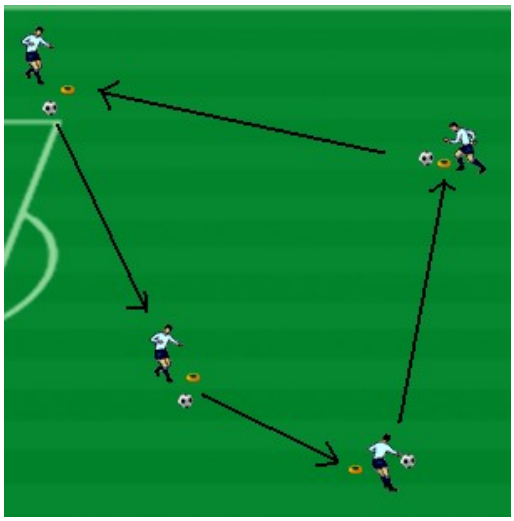

Figure 7. Pass control exercise 2

After that let us increase the number of buoys and vary also its position. (Figure 8)

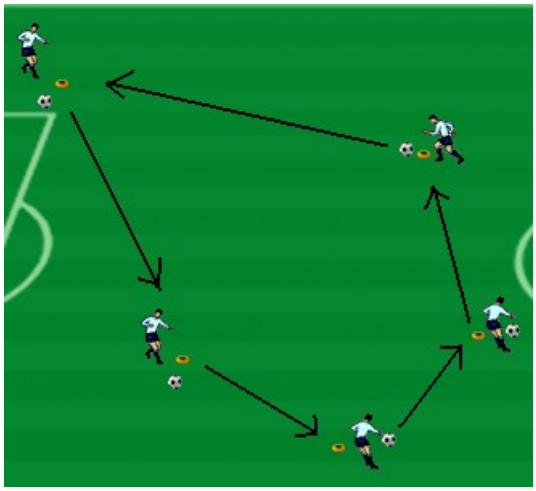

Figure 8. Pass control exercise 3

Power portioning (kinesthesis) (Hirtz, 1985) and accuracy can be developed during the practicing. While not only standard but other figures were used too, where the ball has to make forwarded in challenging angles and distance, orientation has also been connected with studying (Fleishmann, 1964; Nagy, 1987). Referring to the basics of differential learning theory adaptability has been improved. The closest situation, like being on a match was reached; the more efficient would be the training.

Five buoys should be placed out from the starting buoy within a circle of 5 meter radius in that next task. Players standing next to the starting point, all having a ball. (Figure 9)

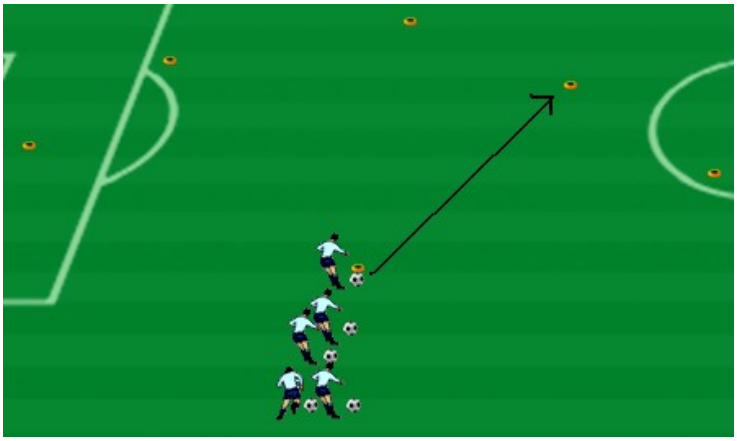

Figure 9. Pass control exercise 4

The first footballer can choose among the buoys. His only task is to pass the football with his internal foot until the chosen one. Ball has to stop there. The following player's exercise is almost the same with a small exception. Balls cannot be shooting where one next to the buoy stands. (Figure 10)

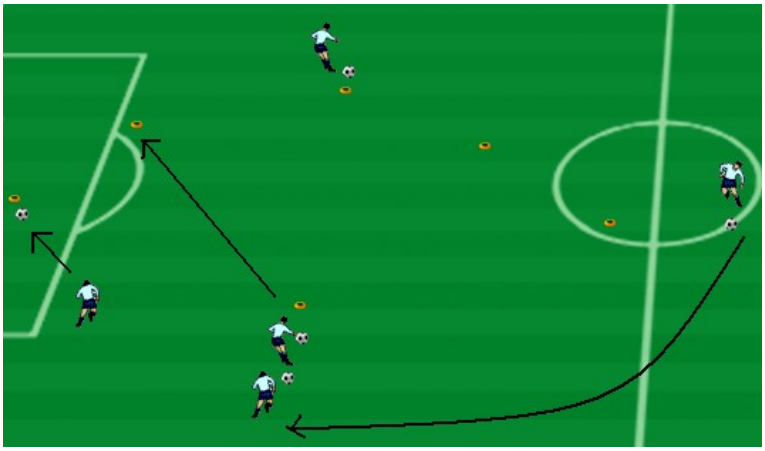

Figure 10. Pass control exercise 5

Let us change the order of the players. Make the necessary corrections.
During this exercise not only power portioning and orientation could be practiced, but the speed of decision-making will also be improved. Since the kid has to realize where can be shot where cannot. The exercise can be completed with time pressure, too. Or two teams can play against with each the other in case of fastness and accuracy.
The three components of coordination can be improved simultaneously. Based on differential learning theory, each element can be changed and varied. Variation requires constant attention and adaptability.

A 10x10 square meter quadrate was pointed out again. Within this quadrate four players are playing balls in a given area. Other four players are standing outside. They have to lead the balls through the quadrate not to graze one other. With exchanged roles make the game again. (Figure 11)
Beside the orientation and fastness the speed of reaction time can be improved.

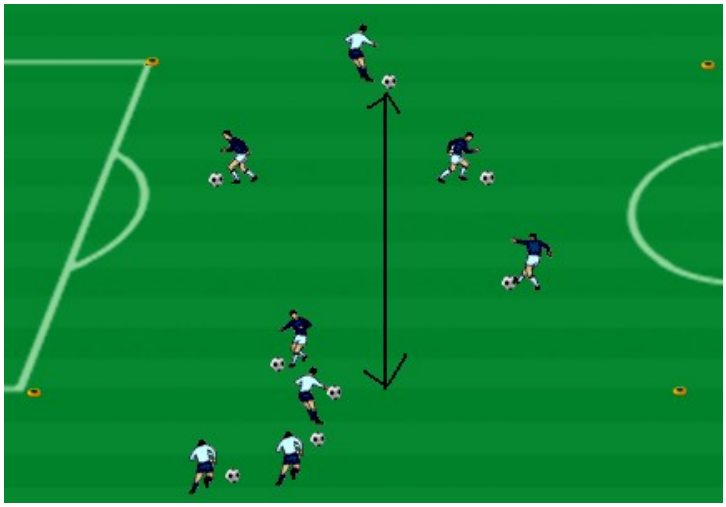

Figure 11. Dribbling skills exercise 1

A 10x10 square meter quadrate was pointed out again. Within this quadrate four players are playing balls in a given area. Other four players are standing outside next to the four side line. The opposite players are partners, one ball by pairs. The task is to pass to ball to his partner without getting stuck into internal footballers. The footballs cannot meet, too (D'Ottavio, 2004). (Figure 12)
All players can move alongside the side line, trying to find the opportunity to pass and bring down. With exchanged roles make the game again!
The exercise can be completed by putting kids under time pressure. For instance, when the footballer has to forward the ball within 5 seconds to his partner, we can create a totally match-like situation with constant positioning and hard shots. Timing, sense of rhythm, power portioning, orientation, sense of balance (Winter, 1975), (because of steady change of direction the player's balance has to be kept) speed of thinking can be practiced at the same time

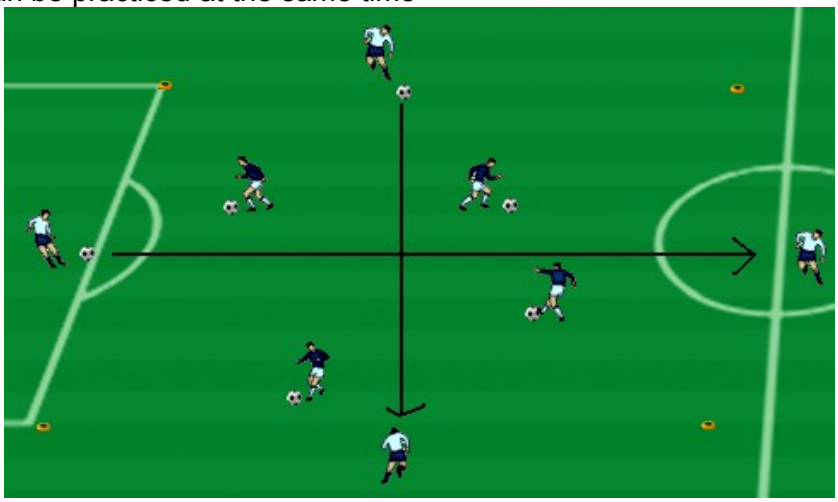

Figure 12. Dribbling skills exercise 2

A 10x10 square meter quadrate was chosen. On the opposite corner two kids are standing without football. One is appointed as captain, he will begin the game. After

feinting with his body, he has to start to one of free buoys, while the other has to run to another free one. Who reaches first the buoy, will win the game. With exchanged roles make the game again. (Figure 13)
Beside the orientation the speed of reaction and movement can also be improved. For feinting successfully the equipoise is essential. So balance keeping will be practiced too.

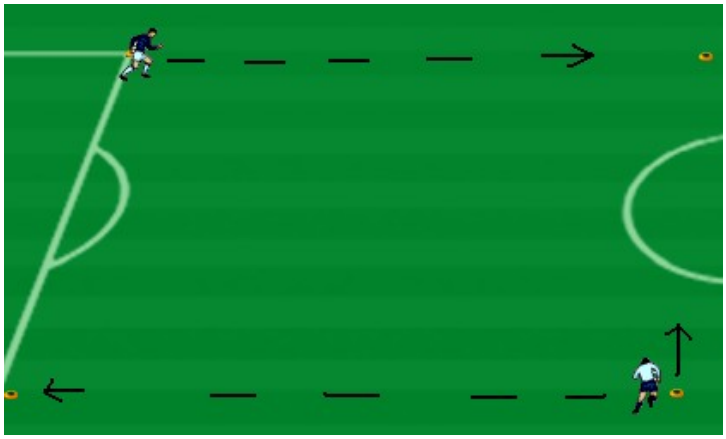

Figure 13. Captain

The next exercise is almost the same like the previous one; the only difference is that it will be executed by dribbling the ball. (Figure 14)
In case of ball appearance the kinematical sensation will also be improved.

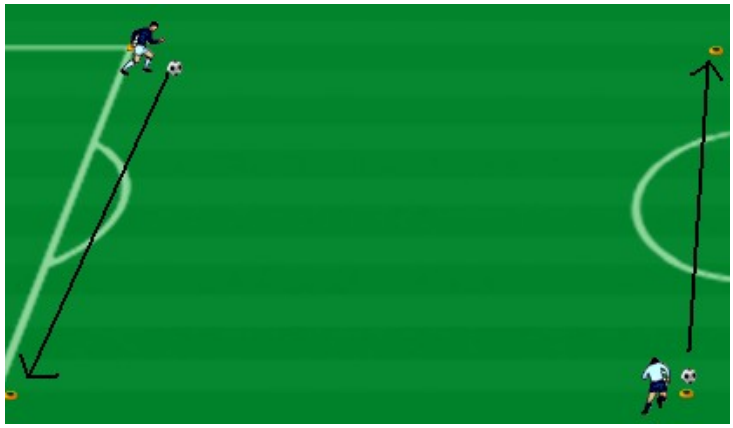

Figure 14. Captain with the ball

Now, another player without a ball will join the play. The captain owns the football. The other two player's role is the correct positioning, so that on either side of the captain can be found one footballer. At the beginning, the captain passes the ball to one player, while the other is running to a free buoy, being the assisting partner on his other side. Who now is having the ball, has to forward back it to the captain, while the other player has to run back to his original position (Curaso, 1996). The captain has to collude with the two other partners. Change the role of captain. As soon as the children could understand the direction of movements and accepted the ball as the base of comparison, then the exercise can be freely executed. In this case the captain's role is to determine to whom to pass, while the others without the ball have to adapt to the constantly changing situation. (Figure 15)

Figure 15. Captain with two other players

Finally, defenseman has also joined the play “3 against 1”. At the beginning the defenseman exclusively has to follow the movement of the ball. From that point, where the three players are moving freely, can do the movements correctly comparing to their move to the football, role of defenseman can be drawn into the play. (Figure 16)

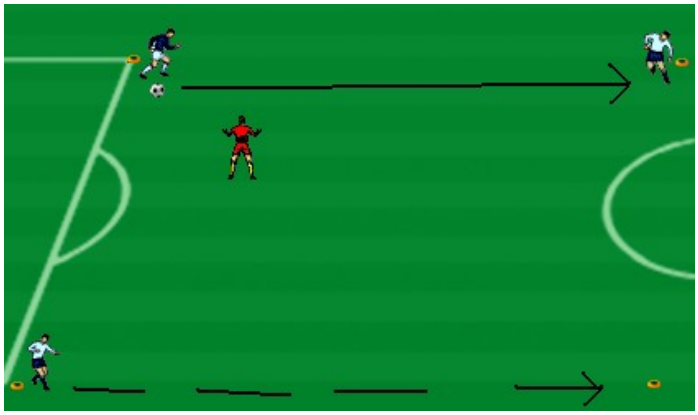

Figure 16. Play 3:1

In the end, the “3 against 1” play was reached (Cook, 2001). With the help of differential learning theory, children’s speed of thought, orientation, kinematical sensation, sense of rhythm and sense of balance could be improved at the same time. Finally, the little football players could reach a simulated match situation, where all of the coordination abilities could be lined up for a tactical element. During training the players were set to new tasks with the use of constant attention and the steady adaptability they have to solve the problems. So in this way children will be able to think how to act, defining and analyzing the circumstances. They should know what and why to do. So the way of thinking will be enhanced. Because of constant intentness, they make decision faster. Following the appropriate instructions, they not only classify the exercises, but they are inspired to sort the concrete tasks. They will also start thinking independently earlier and finding solutions alone. Earlier will be formal elements will be used by them. The differential learning method will help them to obtain a special toolbar that can be changed. Faster and better decision could be made at the right time.

Conclusion

In the „3 against 1“ game the ability-development can became a tactical component when children use their sense of locality on an empty field or when they

run there. They use their speed to get to the right place. They can pass the ball to different angles and different distances with the help of their kinesthetic ability. Their sense of rhythm helps them to pass the ball in time and let them start to a right area. Their sense of balance is used at starting and stopping, body and march fetches, and the motions occupying position (Farmosi, 1999). All these the actual operations are put into an order and the tactical aim is: the suitable fulfillment can be selected in the interest of the ball keeping. Later on this aim will only be a kind of tool to those purposes that can be practiced with the children during this little game. Such aim is the diagonal assistance for the player with ball. The tactical element of an essential basis for the football is to have at least two opportunities of the player with the ball, whom to pass the ball, – playing the empty ground. There should be helpmates for the player with the ball from the two sides. As children get to make the concrete passes settled and classified, they start to think on the formal operation level. Children will not run to the empty buoys because they take into consideration the moving of the ball and have to follow it but at their discretion they are capable of getting the ball if they run to the empty buoy. Now, we reached the essence of the modern football. The position, the speed of movement, and its direction of the players without ball dictate the action of the players with the ball. With the help of the incremental learning we can develop not only the physical ability but also the ability of thinking.

It is necessary for thinking to process the information for the strategy but it is different between children and adults. Chi (1978) proved in a test that the memory of those children who are proficient at specific area (chess) is not less than the adults but they use another memorizing strategy. The critical speed that is the basic of the dynamic system theory is making the process of the incoming information more difficult. The more somebody is conversant with the given range, in this case with football, the more information can he process in a due time (Brown-Smiley, 1978). While this proficiency is not adequate, children have to slow down to the range where they are capable of processing the information. Children can learn better if there is a spontaneous motivation. They can acquire more things in less time if this motivation is utilized appropriately (Gauvin-Rogoff, 1986). The role of motivation is as prominent in the everyday life as in the game (Nunes-Schliemann-Carraher, 1993).

The „3 against 1“ game construction is just an exercise that both trainers and players can verify how they want, as putting the buoys to another places making them differentiation and conformation. In my opinion children at the age between 8 and 12 should get training exercise that take into consideration the differential learning to make them fast minded players and having them technical-tactical ability later on.

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2- Ä°stavan K. ,L.Toth (2010) , The Correlation Of Differential Learning and The Stage Of Cognitive Development Ä°n Football Through A Game Of Three Against One ,Ä°nternational Quarterly Of Sport Science 2 , Hungary , 27-42. 6. REFERENCES 1- SchÃ¶llhorn W.I. (1994) ,Comparison of biomechanical movement patterns by means of orthogonal reference fluctuation ,Barbaras ,Biomechanics of Sport ,188-200.Â You just clipped your first slide! Clipping is a handy way to collect important slides you want to go back to later. Now customize the name of a clipboard to store your clips. Name*. Description. There Are Three Basic Components To Piaget's Cognitive Theory: Schemas. (building blocks of knowledge).Â Piaget proposed four stages of cognitive development which reflect the increasing sophistication of children's thought: 1. Sensorimotor stage (birth to age 2). 2. Pre-operational stage (from age 2 to age 7).Â Discovery learning â€“ the idea that children learn best through doing and actively exploring - was seen as central to the transformation of the primary school curriculum. 'The report's recurring themes are individual learning, flexibility in the curriculum, the centrality of play in children's learning, the use of the environment, learning by discovery and the importance of the evaluation of children's progress - teachers should 'not assume that only what is measurable is valuable.'