Learning with Observation of a Motor-Perceived Task; the Example of Running Shoot in Basket-Ball

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Abstract: We have focused our attention on "One Against One", the key situation in Basket-Ball, which we conceived it for a long time in clubs and in National Teams. We have insisted on demonstration, progression, rhythm, the crossing from the known to the unknown, from the easiest to the most difficult and from the most simple to the most complex, leaning on verbal repetition, contextual interference, Part versus whole training and on motivation. In the side of technique and tactics of Basket-Ball, we have taken care of the learners / players to be interested and initiated in stances, placing, shifting, mark, mark-down, pressing, dribble, interception, dummy, revolve, rebound, against and running shoot, preventing repeats and walking with the ball. Our objective is attained. An optimal learning of spatio-temporal and complex task of ground (case of One Against One in running shoot) is a tributary of the complementarity between observation and physical practice. This kind of learning is function of age and it is clearly and harshly better than artificial experiment, in the laboratory, or training without adversary.
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1. Introduction:

Financed research, free, heavy or operational, inductive, intuitive or deductive, empiric, opting for a systematic and objective goal, based on the faithful and precious description, insist on repetition, rigorous organization, prediction, provocation, control and founded laws. The multiple techniques used in the domain of the scientific research assign unequal importances. Of the direct or postal questionnaires, to multiple or open choices, transporting the simple and benign questions, of the definitive answers, not commented and not deepened, the often guided interviews stay sources of research invalidity, not managing to detect a causal inference between facts. In opposition to these two techniques of research the observation testifies by its specific features of selection, of sensation, of perception, major faculties to be able to discover some relations descended of the nature or the culture, in laboratory or on land, occasionally and accidentally, as the case of Newton for the terrestrial attraction or weight and Archimedes for the thrust or the resistance of water, or by intentional and methodical contemplation, applied for by Gaston Bachelard and Claude Bernard, next to innumerable types of other observations, oscillating between the objectivity and the subjectivity, as the observation by involvement, of hypotheses, to preconceived ideas, predictive, transverse or synchronic, of several situations simultaneously, longitudinal or short, historic and evolutionary, figures or the auto-observation, all intensive, selective or extensive, integrals. In the domain of the physical training, several studies showed effects of the observation of a real model or filmed (Lockahard, 1944,; Brown and Messersmith, 1948,; Nelson, 1958,; Gray and Brumback, 1967,; Carroll and Bandura, 1982 and 1987), particularly the effect of parameter age (Thomas et al., 1977; Feltz, 1982) or more especially the contribution of the observation with the physical practice (Gould and Robert, 1982 ; Mc Cullagh et al., 1990). For us, we look for to see if the cognitive implication of learning is affected by age, requiring an optimal cognitive maturation and if an optimal training is tributary of a complementarity between the observation and the physical practice. The diversity, multiplicity, the increasing number of studies and the same controversies on the training by observation prove the importance of this training type

in general, and notably when environmental and personal conditions are suitable. Before spreading out and to analyze some works on this type of training, it is necessary to define the training by observation and to see the report between the observation and the physical practice. Indeed, Robert (1970) tried to define the training by observation while specifying three complementary criteria: The model and the observer are submitted to the same conditions of stimulations**;** Observer makes only observe without manifest activity ; Observer, facing the same stimulations, is able to execute a similar answer to the one of the model, in a relatively permanent way. We deduct from this criterial definition that the model and the observer must be submitted fairly to the same conditions of repetition, of time of acquirement, the same advantages and the same inconveniences considered. For the observer, his only task is to observe the behaviour of the model, neutralizing the likely parasitic factors, inhibitory of attention and tension. For the same stimulations, the observer will be finally, able to replicate a similar motor answer to the one of the model, in a relatively permanent manner in order to prove that the answer is descended of the Long Memory, not of the Short Memory. Next to this interaction between the model and the observer, the contingencies of the environment procure some not negligible effects. Stimuli can be sensory order or perceptive order. Concerning the contribution between the observation and the physical practice, the classification of Newell (1981) and of Schmidt (1988) seems to be meaningful. Their classification, dissociate the previous factors to the physical practice, during the physical practice or following this one.

2.Method

Participants:

Populations are chosen aimlessly and are independent. They are normally or distributed roughly normally (whose is available is without obligation). They are three types: models, the young observers and the adult observers and are to the number of 24 pupils (8x3): Models are formed by 8 boys, dressed in bruise and are more adult than young. The young observers are formed by 5 boys and 3 girls, dressed in green and whose age varies between 10 and 13 years. The adult observers are formed by 4 boys and 4 girls, dressed in yellows and whose age varies between 15 and 17 years. These pupils are those of the school preparatory Bir Elkram of Elomrane of Tunis. Fifteen of these pupils were our own pupils. Our experimentation took place to the complex of the Sporty Youth of Omrane El, Etayeb Ben Ammar, to Ezayatine city, in two days, separated of 24 hours. We recall that we filmed with video the phase of the Pre-Test of models, the young observers and the adult observers, the second block of the retention1 and the second block of the retention2.

Measures:

We have two experiences: a first experience (experience1) during which the pupil pulls in race, to the basket, after a dribble between obstacles (6 cones), in slalom and a second experience (experience2) that consists to pull in race after an overflow of an adversary (one against one), semi-active. A time of movement TM is calculated to the chronometer (in seconds, two numbers after the comma). This time is the time put between the departure of the pupil of the median line and the movement to set free it the ball. A second parameter that is the score (S). We also recall that we calculated the time of movement and every pupil's score to every test.

Procedures:

For the two experiences, we proceeded -to each- with 6 phases:

- A Pre-Test composed of a 5 test block of physical practice (PP), without knowledge of the result (KR).
- A first acquirement composed of 10 blocks of 5 tests, with KR for models. The young and adult observers observe these models.
- A first retention, composed of 2 blocks of 5 tests, without KR, made to compare the alone observation to the alone PP.
- A second acquirement composed of 10 blocks of 5 tests, with KR, for models (M), the young observers (OJ) and the adult observers (OA).
- A second retention, composed of 2 blocks of 5 tests, without KR, made to compare the alone observation to the observation + PP.
- A third retention, composed of 2 blocks of 5 tests, without KR, made after 24 hours to see if the training persists with time (see table1).

The ultimate objective of our work is to see if an optimal training is tributary of a complementarity between the observation and the physical practice, while trying to discern if the observation asks for an optimal cognitive maturity for this type of training.

Models, the Young and Adult Observers are to the number of 24 (8x3).

Models are formed by 8 Boys, dressed in Bruise.

Young Observers are formed by 5 Boys and 3 Girls, dressed in Green.

Adult Observers are formed by 4 Boys and 4 Girls, dressed in Yellow.

The Retention3 is made after 24 hours.

For the experience1: work with cones (6).

For the experience2: work with adversaries.

We filmed the Pre-Test, the 2nd block of 5 tests of the retention1, the 2nd block of 5 tests of the Retention2 and the 2nd block of 5 tests of the Retention3 for all Models and all Observers of the two experiences. We calculated the Time of Movement and the Score of every topic. The Score is done according to the following scale:

Granted basket = 3 points.

Ball touches the hoop = 2 points.

Ball touches the rectangle (0,59/0,45m) = 1 point.

Ball touches the rectangle (1,80/1,05m) = 0,5 point.

Ball doesn't touch anything/out: (mistake): 0 point.

Analysis of Results:

Concerning the analysis of the two experiences, as good for the time of movement that for the score, we chose the test of ANOVA (Analysis of the variance) that permitted us to establish the analysis of average comparisons and the analysis of the general linear model to disclose the possible differences in the same group. The test of Tukey permits us to disclose differences multiple inter-groups. By definition, the variance is the arithmetic average of gap squares in relation to the average. It reflects the scattering of values in relation to the average. We note that the variance has three shapes: the one of averages of every block in relation to every pupil's average. It is variation of averages inside every group. It is variance intra-group(s), the one of averages of every group in relation with the average of averages. It is variation of averages of a group opposite the general average. It is inter-groups variance. The total variance represents the addition of intra-groups variance and inter-groups variance, the two sources for the test of ANOVA. We tried to apply its best possible conditions, while essentially aiming the two indications: F of Fisher, equal to the report of the biggest variance on the smallest variance, for a continuous and positive value and P that are the doorstep of significance. The difference between values is at the level meaningful of 0,05 and the interval of confidence will be therefore equal to 95%. To this level, the hypothesis is verified. Subsequently, we will try to detect the applicable remarks of the four chosen diagrams.

Experience1 Tm:

Intra - Groups:

Analysis: meaningful values are b9 / R2 of M and OJ, b9 / R3 of M, OJ, OA and b10 / R3 of M, OJ et OA.

Interpretation: The OJ reveal some more meaningful values in quantity and in quality (importance).

Conclusion: Hypothesis2 (H2) is verified. H1 and H4 are also verified, but in part, just for the experience1.

Inter - groups:

Analysis: All values are meaningful for the different phases.

Interpretation: Capacities of the three groups are very distinct.

Conclusion: Identical to the previous.

Analysis: The multiple comparisons demonstrate us that values are especially meaningful between M and OA and between OJ and OA for all phases.

Interpretation: age is a factor determining for the training by observation.

Conclusion: H1 is verified in part and H2 is verified.

Experience1 Score:

Intra-Groups:

Analysis: The OJ are very affected.

Interpretation: Age is a factor determining for the training by observation of a task complex perceptivo-motor of land, artificial. This type of training implies learning it in a cognitive process.

Conclusion: H2 is verified and H1 is partially verified.

Inter-groups:

Analysis: The OJ are affected distinctly.

Interpretation: Age is a criterion determining for the training by observation.

Conclusion: H1 is partially verified and H2 is verified.

Experience2 Tm:

Intra-Groups:

Analysis: Between M and OJ or between OJ and OA, the P values are very meaningful.

Interpretation: Age is a very determinant factor for the training by observation of a task complex perceptivo-motor of land, as very artificial as real.

Conclusion: H1 and H2 are verified.

Inter-groups:

Analysis: The OJ are affected more in relation to the experience1.

Interpretation: Age remained determining.

Conclusion: H1, H2 and H4 are verified, in opposition to H3.

Experience2 Score:

Intra-Groups:

Analysis: In particular, the OJ are very affected.

Interpretation: age is determinant for the training by observation. This type of training requires an optimal degree of cognitive maturity. The real situation proves to be more important than the artificial situation.

Conclusion: H1, H2 and H3 are verified.

Inter-groups:

Analysis: The OJ are clearly the more affected.

Interpretation: Age is a criterion determining for the training by observation of a task complex perceptivo-motor of land.

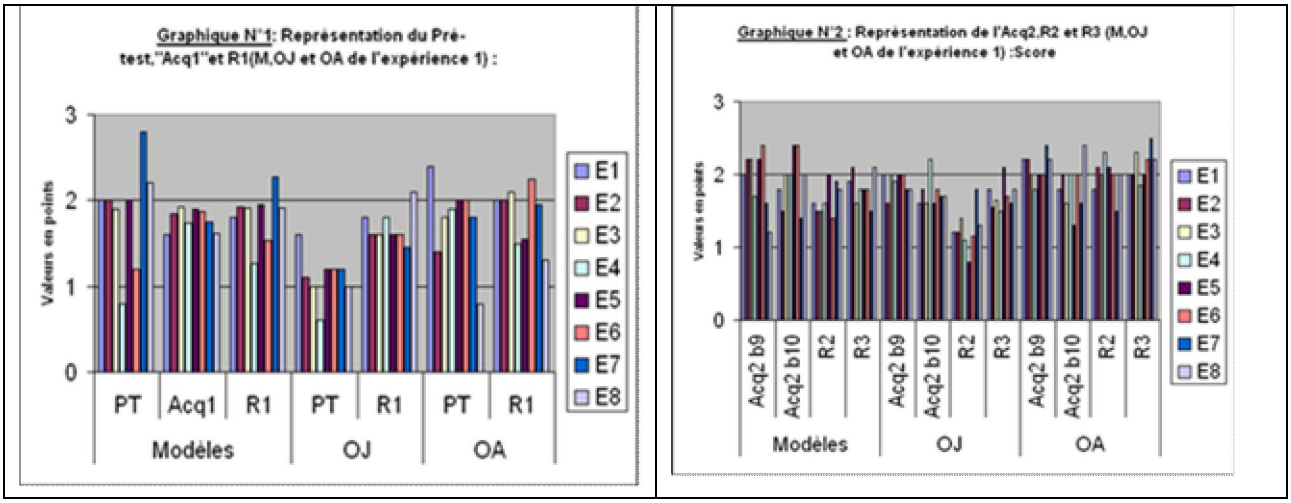
Conclusion: Only H3 is not verified. The real situation is more important than the artificial situation.

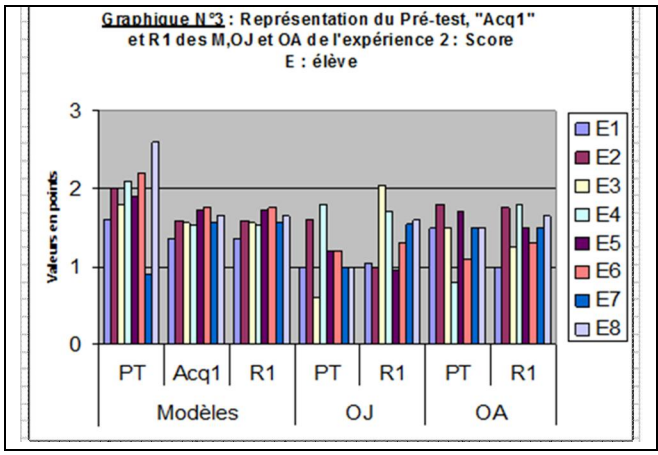
Graphics: (insert the four graphics here)

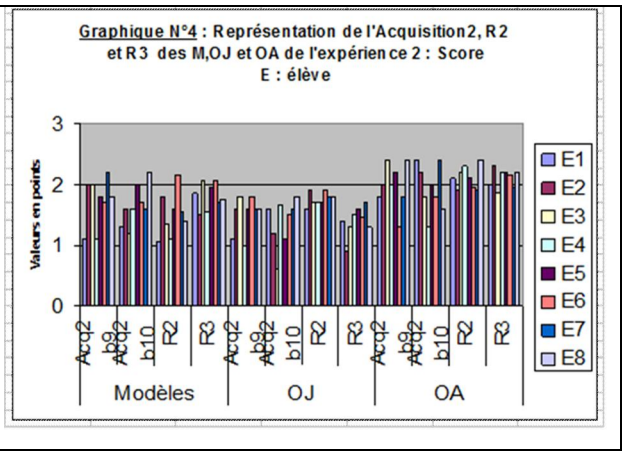
They illustrate and confirm results of analyses of the ANOVA, applied to the different phases of the two experiences. For the first experience, the first graphic shows indeed, that the score of observers in particular - for Pt / R1 are a lot less important than the one of the adult observers or models. For the acquisition2, R2 and R3 of the three groups (second graphic), their representation shows that the score of the OJ is distinctly effective than the two other groups. For the experience2, the score of Pt / R1 of the OA is a little more important than the OJ (graphic3). Acq2 / R2 /R3, their score for the adult observers proves to be extensively and roughly more important than the one of the young observers (graphic4). Hypothesies1, 2 and 4 are verified. The hypothesis3 is refuted, because the real situation is more important than the artificial situation for the training by observation of a task complex perceptivo-motor of land.

Summary table of the different phases of the experimentation: (table1).

	Pre-test	**Acquisition1**	**Retention1**	**Acquisition2**	**Retention2**	**Retention3**
Models	Physical practice without Knowledge of the Result: 1 block of 5 trials	Physical practice with Knowledge of the Result: 10 blocks of 5 trials	Physical practice without Knowledge of the Result: 2 blocks of 5 trials	Physical practice with Knowledge of the Result: 10 blocks of 5 trials	Physical practice without Knowledge of the Result: 2 blocks of 5 trials	Physical practice without Knowledge of the Result: 2 blocks of 5 trials
Observers (Young)	Idem	Observation	Idem	Idem	Idem	Idem
Observers (Adults)	Idem	Observation	Idem	Idem	Idem	Idem







4. Discussion

We notice that we didn't record some meaningful values at a time at models, the young observers and the adult observers, unusually for phases of the Pre-Test/R1, even though models had the privilege to obtain of the physical practice in ten blocks of five trials during the first acquirement. The two other groups of young observers and adults were observers. To this level, the observation seems to be able to replace the physical practice, particularly concerning the first experience and the time of movement, contrary to the second experience that endows itself of a game far from being artificial, but real, notably at the level of the score. We noted rough difficulties at the young observers in the realization of baskets. We also noted some precisely meaningful values, as for the case of the 6th block of the acquirement of the multiple comparisons of the experience 2 score, between models and the adult observers (P = 0.050), what can be explained by the similar level between these two groups on the two plans age and mind. Other values could not be meaningful by excess, as for the case of retention2 between models and the adult observers (P = 0.049), at the level of the multiple comparisons of the experience1 score, in opposition to other values that could have been meaningful, by default, as for the two cases of the 10th block / R3 of the adult observers (P = 0.055) and of the 9th block/R3 of the young observers (P = 0.058). This is the case of the experience1 intra-groups. We proceeded with several phases and innumerable tests and blocks for models, the young observers and the adult observers (Pre-Test / Retention1, Acquisition2 in 10 blocks and Acquisition2 / Retention2 / Retention3: b9 / R2, b10 / R2, b9 / R3, b10 / R3 and Retention2 / Retention3. We note that for the three retentions we wanted to analyze their blocks separately, one by one, but, we noticed that for the TM experience1 we didn't have anything recorded absolutely. This can be explained by the narrow bringing together between the two blocks of retentions in time. Results of the analysis applied to data of the different phases of the two experimentations, for the time of movement and the score could be at a time also very different if the age of models, the young observers and the adult observers was spaced, especially the young observer age. In the same way, models were formed by 8 boys, the young observers were formed by 5 boys and 3 girls and the adult observers were composed by 4 boys and 4 girls, that doesn't distort - on no account - results, seen the very similar biologic, morphological capacity character, biometrical, biomechanics, psychological, technical and tactical of pupils composing the three groups. Results could be more distinct, if these pupils were in totality boys or girls. It is for this reason that the meaningful differences of performances are recorded lucidly between models and the young observers and notably between the adult observers and the young observers. For the meaningful difference absence between the performance of models and the one of the adult observers, it seems to be the reflection of a performance effect ceiling. During their progress, the knowledge of performances was in the beginning then, the two indications that could help pupils to the adequate realization of their tasks of each of experiences, the knowledge of results: the slalom and one against one with test of basket realization in one optimal time, at least that eight seconds, according to the recent official regulation of the Basket-Ball. With regard to the meaningful differences, the performances different of three group pupils could be the reflection of the difference in the length of acquirement phases, notably the acquisition1, rather

than the reflection of effects of the observation (Ross and Coll., 1985; Mc Cullagh and Little, 1990,; Mc Cullagh and Caird (1990), or the effect of the physical practice. Otherwise, graphiques1 and 3 show us that during the acquisition1, models assured the physical practice. As for the adult, young observers proceeded in their training by the observation. Results of models were slightly superior in relation to results of the two other groups. Of the acquisition1 and the retention1, the alone observation, compared to the alone physical practice, proves to be less at the level effective and profitable. Of the acquisition2, the retention2 and the retention3, the observation, proceeded methodically in harmony with the physical practice, proves to be however, at the level distinctly more effective, compared to the alone physical practice. We note and we extol the importance of the memory and the memorization in the motor training, notably helped by the repetition, the progression, the demonstration and the didactics, at the young Basket-Ball players, source of methods and transmission strategies and multiple motor knowledge appropriation. Concentrate on training by observation and after following the previous studies, comparing the observation on the one hand to the physical practice and on the other hand the observation with the physical practice to the alone or same physical practice to the alone observation, we can deduct that:

- The previous motor experience is important, because it first of all facilitates by its skills a physical condition, then a tactical and technical thought - specific to a precise discipline, as for our case the Basket-Ball-, a sporty appraisal. Nevertheless, it is necessary to distinguish between effects attributable to the cleverness of the previous performance and those attributable to the cleverness of the training in progress.

- The previous observation to the physical practice permits to get a better performance compared to a group not having benefited an observation.

- The ulterior observations during the physical practice allow the observer to improve his performance, with the help of a mechanism of detection-correction of mistakes (Carrol and Bandura, 1982,; 1985; 1987 and 1990). The imitation by inference proves to be as enough important (Riopello, 1960). The observer takes advantage of mistakes committed by the model. The observation also permits to reduce the number of tests of physical practice, necessary to the acquirement of motor skills (Ross et al., 1985; Mc Cullagh and Caird, 1990).

-The observation is interesting, important and necessary, but insufficient alone, without physical practice. In the same way, the alone physical practice, without observation is insufficient and very limited, in the realization of motor performances.

For hypothesises: The first is confirmed. Age is a determining factor for the training by observation of a motor-perceived complex task, artificial and especially real land. The second is also confirmed. For the training of a motor-perceived complex task of land, the observation implies learning in a cognitive process of attention, concentration, memorization and intelligence (treatment of all information ways: change of rhythm and direction, make-believes while respecting the regulation to walk and of the resumption), requiring an optimal degree of cognitive maturation (this type of training is function of age). The third is invalidated, because it is proved that for the training by observation of a motor-perceived complex task of land, a real situation is a lot more important than an artificial situation. The fourth is confirmed. For the training, the observation and the physical practice are at a time indispensable and complementary. Finally, the optimal training of such task, with spatio-temporal component, is tributary of a complementarity between the observation and the physical practice. The optimization of this training type is function of age.

We can conclude that the didactic concepts, notably for a field to know very recent are some indispensable intellectual tools. Didactics, in their specificities, they procure some interdisciplinary likeness. For the innumerable theories of the training in general and of the motor training in particular, at a time those that are known as environmentalist, interactionnist, constructivist, socio-constructivist, of mediation or the theory of information and resolution of problems, all insist on a mediator's importance that can play a role of meditation and inspiration, or at least a role of demonstrator and explicator. This role can be very fruitful if the training takes place while respecting “proximal zone of development”, this margin of age that must go synchronically with capacities of learners must prove a certain degree of cognitive maturity for all possible knowledge training. We note that these theories of training are not glimpsed arbitrarily, although they don’t have same contributions concerning the process teaching/training, didactics and the training by observation. The training by observation seems to essentially be inspired by the theory of the treatment of information. This last type of training takes as a

basis -next to proprioceptive faculties and kinesthesis-. Although, the vision and the treatment of information are affected by the tiredness (Rousseu and Coll., 2003) and the environment, they stay to occupy a major room in the vulgate of theories of the training, the eye, the essential organ of the vision, by its three bones (the hammer, the anvil and the stirrup), its seven millions of cones in colour and its hundred twenty millions of short sticks, the pertaining sensory neurons, neurons motor afferents, the intermediate neurons of connection and the memory, the indispensable elements for the treatment of information and the knowledge. The idea applying for that the training is a heap or a set of additions to the knowledge, is not more valid, even though several researchers become attached a lot more to the contents teaching (Brown, 1981), that to the process of knowledge acquirement. The limit of the treatment of information seems to be located at the level of the organization of the motor answer, not at the level of the content or only at the level of the content. It is also necessary to distinguish between a technique that is the direct application of the scientific knowledge and a method that are the set of the steps rational of the mind to arrive to the knowledge. These steps often leave from the didactics to adapt to topics according to its personal requirements, while taking in consideration that better are methods, more they are difficult to apply (Piaget, 1969), and especially to really apply them, even though the mind of the teacher or the pupil is good and lucid. The finality of the training, is not the result in him even, but the manner, the progress (Cornu and Vergnioux, 1992), the reasoning. If we see carefully over ischemic, congenital and poisonous of all actors of the teaching and the training and if one offers a managerial didactic (Hameline,), all would be pedagogical, teachable, didactical. To defect the didactics of the physical education remains produces it of tension between requirements of the school and pressures of the sporty world (Terrisse, 2001). These requirements and these pressures can be obstacles to the progression and the progress of the science. For its part, the memory stays an indispensable factor also for all training and for a very elevated number of mental operations, as the memorization, the storage and the recall of knowledge, the labelling of mistakes, the feedback and the motor control and especially the attention, the concentration and intelligence if the spatio-temporal perceptions to a discipline present themselves and insure.

Conclusion:

With regard to the Basket-Ball and the two experimentations, the one with cones and the one against adversaries, we worked shooting in race in its simplest modes, while being interested in attack -at side- of shooting, on the dribble, tool of progression on land and on the switching and the offensive rebound and in defence on the interception, the against, the wavering and the defensive rebound. For the valid cleverness at a time in attack and in defence, we raise the make-believe, revolve, the investment, the displacement, the marking and the mark down with or without ball, while respecting not to commit to walk with the ball and the resumption and while respecting the allocated officially time. We can deduct from the two experimentations, that the training by observation of a perceptivo-motor task (shooting in race) is tributary of a complementarity between the observation and the physical practice and that this type of training is function of age, requiring an optimal degree of cognitive maturity. The experience2, opting for the real game proves to be more fruitful and profitable that the experience1, opting for an artificial game. We note that infrastructures, the financial side and the human side are also criteria of success. Finally, we insist that the training by observation is not a hazardous emanation or hazard of an opportunist or a passive actor.

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